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UCOR-5234/R0

Quality Assurance Report for Modeling of the Bear Creek Valley Low-level Radioactive Waste Disposal Facilities, Oak Ridge, Tennessee

This document is approved for public release per review by:

Dave Lannom (signature on file)	04-29-2020
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UCOR-5234/R0

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Date Issued—April 2020

Prepared for the
U.S. Department of Energy
Office of Environmental Management

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APPROVALS

Quality Assurance Report for Modeling of the Bear Creek Valley Low-level Radioactive Waste Disposal Facilities, Oak Ridge, Tennessee	UCOR-5234/R0
	April 2020

USQD Review Determination	☐ USQD ☐ UCD ☐ CAT X ☐ Exempt (Select Criteria 1–3 below.) USQD/UCD/CAT X No.:
Exemption Criteria	☐ (1) Non-Intent Change ☐ (2) DOE-Approved Safety Basis Document ☐ (3) Chief Accounting Officer, Internal Audit, Labor Relations, General Counsel, Outreach & Public Affairs, or Project Controls Services OR ☒ (4) Document identified in USQD-MS-CX-REPORTS-1074
USQD Preparer:	KAREN BALO (Affiliate) Digitally signed by KAREN BALO (Affiliate) Date: 2020.04.27 07:46:24 -04'00' Name Date
Exhibit L Mandatory Contractor Document	☒ No (No PCCB Reviewer Signature Required.) ☐ Yes (Requires review by the Proforma Change Control Board.)
PCCB Reviewer:	Name Date

Prepared by: Marshall Davenport (signature) — 4/22/2020
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Date

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REVISION LOG		
Revision Number	Description of Changes	Pages Affected
0	Initial issue of document.	All

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CONTENTS

TABLES

FIGURES

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ACRONYMS

BCK	Bear Creek kilometer
BCV	Bear Creek Valley
BJC	Bechtel Jacobs Company LLC
CBCV	Central Bear Creek Valley
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	*Code of Federal Regulations*
D	Drainage
DAS	Disposal Authorization Statement
DMC	Document Management Center
DOE	U.S. Department of Energy
EMDF	Environmental Management Disposal Facility
EMWMF	Environmental Management Waste Management Facility
EPA	U.S. Environmental Protection Agency
FOSOP	Federal Operations Standard Operating Procedure
FLUTE™	Flexible Liner Underground Technologies, LLC
FS	Feasibility Study
HELP	Hydrologic Evaluation of Landfill Performance
LFRG	Low-Level Waste Disposal Facility Federal Review Group
NQA	Nuclear Quality Assurance
NRC	U.S. Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NT	North Tributary
OREM	Oak Ridge Office of Environmental Management
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
PNNL	Pacific Northwest National Laboratory
POA	point of assessment
PSA	Professional Services Agreement
QA	quality assurance
QAPP	Quality Assurance Program Plan
RESRAD	RESidual RADioactivity
RI	Remedial Investigation
ROD	Record of Decision
RUSLE2	Revised Universal Soil Loss Equation
SAMOA	Server Asset Management and Official Applications
STOMP	Surface Transport Over Multiple Phases
TM	Technical Memorandum
TMR	telescopic mesh refinement
UBCV	Upper Bear Creek Valley
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
V&V	verification and validation
Y-12	Y-12 National Security Complex

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1. INTRODUCTION

1.1 SCOPE AND METHOD

The purpose of this Quality Assurance (QA) Report is to describe and document the QA activities performed during the preparation of Revision 2 of *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge Tennessee* (Performance Assessment) (UCOR, an Amentum-led partnership with Jacobs, 2020a) and Revision 2 of *Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (Composite Analysis) (UCOR 2020b). These two documents are required by the U.S. Department of Energy (DOE) Order 435.1, *Radioactive Waste Management* (DOE 2001a) and the implementing DOE Manual 435.1-1, *Radioactive Waste Management Manual* (DOE 2011) to support the construction and operation of a new radioactive waste disposal facility at a DOE site.

The Performance Assessment quantifies the post-closure dose to a hypothetical receptor from potential radiological contamination migrating from a proposed radioactive and mixed waste disposal facility, the Environmental Management Disposal Facility (EMDF), in Bear Creek Valley (BCV) on the Oak Ridge Reservation (ORR) and compares that dose with performance measures in the DOE Order 435.1. The Composite Analysis quantifies a total (or composite) dose to a hypothetical receptor from the closed EMDF along with other potential sources of radioactive contamination that could contribute to that total dose. The other potential sources of radioactive contamination in the Composite Analysis include the currently operating disposal facility (the Environmental Management Waste Management Facility [EMWMF]) following its closure and historic disposal areas for wastes originating from the Y-12 National Security Complex (Y-12) following their remediation, all of which are also located in BCV. The total dose to the hypothetical receptor in the Composite Analysis is also compared to performance measures in DOE Order 435.1. Both the Performance Assessment and the Composite Analysis calculate a “base case” dose and quantify doses from sensitivity/uncertainty analyses.

In the fall of 2018, the DOE’s Low-Level Waste Disposal Facility Federal Review Group (LFRG) performed a technical review of the Revision 1 versions of the Performance Assessment and the Composite Analysis to support the issuance of a Disposal Authorization Statement (DAS) for construction of the proposed EMDF in accordance with DOE Order 435.1. The LFRG provided Key Issues, Secondary Issues, and Observations on each.

Independently, DOE-Oak Ridge Office of Environmental Management (OREM) decided to replace the conceptual design of the EMDF that was in the initial versions of these two documents with the more detailed preliminary design of the EMDF and include the results of the most recent site characterization on and adjacent to its Central Bear Creek Valley (CBCV) Site 7c. The Performance Assessment and Composite Analysis have been revised to address the Key and Secondary issues from the LFRG review and incorporate the preliminary EMDF design and site-specific characterization data.

Sections 2.2.11 and 3.2.10 of *2017 Disposal Authorization Statement and Tank Closure Documentation* (DOE 2017a) state that the QA sections in the Performance Assessment and the Composite Analysis should document (by appendices or references) the basis for the following QA activities:

- Ensuring radionuclide inventories, model input data and distributions are traceable, qualified, controlled, and archived

- Ensuring software used was evaluated for functionality regarding the problem being solved, was verified before use, is under configuration control, is managed under a software problem reporting system, and is archived
- Ensure development and use of models is documented, verified, under configuration control, and archived in accordance with DOE Order 414.1D, *Quality Assurance*; DOE G 414.1-4, *Safety Software Guide for Use with 10 CFR 830, Subpart A, Quality Assurance Requirements*; and DOE Order 414.1D, *Quality Assurance*
- Document activities for confidence building (e.g., model evaluation) to the extent practicable and appropriate.

This QA Report is referenced in the QA sections of both the Performance Assessment and the Composite Analysis, and documents that the above requirements have been satisfied. It is noted that "qualified" in the first bullet above is being interpreted to mean technically adequate.

This report documents: (1) traceability, technical adequacy, and accuracy of input parameters for the models that were used; (2) review of all supporting calculations used in the reports that were performed outside of the modeling effort; and (3) the technical review of the revised documents prior to finalization and release. This report also documents the versions of the software packages used, their configuration control, and evaluation of the functionality for each software package regarding the problem being solved. It also documents the archival of electronic files resulting from the above QA activities. The intent of this report is to identify the original files and their location, and to provide decision-making support for future maintenance activities and revisions to these documents required by the DOE order. This report is intended to provide information at the proper level of detail required to perform the subsequent maintenance and/or revisions of these documents in the future.

Jacobs and Drummond Carpenter conducted the performance modeling for the Performance Assessment and Composite Analysis. UCOR managed the performance modeling, prepared the three documents (the Performance Assessment, the Composite Analysis, and this QA Report), is responsible for the technical content of these documents, and is responsible for the archival of the electronic files used in the preparation of these documents. UCOR describes its QA Program in *URS | CH2M Oak Ridge LLC Quality Assurance Program Plan Oak Ridge, Tennessee* (UCOR 2019a). This QA Program Plan (QAPP) incorporates the QA criteria of DOE Order 414.1D, *Quality Assurance*; 10 *Code of Federal Regulations (CFR)* 830, Subpart A; and the *EM Quality Assurance Program* (DOE 2012), and states how those criteria are satisfied. It also describes how UCOR ensures that subcontractors and suppliers satisfy the criteria of 10 *CFR* 830.122. (Jacobs provides support to UCOR through a Request for Offsite Services, Drummond Carpenter provides support to UCOR through a Professional Services Agreement [PSA].)

This QA Report provides information to support the certification of each model used in the Performance Assessment and/or Composite Analysis (see Sect. 4.6 and "certification," as defined by UCOR procedure, in Sect. 2.1). It defines, references, and documents the primary input parameters in the revised Performance Assessment (the EMDF preliminary design, the revised EMDF partitioning coefficients [K_d values], the revised EMDF radiological inventory, and information from the recent characterization of the EMDF site in the CBCV). This QA Report summarizes the development and regulatory acceptance of the conceptual site model for the BCV to support its use in the modeling of contaminant fate and transport in the Performance Assessment and the Composite Analysis. Documentation of the model-specific input data and its verification, including spreadsheets documenting each input parameter for each model used, a reference for each input parameter, as well as reviews of any calculations needed to determine input parameters is provided in this report (Appendix A). These spreadsheets document that review and document that all input parameters were accurately incorporated into the respective models.

This report also defines the output from each of the models used and identifies the model(s) that accepted that output as input (Appendix B).

This report discusses the specifics of each of the models used in the Performance Assessment and the Composite Analysis such as the version, the computer(s) on which it was used, etc. (in Sect. 2). The following models were used in the Performance Assessment: Hydrologic Evaluation of Landfill Performance (HELP); Surface Transport Over Multiple Phases (STOMP); MODFLOW; MT3D; and RESidual RADioactivity (RESRAD)-OFFSITE. The RESRAD-OFFSITE model, MODFLOW, MT3D, and PATHRAE-RAD supported the development of the Composite Analysis. Note that if a model supported both the Performance Assessment and the Composite Analysis, all of the documentation associated with the modeling resides in a single section in this report rather than two sections for the same software. The model sections present the verification and application testing, model development, and model results and post-processing calculations and checks.

This report identifies and discusses each of the supporting calculations that were performed during the development of the Performance Assessment and the Composite Analysis. Examples of supporting calculations are the EMDF cover erosion calculation that used the Revised Universal Soil Loss Equation (RUSLE2) model and the quantification of radon flux emanating from the surface of the cover of the EMDF that used a U.S. Nuclear Regulatory Commission (NRC) equation developed to support the remediation of uranium mill tailings sites. Each of the supporting calculations were documented in a reviewed and approved calculation package. All calculation packages that were prepared are identified in this report.

This report details the portions of corporate QA programs and protocol for UCOR and its supporting suppliers (Jacobs and Drummond Carpenter) that are applicable to the scope of work performed during the preparation of the revised Performance Assessment and Composite Analysis. This includes the preparation, review, and approval of calculation packages, software management and configuration control, and records management (archival). Independent technical reviews were conducted by UCOR on the final drafts of the Revision 2 Performance Assessment and Composite Analysis. These reviews are described and documented in this report (Appendix C).

1.2 QA SUMMARY

The QA review of the performance modeling and associated supporting calculations in this report indicates that Revision 2 of the Performance Assessment and Composite Analysis have no outstanding issues that require resolution. Therefore, the results of the revised Performance Assessment and Composite Analysis are technically defensible and complete. The Performance Assessment and Composite Analysis modeling results are appropriate for their intended uses.

1.3 OVERVIEW OF PERFORMANCE MODELING

1.3.1 Performance Modeling Conceptual Models

The EMDF site characteristics and facility features are incorporated into the conceptual models and performance analyses of the Performance Assessment. It is assumed in the Performance Assessment modeling, specifically the HELP modeling, that the effectiveness of engineered barriers decreases over time, leading to the release of radionuclides through the disposal facility's liner system beneath the waste. A detailed description of the natural processes that degrade design features and limit safety functions over time and a generalized conceptual model of EMDF performance evolution is provided in Sect. 3 of the Performance Assessment.

Conceptualization of the EMDF disposal system for performance analysis and modeling is organized around four related components, as shown in Table 1.

Table 1. EMDF disposal system components, conceptual model elements, and model codes

Disposal system component	Conceptual model elements	Model codes
Water Balance and Performance of Engineered Barriers (PA Sect. 3.2.1)	• Facility water balance • Performance of engineered systems • Degradation of synthetic and earthen barriers • Expected evolution of EMDF cover infiltration and leachate release	HELP RESRAD-OFFSITE
Radionuclide Release and Vadose Zone Transport (PA Sect. 3.2.2)	• EMDF radionuclide inventory • Disposal practices and waste forms • Facility design geometry • EMDF cover performance evolution • Vapor phase release and radon flux • Aqueous phase release from waste • Transport through waste and liner system, including chemical retardation • Vadose zone transport below liner	STOMP RESRAD-OFFSITE
Saturated Zone Flow and Radionuclide Transport (PA Sect. 3.2.3)	• Vadose zone flux to saturated zone • CBCV hydrogeology • CBCV site geology and topography • CBCV surface water features • CBCV saturated zone flow and transport, including chemical retardation	MODFLOW MT3D RESRAD-OFFSITE
Exposure Pathways and Scenarios (PA Sect. 3.2.4) (analysis of the inadvertent human intrusion scenario is presented in Sect. 6 of the PA)	• Resident farmer exposure scenario • Groundwater POA (well location) • Surface water POA • Exposure pathways, abiotic and biotic • Dose analysis	RESRAD-OFFSITE

BCV = Bear Creek Valley
CBCV = Central Bear Creek Valley
EMDF = Environmental Management Disposal Facility
HELP = Hydrologic Evaluation of Landfill Performance
PA = Performance Assessment
POA = point of assessment
RESRAD = RESidual RADioactivity
STOMP = Subsurface Transport Over Multiple Phases

Conceptual models of post-closure and long-term performance of engineered barriers are incorporated in the expected evolution of the EMDF water balance as controlled by the safety functions of engineered cover and liner system features. These conceptual models account for expected degradation of engineered drainage systems and earthen barriers over time and are described in Sect. 3.2.1 and in the cover system analysis presented in Appendix C of the Performance Assessment. These conceptual models also account for the exposure scenarios in the inadvertent human intruder scenarios that are evaluated in Sect. 6 and Appendix I of the Performance Assessment.

The base case EMDF performance scenario assumes full design performance (zero infiltration through the cover and into the waste) for a period of 200 years post-closure. A period of increasing cover infiltration and leachate release due to degradation of engineered barriers is assumed to occur between 200 and 1000 years post-closure, followed by a long-term degraded performance condition of indefinite duration. A generalized conceptual model of changes in cover infiltration and leachate release expected as a result of natural processes and events that can impact cover and liner performance over time is presented in Sect. 3.2.1 of the Performance Assessment. The purpose of the model is to integrate and generalize the impact of multiple events and processes on safety functions and EMDF performance over time, incorporating uncertainty in timing and degree of degradation and the occurrence of severe events. Implementation of this general model of increasing cover infiltration over time for each of the Performance Assessment models is described in Sect. 3.3 of the Performance Assessment. Uncertainty in the timing and degree of performance degradation (relative to the base case performance evolution scenario) is addressed in the probabilistic RESRAD-OFFSITE analysis presented in Sect. 5.4 of the Performance Assessment.

Conceptual models of post-closure radionuclide release from the EMDF disposal system include simplified representations of vapor-phase transport of radon and other radionuclides through the cover and atmospheric transport from the cover surface, and more detailed models of radionuclide release and transport in the aqueous phase (Performance Assessment Sect. 3.2). Conceptual models for aqueous release incorporate the expected changes in cover infiltration over time (Performance Assessment Sect. 3.2.1) and include waste zone source release and unsaturated vertical flow and radionuclide transport through the waste, liner system, and underlying vadose zone. These conceptual models are based on the estimated EMDF radiological inventory (Performance Assessment Appendix B), assumed waste disposal practices and waste forms, vertical sequence of vadose zone materials, and the analysis of cover performance (Performance Assessment Sect. 3.2.1 and Appendix C).

Conceptual models of saturated zone flow and radionuclide transport are based on the hydrogeologic conceptual site model for BCV (Performance Assessment Sect. 2.1.5.1), including the lithology and stratigraphy of the EMDF site, major topographic and structural controls on groundwater movement, surface water features, and chemical retardation properties of the saprolite and bedrock. Conceptualization of the saturated zone for purposes of quantifying a total dose in BCV is described in the Composite Analysis (Sect. 3.2) and performance modeling of the EMDF is described in the Performance Assessment (Sect. 3.2.3). Justification for the use of this BCV conceptual site model is provided in Sect. 4.5 of this QA Report.

Conceptual models of post-closure public exposure to radionuclides include the general resident farmer scenario considered for the analysis, as well as detailed assumptions for abiotic (e.g., water ingestion, inhalation) and biotic (e.g., ingestion of contaminated fish and produce) exposure pathways. The exposure pathways assumed for the all-pathways dose analysis are shown on Fig. 1. The exposure scenario and pathway assumptions describe the basis for the inputs and assumptions incorporated into the dose analysis are described in the Performance Assessment (Sect. 3.2.4) and the Composite Analysis (Sect. 3.3).

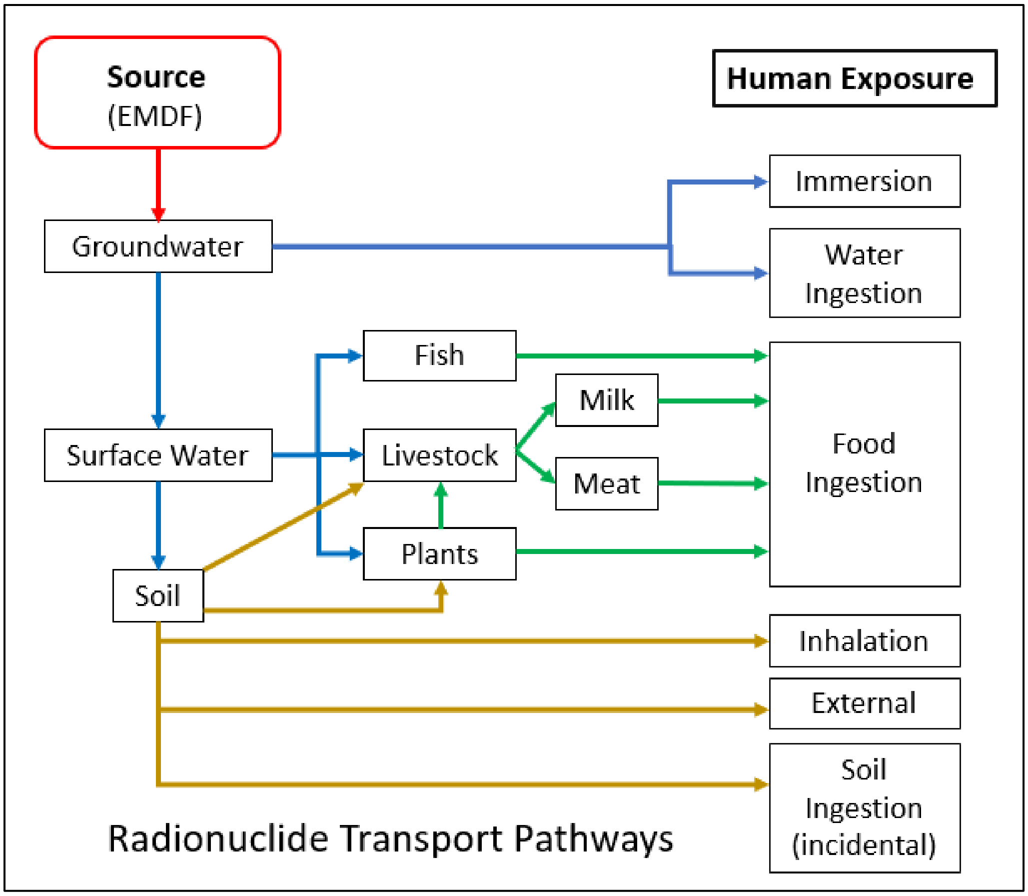
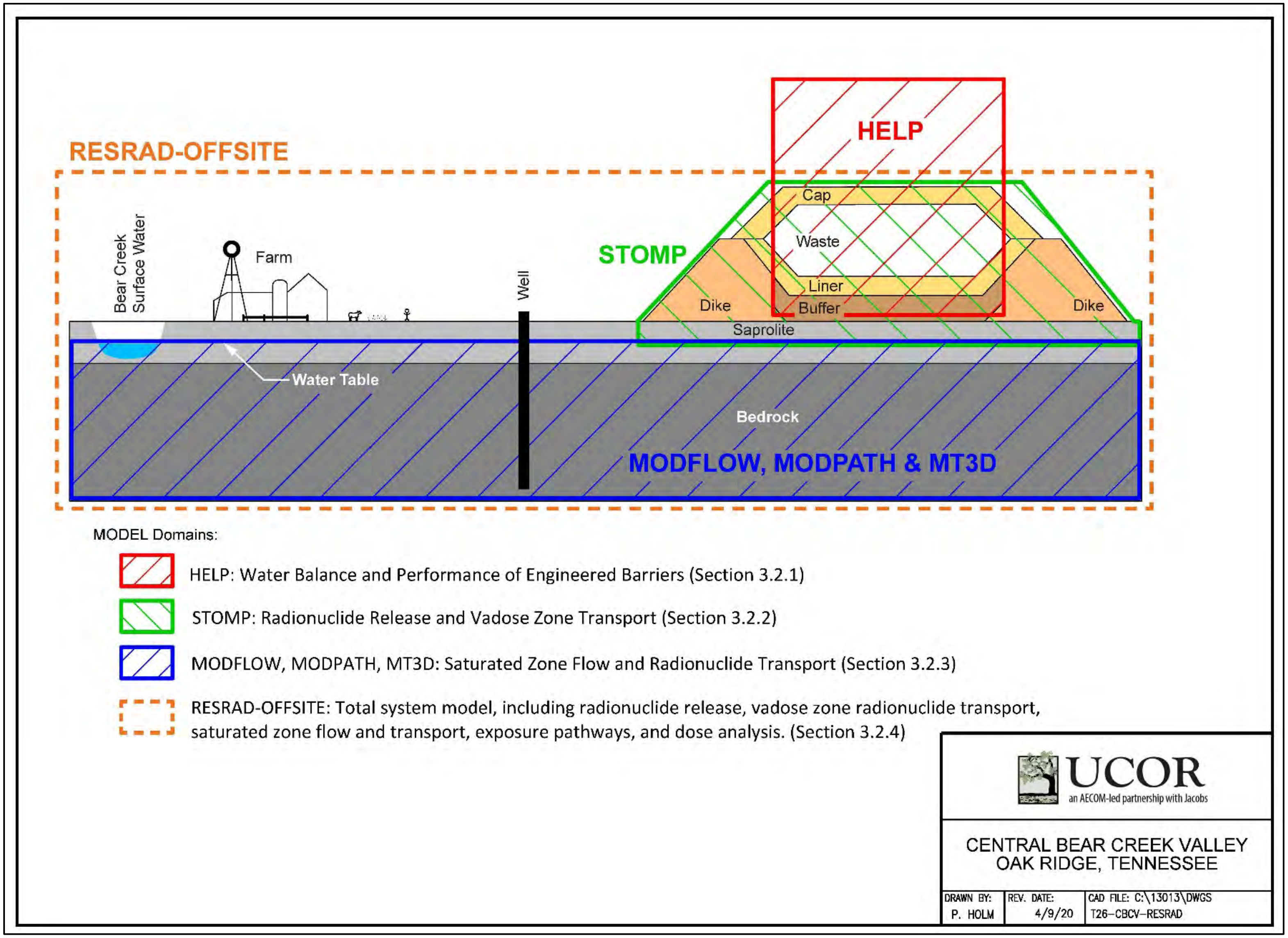


Fig. 1. Flow chart of environmental transport and exposure pathways for the all-pathways analysis

1.3.2 Performance Assessment Model Implementation and Integration

Implementation of EMDF system conceptual models with computer modeling codes is structured around four conceptual components (Table 1 and Fig. 2) and includes detailed process model codes for the components that encompass engineered facility performance and abiotic transport elements. These conceptual components are as follows:

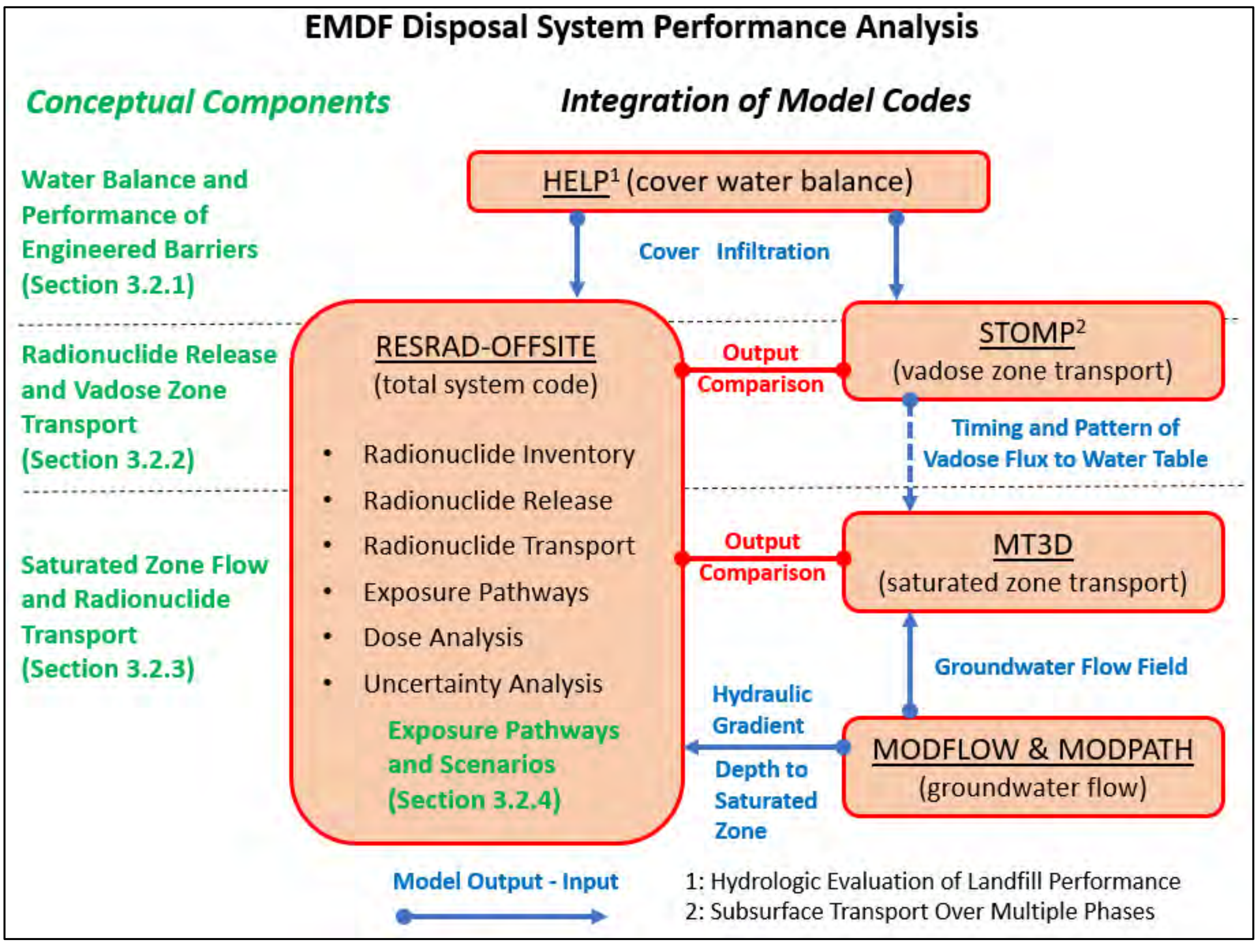
- Water balance and performance of engineered barriers (HELP)
- Radionuclide release and vadose zone transport (STOMP)
- Saturated zone flow and radionuclide transport (MODFLOW and MT3D)
- Total system model, including radionuclide release, vadose zone radionuclide transport, saturated zone flow and transport, exposure pathways, and dose analysis (RESRAD-OFFSITE).



Note: Section references relate to the Performance Assessment (UCOR 2020a).

Fig. 2. Schematic illustration of EMDF disposal system conceptual models and modeling tools used for implementation

RESRAD-OFFSITE is a total system model code that encompasses all four conceptual components, including the exposure scenario and biotic pathways for radionuclide transfer. The more detailed models were used for modeling the complexities of primarily abiotic environmental transport pathways to predict concentrations of key radionuclides at the point of assessment, while the total system model uses simplified representations of transport pathways along with biotic transformations and scenario-specific exposure factors to identify which radionuclides are likely key dose contributors and to quantify total dose for comparison to performance objectives. Implementation of the component-level Performance Assessment models and the total system model proceeded concurrently, with iterative development and refinement of model assumptions, cover performance and source release approaches, and parameter value selections for each of the model tools. The primary model output-to-input linkages and the key comparisons of model outputs are shown on Fig. 3 and in Table 2. Inputs common to all model codes include radionuclide inventories, EMDF design specifications, and CBCV site characteristics (each are described in Sect. 4). Some model outputs serve as inputs for other modeling tools. Selection, implementation, and integration of these model codes for EMDF performance analysis is explained in the following sections.



Note: Section references relate to the Performance Assessment (UCOR 2020a).

Fig. 3. EMDF disposal system conceptual components and integration of model codes for performance analysis

Table 2. EMDF Performance Assessment model input parameters and linkages among models

Model and purpose	Primary model inputs	Primary model output (used as input to or compared with other PA models)
HELP Water balance and engineered barrier performance (PA Appendix C)	• Local climate data • EMDF preliminary design (geometry and material specifications)	• Cover infiltration rates
MODFLOW Saturated zone flow (PA Appendix D)	• EMDF preliminary design • BCV topography, geology, and surface water features • Conasauga Group hydraulic conductivities • EMDF cover infiltration • Estimated natural recharge rates	• Flow directions • Hydraulic gradients • 3-D groundwater flow field • Depth to groundwater
STOMP Unsaturated flow and transport (PA Appendix E)	• EMDF radiological inventory • EMDF preliminary design • Estimated natural recharge rates • EMDF cover infiltration • Conasauga Group hydraulic conductivities and porosity • Solid-aqueous partition coefficients	• Radionuclide release • Vadose zone flux • Water table flux • Water table time of arrival (vadose delay times)
MT3D Saturated zone transport model (PA Appendix F)	• EMDF radiological inventory • EMDF preliminary design • EMDF cover infiltration • Radionuclide flux from vadose zone • Effective porosities • 3-D groundwater flow field • Solid-aqueous partition coefficients	• Plume location, evolution and maximum extent • Peak groundwater concentration and time of peak at well • Contaminant discharge to Bear Creek surface waters
RESRAD-OFFSITE Radionuclide release and transport; exposure and dose analysis (PA Appendix G)	• EMDF radiological inventory • EMDF preliminary design (material specifications) • EMDF cover infiltration • Hydraulic gradients • Effective porosities • Solid-aqueous partition coefficients • Biotic transfer factors • Dose conversion factors • Exposure scenario and exposure factors (ingestions rates, etc.)	OUTPUTS for evaluating compliance with performance objectives: • Peak total dose during compliance period • Dose contributions by exposure pathway • Key radionuclide contributions to total dose • Well water and surface water concentrations

BCV = Bear Creek Valley
D = dimensional
EMDF = Environmental Management Disposal Facility
HELP = Hydrologic Evaluation of Landfill Performance
PA = Performance Assessment
RESRAD = RESidual RADioactivity
STOMP = Subsurface Transport Over Multiple Phases

1.3.3 Composite Analysis Model Implementation

RESRAD-OFFSITE modeling was performed in the base case assessment in the Composite Analysis to estimate the contribution to a composite dose for a hypothetical receptor using Bear Creek water at the confluence of North Tributary (NT)-11 (the point of assessment [POA] at Bear Creek kilometer [BCK] 7.73) from the closed EMDF. (Positions along Bear Creek are denoted by locators termed "creek kilometers." These locators are designated by BCK, plus the distance measured in kilometers from the confluence with East Fork Poplar Creek.) Note that the Performance Assessment modeling included contaminant flow to a surface waterbody (Bear Creek) in the Performance Assessment Sect. 3.3.4.6; therefore, the only modification to that modeling to support the Composite Analysis was to revise the intake of water by the hypothetical receptor from well water to surface water.

Total system simulations were run for a post-closure period of 10,000 years to provide the dose estimates for comparison with the Composite Analysis performance measures, focusing on a predicted total dose within the 1000-year compliance period (Composite Analysis Sect. 5.3). Potential future release of relatively immobile radionuclides with significant expected inventories (e.g., U-234) was evaluated with a 100,000-year RESRAD-OFFSITE simulation to identify peak concentrations at the POA (BCK 7.73) (Composite Analysis Sect. 5.3). The RESRAD-OFFSITE simplified representation of EMDF and its site is summarized in the Performance Assessment (Sect. 3.3.4). It also describes parameterization of the abiotic radionuclide transport pathways, including source release, and the vadose and saturated zones. The RESRAD-OFFSITE exposure scenario, biotic pathways, and dose analysis are described in the Performance Assessment (Sect. 3.4). Detailed explanation of RESRAD-OFFSITE input parameters and tabulation of all base case parameter values is provided in the Performance Assessment (Appendix G).

RESRAD-OFFSITE identifies subsystems, including the primary contamination (EMDF waste), cover soil layer, a layered vadose zone below the waste, the aquifer (saturated zone), and dwelling and agricultural areas that can be affected by the release of radionuclides from the primary contamination.

Three-dimensional groundwater flow and radionuclide transport models for the CBCV site were developed to assess the impact of the proposed EMDF in the Performance Assessment using MODFLOW and MT3D. These models were used to guide the implementation of the RESRAD-OFFSITE model of the EMDF system. A description of this EMDF groundwater model, model development, justification for use of the model, and description of the input parameters are provided in this document and also included in the Performance Assessment (Appendices D and F). Similarly, a three-dimensional groundwater flow and radionuclide transport model, the Upper Bear Creek Valley (UBCV) groundwater model, was developed for the Composite Analysis to assess the appropriateness of the BCV conceptual site model used in the Composite Analysis and determine the appropriateness of using only surface water in the pathway analysis at the POA. A description of the UBCV groundwater model, model development, justification for use of the model, and description of the input parameters are provided in this document as well as Appendix A of the Composite Analysis. Several important points associated with the development of the UBCV model need to be highlighted for this QA Report. This model was developed as described in Appendix A of the Composite Analysis to support the Revision 1 Composite Analysis; those modeling results were incorporated directly into this Composite Analysis. Neither the modeling nor the results from the modeling were revised to support this revision of the Composite Analysis. This means the EMDF representation in the UBCV model is based on the conceptual design from *Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal Oak Ridge, Tennessee* (DOE 2017b) rather than the preliminary design. However, the UBCV model was used to predict contaminant migration from only the EMWMF and the other existing BCV sources (the UBCV sources). The groundwater flow and radionuclide transport modeling in the EMDF area in BCV was performed using the EMDF model from the Performance Assessment as described above. The EMDF model incorporates the preliminary design as described in Sect. 4.1 of this QA Report and the results of the most recent site characterization on and around the CBCV site as described in Sect. 4.4 of this QA Report.

To calculate the dose from EMDF in the Composite Analysis, several modifications were made to the RESRAD-OFFSITE input parameters in modeling used to support the Performance Assessment to predict the dose concentration from using surface water within Bear Creek at its confluence with NT-11. It was assumed that the stretch of Bear Creek impacted by contaminated groundwater was 100 m long, 5 m wide, and 0.5 m deep, which is consistent with Sect. 3.3.4.6 in the Performance Assessment. The mean residence time of water in this section of Bear Creek was specified as 0.0001 years, which relates to an average flow rate of 0.08 m^3/s. The distance from the down gradient EMDF edge of waste to the assumed impacted portion of Bear Creek was modeled as 315 m.

To assess the predicted dose resulting from using water and consuming fish from Bear Creek that is potentially contaminated with groundwater migrating to the surface water body, it was assumed in the model (with a bias towards protectiveness) that all water for human and animal consumption originated from the hypothetically impacted portion of Bear Creek. To represent this assumption in RESRAD-OFFSITE, two parameters in the Water Use parameter input menu were modified from their value in the Performance Assessment model. In the Performance Assessment model, all water for consumption and indoor use was assumed to come from a production well located 100 m from the edge of waste, and the fractions of water from the impacted well for consumption by humans and indoor dwelling use were accordingly assigned a value of 1 (indicating 100 percent). In the Composite Analysis model, the fraction of water from the surface water body (Bear Creek) consumed by humans and the fraction of water used in the indoor dwelling were specified as 1 (all water originating from Bear Creek). All irrigation water is also assumed to originate from the hypothetically impacted section of Bear Creek. In addition to assuming all water used for consumption and irrigation originated from Bear Creek, it was also assumed that all fish consumed came from the affected surface water body. The modeling assumes that three-quarters of the beef and one-half of the other food that is consumed originates from outside of this exposure scenario. (This is consistent with the EMDF Performance Assessment.) The results of the RESRAD-OFFSITE modeling following the 1000-year compliance period were used to support the post-1000 year maximum dose calculation in Sect. 5.3 of the Composite Analysis.

The PATHRAE-RAD model was used to quantify a dose in Bear Creek at BCK 10.5 from the closed EMWMF in the Composite Analysis. This dose was quantified assuming a waste inventory at closure based on actual waste disposed to-date (UCOR 2019b). Its use in supporting the base case assessment, as well as a detailed description, justification, and input parameters, is included this document as well as Appendix B of the Composite Analysis. Justification for the use of PATHRAE-RAD is provided in Sect. 4.6.6 of this report. The results of the PATHRAE-RAD modeling following the compliance period were used to support the post-1000 year maximum dose calculation in Sect. 5.3 of the Composite Analysis.

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2. CORPORATE QUALITY ASSURANCE PROTOCOL

This section summarizes the QA protocol for UCOR, Jacobs, and Drummond Carpenter as it applies to the preparation of Revision 2 of the Performance Assessment and the Composite Analysis. Analyses of the availability of the radiological inventory in an accident scenario and through inventory limitations on the working open face of the EMWMF and proposed EMDF landfills have concluded that these facilities are/will be less than Hazard Class 3 (UCOR 2018a) and a graded approach for the Nuclear Quality Assurance (NQA) program NQA-1 is used.

2.1 UCOR

UCOR describes its QA Program in the QAPP (UCOR 2019a), which incorporates the QA criteria of DOE Order 414.1D, *Quality Assurance*; 10 *CFR* 830, Subpart A; and the *EM Quality Assurance Program* (DOE 2012), and states how those criteria are satisfied. It also describes how UCOR ensures that subcontractors and suppliers satisfy the criteria of 10 *CFR* 830.122. The 10 criteria in 10 *CFR* 830.122 are incorporated and implemented in three program areas (management, performance, and assessment). The QAPP was developed in response to DOE requirements for contract DE-SC-0004645 (the UCOR contract with DOE). The requirements of the document are reflected in implementing programs, plans, and procedures. Appendix C of the QAPP is a requirements flow down matrix that identifies the UCOR documents that implement each criterion in 10 *CFR* 830.122.

DOE Order 414.1D, *Quality Assurance*; 10 *CFR* 830, Subpart A, *Quality Assurance Requirements*; and DOE-HQ-EM-QA-001, *Office of Environmental Management (EM), Subject: EM Quality Assurance Program (QAP)*, establish basic QA requirements for nuclear facilities and activities with potential to cause radiological harm. This ensures that risks and environmental impacts are minimized; and that safety, reliability, and performance are maximized through effective management systems. DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order Nuclear Safety Analysis Reports*, defines nuclear facilities; and outlines principles for managing performing and assessing quality in an integrated and cost-effective manner. The UCOR QAPP was written to meet to requirements of 10 *CFR* 830, Subpart A, and EM-QA-001, and describes the UCOR QA program, which is applicable to all UCOR facilities and operations using a graded approach. Subcontractors are required to either perform work under the UCOR QA program or address all elements of 10 *CFR* 830.122 and the *EM Quality Assurance Program* applicable to their scope of work in their project/functional-specific QA plans when required by subcontract language. The specifics of the UCOR QA Program that have been determined to be integral to the preparation of the Performance Assessment and Composite Analysis are detailed below.

2.1.1 Preparation of Calculation Packages

UCOR reviewed information/data and prepared calculations that resulted in input to the documents (such as EMDF radiological inventory in the Performance Assessment and the conversion of contaminant concentrations in Bear Creek to a dose for the "other existing BCV sources" in the Composite Analysis). UCOR used either its procedure PROC-WM-2031, *Waste Management Calculations*, or PROC-DE-0704, *Project Calculations*, to document these reviews and calculations. These procedures are similar and the formats for the output are consistent. The primary difference is that PROC-WM-2031 is specific to waste management activities, while PROC-DE-0704 is applicable to engineering and other calculations. PROC-WM-2031 is applicable to this document revision process because the documents being revised are required by DOE Order 435.1. It is noted that both of these procedures require the output from any computational support (such as an Excel spreadsheet) to be independently checked. The two procedures also define the process for approving calculations and revising approved calculations.

Both of these procedures require submittal of approved calculation packages to the Document Management Center (DMC) in accordance with UCOR procedure PROC-OS-1001, *Records Management, Including Document Control*, for archival. Both of these procedures also require a hardcopy submittal and an electronic copy in the native format (such as Microsoft Word or Excel) to the DMC when possible. This requirement is being interpreted as including digital files (such as input and output files) created during the performance modeling simulations.

Calculations by UCOR in support of the Performance Assessment were performed on computers USDOE0041438DT and USDOE0048020DT in Oak Ridge, TN. Computer USDOE0041438DT is a Hewlett-Packard Elite Desk (64 bit, 3.20 GHz quad processor) using the Microsoft Windows 10 Enterprise Version 10.0.15063, Build 15063 operating system. Computer USDOE0048020 is a Hewlett-Packard Elite Desk 800 (64 bit, 3.41 GHz, quad processor) using the Microsoft 10 Enterprise Version 1803, Build 17134.1039 operating system. Computer USDOE 0048020 was also used to support the preparation of the Composite Analysis. Neither the computers nor the operating systems were modified during the time these computers were supporting the development of these documents. These computers are considered DOE property under the terms of the UCOR contract with DOE.

The results of the modeling and the computational support provided by Drummond Carpenter and Jacobs were transmitted to UCOR using calculation packages. Calculation packages prepared by Jacobs and Drummond Carpenter were also assigned a UCOR calculation number and reviewed, approved, and controlled in accordance with one of these two UCOR calculation procedures. This review and approval is documented on either the UCOR Form-3416, “Waste Management Calculation Cover Page” (for PROC-WM-2031), or Form-136, “Engineering Document Cover Page” (for PROC-DE-0704) that is added as a cover page to the calculation packages prepared by Jacobs and Drummond Carpenter.

2.1.2 Software Quality Assurance

Appendix C of the UCOR QAPP identifies UCOR program documentation PPD-IT-6007, *Software Quality Assurance Program* (UCOR 2018b), and UCOR procedure PROC-IT-6008, *Application Lifecycle Management*. The software QA Program describes the requirements for acquisition, development, operation, and retirement of software applications, firmware, and process-control devices used by UCOR in support of operations or mission objectives by UCOR and its subcontractors. It allows software QA to be implemented according to a risk-based, graded approach. The application lifecycle management procedure implements the software QA program and applies to software and firmware, whether a UCOR official application or a subcontractor-supplied software application that is used in support of UCOR operations or mission objectives. This includes databases, qualified spreadsheets, custom-developed software calculations, configurable software applications, utility calculations, and commercial off-the-shelf or government off-the-shelf software and other acquired software and firmware. All of the software used by UCOR, Jacobs, and Drummond Carpenter in the revision activities for the Performance Assessment and Composite Analysis have been determined to be “acquired software” as defined in this procedure. This procedure also defines and provides guidance for software problem/error reporting system under which the software is managed.

UCOR procedure PROC-IT-6008 requires three forms to be completed. UCOR Form-2174, “Required Application Information”, defines the management requirements by identifying the application (along with its tools and supporting software) and the hardware on which it will reside, specifying the sensitivity of the data processed or stored on each component, and listing the expected users, frequency of use, and backup requirements. Software is categorized and sensitivity determined on UCOR Form-457, “Software Categorization Form” by definitions in the Scope section of the procedure. This form is completed after a technical evaluation of the software application has been completed and compliance with the software QA requirements are verified. This includes software categorization, verification of model verification and validation (V&V), personal computer operability testing and certification for production. These activities are documented in UCOR's software QA program and are maintained in the Server Asset Management and Official Applications (SAMOA) system. All software used in the revision activities for the Performance Assessment and the Composite Analysis have been determined to be "Category C – Business Impacting Software" as defined in this procedure. The lifecycle phase of the software is then determined based on the use(s) of the software. Of special note, "certification" of software is defined by the procedure. Software certification is required when a new or upgraded software application is acquired, has been tested and proven accurate, and is to be placed into production. Software certification is documented on the UCOR Form-452, "Official Application Certification for Production." Therefore, certification of each software application used in the revision activities is required by UCOR and has been documented per this procedure on its Form-452. If the software application is a subcontractor supplier application, the following information (at a minimum) is required:

- Name of the software
- Version of the software
- Location of the software
- Identification of all computers on which the software application resides
- Vendor, if applicable
- Date placed in service
- Software category
- Software sensitivity
- Technical contact.

This information is on the applicable forms referenced above and in the procedure, and is transmitted to the SAMOA system for review and retention. Active UCOR Official Applications and subcontractor supplied applications residing in the SAMOA system are required to have an annual factual accuracy review. Management Assessment MA-EMDF-19-002 was conducted in March 2019 to document this factual accuracy review; a summary and the results of this assessment are presented in Appendix D of this QA Report. No findings or observations were identified during this assessment. The project participated in the annual assessment that was performed in February 2020.

2.1.3 Independent Technical Review

UCOR is considered the primary author and is responsible for the technical content of the Performance Assessment and Composite Analysis documents. For this reason, the independent technical review of the completed documents was performed by UCOR prior to their release. A discussion of these reviews is presented in Sect. 3.3.

2.1.4 Records Management

Configuration control for Revision 2 of the Performance Assessment and Composite Analysis documents, supporting data, and calculation packages will be maintained in accordance with UCOR procedure PROC-OS-1001, *Records Management, Including Document Control*. This procedure allows for the submittal and defines the requirements for submitting records on media other than paper (such as input and output files from the performance modeling simulations). This QA Report, as well as the Performance Assessment and the Composite Analysis, will be entered into the DMC upon transmittal to DOE for distribution. At that time, all associated "records" will be submitted to the DMC for archival.

2.2 DRUMMOND CARPENTER

Drummond Carpenter provides support to UCOR in accordance with a PSA. Section 13 of the PSA requires Drummond Carpenter to follow the UCOR QAPP in accordance with Appendix C of the QAPP. Drummond Carpenter provided the RESRAD-OFFSITE performance modeling support for the Revision 2 of the Performance Assessment and the Composite Analysis (see Fig. 3 and Table 2). The modeling was performed on DESKTOP-BV4F840, a Dell Precision 7710 computer with the Windows 10 Professional operating system; DESKTOP-MDFIMDA, a Dell Precision 7510 with a Windows 10 Professional operating system; or DC-Desktop1, an Asystech DC19 with a Windows 10 Professional Operating System. No updates, other than regular Microsoft updates, were made to the computer or operating system during the modeling support that was provided to the Performance Assessment and Composite Analysis. Additional computational support was provided using the Excel program in the Windows 10 Professional operating system.

The results of the modeling and the computational support were transmitted by Drummond Carpenter to UCOR using calculation packages. These calculation packages were prepared in accordance with Drummond Carpenter procedure PROC-CALC-PA19, *Performance Assessment Calculations*. This procedure details the format, content, review, approval, revision control, and document control for the calculation packages. All calculation packages were technically reviewed by a checker and approved. This approval is confirmation that the calculation package has been prepared in compliance with the procedure. This procedure was reviewed by UCOR and determined to be functionally equivalent to UCOR procedure PROC-WM-2031, *Waste Management Calculations*.

2.3 JACOBS

Jacobs provided the remainder of the modeling for Revision 2 of the Performance Assessment and the Composite Analysis (see Fig. 3 and Table 2). All of the modeling was performed by the same Jacobs individual using the same Jacobs computer (USOKR1-LAP0043, a Dell Precision 7720 with a Windows 10 Enterprise operating system) in Oak Ridge, TN. Jacobs also provided additional computational support for the revisions to the Performance Assessment and the Composite Analysis. This computational support was provided using the Excel program in the Windows 10 Enterprise operating system. Neither the computer nor the operating system was modified during the modeling that was performed to support the Performance Assessment and Composite Analysis.

Jacobs manages software used for engineering design purposes in accordance with Federal Operations Standard Operating Procedure (FOSOP) 202, *Control of Engineering Software*. The purpose of this procedure is to establish the methods and responsibilities for the acquisition, validation/verification, and control of software used during an engineering design process. The software used by Jacobs falls into three categories: purchased and licensed, downloadable to a computer, and online toolboxes. The post-processing software used by Jacobs such as Surfer and Groundwater Vistas were purchased and licensed. The software used during the performance modeling (HELP, MODFLOW, STOMP, MT3D, and PATHRAE-RAD) is defined as downloadable software (or Freeware). The software packages used to calculate the radon flux, estimate the cover erosion, and assess the bathtub scenario were downloadable versions of Excel spreadsheets. The U.S. Environmental Protection Agency (EPA) Regional Screening Level calculator, an online toolbox, was used in the conversion of contaminant concentrations in Bear Creek to a dose for the "other existing BCV sources" in the Composite Analysis. With the exception of software V&V, the Jacobs Engineering Manager is responsible for compliance with this procedure. Discipline Managers ensure that all software used in the design process has undergone V&V, but the Engineering Manager authorizes the use of the software. It is noted that this procedure includes configuration control requirements and a software problem reporting system.

The results of the modeling were transmitted by Jacobs to UCOR using calculation packages. These calculation packages were prepared in accordance with Jacobs FOSOP 206, *Design Calculations*. This procedure details the format, content, review, approval, revision control, and document control for the calculation packages. All calculation packages were technically reviewed by a checker and approved by the Engineering Manager. This includes independent validation of the results from the additional computational support that was provided. This approval is confirmation that the calculation package has been prepared in compliance with FOSOP 206.

Some of the additional computational support was provided by Jacobs directly to UCOR for incorporation into UCOR-prepared calculation packages. In these cases, the support and the results were subject to the UCOR procedural requirements.

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3. QUALITY ASSURANCE DOCUMENTATION

This section identifies and describes the products prepared to document the development of Revision 2 of the Performance Assessment and the Composite Analysis. It also identifies the location of those products and where they are archived.

3.1 PERFORMANCE MODELING DOCUMENTATION

The performance modeling conducted to support the revised Performance Assessment and Composite Analysis (HELP, STOMP, MODFLOW, MT3D, RESRAD-OFFSITE, and PATHRAE-RAD models) was documented on a series of forms. This section identifies those forms, describes the purpose(s) of each form, and presents the relationship between the forms. All of these forms are presented in the appendices of this document. The following seven forms used to document the performance modeling are:

- Model Input Parameter Identification, Review, and Verification form
- Model Check form
- Model Files table
- Model Simulation log
- UCOR Information/Data Transfer Transmittal submittal
- Data Transfer Transmittal log
- Model Result Transfer form.

The Model Input Parameter Identification, Review, and Verification form documents all input parameters for the initial simulation for each of the above models. This form documents the value used, a reference for that value and a review of that value for technical appropriateness. This form also documents that the records from the initial simulation have been examined to determine that the correct input parameters were used in the simulation. This form was completed for all six of the models used to support the Performance Assessment and the Composite Analysis. These forms are in Appendix A of this QA Report.

The Model Check form documents the input parameters in the subsequent simulations for a model. It identifies the source model filename and the new model filename, and describes the change that was made in the modeling. The source model is usually the initial simulation for which the Model Input Parameter Identification, Review, and Verification form was prepared. The Model Check form also documents the technical appropriateness review of the change that was made (concurrence with the change). This form was completed for the HELP and RESRAD-OFFSITE modeling used to support the Performance Assessment. These forms are in Appendix B of this QA Report.

The Model Check forms were not used for the STOMP, MODFLOW, and MT3D groundwater simulations because they were not modified by changing a single parameter at a time (as performed in the HELP modeling). These three models were modified by substituting an entire input file (such as a set of hydraulic conductivities). This did not lend itself to the type of check that would be performed and documented using the Model Check forms. Additionally, the output from the groundwater simulations could not be confirmed using the Model Check forms because they were not in a form and format that could be checked (they were revised model files that digitally reflected the revised groundwater regime). The technical appropriateness of the outputs from the groundwater simulations were documented by the review of the appropriate calculation package using an independent Jacobs groundwater modeler.

A Model Check form was not used for the PATHRAE-RAD modeling that supported the Composite Analysis because only an initial simulation using the predicted EMWMF waste inventory was performed for the base case assessment. No subsequent revision to the initial PATHRAE-RAD model simulation was performed.

The Model Files table is summary documentation of each simulation for a model that includes the verification and the initial simulation. It links the input files with a model simulation title (or number), and it also documents the parameters that changed from simulation to simulation and documents that the correct parameters were used in the modeling simulations.

The Model Simulation log is prepared for each simulation for each of the six models, including the verification and the initial simulation. This log details each simulation and contains the following information:

- Analyst (performed by), contact information, and date prepared
- Simulation title
- Purpose of simulation
- Model code used/version number
- Configuration control (computer hardware/operating system)
- Names of input files
- Comments on input data
- Names of output files
- Comments on model outputs/results
- General comments
- Simulation reviewer and date reviewed.

Note that the review of the simulation also includes a consistency check between appropriate files to confirm the hardware and software did not change during the simulation. The Model Files table and the Model Simulation forms are in Appendix B of this QA Report.

The UCOR Information/Data Transfer Transmittal submittal is used to document the transfer of project information or data from one party to others. An example of this is detailed in Sect. 4.2 concerning the transfer of partition coefficients (K_d values). This document presents and details the information being transferred, the providing party, and the receiving parties. Each submittal contains a revision number in the event that an update is required. This form also documents the review that the information received prior to its transfer. This documentation is included in Appendix B of this QA Report.

All transfers of information or data were coordinated through a single point-of-contact. This point-of-contact maintained the Data Transfer Transmittal log. This log summarizes each transfer and serves as documentation for all transfers and the history of any revisions that were required.

The Model Result Transfer form documents the output from one model, which is in turn used as input to another model. This form presents the information and/or data being transferred between models, the model that produced the information being transferred, and the model(s) that will use the information. It also documents whether the subsequent model will use the output directly or if a change is required to the output is required before it will be used in another model. The Model Result Transfer form also documents a technical review and a check to ensure the proper information was used in the subsequent modeling. The Model Results Transfer forms are also included in Appendix B of this QA Report.

Calculation packages were also prepared to describe and document simulations performed using each of the models used in the performance modeling. Calculation packages were also prepared for input to models (as described in Sects. 4.1 and 4.3). These calculation packages were prepared in accordance with procedures from the organizations generating the calculation packages and documents a technical and accuracy review, as well as any verification that was performed.

3.2 SUPPORTING CALCULATIONS

Additional computational support was provided for the Performance Assessment and Composite Analysis. This additional support is documented in calculation packages. These calculations were performed to provide required information during the preparation of the Performance Assessment and the Composite Analysis that did not rely on the models identified and summarized above. Each of these supporting calculations are summarized below.

3.2.1 EMDF Radiological Inventory Calculation

The EMDF radiological inventory is identified as a primary input in Sect. 4.3 because it directly supports the Performance Assessment (it is presented in Appendix B of the Performance Assessment) and it is input to the models assessing the performance of the EMDF. This radiological inventory was re-evaluated for use in the Revision 2 Performance Assessment. That re-evaluation and the quantification of the predicted radionuclide concentrations in the waste expected to be disposed in the EMDF is documented in the UCOR calculation package "Calculation and Data Package – EMDF Radiological Inventory" (CAW-90EMDF-F898). The formal transmittal of the EMDF radiological inventory to those performing the modeling is described in Sect. 4.3.

3.2.2 EMDF Preliminary Design Calculation

The EMDF preliminary design is also identified as a primary input in Sect. 4.1 because it is directly supports the Performance Assessment (it is presented in Sect. 2.2 and Appendix C of the Performance Assessment) and it is input to the models assessing the performance of the EMDF. The EMDF preliminary design was performed by Jacobs external to those preparing the Performance Assessment. Calculation package "Calculation and Data Package for the Parameter Development based on the EMDF Design" (CAW-90EMDF-G119), as well as Sect. 4.1 of this QA Report, documents the transfer of the EMDF preliminary design to those preparing the Performance Assessment. This package also documents the calculation of parameters from the preliminary design that are direct input into the EMDF performance modeling (such as HELP). This calculation package was prepared by Jacobs.

3.2.3 EMDF Cover Erosion Calculation

The RUSLE2 program was used to estimate and quantify the effects of erosion on the EMDF cover over time. This program was downloaded from the U.S. Department of Agriculture (USDA) website. After an accuracy evaluation, it was populated with EMDF-specific parameters and the results are presented in Appendix C of the Performance Assessment. The RUSLE2 application was developed cooperatively by the USDA Agricultural Research Service, the USDA-Natural Resources Conservation Service (NRCS), and the Biosystems Engineering and Environmental Science Department of the University of Tennessee (USDA 2013). RUSLE2 is a mathematical model that uses a system of equations implemented in a computer program to estimate erosion rates. The other major component of RUSLE2 is a database containing an extensive array of values that are used by the RUSLE2 user to describe a site-specific condition so that RUSLE2 can compute erosion values that directly reflect conditions at a particular site. The RUSLE2 program is in the public domain.

The RUSLE2 estimates soil loss, sediment yield, and sediment characteristics from rill and interrill (sheet and rill) erosion caused by rainfall and its associated overland flow. RUSLE2 uses factors that represent the effects of climate (erosivity, precipitation, and temperature), soil erodibility, topography, cover management, and support practices to compute erosion.

RUSLE2 is used to evaluate potential erosion rates at a specific site, guide conservation and erosion control planning, inventory erosion rates over large geographic areas, and estimate sediment production on upland areas that might become sediment yield in watersheds. RUSLE2 is land use independent; therefore, it can be used on cropland, pastureland, rangeland, disturbed forestland, construction sites, mined land, reclaimed land, landfills, military lands, and other areas where mineral soil is exposed to raindrop impact and surface overland flow produced by rainfall intensity exceeding infiltration rate (i.e., Hortonian overland flow).

The surface layer characteristics and geometry of the cover design of the proposed EMDF and area-specific meteorological parameters were used. During the model application, various sensitivity runs were conducted to estimate the impact of uncertainty in assigning input parameter values. Calculation package "EMDF Cover Erosion Calculation (RUSLE2)" (CAW-90EMDF-G123) documents the EMDF cover erosion rates, the verification of the RUSLE2 program prior to its use, and the sensitivity analyses that were performed. This calculation package was prepared by UCOR and the EMDF cover erosion information is in Appendix C of the Performance Assessment.

The times and depths of cover erosion are cited in several places in the Performance Assessment, but they are not input to subsequent calculations or modeling. Qualitative results from the calculation were used to support other assessments in the Performance Assessment such as the evaluation of the bathtub scenarios and the quantification of the radon flux by demonstrating that significant erosion of the cover that could affect the potential radon flux is not predicted.

3.2.4 EMDF Bathtub Calculation

DOE Order 435.1 requires the Performance Assessment to assess a bathtub scenario. The assessment of EMDF bathtub scenarios consisted of assembling a set of assumptions for the migration of leachate from the closed cell in the event that the EMDF cover degraded to the point that waste would become saturated and the contaminated water leaked to the surface. Mixing ratios in surface and well water were calculated using initial radionuclide concentrations predicted in the waste, partition coefficients, travel pathways, etc. This information was used to populate a spreadsheet. This assessment is a stand-alone calculation and is not used in subsequent modeling or calculations. This assessment is included in Appendix C of the Performance Assessment and is documented in the UCOR calculation package "EMDF Bathtub Scenario Analysis" (CAW-90EMDF-G048).

3.2.5 EMDF Radon Flux Calculation

DOE Order 435.1 also requires an assessment of the radon flux at the surface of the disposal cell and a comparison of that flux to a performance measure. Radon calculations were performed using the methods described in *Radon Attenuation Handbook for Uranium Mill Tailings Cover Design* (NRC 1984). The calculation was recreated from the handbook, verified as correct, and used to quantify the radon flux at several locations beneath the surface of the EMDF cover as well as at the surface of the cover. This calculation was used to confirm that the predicted radon flux was less than that specified in the performance measure. This assessment is a stand-alone calculation and is not used in subsequent modeling or calculations. This assessment is in Appendix H of the Performance Assessment and is documented in the UCOR calculation package "EMDF Radon Flux Calculation" (CAW-90EMDF-G124).

3.2.6 EMDF Waste and Engineered Material Properties

Two calculations were prepared to document the EMDF waste and engineered material properties that were used in the modeling in the Performance Assessment and the Composite Analysis. "Data and Calculation Package – Average Properties of EMDF Waste" (CAW-90EMDF-G496) describes the process for estimating the average mass fraction of clean fill added to the waste during disposal operations, the average as-disposed, bulk density of EMDF waste and clean fill, and the estimated average solids density of EMDF waste and clean fill. These quantities are used in the Performance Assessment models to assign average as-disposed radionuclide concentrations and in modeling radionuclide release from the waste. "Data and Calculation Package – EMDF Engineered Material Properties" (CAW-90EMDF-G497) describes the summarizes the calculation of material properties for components of the EMDF cover, liner, and geologic buffer. This calculation describes estimated effective porosities and bulk densities for the materials of the cover and liner components, and the geologic buffer. The effective porosity of the waste is estimated based on design assumptions.

3.2.7 EMWMF Dose Calculations

A percent of capacity filled for the six-cell EMWMF was needed to support the definition of the source term for the EMWMF in the Composite Analysis (Sect. 2.5.2 and Appendix B). This percentage was calculated using the volume information for the EMWMF from the current 3-Year Window (fiscal years 2019 – 2021) spreadsheet (UCOR 2019b). This percentage was also used to calculate the closure mass in the PATHRAE modeling of the dose from EMWMF in Bear Creek at BCK 10.5. This percentage was calculated in the UCOR calculation package "EMWMF %full" (CAW-90EMDF-F897R1).

"Calculation of the Base Case Assessment Dose, the Mixing Ratios in Bear Creek, and the Sensitivities in Revision 2 of the EMDF and EMWMF Composite Analysis" (CAW-90EMDF-G002) was prepared by UCOR to document most of the calculations in the Composite Analysis. These include the calculation of the composite dose at the POA for the Composite Analysis in Sect. 4.3 and the composite doses for the sensitivity analyses in Sect. 5 of the Composite Analysis. This calculation package also documents the quantification of the mixing ratios used to account for the flow in Bear Creek between various locations and supports "Environmental Transport of Radionuclides" (Sect. 4.2) in the Composite Analysis.

3.2.8 Composite Analysis "Other Existing BCV Sources" Dose Calculations

The dose for the "Other Existing BCV Sources" in the Composite Analysis was quantified using concentrations from *2018 Remediation Effectiveness Report for the U.S. Department of Energy Oak Ridge Site Oak Ridge, Tennessee* (DOE 2018a). These concentrations were then adjusted to comply with the post-remediation commitments for BCV as documented in *Record of Decision for the Phase I Activities in Bear Creek Valley at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee* (Phase I BCV Record of Decision [ROD]) (DOE 2000). These concentrations were then converted to a dose at BCK 9.2 for the other existing BCV sources and used in the composite dose for the base case assessment and most of the sensitivity analyses. The concentrations and the conversion from concentrations to a dose are described in Sect. 2.5.1 and Appendix C of the Composite Analysis, and are documented in the UCOR calculation package "Dose Calculation for the "Other Existing BCV Sources" Composite Analysis Source Term" (CAW-90EMDF-G247).

3.2.9 Revision 1 Composite Analysis Calculation Package

The calculation package "EMDF Composite Analysis – Calculations of the Base Case Dose, the Mixing Ratios in Bear Creek, and the Sensitivities in the EMDF and EMWMF Composite Analysis," (CAW-90EMDF-E660R1) was prepared by UCOR to support Revision 1 of the Composite Analysis. The base case assessment in that revision of the Composite Analysis is now a sensitivity analysis in Sect. 5.7 in the Revision 2 Composite Analysis. This calculation package supports the documentation of that sensitivity analysis.

These calculations use far less input parameters than the performance models and usually involve only a single simulation with an associated sensitivity analysis with results that can be summarized in a single table. For this reason, the QA documentation is an approved calculation package rather than the forms described in the preceding subsection.

Note that all calculation packages prepared by UCOR subcontractors (i.e., Jacobs and Drummond Carpenter) are subsequently assigned a UCOR calculation number, reviewed and approved by UCOR personnel, and archived in the UCOR Document Management Center (DMC) (see Sect. 6). This is documented on either UCOR Form-3416, "Waste Management Calculation Cover Page" or UCOR Form-136, "Engineering Document Cover Page." Calculation packages can be retrieved from the UCOR DMC using the UCOR calculation number.

Table 3 lists all of the calculation packages written to support the Performance Assessment and the Composite Analysis (including the calculation packages prepared to document the performance modeling). It also provides the company that authored the calculation package and the UCOR calculation identification number.

Table 3. Summary of EMDF Performance Assessment and Composite Analysis Calculation Packages

Calculation Package Title	Author	UCOR Calculation Number	Document Reference(s)
Performance Assessment			
Data and Calculation Package-EMDF Radiological Inventory	UCOR	CAW-90EMDF-F898	Sect. 2.3, Appendix B
Calculation and Data Package for the HELP Model	Jacobs	CAW-90EMDF-G118	Sect. 3.3.1, Appendix C
Calculation and Data Package for the Parameter Development based on EMDF Design	Jacobs	CAW-90EMDF-G119	Sect. 2.2, Appendix C
Calculation and Data Package for the STOMP Model	Jacobs	CAW-90EMDF-G120	Sect. 3.3.2, Appendix E
Calculation and Data Package for the MODFLOW Model	Jacobs	CAW-90EMDF-G121	Sect. 3.3.3, Appendix D
Calculation and Date Package for the MT3D Model	Jacobs	CAW-90EMDF-G122	Sect. 3.3.3, Appendix F
EMDF RESRAD-OFFSITE Operational Period Inventory Depletion Calculation Package	Drummond Carpenter	CAW-90EMDF-G182	Sect. 3.2.2.5, Appendix G
EMDF RESRAD-OFFSITE Performance Assessment and Composite Analysis Calculations Package	Drummond Carpenter	CAW-90EMDF-G183	Sects. 3.3.4, 3.4, Appendix G

Table 3. Summary of EMDF Performance Assessment and Composite Analysis Calculation Packages (cont.)

Calculation Package Title	Author	UCOR Calculation Number	Document Reference(s)
Performance Assessment (cont.)			
EMDF IHI RESRAD-OFFSITE Modeling Calculations Package	Drummond Carpenter	CAW-90EMDF-G184	Sect. 6, Appendix I
EMDF Cover Erosion Calculation (RUSLE2)	UCOR	CAW-90EMDF-G123	Sect. 3.2.1, Appendix C
EMDF Radon Flux Calculation	UCOR	CAW-90EMDF-G124	Sect. 3.2.2.2, Appendix H
EMDF Bathtub Scenario Analysis	UCOR	CAW-90EMDF-G048	Sect. 3.2.1, Appendix C
Data and Calculation Package – Average Properties of EMDF Waste	UCOR	CAW-90EMDF-G496	Sect. 3.3, Appendices C, D, E, F, G (all models except HELP)
Data and Calculation Package- EMDF Engineered Material Properties	UCOR	CAW-90EMDF-G497	Sect. 3.3, Appendices C, D, E, F, G (all models except HELP)
Composite Analysis			
EMWMF %full	UCOR	CAW-90EMDF-F897R1	Sect. 1.1
Calculation of the Base Case Assessment Dose, the Mixing Ratios in Bear Creek, and the Sensitivities in Revision 2 of the EMDF and EMWMF Composite Analysis	UCOR	CAW-90EMDF-G002	Sects. 2.5, 4.2, and 5
EMDF RESRAD-OFFSITE Performance Assessment and Composite Analysis Calculations Package	Drummond Carpenter	CAW-90EMDF-G183	Sects. 2.5, 5.3, and 5.4
Data and Calculation Package for the Upper Bear Creek Valley Groundwater Model	Jacobs	CAW-90EMDF-G494	Appendix A
Calculation and Data Package for the PATHRAE Model	Jacobs	CAW-90EMDF-G257	Appendix B
Dose Calculation for the “Other Existing BCV Sources” Composite Analysis Source Term	UCOR	CAW-90EMDF-G247	Sect. 2.5.1, Appendix C
EMDF Composite Analysis- Calculation of the Base Case Dose, the Mixing Ratios in Bear Creek, and the Sensitivities in the EMDF and EMWMF Composite Analysis	UCOR	CAW-90EMDF-E660R1	Sect. 5.7

BCV = Bear Creek Valley
EMDF = Environmental Management Disposal Facility
EMWMF = Environmental Management Waste Management Facility
HELP = Hydrologic Evaluation of Landfill Performance
IHI = inadvertent human intrusion
RESRAD = RESidual RADioactivity
RUSLE = Revised Universal Soil Loss Equation
STOMP = Surface Transport Over Multiple Phases

3.3 INDEPENDENT TECHNICAL REVIEW

This section describes and documents the independent technical reviews of the final drafts of the Revision 2 Performance Assessment and Composite Analysis. As previously stated, the LFRG performed a technical review of the initial versions of the Performance Assessment and the Composite Analysis to support the issuance of a DAS for construction of the proposed EMDF in accordance with DOE Order 435.1. The LFRG provided Key Issues, Secondary Issues, and Observations on each.

OREM worked extensively with the LFRG during the preparation of Revision 2 of the Performance Assessment and Composite Analysis. These interactions included preparation, negotiation, and acceptance of corrective actions for each of the Key and Secondary Issues that were identified during the review of the Revision 1 versions of the Performance Assessment and Composite Analysis. Following the acceptance of the corrective actions by LFRG, OREM and LFRG held a series of teleconferences to verify that the corrective actions were accurately and adequately incorporated into the revised documents.

Independent technical reviews of the final drafts of Revision 2 of the Performance Assessment and Composite Analysis were coordinated by UCOR prior to re-release to the LFRG for its review. These reviews were documented using the UCOR Form-141, "Document Review Request." These forms document the names of those reviewing the documents, the scope (purpose) of the reviews, how comments on the documents were transmitted from the reviewers to the preparer, and that comments were adequately resolved.

The scope of the reviews included the following (at a minimum):

- An OREM (DOE) review of the Performance Assessment and the Composite Analysis
- A review of the Performance Assessment and the Composite Analysis by a technical consultant to OREM on the development of these documents
- A review of the Performance Assessment and the Composite Analysis by the UCOR EMDF Project Manager
- A technical, consistency, and waste management review of the Performance Assessment by the primary author of the Composite Analysis (UCOR)
- A consistency review of the Composite Analysis by the primary author of the Performance Assessment (UCOR)
- A waste management review (focusing on coordination with the EMWMF) of the Composite Analysis (UCOR)
- A review of the Composite Analysis Conceptual Model (Composite Analysis Sect. 3.2) and Contaminant Migration Pathways (Composite Analysis Sect. 2.4.4.1) by Dick Ketelle (a commitment in the corrective action for Composite Analysis Secondary Issue EMDF-S06-CA15-03, "Surface water concentrations for contaminants of concern")
- Other subject matter expert reviews, as appropriate (primarily geologists)
- Verification that values in the Performance Assessment and the Composite Analysis that originated in calculation packages, modeling, etc. have been correctly transcribed to the documents from those sources.

Completed Forms-141 documenting the scope and participants in the independent technical reviews of the Performance Assessment and Composite Analysis are included in Appendix C.

Additionally, an independent review of this QA Report was conducted. The scope of the review of this report included (at a minimum):

- An OREM (DOE) review
- A review by the UCOR EMDF Project Manager
- A review by the primary author of the Performance Assessment
- A review by the UCOR project quality assurance representative.

Completed Forms-141 documenting the scope and participants in the independent technical reviews of this report are also included in Appendix C.

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4. INPUT DATA VERIFICATION

Section 4 of this QA Report focuses on the verification of input used in the performance modeling and preparation of the Performance Assessment and the Composite Analysis. The first four sections document the source and detail the review and archival of the four primary sources of performance modeling input parameters: the EMDF preliminary design (Sect. 4.1), the EMDF radionuclide-specific leaching partition coefficients (K_d values) (Sect. 4.2), the updated expected EMDF radiological inventory (Sect. 4.3), and the recent CBCV site characterization (Sect. 4.4). This information is considered “Performance Assessment Primary Inputs” because, rather than a single parameter (i.e., a number or piece of information), all of these inputs are comprised of many parameters and, as reflected in Fig. 4, are direct inputs to the Performance Assessment as well as input to the Performance Assessment performance modeling. Additionally, the EMDF preliminary design was a series of figures and files received from another Jacobs organization not directly supporting the preparation of the Performance Assessment and the Composite Analysis. Although not represented in Fig. 4, these primary inputs to the Performance Assessment are also indirect input to the Composite Analysis as detail in the EMDF source term and EMDF groundwater model used in the Composite Analysis.

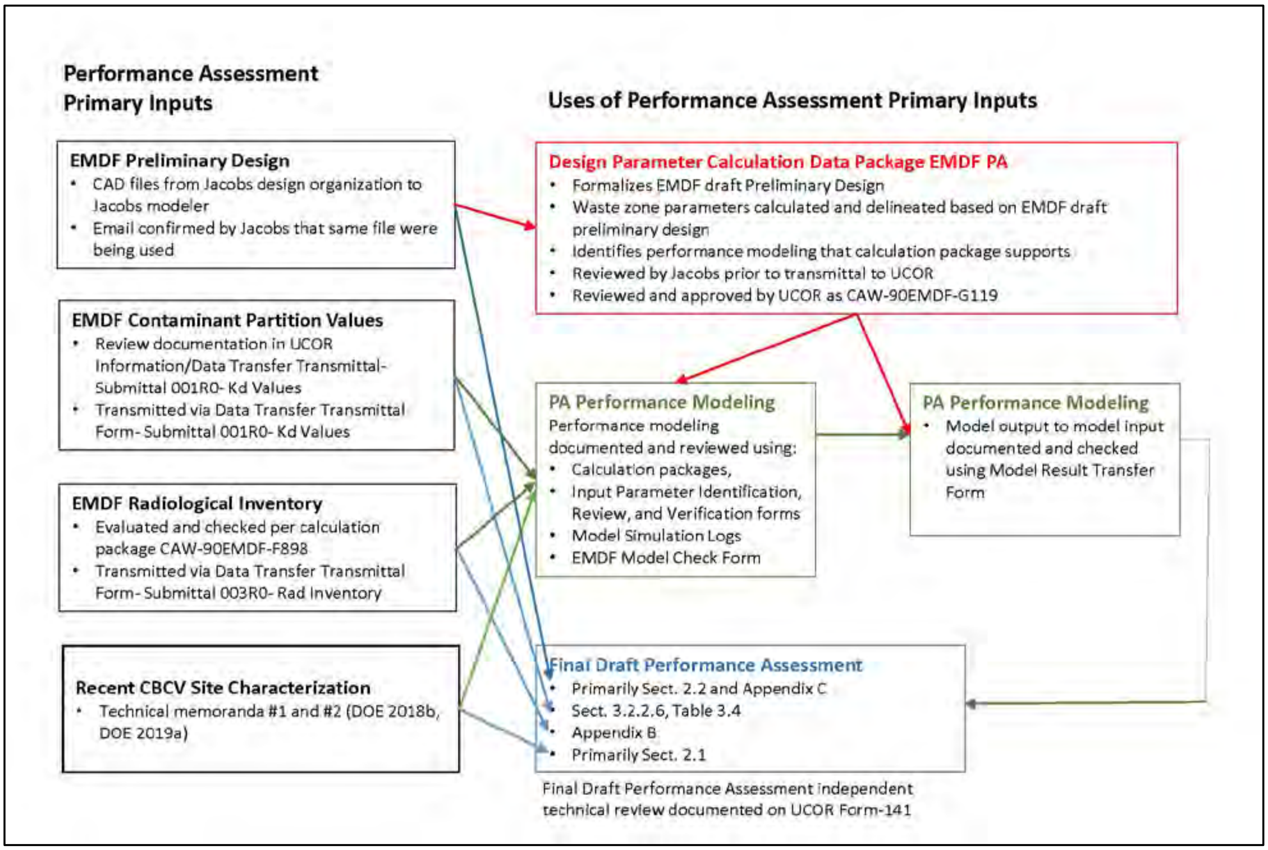


Fig. 4. Flowchart of Performance Assessment primary inputs

Section 4.5 provides the current understanding of the BCV conceptual site model, which was used to construct the models used in the contaminant fate and transport modeling that was used for the Performance Assessment and Composite Analysis. As described in Sect. 4.5, the site-specific conceptual model for the proposed EMDF is a subset of the overall BCV conceptual site model, which was updated with two phases of characterization activities (described in Sect. 4.4), during which hydrogeological and geotechnical data were collected at and in the vicinity of the EMDF site.

Section 4.6 provides information constituting the certification for each of the models used in the Performance Assessment and/or Composite Analysis. This includes the title and description of the model, its developer, its use in the Performance Assessment and/or Composite Analysis, its conceptual model, justification for its use, etc. These subsections also identify the input and output for each of the models.

The final subsection in Sect. 4 references the appendices containing the Model Input Parameter Identification, Review, and Verification forms and the Model Check forms. The Model Input Parameter Identification, Review, and Verification forms list input parameters for each of the models used in the Performance Assessment and/or Composite Analysis, the sources of the input parameters, and other related information. These forms also document that each of the input parameters have been technically reviewed for appropriateness in the models in which they are being used and that these parameters were correctly input into the respective models. The Model Check forms document changed input parameters from the initial simulation run by the models and document a review of those changed parameters.

4.1 EMDF PRELIMINARY DESIGN

The preliminary design for the EMDF that is described in the Performance Assessment and used in the performance modeling was provided by Jacobs in response to a February 2019 request for information (OSWDF-RFI-010, Design Inputs for performance Assessment, Part 1: Landfill Layouts and Top of Waste) and a subsequent May 2019 request for information (OSWDF-RFI-018). The files in these two requests for information were provided by Jacobs in response to the requests for information. The preliminary design files from OSWDF-RFI-010 were also downloaded to a compact disk and that disk was provided directly to the Jacobs modeler in Oak Ridge. The preliminary design files from OSWDF-RFI-018 were provided to the Jacobs modeler in Oak Ridge directly from the Jacobs office performing the design. The preliminary design files were also downloaded from the two SharePoint sites.

Jacobs provided confirmation that the preliminary design files used in performance modeling were the files that were transmitted in February and May 2019 (Jacobs 2019).

The preliminary design consists of computer-aided design files defining four EMDF surfaces and a cross-section of the EMDF showing the components of the cover system and the liner system. The surfaces are: the top of waste (bottom of cover), the bottom of waste (top of liner), the side slopes, and the bottom of the geologic buffer, or geobuffer.

It is noted that the design files provided in OSWDF-RFI-018 were of disposal facility surfaces that had been revised from the OSWDF-RFI-010 submittal. In this revision, the design of a surface water diversion feature on the north side of the disposal facility was deepened to be consistent with modeling being performed to support the design. For this reason, Jacobs first replaced the files for the appropriate surfaces in the OSWDF-RFI-010 submittal with the revised surfaces in the OSWDF-RFI-018 submittal.

Jacobs prepared a calculation package titled "Calculation and Data Package for the Parameter Development based on EMDF Design" (CAW-90EMDF-G119) to document the receipt of the preliminary design and the facility cross-section, the description of the cover and liner system components in the cross-section, the models to which the preliminary design supported, and the calculations performed using the design information that was provided. This information consisted of dimensions of the disposal facility and disposed waste, dimensions and contours of the top of the disposal cell cover, etc. This calculation package documented that the input design files were confirmed to be the files transmitted from Jacobs, the surfaces that were subsequently defined were done so correctly, and that the information required from the preliminary design in the other performance modeling efforts related to the Performance Assessment (such as the HELP modeling, the radon flux calculation, the estimate of cover erosion, etc.) were included. An electronic submittal of all input files that were used and all output files generated was provided with the calculation package for archival purposes.

4.2 EMDF RADIONUCLIDE-SPECIFIC CONTAMINANT PARTITION COEFFICIENT VALUES

Performance Assessment Table 3.4 documents the K_d values that were assumed for the performance modeling in the initial version of the Performance Assessment. These values were the subject of two Key Issues identified during the LFRG review of the Performance Assessment (Key Issues K01-PA11-01 [I-129 K_d in contamination zone] and K02-PA11-02 [K_d of I-129, C-14 & Tc-99 in vadose & saturation zone]). For this reason, all of the K_d values used in the performance modeling were re-evaluated for use in the Revision 2 Performance Assessment.

Additional research was performed on the K_d values for I-129, C-14, Tc-99, and uranium. Results of work performed on soil and groundwater samples from the ORR and other relevant DOE sites were identified. The LFRG participated in this re-evaluation process through discussions of the K_d values for the radionuclides whose dose was predicted to peak inside or just outside of the 1000-year compliance period (such as C-14, H-3, I-129, and Tc-99) as defined in DOE Order 435.1, and the K_d value for uranium. Future studies using site-specific soil and groundwater samples to support the values that were assumed in the Performance Assessment were identified and planned. The revised table was presented to the LFRG as verification of the incorporation of the corrective actions from the above two Key Issues.

This re-evaluation resulted in a revision to Performance Assessment Table 3.4. The revised K_d values in Table 3.4 were formally transmitted to those requiring them for performance modeling as UCOR Information/Data Transfer Transmittal 001-R1.

This transmittal was recorded and tracked using the Data Transfer Transmittal log. This transmittal also documented the technical review of the K_d values in the revised table. This technical review consisted of ensuring the K_d value in the source reference was in revised table and that the K_d value was appropriate.

4.3 EMDF RADIOLOGICAL INVENTORY

Performance Assessment Appendix B, "Radiological Inventory Estimate for the Environmental Management Disposal Facility", was re-evaluated for its use in the Revision 2 Performance Assessment. As a result of this re-evaluation, the expected EMDF radiological inventory was revised and formally transmitted to the team members requiring it for performance modeling using the same process as described in Sect. 4.2. This transmittal is titled "UCOR Information/Data Transfer Transmittal 003-R1-Rad Inventory".

The review of the radiological inventory in this transmittal is documented in the UCOR calculation package "Data and Calculation Package – EMDF Radiological Inventory" (CAW-90EMDF-F898). This calculation package is referenced on the Information/Data Transfer Transmittal form for this submittal.

4.4 RESULTS OF RECENT CENTRAL BEAR CREEK VALLEY SITE CHARACTERIZATION

The Phase 1 site characterization activities focused on the CBCV site and were performed from January to May 2018 with monitoring onging. All activities were conducted in accordance with *Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee* (DOE 2018b), which includes the project-specific QA Project Plan. These activities are described and their results documented in *Technical Memorandum #1, Environmental Management Disposal Facility Phase 1 Field Sampling Results Oak Ridge, Tennessee* (DOE 2018c), and *Technical Memorandum #2, Environmental Management Disposal Facility Phase 1 Monitoring Oak Ridge, Tennessee* (DOE 2019).

The Phase 1 subsurface drilling investigation included the following activities:

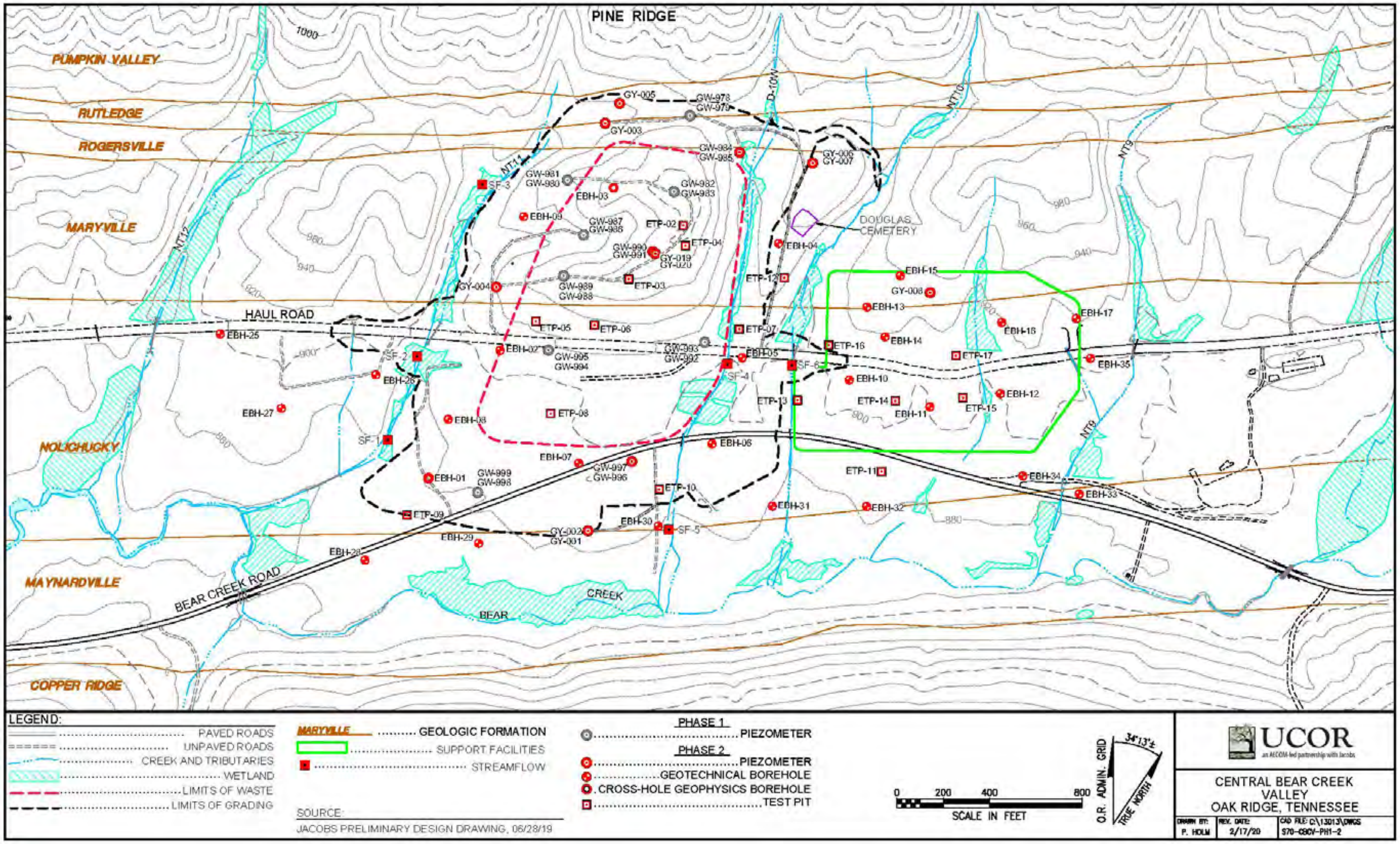
- Sixteen borings/piezometers (eight shallow and eight deep) were drilled, installed, and instrumented (see Fig. 5).
- Shelby tubes, jar samples, and bucket samples of unconsolidated materials and of the highly weathered shale (saprolite) were collected for geotechnical laboratory analysis.
- Flexible Liner Underground Technologies, LLC (FLUTe™) testing was performed on the eight deep boreholes (GW-978, GW-980R, GW-982, GW-986, GW-988, GW-992R, GW-994, and GW-998).
- Slug testing was conducted in the eight shallow boreholes (GW-979, GW-981, GW-983, GW-987, GW-989, GW-993, GW-995, GW-999).

Six flumes were installed during Phase 1 site characterization. Three flumes were installed east of the CBCV site in NT-10 and Drainage (D)-10W, and three were installed west of the site in NT-11 (see Fig. 5).

Phase 1 characterization also included five detailed site walkdowns to further characterize surface geology; examine hydrogeologic areas of interest; and identify seeps, springs, and other expressions of shallow groundwater in NT-10, D-10W, D-11E, and NT-11. Representatives from the Tennessee Department of Environment and Conservation participated in each of these walkdowns. During the first of these walkdowns, the Nolichucky/Maynardville geologic contact was observed at three locations in the field and coordinates for the contact locations were obtained using Global Positioning System equipment.

The objective of Phase 1 site characterization of the proposed CBCV site was to validate key assumptions regarding the hydrogeologic setting (groundwater and surface water conditions) at the site. These key assumptions were validated and were used to confirm the acceptability of the CBCV for a new, low-level waste landfill and to support a final site selection. The key validated assumptions for the Phase 1 characterization are:

- Geology is typical of BCV with steeply dipping, fractured bedrock, and there are no major karstic features in the Maryville, Nolichucky, or Rogersville Formations underlying the CBCV site.
- The contact with the Maynardville Limestone is located south of the proposed CBCV footprint. (The observed locations in the field were approximately 50 ft further south than represented on geologic maps prior to the field mapping effort).
- Precipitation primarily runs off as surface water and shallow groundwater in the stormflow zone. (This is consistent with the BCV conceptual site model.)



Source: Modified from DOE 2018c and DOE 2019.

Fig. 5. Summary of Phase 1 and Phase 2 EMDF site characterization

- Potentiometric surface elevations are typical of other BCV wells in similar settings.

- Water level extrapolations presented in TM #1 (DOE 2018c) based on other BCV wells are found to be relatively consistent with observations at the CBCV site.

The Phase 2 site characterization activities also focused on the CBCV site and were performed from October 2018 to January 2019 and monitoring is ongoing. Activities were conducted in accordance with *Phase 2 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee* (DOE 2018d).

The Phase 2 subsurface drilling investigation included the following activities:

- Sixteen borings/piezometers (eight shallow and eight deep) were drilled, installed, and instrumented (see Fig. 5).
- Split-spoon sampling, standard penetration testing, Shelby tubes (from predetermined intervals in select boreholes), bedrock coring.
- FLUTe™ testing was performed on six of the eight deep boreholes (GW-984, GW-990, GW-996, GY-001, GY-005, and GY-006).
- Slug testing was conducted in the 14 boreholes that contained groundwater (all except GW-991 and GY-008).

Seventeen test pits were excavated during the Phase 2 site characterization. Eight were excavated within the landfill footprint, three in potential stormwater collection basins, one in the potential D-10W rerouted channel area, and five within the Landfill Wastewater Treatment System support facilities area to collect larger volume samples for geotechnical testing.

Phase 2 characterization also included a seismic investigation for analysis of liquefaction and other seismic-related analyses performed during the landfill design. Two arrays, consisting of three in-line core holes drilled to depths of approximately 150 ft, were installed to obtain cross-hole shear-wave and compression wave velocity data. Geophysical logging (natural gamma, single point resistance, spontaneous potential, and acoustic borehole televiewer) was performed in one borehole in each array. Additionally, synthetic caliper logs were calculated from the acoustic viewer travel time data to aid in interpretation. The geophysical logging program:

- Identified subsurface stratigraphy, lithology, and geologic contacts
- Identified the nature and density of fracture, bedding planes, joint, conduits, and fracture zone intervals
- Identified the orientation of fractures, joints, and bedding planes, and measured the strike and dip relative to true/magnetic north
- Obtained borehole deviation information at intervals to the bottom of the hole (to support the cross-hole investigation).

The objective of Phase 2 site characterization was to collect geotechnical and environmental data for the evaluation of geology, groundwater, and geotechnical properties of soil and rock at the proposed EMDF site.

Groundwater model development occurred concurrently with the site characterization process. All site characterization data available at the time of CBCV model development and calibration (DOE 2018c, DOE 2019) were considered (Sect. D.2.3 of the Performance Assessment). Additional model verification to support engineering design was based on longer periods of groundwater level monitoring and additional analysis of streamflow data (UCOR 2020a).

Documentation of Phase 1 field activities (DOE 2018c, DOE 2019), including surface water records and groundwater data that had been collected from the 16 Phase 1 piezometers over the first year of monitoring (March 2018 through February 2019), were used in the development and calibration of the CBCV model (Sect. D.3 of the Performance Assessment). Phase 2 piezometer observations through March 2019 represent only the wet season, and therefore, were not suitable for calibrating the CBCV model simulation of average annual conditions.

4.5 BEAR CREEK VALLEY CONCEPTUAL SITE MODEL

The BCV conceptual site model forms the basis for the current understanding of contaminant fate and transport in the valley (Sect. 2.4.4.1 of the Composite Analysis). The BCV conceptual site model is described in Sect. 3.2 of the Composite Analysis. The models used in the contaminant fate and transport modeling performed to support the Performance Assessment and Composite Analysis were constructed to represent the BCV conceptual site model. Although the BCV conceptual site model cannot be direct input to the contaminant fate and transport modeling, the models used input parameters that represent the material conditions and water balance relationships in the BCV conceptual site model and assumptions consistent with the BCV conceptual site model. This section presents a justification for use of the BCV conceptual site model because it is the primary driver of the results from the Performance Assessment and Composite Analysis contaminant fate and transport modeling and the technical appropriateness of those results is assessed against the BCV conceptual site model. The remainder of this section describes the origin of the BCV conceptual site model and its evolution over the past 20-plus years. It summarizes fieldwork and the results of fieldwork that were used to check and calibrate the BCV conceptual site model. Finally, it documents the regulatory acceptance of the BCV conceptual site model.

Hydrogeological conceptual models for the ORR were developed in the early 1980s and 1990s to facilitate site characterization and remediation of contaminant sources and plumes within the unique site conditions across the ORR. The conceptual model for the BCV watershed was initially detailed in the BCV Remedial Investigation (RI) Report (DOE 1997a), incorporating the hydrologic framework for the ORR developed by Oak Ridge National Laboratory (ORNL) researchers (Moore and Toran 1992, ORNL 1992a, ORNL 1992b), with the specific conditions unique to BCV and to contaminant fate and transport within BCV.

In developing the BCV hydrogeologic conceptual model, data collected during RI field activities within BCV were combined with a wealth of previous studies that have been carried out in BCV or elsewhere on the ORR. Interest in contaminant transport associated with the waste disposal sites in BCV motivated Y-12 to develop a large database of environmental data from studies of the disposal areas and of potential exit pathways within the valley. BCV-specific studies have included quarterly water level measurements summarized in an annual Groundwater Quality Report, data from studies carried out in BCV between 1984 and 1994 (e.g., work by Golder and Associates and Geraghty and Miller provided hydraulic characteristics as described in the BCV RI Report), an Exit Pathway Monitoring Program (that provided information on the Maynardville Limestone as described in the BCV RI Report), data from RIs conducted in BCV during 1994 and 1995, and other more specific studies carried out by the Environmental Sciences Division at ORNL for the Groundwater Protection Program or the ORR Hydrology and Geology Studies program (e.g., Dreier et a1. 1993; Goldstrand 1995; Moline and Schreiber 1995). Using these data, the BCV hydrogeologic conceptual model builds on the previous theories and hypotheses for groundwater movement on the ORR (e.g., ORNL 1992b; Moore and Toran 1992). A summary of the BCV hydrogeologic conceptual model was presented in the BCV Phase I ROD (DOE 2000) that was approved by DOE, EPA, and the state of Tennessee. Figure 8 in the Composite Analysis appears as Fig. 2.4 in the BCV Phase I ROD.

The BCV conceptual site model formed the basis for the performance modeling for the EMWMF in the RI/Feasibility Study (FS) and its addendum (DOE 1998a, DOE 1998b) and a subsequent evaluation of the six-cell design (Bechtel Jacobs Company LLC [BJC] 2010). The conclusions from the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) evaluations resulted in an approved ROD in which the selected remedy was the construction of the EMWMF (DOE 1999). The EMWMF is an operating disposal facility for waste generated on the ORR by response actions conducted under CERCLA. More recently, in December 2018, the EMWMF received an Operating DAS from DOE-Headquarters. This Operating DAS was issued following the development of adequate corrective actions to address issues from the LFRG relating to the addition of Cell 6 that increased the capacity of the EMWMF (DOE 2018e). The BCV conceptual site model as presented in the RI/FS and calibrated with the results of more recent investigations in BCV was integral to the modeling simulations used to address those issues.

To build consensus around a path forward for managing ORR groundwater challenges, a Groundwater Strategy Team was convened in 2013 and six workshops were held with representatives from DOE, EPA, and the state of Tennessee. Three of the workshops reviewed conceptual site models for the ORR watersheds. The BCV was selected as the test case for the first workshop held in January 2013. The BCV conceptual site model is presented in Appendix B of the workshop documentation (DOE 2014); Fig. 8 in the Composite Analysis appears as Fig. B.5 in the appendix. The appendix also presents a chronology of events associated with the Bear Creek Watershed.

The site-specific conceptual models for the proposed EMDF site presented in the EMDF RI/FS (DOE 2017b), the Performance Assessment, and the UBCV groundwater model for the Composite Analysis are subsets of the overall conceptual model for the BCV watershed. The BCV conceptual site model predicts that the potential future release of contaminants via groundwater and surface water pathways would migrate initially from the footprint areas downgradient across the lower elevation areas of BCV dissected by the NTs and ultimately toward the main channel of Bear Creek. Recently, two major phases of characterization activities at the CBCV site occurred from February 2018 to January 2019 (DOE 2018c, DOE 2019). The focus of this characterization was to collect hydrogeological and geotechnical data for the evaluation of geology, groundwater, and geotechnical properties of soil and rock at the proposed EMDF site. The geologic and hydrogeologic data collected were consistent with the conceptual site model for this portion of BCV.

4.6 VERIFICATION OF MODEL PARAMETERS

This section details each of the six models that supported the preparation of the Performance Assessment and/or Composite Analysis (HELP, STOMP, MODFLOW, MT3D, RESRAD-OFFSITE, and PATHRAE-RAD). For each of these models, this section presents the background and references the organization that developed the model, its history (including the current version used), a description of the model, and its use in the Performance Assessment and/or the Composite Analysis. It also includes information justifying the use of each model.

This section also documents the input parameters for each of the six models that supported the preparation of the Performance Assessment and/or Composite Analysis and the review of each of those input parameters. Each parameter was technically reviewed for appropriateness and reviewed to ensure that the referenced value was transcribed correctly when it was used in the modeling. This documentation is provided on the Model Input Parameter Identification, Review, and Verification form and the Model Check forms for each model that was used.

Additionally, this section documents the transfer and review of output data that are generated in one model and transferred as an input parameter to another model. This transfer of information from one model to another and the QA/quality control of the transfer of the output is documented in the Model Result Transfer form.

4.6.1 HELP

This subsection presents information that supports the QA documentation for the HELP modeling that was performed for the EMDF Performance Assessment. This modeling was performed using the EMDF preliminary design as documented in Sect. 4.1 of this report. In the base case, the cover is assumed to degrade as described in this subsection and the HELP model was used to predict infiltration rates into and out of the EMDF at times prior to and during its degradation during the 1000-year compliance period defined by DOE Order 435.1. Figure 6 summarizes HELP modeling scenarios and the cover performance assumptions incorporated in the modeling. Input parameters such as the assumed annual precipitation and cover component performance were varied as part of the sensitivity analysis for different modeling scenarios.

Appendix C of the Performance Assessment, “Cover System Analyses for the Environmental Management Disposal Facility”, details the performance features, events, and processes assumed in the HELP modeling. Jacobs calculation package, “Calculation and Data Package for the HELP Model” (CAW-90EMDF-G118) documents the HELP modeling that was performed.

4.6.1.1 Conceptual model of EMDF water balance

A basic conceptual model for the water balance of the EMDF system includes the natural environmental drivers of land surface hydrology and the engineered drainage features and barrier systems of the landfill design (Fig. 7). Net infiltration of water through the surface layer and into the cover lateral drainage system is a function of climatic and meteorological dynamics and characteristics of the surface soil and vegetation that control local surface water and energy budgets. Subsurface percolation of water is conceptualized as predominantly vertical within the waste zone and earthen barriers of the cover and liner systems, whereas both vertical and lateral drainage are assumed to occur within the engineered drainage layers. Water movement through the unsaturated zone beneath the liner also is conceptualized as vertically downward to the water table.

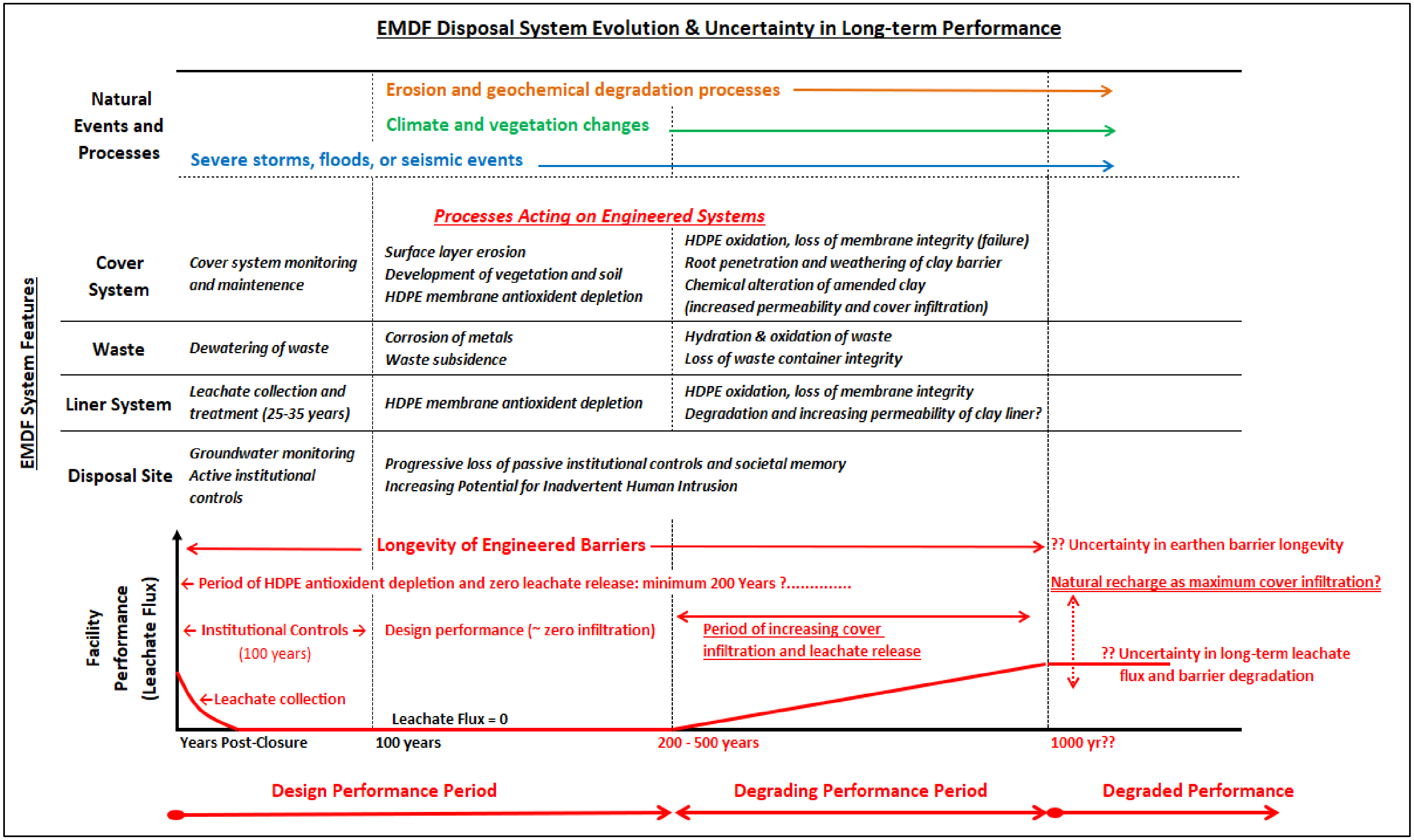


Fig. 6. Generalized conceptual model of EMDF performance evolution

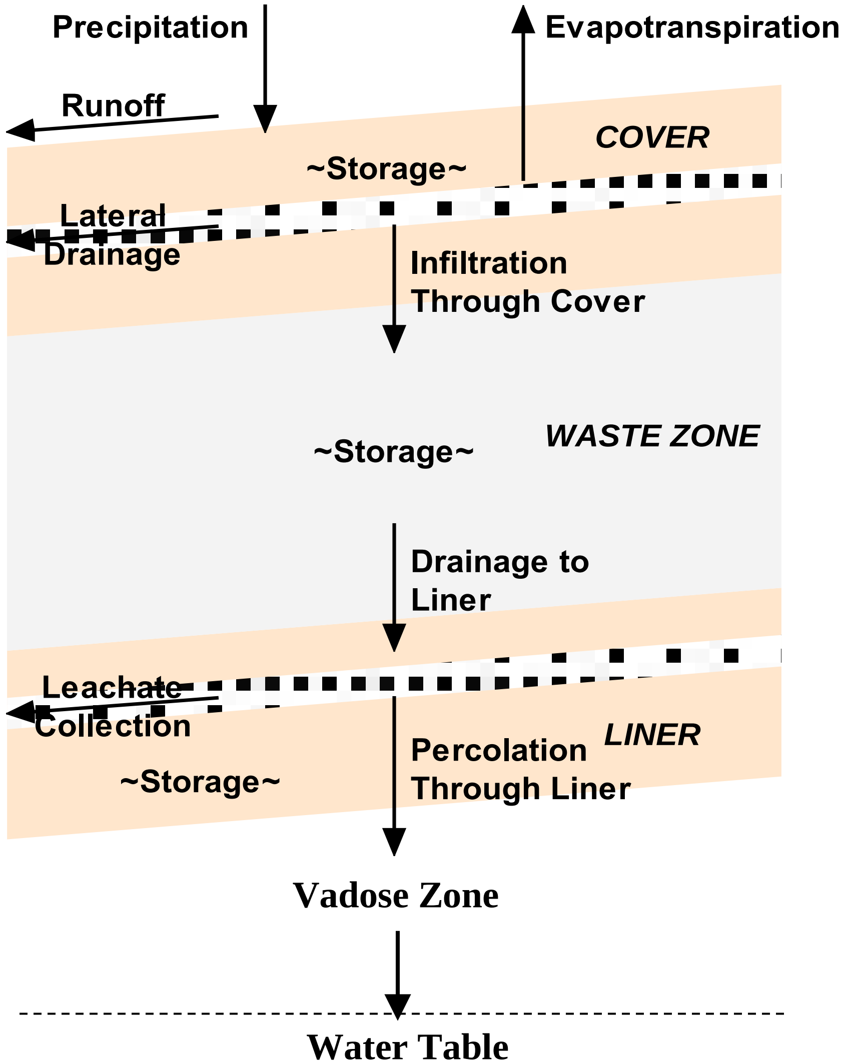


Fig. 7. Schematic diagram of EMDF water balance

4.6.1.2 HELP model code

Selection of the modeling tool to simulate EMDF cover system hydrologic dynamics and variably saturated zone flow through the landfill is based on the conceptual model presented above. Simulation of transient hydrologic phenomena (i.e., variability in precipitation, runoff, and evapotranspiration) is necessary for adequate prediction of long-term cover system performance. For cover system water balance modeling that incorporates daily and seasonal fluctuations in weather, the HELP computer code (Schroeder et al. 1994a, Schroeder et al. 1994b) is utilized to estimate post-closure rates of vertical percolation from the cover into the waste zone and out of the liner system under different environmental scenarios.

The HELP model was developed at the U.S. Army Corps of Engineer Waterways Experiment Station under a cooperative agreement with EPA to support Resource Conservation and Recovery Act of 1976 and Superfund programs. Use of the HELP model is recommended by EPA and required by most states for the evaluation of closure designs for hazardous and nonhazardous waste management facilities. Numerous private engineering firms and federal, state, and municipal governmental agencies use the model for design evaluation and regulatory permitting actions. The model also is used for training and continuing research at many universities. The HELP code (Version 3.07, dated November 1997) reflects the most recent modifications and corrections suggested by independent source code verification, sensitivity analysis, and related activities.

4.6.1.3 HELP model description

HELP is a quasi two-dimensional hydrologic model of water movement into and through landfill systems. The model accepts climate, soil, and design data, and uses estimation techniques that account for the effects of surface storage, snowmelt, runoff, infiltration, evapotranspiration, vegetative growth, soil moisture storage, lateral subsurface drainage, leachate recirculation, and unsaturated vertical drainage as well as leakage through soil, geomembrane, or composite liners. Landfill systems, including various combinations of vegetation, cover soils, waste cells, lateral drain layers, low permeability barrier soils, and synthetic geomembrane liners, may be modeled. The HELP model was developed to assist hazardous waste landfill designers and regulators in evaluating the hydrologic performance of proposed landfill designs. The program was developed to conduct water balance analyses of landfills, cover systems, and solid waste disposal and containment facilities. The model facilitates rapid estimation of the amounts of runoff, evapotranspiration, drainage, leachate collection, and liner leakage that may be expected to result from the operation of a wide variety of landfill designs. The HELP model has been used for design and performance modeling of the EMWMF in BCV and has been selected for use in EMDF design.

The HELP code has been widely used for landfill design and performance evaluation over more than two decades. The HELP model employs an extensive set of submodels to represent the water and energy balance at the surface, the USDA-NRCS Curve Number method for estimating surface runoff (USDA 1986), a Dupuit-Forcheimer approximation for saturated flow in lateral drainage layers, and simplified algorithms for vertical flow and routing of water through a user-defined profile of landfill layers that may include lateral drainage layers, vertical percolation layers, soil barrier layers, and synthetic geomembranes (Schroeder et al. 1994a, Schroeder et al. 1994b).

The HELP model includes approximations that can affect the predicted surface water balance and vertical fluxes below the surface. Parameterization of surface soil and vegetation characteristics, in particular, will affect the estimated net infiltration through the surface layer (precipitation–runoff–evapotranspiration), which sets an upper bound on percolation through the cover system as a whole. HELP utilizes a soil moisture characteristic model for unsaturated flow based on moisture content at soil field capacity and wilting point and employs a unit hydraulic gradient assumption (Darcy velocity equal to [un]saturated hydraulic conductivity) for each vertical percolation layer. Soil barrier layers are assumed to remain saturated, with flow driven by the estimated head on the top of the barrier. Depending on the predicted net infiltration, lateral drainage flux, and specified soil hydraulic characteristics, these simplifying vertical flow assumptions will tend to over predict downward vertical water movement through the modeled profile. In particular, these HELP flow approximations omit more complex surface tension physics such as the effect of capillary barriers designed to inhibit downward subsurface flow.

4.6.1.4 Previous applications of HELP to landfill water balance modeling

Evaluations of HELP results relative to predictions of more complex, mechanistic models of subsurface flow and to field measurements of landfill hydrologic fluxes have yielded variable conclusions. As discussed in "Water Balance Modeling of Earthen Final Covers" in the *Journal of Geotechnical and Geoenvironmental Engineering* (Khire et al. 1997), HELP and UNSAT-H model predictions were compared to field measurements at an arid site and it was found that HELP grossly under predicted surface runoff using the curve-number approach and that percolation from the evaporative zone was over predicted due to the simplified flow and routing procedures employed. Another comparison of HELP and UNSAT-H models applied to a hypothetical humid site suggested that UNSAT-H predictions of vertical percolation based on daily rainfall data were higher than HELP-predicted rates (NRC 1996). A comprehensive study of multiple landfills in a variety of climatic settings (Albright et al. 2013) that compared HELP predictions to field data found that, for the two humid sites included, HELP tended to over predict both runoff and percolation from the cover barriers. In general, the available studies indicate that HELP tends to over predict vertical percolation at humid sites, suggesting that use of HELP for modeling humid site conditions may be conservative in terms of estimating cover system performance.

In consideration of these particular model-structure uncertainties in use of HELP for design and performance modeling, it is essential to develop a detailed understanding of model sensitivity to parameter choices so that the most important parameter uncertainties may be identified. HELP simulations for the EMDF preliminary design, estimated long-term performance conditions, and model sensitivity and uncertainty analysis are described in Sect. C.2 of the Performance Assessment. HELP model estimates representing long-term performance conditions are only very general indications of the actual cover infiltration that may be expected for a given change in engineered barrier properties and should not be considered.

As shown by the conceptual model (Fig. 2), the HELP model is specifically designed to be used for the landfill setting. Therefore, it is commonly used by landfill designers and often required by the regulators to perform water-balance analysis and to evaluate the hydrologic performance of proposed landfill designs. Since the EMDF is a designed engineering landfill, the HELP model is uniquely suitable to be used to estimate the infiltration rate into and out the landfill system. As previously mentioned, the use of the HELP model is recommended by EPA and required by most states for evaluating closure designs of hazardous and nonhazardous waste management facilities. Numerous private engineering firms and federal, state, and municipal governmental agencies use the model for design evaluation and regulatory permitting actions. The model is also used for training and continuing research at many universities.

HELP model has also been extensively tested and verified using various other methods (Schroeder et al. 1987a, Schroeder et al. 1987b, Berger 2000), so it is a well applied and reliable model.

Additionally, results from the HELP modeling of the EMWMF were used to support the evaluation of the performance of that facility (DOE 1998a, DOE 1998b). The conclusions from that evaluation resulted in a ROD in which the selected remedy was the construction of the EMWMF. The ROD was approved by DOE, EPA, and the state of Tennessee (DOE 1999). The EMWMF is an operating disposal facility for waste generated on the ORR by response actions conducted under CERCLA.

More recent performance evaluations associated with the final EMWMF disposal cell design and site layout have included the results of HELP modeling of the EMWMF. That work has been approved by the DOE-headquarters LFRG (DOE 2018e).

Since the EMDF will be disposing of similar waste streams and waste forms, the design components are identical to the EMWMF. Both the EMWMF and the EMDF are located in BCV (the same watershed) on the ORR. The EMDF site is approximately 1.5 miles southwest (downstream) of the EMWMF. The EMDF site is similar to the EMWMF site because it is along strike of the bedrock units and therefore, in the same geologic setting as EMWMF. In addition, due to close proximity to the EMWMF, the climate is considered identical at both locations. Therefore, the topography, the vegetation, the soil, hydrologic regime, and the bedrock are essentially the same at the two sites.

4.6.2 STOMP

The EMDF at the CBCV site will be built in an elevated area between drainages to provide sufficient separation between the waste and groundwater to meet a key design requirement. In addition to the cell liner system, there will be a minimum 10-ft combined geologic buffer zone and unsaturated in situ soil/bedrock interval above the groundwater table. Therefore, the vadose zone is expected to have a significant impact on the fate and transport of radionuclides that may be released from the disposal cell.

The STOMP Model (White and Oostrom 2000, White and Oostrom 2006) is used to simulate radionuclide release and vadose zone transport for the EMDF. The other models applied in the performance assessment do not explicitly represent vadose zone contaminant transport or incorporate simplified waste geometry and vadose transport representations (refer to the description of the RESRAD-OFFSITE model in Sect. 3.3.4 and Appendix G of the Performance Assessment). The STOMP model provides information on the spatial distribution and timing of radionuclide flux through the vadose zone to the water table, and explicitly represents the geometry of the EMDF preliminary design (waste and liner system) and materials below the liner (geologic buffer zone, saprolite and fractured bedrock).

The STOMP model was developed by Pacific Northwest National Laboratory (PNNL) for modeling subsurface flow and transport systems. The fundamental purpose of the STOMP simulator is to produce numerical predictions of thermal and hydrogeologic flow and transport phenomena in variably saturated and fractured subsurface environments that are contaminated with radionuclides and volatile or nonvolatile organic compounds. The STOMP model is selected due to its ability to simulate transient flow and radionuclide transport phenomena in complex, variably saturated subsurface environments. Although the STOMP model is capable of simulating contaminant transport in saturated media, the EMDF application the model is limited to transport in the waste and unsaturated zone above the water table. The STOMP model also has been applied for performance assessment at the DOE Hanford and Portsmouth facilities.

Quantitative predictions from the STOMP simulator are generated from the numerical solution of partial differential equations that describe subsurface environmental transport phenomena. Representation of the contaminated subsurface environment is based on governing conservative equations and constitutive functions. Governing coupled flow equations are partial differential equations for the conservation of water mass, air mass, carbon dioxide mass, methane mass, volatile organic compound mass, salt mass, and thermal energy. Constitutive functions relate primary variables to secondary variables. The solution of the governing partial differential equations occurs by using the integral volume finite difference method. The governing equations that describe thermal and hydrogeological flow processes are solved simultaneously using the Newton Raphson iteration to resolve the nonlinearities in the governing equations. Governing transport equations are partial differential equations for the conservation of solute mass. The governing equations for solute mass conservation are solved sequentially following the solution of the coupled flow equations.

STOMP follows the PNNL standards based management system safety software subject area that has been written to meet those QA requirements. STOMP development is managed under a configuration management plan in conjunction with a software test plan that details the procedures used to test, document, and archive modifications to the source code. Formal procedures for software problem reporting and corrective actions for software errors and updates are maintained and rigorously implemented. The model simulations of various scenarios have compared to existing analytical and numerical models. Documentation of all verification and validation testing is publicly available (White and Oostrom 2000, White and Oostrom 2006, Nichols et al. 1997).

The STOMP model code may be obtained from the model author at DOE PNNL (http://stomp.pnnl.gov/) and the user manual may be downloaded from http://stomp.pnnl.gov/training/trainingdoc.stm.

4.6.2.1 Application of STOMP results to other Performance Assessment models

As discussed above, STOMP modeling provides a detailed understanding of source depletion and the impact of liner system design on release to and transport in the vadose zone. Sensitivity runs demonstrate the significance of assumed K_d values and long-term cover performance for radionuclide flux to the saturated zone. Two key output products provided by the STOMP modeling are used to assist in the proper application of the other Performance Assessment models. These outputs relate to the non-uniform pattern of release and the vadose zone transport time (arrival time at the water table elevation below the disposal unit). These outputs were calculated and applied to the saturated zone radionuclide transport analysis conducted using MT3D model (see Appendix F in the Performance Assessment).

4.6.2.2 Non-uniform release and input to the saturated zone

A commonly used simplification in modeling contaminant release from a waste zone is assuming uniform water flux from the waste area, which generally provides a good approximation for the overall mass flux to groundwater. The detailed STOMP modeling of the EMDF system suggests that the liner system design could have a strong impact on the pattern of mass release, producing a highly non-uniform water and radionuclide flux from the disposal facility or from a single cell. This impact is primarily a result of the geometry and slope of the liner system required for effective leachate drainage and collection during operations and the early post-closure period.

Therefore, saturated zone radionuclide transport modeling for the EMDF may need to consider the potential impact of a non-uniform release scenario, as an alternative to the commonly used uniform source release conceptual model. Use of the STOMP model results to analyze a simplified non-uniform release scenario in the EMDF saturated zone transport modeling is presented in Appendix E in the Performance Assessment.

4.6.2.3 Vadose zone delay on contaminant movement from waste source

The STOMP model results clearly show the impact of the vadose zone on the movement of the radionuclides. The vadose zone both retards transport and reduces the radionuclide aqueous concentration between the waste and saturated zone beneath the EMDF due to the sorption and desorption process.

In addition to the general vadose sorption impact (delay of flux to the saturated zone), the complexity of the EMDF design (multiple disposal cells with variable liner floor elevations) and the effect of non-uniform vadose zone thickness results in variable initial arrival times and peak concentrations for radionuclides entering the saturated zone. To provide a reasonable average vadose delay time for the saturated zone fate-transport model (MT3D), (Zheng and Wang 1999), the total radionuclide mass flux rate at the water table output surface in the STOMP Section A model is utilized.

The average arrival times were calculated for the three radionuclides (Tc-99, C-14, and I-129) that make the primary dose contributions in the performance analysis (Table E.8 in the Performance Assessment). The Section A model predicted somewhat earlier Tc-99 arrival times than the Section B model, so the Section A model results are used for subsequent application in the saturated zone modeling. Radionuclide-specific arrival times for each disposal cell was also calculated based on the output from the corresponding water table surface segments. These cell-by-cell arrival times were used to formulate the non-uniform release scenario for the saturated zone transport model as discussed in Appendix E of the Performance Assessment.

4.6.3 MODFLOW

A series of three-dimensional groundwater flow models were developed for the proposed EMDF at the CBCV site. The site-specific models were used to predict the groundwater levels under current conditions and groundwater levels after construction of a new disposal facility. The predictive results of the groundwater flow models are being used to guide the design process of the new disposal facility. In addition, the future condition (degraded cover and liner performance) of the design model provides required key input parameters to support the Performance Assessment.

These site-specific groundwater flow models were developed for the proposed EMDF area based on the BCV regional groundwater flow model. During the BCV FS (DOE 1997b), a BCV regional model was developed based on data collected during comprehensive RI activities (DOE 1997a) and recently developed conceptual frameworks for geology and hydrology of the ORR (ORNL 1992a, ORNL 1992b, ORNL 1988). The BCV regional groundwater flow model was used to refine and quantify components of the hydrogeologic conceptual model for BCV, and quantitatively evaluate alternatives for remediation as discussed in the BCV FS (DOE 1997b).

The groundwater flow models for the EMDF site in CBCV were developed in two stages. The site-specific flow model for the CBCV (CBCV model) representing current (pre-construction) site conditions was the first stage. The CBCV model incorporates all the recently available site characterization data collected at the EMDF site, including well tests, groundwater levels, and stream flow rates. The CBCV model results were compared to the field data and model parameters were refined (calibrated) to better represent site specific groundwater conditions. Sensitivity analyses were conducted to establish the key hydrogeologic parameters influencing predicted conditions as part of the model refinement.

The design condition model (EMDF model) was the second stage of the model development. The EMDF model started from the calibrated CBCV model and incorporated the EMDF preliminary design features into the model grid. The EMDF model was used to predict post-construction disposal facility groundwater conditions, assuming zero recharge to the saturated zone.

For the Performance Assessment, the EMDF model was run assuming long-term cover and liner hydrologic performance (non-zero recharge directly beneath the disposal unit) to provide the following information:

- Groundwater levels for various performance conditions
- Depth to groundwater beneath the disposal cells
- Groundwater flow field and discharge locations
- Delineation of the likely maximum impact location for groundwater
- Sensitivity analysis for key model parameters
- Flow linking files to conduct contaminant fate-transport modeling in the saturated zone.

The BCV regional, CBCV, EMDF, and UBCV groundwater models all use the MODFLOW code—a finite-difference groundwater flow code developed by the U.S. Geological Survey (USGS) (McDonald and Harbaugh 1988a). MODFLOW is a modular, block-centered finite-difference groundwater flow code capable of simulating both transient and steady-state saturated groundwater flow in one, two, or three dimensions. MODFLOW calculates potentiometric head distribution, groundwater flow rates, velocities, and water balances throughout an aquifer system. It also includes modules simulating recharge, flow toward wells, and groundwater flowing into drains and rivers. A number of different boundary conditions are available, including specified head, areal recharge, injection or extraction wells, evapotranspiration, drains, and streams or rivers. Aquifers can be simulated as unconfined, confined, or a combination of unconfined and confined. The finite-difference equations may be solved using a strongly implicit procedure, slice-successive over-relaxation, or preconditioned conjugate gradient method.

MODFLOW assumes that the aquifer can be characterized as a porous medium. The application of a porous media code (i.e., MODFLOW) to a fractured bedrock system, such as BCV, is termed the equivalent porous media approach. This approach assumes that the media is fractured to the extent that it behaves hydraulically as a porous media. Three-dimensional representation of hydraulic properties within MODLFOW also provides flexibility to present fracture orientation and distribution. This approach is applicable to BCV given the high degree of weathering near the surface, numerous bedding planes and fractures in the sedimentary rock units, presence of a very active groundwater flow system, and extensive groundwater-surface water interaction. Given the large scale of the model domain (kilometers) compared to the fractured nature of the underlying geologic units (on the order of centimeters to meters), and the degree of precision required to support the Performance Assessment, the MODFLOW model can accurately predict the nature of the groundwater flow system for the area. In addition, the equivalent porous media approach is the most practicable modeling approach for the BCV area. Previous model applications have shown its predictability and consistency with field groundwater and surface flow measurements through mass balance analyses and contaminant plume extent and movement through particle tracking (USGS 1988, DOE 1997b, BJC 2010).

MODFLOW was selected for the BCV site because it is in public domain and is widely used by the industrial, scientific, and governmental communities in the United States and around the world. The code has been rigorously tested and verified, and a variety of software tools are available for graphical pre- and post-processing. MODFLOW models also were developed for the BCV RI and FS as well as the EMWMF design and performance evaluations. These models received tri-party approval under the CERCLA process (DOE 1997b, DOE 1998a, DOE 1998b). All groundwater flow model simulations were conducted using MODFLOW-2005 code (Harbaugh 2005). A telescopic mesh refinement (TMR) modeling approach was used to develop the CBCV model from the calibrated BCV regional flow model originally constructed by the Jacobs Environmental Management Team for the BCV FS (DOE 1997b). The TMR approach enables the user to develop a site-specific model using existing regional information and allows focus on areas of interest with increased model grid resolution and more accurate representation of site-specific features. The TMR approach utilizes the results from the calibrated regional flow model to assign preliminary boundary conditions and model parameters in the TMR model, which reduces the degree of detailed model recalibration. Further refinements were made to the TMR model framework after extraction and incorporated to better represent the location of streams, hydrogeological units, and existing topography in the CBCV model, as described below.

Groundwater Vistas (Environmental Solutions, Inc. 2017), a graphic user interface program to aid in model development, simulation, and pre- and post-modeling processes, was used to perform the TMR model approach. Refinement of the CBCV model was also conducted using the Groundwater Vistas software. The use of a graphic interface allows both simpler refinement and quality control in model development.

Based on the flow model results, particle tracking was performed using the MODPATH model developed by USGS (Pollock 1989) for selected flow model runs. Particle tracking is a technique that uses the velocity field produced by the model to delineate the path that a molecule of water, or contaminant, would take from its origin to a discharge point. This information is especially important because of the high anisotropy associated with the aquifer units underlying the BCV watershed. MODPATH Version 5 was used for the simulation and was used to help illustrate the groundwater flow paths, including the high anisotropy of the different geologic layers and with depth.

4.6.4 MT3D

To evaluate the potential impact of radionuclides released from the proposed EMDF to the groundwater at the CBCV site, a groundwater fate-transport model was implemented. The purposes of the modeling include the following:

- Delimit the maximum extent of the contaminant plume
- Determine the maximum impact location along the 100-m buffer zone boundary
- Evaluate the impact to groundwater from disposal cell leakage during post-closure period
- Quantify contaminant discharge to the surface water streams
- Predict the likely concentrations of selected radionuclides at the 100 m groundwater well location and timing of the peak concentration.

A site-specific three-dimensional groundwater flow model was constructed for the proposed EMDF as discussed in Appendix D of the Performance Assessment. Flow simulations were conducted using the MODFLOW-2005 code (USGS 1988; Harbaugh 2005). Based on the MODFLOW flow model simulation, the movement of contaminants from EMDF are predicted using MT3DMS (Zheng and Wang 1999), an improved version of the original three-dimensional fate-transport model code MT3D (Zheng 1990).

MT3D is a comprehensive three-dimensional numerical simulation code that models the fate and transport of dissolved contaminants in complex groundwater systems. The MT3D model calculates concentration distributions, concentration histories at selected points and hydraulic sinks (e.g., extraction wells), and the mass of contaminants in the groundwater system. The code can simulate three-dimensional transport in complex steady-state and transient flow fields and can represent anisotropic dispersion, source-sink mixing processes, first-order transformation reactions, and linear and nonlinear sorption. The MT3D model offers the user a choice of four solution options that make it uniquely well suited for handling a wide range of conditions, one of which, the Method of Characteristics technique, is best suited for handling advection-dominated problems. The MT3D model is linked with MODFLOW, the USGS groundwater flow simulator, and is designed specifically to handle advectively dominated transport problems without the need to construct refined models specifically for solute transport. MT3D is one of the most used three-dimensional solute transport codes and has been used successful in modeling thousands of sites. The MT3D model is widely accepted by the regulators and groundwater consulting and research communities and has been used in BCV (DOE 1997b, DOE 1998a, DOE 1998b).

4.6.5 RESRAD-OFFSITE

The RESRAD-OFFSITE version 3.2 (Yu et al. 2007, Gnanapragasam and Yu 2015) computer code estimates the radiological dose and/or risk to a receptor located inside or outside an area of radionuclide contamination. RESRAD-OFFSITE is part of a suite of RESRAD codes developed and maintained by researchers at Argonne National Laboratory with sponsorship provided by DOE and the NRC. Computer code and version control are maintained by DOE through Argonne National Laboratory.

In RESRAD-OFFSITE, concentration, dose, and risk may be calculated at different time intervals of interest. The code contains computational models for primary contamination, atmospheric transport, groundwater transport, offsite accumulation, and exposure. Deterministic and probabilistic simulations may be performed within RESRAD-OFFSITE and both were used to assess EMDF cell performance and predict radiological dose to a hypothetical representative receptor. Deterministic simulations were performed to enable comparison of results with regulatory criteria. Probabilistic simulations provided an approach to assess uncertainty given potential variation in model parameter values.

In addition to calculating radiological dose, the use of RESRAD-OFFSITE enables calculating excess lifetime cancer risk using the predicted radionuclide concentrations in the environment. RESRAD-OFFSITE can be used to derive single radionuclide soil guidelines to determine cleanup levels corresponding to a user-specified dose limit (e.g., 25 mrem/year) or to estimate the amount of a specific isotope that may be emplaced in a disposal cell. Calculations of radon flux across the cell cover also are possible; however, other methods were used to calculate radon flux at EMDF (see CAW-90EMDF-G124).

RESRAD-OFFSITE has been benchmarked by the code developers with other peer codes, including Clean Air Act Assessment Package-1988 (Parks 1992), Industrial Source Complex-Long Term (EPA 1995), GoldSim (GoldSim 2010), Disposal Unit Source Term-Multiple Species (Sullivan 2001), and others (Yu et al. 2006). Prior to performing simulations, model verification of the RESRAD-OFFSITE version 3.2 software was performed on the three Drummond Carpenter computers used for simulations. Model verification documentation is included in the Performance Assessment (Appendix G, Sect. G.3.2).

4.6.6 PATHRAE-RAD

Contribution of the dose from EMWMF to the Composite Analysis uses the same method applied for the waste acceptance criteria development and performance evaluations conducted for the EMWMF. The PATHRAE-RAD model (Rogers and Associates 1995) was used to develop the waste acceptance criteria for EMWMF located in BCV (DOE 1998a, DOE 2001b) and subsequent performance evaluations associated with cell expansions (BJC 2010). In December 2018, the EMWMF received an Operating DAS from DOE Headquarters following the development of adequate corrective actions using the PATHRAE-RAD model to address issues from the LFRG relating to the addition of Cell 6 that increased the capacity of the EMWMF (DOE 2018e). To be consistent with these previous modeling efforts, the PATHRAE-RAD code was used in the Composite Analysis to quantify doses for the EMWMF.

PATHRAE-RAD is a computer code capable of assessing multiple transport pathways for radiological contaminants that have the potential to impact human receptors. PATHRAE-RAD was originally developed for use by EPA (PATHRAE-EPA) in preparation of standards for management of low-level (radioactive) waste (EPA 1987). PATHRAE-RAD can be used to estimate risks and doses to humans from possible releases and subsequent transport of contaminants through multiple pathways from land disposal units containing chemical and radioactive wastes. The code also can be used to calculate risks at specified points in time and peak risks (in time) to individuals at any number of key locations inside or outside the boundaries of a disposal facility.

The PATHRAE-RAD code can model the movement of contaminants via groundwater to surface water. This pathway consists of the downward movement of contaminants from the overlying waste through the unsaturated zone. This movement results from the leaching of contaminants by precipitation that infiltrates through the cap and percolates through the waste. A one-dimensional model of this movement through a uniform medium was used. Once the contaminants reached the saturated zone, their horizontal movement to the point of discharge into the surface water was modeled as one dimensional movement through a uniform medium. For migration of radionuclides through the saturated zone, the in growth of daughter radionuclides can be calculated for any of seven radioactive decay chains.

The PATHRAE-RAD code performs similar tasks to other pathway analysis codes, such as RESRAD (Yu et al. 2001). A benchmarking comparative study by a RESRAD team concluded that the doses predicted by the RESRAD and PATHRAE-RAD codes for the inhalation and ingestion pathways were in relatively good agreement (Fallace et al. 1994). An advantage of the PATHRAE-RAD codes is the simplicity of operation and presentation of results, while still allowing the analysis of a comprehensive set of contaminants and pathways to human receptors. This allows the easy identification of parameters important for the protection of the public from potential releases.

The PATHRAE-RAD model was used to estimate the resulting dose for a receptor at the Bear Creek and NT-5 (BCK 10.5) location from an estimated closure waste inventory in the EMWMF based on latest operational data using the same method and model parameter assumptions used for the EMWMF RI/FS (DOE 1998a), its addendum (DOE 1998b), and subsequent performance evaluations associated with cell expansions (BJC 2010). The dose then was applied to the downstream receptor locations for the Composite Analysis. The PATHRAE-RAD modeling is documented in Appendix B of the Composite Analysis and in calculation package "Calculation and Data Package for the PATHRAE Model" (CAW-90EMDF-G257). The results of this modeling were used to calculate composite doses for the base case assessment and the sensitivities/uncertainties evaluated in calculation package "Calculation of the Base Case Assessment Dose, the Mixing Ratios in Bear Creek, and the Sensitivities in Revision 2 of the EMDF and EMWMF Composite Analysis" (CAW-90EMDF-G002).

4.7 DOCUMENTATION OF MODEL INPUT PARAMETERS

The Model Input Parameter Identification, Review, and Verification forms identify all of the input parameters in the initial simulations run by each of the models and the reviews that were performed on the input parameters. The Model Check forms document changed input parameters from the initial simulation such as changes in the Performance Assessment base case to account for EMDF cover degradation over time and for sensitivity/uncertainty analyses and document the review of those parameters. Note that input parameters for supporting calculations such as RUSLE2, the bathtub scenario analysis, and radon flux were documented and reviewed during the preparation of their respective calculation packages. The Model Input Parameter Identification, Review, and Verification forms for each of the six models described above are in Appendix A of this QA Report. Applicable Model Check forms are in Appendix B.

5. MODEL DEVELOPMENT

Previous sections in this report present overviews of the models that were used to predict the performance of the EMDF (in the Performance Assessment) and the EMDF, the EMWMF, and the other existing BCV sources (in the Composite Analysis). Section 4 included a description of input to the Performance Assessment and the Composite Analysis (that is preparation, review, and approval of calculation packages) and the input parameters for each of the models.

The purpose of this section is to provide an overview of the scope of the simulations performed using each of the models in this section in order to aid in the interpretation of the completed forms that document the simulations. This section details the performance modeling conducted to support the development of the Performance Assessment and the Composite Analysis such as the software configuration control, verification testing, identification of digital files, and any post-processing that was performed.

Jacobs FOSOP 202, *Control of Engineering Software*, contains the requirements for the acquisition and installation of software on Jacobs computers, software configuration control, and software verification testing. UCOR has a similar software QA that contains similar requirements (including verification testing) for software documentation. UCOR documents these requirements in the UCOR SAMOA system.

This section references the completed Model Simulation logs and the UCOR Information/Data Transfer Transmittal submittal for the HELP, STOMP, MODFLOW, MT3D, and RESRAD-OFFSITE models. The forms are in Appendix B of this QA Report.

5.1 HELP

The HELP program and supporting documents were downloaded from the https://www.epa.gov/land-research/hydrologic-evaluation-landfill-performance-help-model website onto on a Jacobs-owned Dell Precision 7720 computer with a Window 10 Enterprise operational system. (LAP0043). Since HELP is a 16-bit program, it will not run on 64-bit systems (that is, most Windows 7 and more recent operational systems), the required third party emulator was also downloaded.

This section documents the details of the HELP modeling such as the software configuration control, verification testing, modeling results and post-processing. This documentation is provided on the Model Simulation logs that were completed during, and following, the HELP modeling. These Model Simulation Log- HELP forms are provided in Appendix B.

Additionally, the software modeling codes and version and the configuration control procedures are presented in the Model Simulation Log - HELP for each of the following modeling simulations:

- Verification and application test (see Sect. 5.1.1)
- Post-processing modeling runs (see Sect. 5.1.2).

The Model Simulation Log-HELP presents the following information for each of the model simulations:

- Analyst
- Simulation title
- Purpose of simulation

- Model code used/version number
- Configuration control (computer hardware/operating system)
- Names of input files
- Comments on input data
- Names of output files
- Comments on model outputs/results
- General comments
- Reviewer and date reviewed.

Note that the same information is presented in the Model Simulation logs for the remaining models described in this section (STOMP, MODFLOW, MT3D, and RESRAD-OFFSITE and PATHRAE-RAD). Therefore, this description of the type of information will not be duplicated in the following Sects. 5.2 through 5.6.

The HELP modeling is also detailed in the Jacobs calculation package (CAW-90EMDF-G118), which includes the following information:

- Calculation title
- Purpose
- Description of calculation
- Assumptions
- Design inputs
- Software
- Calculation section
- Conclusions and recommendations
- References.

Note that the same information is also presented in the calculation packages for the remaining modeling described in this section. Therefore, this description of the type of information will not be duplicated in the following Sects. 5.2 through 5.6.

This calculation package was prepared by Jacobs in accordance with the Jacobs FOSOP 206, *Design Calculations*. The Calculation Cover Sheet (FOSOP 206f1) documents that the calculation package has been technically reviewed (checked) and it complies with FOSOP 206 (approved). Since this calculation package was prepared by Jacobs, it was also technically reviewed and approved by UCOR. This review and approval is documented on UCOR Form-3416 which is assigned a UCOR calculation number (CAW-90EMDF-G118) and attached to the Jacobs calculation. This allows the calculation to be archived by UCOR for future retrieval if necessary. This calculation package was transmitted by Jacobs with the appropriate digital files for UCOR archival. The digital files are identified in the calculation package. Archival and retrieval of calculation packages and accompanying digital files is discussed in Sect. 6 of this document.

5.1.1 Verifications and Application Testing

Model V&V is an enabling methodology for the development of computational models that can be used to make engineering predictions with quantified confidence. Model verification is addressed by the modeling applicable references listed in the reference section. The hardware and operational system's operability testing was conducted by running a sample problem and comparing the output from the testing run to the original output file.

As detailed in the calculation package, before the project-specific HELP model simulations were performed, model V&V was performed to verify the applicability and operability of the HELP model on the selected hardware and operational system (Dell Precision 7720/Window 10 Enterprise).

Input files provided by the HELP model were used to run the code on the working computer and the resulting output file was compared to the original problem output file by spot checking randomly throughout the output file and the predicted results.

The original input and output file names are identified below and were provided with the HELP calculation package:

- RCRA.D4
- RCRA.D7
- RCRA.D10
- RCRA.D11
- RCRA.D13
- RCRA.OUT.

Using the input files above, the acceptance testing run output file name is RCRA-VV.OUT. This digital file was also provided with the calculation package.

The test run from this project provided identical output result as the original output file. The test indicates the computer hardware and software version applied in the project are able to be used as model intended.

This V&V is also documented on the Model Simulation Logs- HELP forms.

5.1.2 Model Results and Post Processing

The HELP modeling resulted in infiltration rates of rainwater into the EMDF at three time frames following its closure:

- 0.00 in./year up to 200 years
- 0.43 in./year from 200 to 1000 years
- 0.88 in./year for times greater than 1000 years.

These results are documented in the Jacobs calculation package (CAW-90EMDF-G118). These infiltration rates were transmitted to others needing this information using UCOR Information/Data Transfer Transmittal Submittal 002-R1. This includes those performing simulations with the models identified in Fig. 3 and the author of the Performance Assessment.

No post processing programs were used for presentation and visualization of these results.

5.2 STOMP MODEL DEVELOPMENT

The STOMP model code was obtained from the model author at DOE PNNL (http://stomp.pnnl.gov/) and the user manual was also downloaded (in portable document format) from http://stomp.pnnl.gov/training/trainingdoc.stm. The STOMP model was downloaded onto on a Jacobs-owned Dell Precision 7720 computer with a Window 10 Enterprise operational system (LAP0043).

This section documents the details of the STOMP modeling such as the software configuration control, verification testing, modeling results and post-processing. This documentation is provided on the Model Simulation logs that were completed during and following the STOMP modeling. These Model Simulation Logs - STOMP forms are provided in Appendix B.

Additionally, the software modeling codes and version and the configuration control procedures are presented in the Model Simulation Log - STOMP for each of the following modeling simulations:

- Verification and application test (see Sect.5.2.1)
- Post-processing modeling runs (see Sect. 5.2.2).

The STOMP model calculation package was prepared by Jacobs in accordance with the Jacobs FOSOP 206, *Design Calculations*. The Calculation Cover Sheet (FOSOP 206f1) documents that the calculation package has been technically reviewed (checked) and it complies with FOSOP 206 (approved). Since this calculation package was prepared by Jacobs, it was also technically reviewed and approved by UCOR. This review and approval is documented on UCOR Form-3416 which is assigned a UCOR calculation number (CAW-90EMDF-G120) and attached to the Jacobs calculation. This allows the calculation to be archived by UCOR for future retrieval if necessary. This calculation package was transmitted by Jacobs with the appropriate digital files for UCOR archival. The digital files are identified in the calculation package. Archival and retrieval of calculation packages and accompanying digital files is discussed in Sect. 6 of this document.

5.2.1 Verifications and Application Testing

The purpose of performing the model V&V for all of the models presented in this QA Report was described in detail in the HELP Sect. 5.1.1 and therefore will not be duplicated in this section. As detailed in the calculation package, prior to the project-specific STOMP model simulations were performed, Jacobs performed the model V&V to verify the applicability and operability of the STOMP model on the selected hardware and operational system (Dell Precision 7720/Window 10 Enterprise).

The title of the V&V program used was “STOMP Tutorial Problem 3”. The name of the Tutorial program was “Classic test problem for 1D Transport problem, Water mode (STOMP1) with transport”. Input files provided by the STOMP model were used to run the code on the working computer and the resulting output file was compared to the original problem output file by spot checking randomly throughout the output file and the predicted results.

The original input and output file names are identified below and were provided with the STOMP calculation package:

- Input file name – input
- Output file names – Output-VV and Plot.100.

The test run from this project provided identical output results as the original output file. The test indicates the computer hardware and software version applied in the project are able to be used as model intended. This digital file was also provided with the calculation package. This V&V is also documented on the Model Simulation Logs - STOMP forms.

5.2.2 Model Results and Post Processing

All STOMP simulations were performed for 1 million years because the half-life of uranium is several hundred thousand years. For the STOMP model, the two groundwater flow models, and the fate and transport model (MODFLOW and MT3D that will be described in the following subsections), the "base case" is defined as greater than 1000 years. Note that only the results for Tc-99 are presented in the Performance Assessment although the simulation included all of the predicted radionuclides in the waste inventory. The model simulations incorporated two sets of contaminant partition values (K_d values), one set for the waste and one set for the remainder of the system that was modeled by STOMP. The K_d values for the waste zone were assumed to be one-half of the K_d values used for the remainder of the system. For the base case, the following two simulations were run (Model Runs X-A Base and X-B Base), which correlated to two separate cross section lines. The base case model runs are presented in the Model Simulation Log – STOMP:

- Base Condition Model for Cross-section A-A′ (Northwest-Southeast) – Model Run X-A Base: Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A′ (Northwest-Southeast) for the base case parameter and assumptions
- Base Condition Model for Cross-section B-B′ (Northeast-Southwest) – Model Run X-B Base: Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section B-B′ (Northeast-Southwest) for the base case parameter and assumptions.

In addition, the following three sensitivity analyses (X-A S1 same-kd High, X-A S2 same-kd low, and X-A S3 high recharge) were performed with the STOMP model and are also presented in the Model Simulation Log – STOMP:

- Future Condition – Model Run X-A S1 same-kd High: Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A′ (Northwest-Southeast) for the base case parameter and assumptions, except the K_d values for the waste zone were increased to be the same as the values used in the other zones in the simulation
- Future Condition – Model Run X-A S2 same-kd Low: Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A′ (Northwest-Southeast) for the base case parameter and assumptions, except the K_d values for the remainder of the system that was modeled were decreased to be the same as the values used in the waste zone
- Future Condition – Model Run X-A S3 High Recharge: Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A′ (Northwest-Southeast) for the base case parameter and assumptions, except for doubling the higher water infiltration rate (the rates are 0 to 1.76 in./year from 200 to 1000 years in a linear increase function and being constant beyond 1000 years).

These results are documented in the Jacobs calculation package (CAW-90EMDF-G120). The results of the STOMP modeling were not transferred to others on the team because these results were only input to the Performance Assessment and not input to other models. No post processing programs were used for presentation and visualization of these results.

5.3 MODFLOW MODEL DEVELOPMENT

A series of three-dimensional groundwater flow models were developed for the proposed EMDF at the CBCV site. The site-specific models were used to predict the groundwater levels under current conditions and groundwater levels after construction of a new disposal facility. The predictive results of the groundwater flow models are being used to guide the design process of the new disposal facility. In addition, the future condition (degraded cover and liner performance) of the design model provides required key input parameters to support the Performance Assessment.

These site-specific groundwater flow models were developed for the proposed EMDF area based on the BCV regional groundwater flow model. During the BCV FS, a BCV regional model was developed based on data collected during comprehensive RI activities and recently developed conceptual frameworks for geology and hydrology of the ORR. The BCV regional groundwater flow model was used to refine and quantify components of the hydrogeologic conceptual model for BCV, and quantitatively evaluate alternatives for remediation as discussed in the BCV FS.

The groundwater flow models for the EMDF site in CBCV were developed in two stages. The site-specific flow model for the CBCV (CBCV model) representing current (pre-construction) site conditions was the first stage. The CBCV model incorporates all the recently available site characterization data collected at the EMDF site, including well tests, groundwater levels, and stream flow rates. The CBCV model results were compared to the field data and model parameters were refined (calibrated) to better represent site specific groundwater conditions. Sensitivity analyses were conducted to establish the key hydrogeologic parameters influencing predicted conditions as part of the model refinement.

The design condition model (EMDF model) was the second stage of the model development. The EMDF model started from the calibrated CBCV model and incorporated the EMDF preliminary design features into the model grid. The EMDF model was used to predict post-construction disposal facility groundwater conditions, assuming zero recharge to the saturated zone.

For the EMDF PA, the EMDF model was run assuming long-term cover and liner hydrologic performance (non-zero recharge directly beneath the disposal unit) to provide the following information:

- Groundwater levels for various performance conditions
- Depth to groundwater beneath the disposal cells
- Groundwater flow field and discharge locations
- Delineation of the likely maximum impact location for groundwater
- Sensitivity analysis for key model parameters
- Flow linking files to conduct contaminant fate-transport modeling in the saturated zone.

All flow model simulations for the Performance Assessment were conducted using MODFLOW-2005 code (Harbaugh 2005), an improved version of the original MODFLOW (USGS 1988). The MODFLOW model was downloaded onto on a Jacobs-owned Dell Precision 7720 computer with a Window 10 Enterprise operational system (LAP0043).

A three-dimensional groundwater flow and radionuclide transport model, the UBCV groundwater model, was developed for the Composite Analysis to assess the appropriateness of the BCV conceptual site model used in the Composite Analysis and determine the appropriateness of using only surface water in the pathway analysis at the POA. A description of the UBCV groundwater model, model development, justification for use of the model, and description of the input parameters are provided in this document as well as Appendix A of the Composite Analysis. This model was developed as described in Appendix A of the Composite Analysis to support the Revision 1 Composite Analysis. Those modeling results were incorporated directly into this Composite Analysis. Neither the modeling nor the results from the modeling were revised to support Revision 2 of the Composite Analysis. The EMDF representation in the UBCV model is based on the conceptual design from the EMDF RI/FS (DOE 2017b) rather than the preliminary design. However, the UBCV model was used to predict contaminant migration from only the EMWMF and the other existing BCV sources. The groundwater flow and radionuclide transport modeling in the EMDF area in BCV was performed using the EMDF model from the Performance Assessment as discussed above.

The UBCV model in the Composite Analysis used the MODFLOW-2000 code (Harbaugh et al. 2000), and both of the models used the enhanced finite-difference groundwater flow MODFLOW codes developed by the USGS (USGS 1988) to simulate the groundwater flow condition and predict the interaction between groundwater and surface water.

This section documents the details of the MODFLOW modeling such as the software configuration control, verification testing, modeling results and post-processing. This documentation is provided on the Model Simulation logs that were completed during and following the MODFLOW modeling. These Model Simulation Logs – MODFLOW forms are provided in this section.

Additionally, the software modeling codes and version and the configuration control procedures are presented in the Model Simulation Log – MODFLOW for each of the following modeling simulations:

- Verification and application test (see Sect. 5.3.1)
- Post-processing modeling runs (see Sect. 5.3.2).

The MODFLOW model calculation package was prepared by Jacobs in accordance with the Jacobs FOSOP 206, *Design Calculations*. The Calculation Cover Sheet (FOSOP 206f1) documents that the calculation package has been technically reviewed and it complies with FOSOP 206 (approved). Since this calculation package was prepared by Jacobs, It was also technically reviewed and approved by UCOR. This review and approval is documented on UCOR Form-3416 which is assigned a UCOR calculation number (CAW-90EMDF-G121) and attached to the Jacobs calculation. This allows the calculation to be archived by UCOR for future retrieval if necessary. This calculation package was transmitted by Jacobs with the appropriate digital files for UCOR archival. The digital files are identified in the calculation package. Archival and retrieval of calculation packages and accompanying digital files is discussed in Sect. 2 of this document.

5.3.1 Verifications and Application Testing

The purpose of performing the model V&V for all of the models presented in this QA Report was described in detail in Sect. 5.1.1 concerning the HELP model and therefore will not be duplicated in this section. As detailed in the calculation package, prior to the project-specific MODFLOW model simulations were performed, Jacobs performed the model V&V to verify the applicability and operability of the MODFLOW model on the selected hardware and operational system (Dell Precision 7720/Window 10 Enterprise).

The V&V program from the original example testing file from MODFLOW Manual was used for the model V&V model testing run. The version of this software was used for all of the MODFLOW modeling was

MODFLOW-2005, Version 1.12.00 (February 3, 2017), which includes the MODFLOW modeling for both the Performance Assessment and Composite Analysis.

The original input and output file names are identified below and are provided with the MODFLOW calculation package and the model simulation logs. The input file names are as follows:

- twri.bas
- twri.bcf
- twri.dis
- twri.drn
- twri.lst
- twri.nam
- twri.oc
- twri.rch
- twri.sip
- twri.wel.

The output file names are as follows:

- twri.ddn
- twri.hds
- twri.lst.

The test run from this project provided identical output results as the original output file. The test indicates the computer hardware and software version applied in the project are able to be used as model intended. This digital file was also provided with the calculation package. This V&V is also documented on the Model Simulation Logs – MODFLOW forms.

The UBCV model is described in Appendix A of the Composite Analysis. This model was developed in the 2016-2017 timeframe to support the Revision 1 Composite Analysis. The V&V for the UBCV model is documented by Jacobs per their procedure FOSOP 202 and in the UCOR SAMOA system.

5.3.2 Model Results and Post Processing

The MODFLOW groundwater model was used to simulate the current groundwater condition at the EMDF (EMDF-CC), as well as the design condition model (EMDF-DC), and two future condition models (Future Condition Model-EMDF-FC, and Future Condition Model-phase 1-EMDF-FC-p1). In addition, the following three sensitivity analyses were modeled: EMDF-FC-R-1p5, EMDF-FC-K1, and EMDF-FC-K2. The three modeling runs are summarized below and are also presented in the Model Simulation logs presented in Appendix B:

- Calibrated Current Condition Model – Model Run EMDF-CC: Model run to simulate the current condition long-term steady-state groundwater condition at the site
- Design Condition Model – Model Run EMDF-DC: Model run to simulate the design condition steady-state groundwater condition at the site

- Future Condition Model – Model Run EMDF-FC: Model run to simulate the future condition steady-state groundwater condition at the site with recharge rate of 0.88 in./year applied to the lined cell area
- Future Condition Model Phase 1 – Model Run EMDF-FC-p1: Model run to simulate the future condition steady-state groundwater condition at the site with recharge rate of 0.43 in./year applied to the lined cell area to represent the condition during the partial design-performance period (200 to 1000 years).

In addition, the following three sensitivity analyses were performed with the MODFLOW model:

- Future Condition Model – Model Run EMDF-FC-R-1p5: Model run to simulate the future condition steady-state groundwater condition at the site under wet condition with 1.5X of the base recharge rates for the whole model domain (1.32 in./year applied to the lined cell area)
- Future Condition Model – Model Run EMDF-FC-K1: Model run to simulate the future condition steady-state groundwater condition with different of anisotropy ratios (3/5X base anisotropy), lower anisotropy ratio
- Future Condition Model – Model Run EMDF-FC-K2: Model run to simulate the future condition steady-state groundwater condition with different of anisotropy ratios (2X base anisotropy), higher anisotropy ratio.

Groundwater zone characteristics and model parameters based upon groundwater modeling results, and post-processing, were transmitted to others needing this information using UCOR Information/Data Transfer Transmittal Submittal 005-R0. The data included average and cell-specific depth to water from the water for the future condition, groundwater hydraulic gradient to the assessment point, and other aquifer parameters.

5.4 MT3D MODEL DEVELOPMENT

As presented in Sect. 5.3, flow simulations were conducted using the MODFLOW code (USGS 1988, Harbaugh et al. 2000). Based on the MODFLOW flow model simulation, the movement of contaminants from EMDF are predicted using MT3D (Zheng 1990), a three-dimensional fate-transport model code. The MT3D model was downloaded onto on a Jacobs-owned Dell Precision 7720 computer with a Window 10 Enterprise operational system (LAP0043). Note that this simulation was performed to support both the Performance Assessment and the Composite Analysis.

This section documents the details of the MT3D modeling such as the software configuration control, verification testing, modeling results and post-processing. This documentation is provided on the Model Simulation logs that were completed during and following the MT3D modeling. These Model Simulation Logs – MT3D forms are discussed in this section and presented in Appendix B.

Additionally, the software modeling codes and version and the configuration control procedures are presented in the Model Simulation Log – MT3D for each of the following modeling simulations:

- Verification and application test (see Sect. 5.4.1)
- Post-processing modeling runs (see Sect. 5.4.2).

The MT3D model calculation package was prepared by Jacobs in accordance with the Jacobs FOSOP 206, *Design Calculations*. The Calculation Cover Sheet (FOSOP 206f1) documents that the calculation package has been technically reviewed and it complies with FOSOP 206 (approved). Since the calculation package was prepared by Jacobs, it was also technically reviewed and approved by UCOR. This review and approval is documented on UCOR Form-3416 which is assigned a UCOR calculation number (CAW-90EMDF-G122) and attached to the Jacobs calculation. This allows the calculation to be archived by UCOR for future retrieval if necessary. This calculation package was transmitted by Jacobs with the appropriate digital files for UCOR archival. The digital files are identified in the calculation package. Archival and retrieval of calculation packages and accompanying digital files is discussed in Sect. 2 of this document.

The information presented in this section will be in the same level of detail as those described for the HELP model in Sect. 5.1.

5.4.1 Verifications and Application Testing

The purpose of performing the model V&V was described in the HELP Sect. 3.1.1 and therefore will not be duplicated in this section. As detailed in the calculation package, prior to the project-specific MT3D model simulations were performed, Jacobs performed the model V&V to verify the applicability and operability of the MT3D model on the selected hardware and operational system (Dell Precision 7720/Window 10 Enterprise).

The V&V program from the example testing file from MT3D Manual was used for the model V&V model testing run. The title of the MT3D Benchmark Problem 7 was “3D Transport in Uniform Flow Field with Continuous Point Source (Refer To Section 7.7 Of MT3DMS Manual)”. The version of this software used for all of the MT3D modeling was MT3D Model – MT3DMS Version 5, 2006.

The original input and output file names are identified below and are provided with the MODFLOW calculation package and the model simulation logs. The input file names are as follows:

- MT3DMS v5 Name file for test case P7
  - p7mt.nam
- Transport package input files
  - BTN p7.btn
  - ADV p7.adv
  - DSP p7.dsp
  - SSM p7.ssm
  - GCG p7.gcg
- Flow-Transport Link input file
  - FTL p7.ftl.

The output file names are as follows:

- twri.ddn
- twri.hds
- twri.lst.

The test run from this project provided identical output results as the original output file. The test indicates the computer hardware and software version applied in the project are able to be used as model intended.

This digital file was also provided with the calculation package. This V&V is also documented on the Model Simulation Logs – MT3D forms which are presented in Appendix B.

5.4.2 Model Results and Post Processing

The MT3D transport model was used to simulate the following general application model runs:

- Uniform and Constant Source Model Run – Model Run EMDF-FC-T: Model run to predict the maximum plume development, delineate the plume discharge to the surface streams, and determine the applicable location and vertical profile for the 100-m well
- Non-uniform and Constant Source Model Run – Model Run EMDF-FC-HC-T: Model run to evaluate the impact of non-uniform source release
- Uniform and Constant Source Model Run with Dispersivity Applied – Model Run EMDF-disp-T: Model run to evaluate the impact of dispersivity.

The MT3D transport model was used to simulate the following contaminant of concern-specific model runs:

- Technetium-99 Base Condition Run – Model Run EMDF-FC-20sp-T-TC99-2: Model run to simulate the Tc-99 fate and transport in the groundwater zone with uniform release
- Techntium-99 Sensitivity Run for Higher K in Model Layer 2 – Model Run EMDF-FC-20sp-T-TC99-hk-L2-2: Model run to simulate the Tc-99 fate and transport in the groundwater zone for the higher K in layer 2
- Technetium-99 Sensitivity Run for Non-Uniform Release for the Waste Zone – Model Run EMDF-FC-20sp-T-TC99-nu2: Model run to simulate the Tc-99 fate and transport in the groundwater zone for non-uniform release for the waste zone
- Iodine-129 Base Condition Run – Model Run EMDF-FC-20sp-T-I129-2: Model run to simulate the I-129 fate and transport in the groundwater zone
- Carbon-14 Base Condition Run – Model Run EMDF-FC-20sp-T-C14-2: Model run to simulate the C-14 fate and transport in the groundwater zone.

The Composite Analysis also presents an MT3D model simulation showing the movement of contaminants from the EMWMF and the other existing BCV sources based on the UBCV groundwater model. Since this groundwater model was developed to support the Revision 1 Composite Analysis and was not modified or re-run for the Revision 2 Composite Analysis, MT3D simulations were not repeated to support the Revision 2 Composite Analysis.

5.5 RESRAD-OFFSITE MODEL DEVELOPMENT

The RESRAD-OFFSITE program and the supporting documents were downloaded from the https://resrad.evs.anl.gov/codes/resrad-offsite/ website onto Drummond Carpenter-owned computers, including a Dell Precision 7710 (DESKTOP-BV4F840), a Dell Precision 7520 (DESKTOP-MDFIMDA), and a desktop computer (DC-Desktop 1), which all use a Windows 10 Professional operating system.

This section documents the details of the RESRAD-OFFSITE modeling including the software configuration control, V&V testing, modeling results, and post-processing performed on model results.

Documentation of modeling is provided on the Model Simulation logs that were completed during and following the RESRAD-OFFSITE modeling, which are also presented in Appendix B.

The Model Simulation logs present the following information for each of the model simulations:

- Analyst
- Simulation title
- Purpose of simulation
- Model code used/version number
- Configuration control (computer hardware/operating system)
- Names of input files
- Comments on input data
- Names of output files
- Comments on model outputs/results
- General comments
- Reviewer and date reviewed.

RESRAD-OFFSITE modeling is also documented in the RESRAD-OFFSITE calculation packages (CAW-90EMDF-182, CAW-90EMDF-183, and CAW-90EMDF-184), which include the following information:

- Calculation title
- Objective
- Software
- Calculation
- References.

These calculation packages were prepared by Drummond Carpenter in accordance with the Drummond Carpenter procedure *Performance Assessment Calculations* (PROC-CALC-PA19). The Calculation Cover Page documents that the calculation is valid and accurate and that any calculation assumptions are valid. Since these calculation packages were prepared by Drummond Carpenter, they were also technically reviewed and approved by UCOR. This review and approval are documented on UCOR Form-3416, which is assigned a UCOR calculation numbers (CAW-90EMDF-G182, CAW-90EMDF-G183, and CAW-90EMDF-G184) and attached to the Drummond Carpenter calculation packages. Calculation packages were transmitted by Drummond Carpenter with the appropriate digital files for UCOR archival. Digital files are identified in the calculation packages. Archival and retrieval of calculation packages and accompanying digital files are discussed in Sect. 2 of this document.

5.5.1 Verifications and Application Testing

Model V&V is an enabling methodology for the development of computational models that can be used to make engineering predictions with quantified confidence. Model verification is addressed by the modeling applicable references listed in the reference section. The hardware and operational system’s operability testing was conducted by running a sample problem and comparing the output from the testing run to the original output file.

As detailed in the calculation package, before the project-specific RESRAD-OFFSITE model simulations were performed, model V&V was performed to verify the applicability and operability of the RESRAD-OFFSITE model on the selected hardware and operational system (Dell Precision 7710 [DESKTOP- BV4F840]/Window 10 Professional, Dell Precision 7520 [DESKTOP- MDFIMDA]/ Window 10 Professional, and a custom-built desktop computer [DC- Desktop 1]/Window 10 Professional).

Input files provided by Argonne National Laboratory for the RESRAD-OFFSITE model (RESRAD-OFFSITE 3.2 Extended QA Files, https://resrad.evs.anl.gov/user-center/) were used to run the code on the working computers and the resulting output file was compared to the original problem output file by spot checking randomly throughout the output file and the predicted results.

The original input and output file names are:

Input files:

- QUALITY ASSURANCE AREAFACTORS.rof
- QUALITY ASSURANCE RESRAD OFFSITE EXTENSIONS.rof.

Output files:

- QUALITY ASSURANCE AREAFACTORS.par
- QUALITY ASSURANCE AREAFACTORS.prb
- QUALITY ASSURANCE RESRAD OFFSITE EXTENSIONS.par
- QUALITY ASSURANCE RESRAD OFFISTE EXTENSIONS.prb.

The test run from this project provided identical output result as the original output file. The test indicates the computer hardware and software version applied in the project are able to be used as model intended. This V&V effort is documented on the Model Simulation logs.

5.5.2 Model Results and Post Processing

RESRAD modeling was performed to quantify EMDF operational period inventory depletion for C-14, H-3, I-129, and Tc-99 to support the Performance Assessment and Composite Analysis modeling.

These results are documented in the Drummond Carpenter calculation package CAW-90EMDF-G182. Post-operational source concentrations used in the EMDF modeling were transmitted to others needing this information using UCOR Information/Data Transfer Transmittal 007-R0.

Post processing of model results to quantify radionuclide reduction was completed using Microsoft Excel.

The results of modeling the base case scenario for the Performance Assessment are presented in Appendix G of the Performance Assessment and documented in CAW-90EMDF-G183.

The results of the base case assessment for the Composite Analysis are presented in Sects. 3.4, 5.3, and 5.4 of the Composite Analysis and documented in CAW-90EMDF-G183.

Upon completion of model simulations, dose predictions were exported to Microsoft Excel for presentation and visualization.

5.6 PATHRAE-RAD

The PATHRAE-RAD model was used in the Composite Analysis to calculate the dose at BCK 10.5 from EMWMF based on an inventory at closure based on waste disposed to-date (UCOR 2019b). The PATHRAE-RAD model has been used to support performance evaluations for the EMWMF for the past two decades. Most recently, PATHRAE-RAD was used to address comments resulting from an LFRG review of the design modification to add Cell 6 and increase the capacity of the EMWMF. An Operating DAS for the EMWMF was issued in December 2018 (DOE 2018e). PATHRAE-RAD had been previously installed on a Jacobs-owned Dell Precision 7720 computer with a Window 10 Enterprise operational system (LAP0043) to support this activity.

This version of PATHRAE-RAD was updated with the revised waste inventory and the modeling results were incorporated into the Composite Analysis. The V&V for the PATHRAE-RAD model is documented by Jacobs per their procedure FOSOP 202 and in the UCOR SAMOA system.

The details of the PATHRAE-RAD modeling are presented in Appendix B of the Composite Analysis and documented in calculation package CAW-90EMDF-G257. The PATHRAE-RAD model calculation package was prepared by Jacobs in accordance with the Jacobs FOSOP 206, *Design Calculations*. The Calculation Cover Sheet (FOSOP 206f1) documents that the calculation package has been technically reviewed (checked) and it complies with FOSOP 206 (approved). Since the calculation package was prepared by Jacobs, it was also technically reviewed and approved by UCOR. This review and approval is documented on UCOR Form-3416 which is assigned a UCOR calculation number (CAW-90EMDF-G257) and attached to the Jacobs calculation. This allows the calculation to be archived by UCOR for future retrieval if necessary. This calculation package was transmitted by Jacobs with the appropriate digital files for UCOR archival. The digital files are identified in the calculation package. Archival and retrieval of calculation packages and accompanying digital files is discussed in Sect. 2 of this document.

As previously stated, Model Simulation logs were not completed for the PATHRAE-RAD modeling due to its limited scope (a single EMWMF simulation with a single waste inventory). No post-processing was performed using the results of the PATHRAE-RAD.

6. CONCLUSION

This section presents examples of activities performed during the preparation of the Performance Assessment and the Composite Analysis to demonstrate that the four documentation requirements in Sects. 2.2.11 and 3.2.10 of *2017 Disposal Authorization Statement and Tank Closure Documentation* (DOE 2017a) have been satisfied under existing QA protocol and existing procedures:

Requirement 1: Ensuring radionuclide inventories, model input data, and distributions are traceable, qualified, controlled, and archived. Evidence includes:

- "Data and Calculation Package – EMDF Radiological Inventory," CAW-90EMDF-F898, documents traceability of radionuclide inventories to sources of inventory information.
- EMDF radiological inventory reviewed by UCOR (documented in UCOR calculation package CAW-90EMDF-F898).
- Calculation package CAW-90EMDF-F898 is a controlled document and requires revision if changed; radiological inventory distributed to project team using Information/Data Transfer– Submittal 003-R1 (also controlled and requires revision if changed); radiological inventory as model input reviewed and documented on Model Input Parameter Identification, Review, and Verification and Model Check forms; independent technical review of the Performance Assessment included a check of values in the Performance Assessment with the sources of those values.
- CAW-90EMDF-F898 is archived in the UCOR DMC; Information/Data Transmittal – Submittal 003-R1 is archived in the UCOR DMC with this QA Report; Model Input Parameter Identification, Review, and Verification forms archived with this QA Report; independent technical review of Performance Assessment is documented on UCOR Forms-141 (included in this QA Report).
- QA Report (this document) archived by UCOR.

Requirement 2: Ensuring software used was evaluated for functionality regarding the problem being solved, was verified before use, is under configuration control, is managed under a software problem reporting system, and is archived. Evidence includes:

- Calculation packages prepared, reviewed, approved, and archived for software used in the preparation of the Performance Assessment and the Composite Analysis (models and supporting calculations).
- Evaluation of functionality of models and supporting calculations (appropriateness, description of conceptual model, past use on similar projects, regulatory acceptance, etc.) is documented in Performance Assessment, Composite Analysis, QA Report, and calculation packages.
- V&V using example problem was performed prior to use (V&V files identified on Model Simulation logs and provided to UCOR by Jacobs) and files archived in UCOR DMC with final calculation package.
- V&V for supporting calculations consists of repeating the calculations during the review of calculation package; V&V for some models consists of performing example problems and comparing results.
- Jacobs software is managed under FOSOP 202, *Control of Engineering Software*, and UCOR procedure PROC-IT-6008, *Application Lifecycle Management*.
- Jacobs FOSOP 206 includes a software problem reporting system; UCOR issues guidance on software error reporting to its subcontractors in PROC-IT-6008.

Requirement 3: Ensure development and use of models is documented, verified, under configuration control, and archived in accordance with DOE Order 414.1D, *Quality Assurance*, and DOE Guide 414.1-4, *Safety Software Guide for Use with 10 CFR 830, Subpart A, Quality Assurance Requirements*, and DOE Order 414.1D, *Quality Assurance*. Evidence includes:

- UCOR QAPP incorporates the QA criteria of DOE Order 414.1D, *Quality Assurance*; 10 *CFR* 830, Subpart A; and DOE-HQ-EM-QA-001, and states how those criteria are satisfied.
- UCOR QAPP also states that UCOR ensures that subcontractors and suppliers satisfy the criteria of 10 *CFR* 830.122.
- Model development and use documented and verified using Model Input Parameter Identification, Review, and Verification forms and Model Simulation logs (included in and archived with this QA Report).
- Jacobs software is under configuration control per FOSOP 202 (includes configuration control and archival).
- RESRAD-OFFSITE is under DOE configuration control and archival.
- Documentation of configuration control of models in UCOR SAMOA system under UCOR procedure PROC-IT-6008.

Requirement 4: Document activities for confidence building (e.g., model evaluation) to the extent practicable and appropriate. Evidence includes:

- Numerous output comparisons from similar modeling scenarios and sensitivity analyses were performed and presented to demonstrate model appropriateness.
- Evaluation of model appropriateness documented previous acceptance of results from models for similar projects in BCV (EMWMF ROD, Phase I BCV ROD, and recent issuance of Operational DAS for EMWMF by LFRG).
- This QA Report justifies the use of the conceptual site model for the BCV – its development, regulatory acceptance, and consistency with the results of recent characterization activities at the EMDF site.
- LFRG review of the Revision 1 Performance Assessment and Composite Analysis is described and the LFRG review report is referenced.
- All aspects of the document development process include technical review, change control, and archival.
- Most aspects of the implementation of the QA process includes redundancy (e.g., review, approval, and archival of subcontractor-generated calculation packages).
- Performance Assessment and Composite Analysis summarize the major pessimistic biases in the assumptions and modeling.

These activities provide specific examples of activities performed during the preparation of these two documents and demonstrate that the four documentation requirements in the *2017 Disposal Authorization Statement and Tank Closure Documentation* (DOE 2017a) were adequately addressed by existing QA protocols and procedures that were implemented during the development of the Performance Assessment and the Composite Analysis.

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APPENDIX A.
MODEL INPUT PARAMETER IDENTIFICATION, REVIEW, AND VERIFICATION FORMS

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ATTACHMENT A.1. HELP MODEL

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A. **Model Code Used/Version Number**: Hydrologic Evaluation of Landfill Performance (HELP), version 3.07 (November 1997)
B. **Organization Performing Modeling**: (Jacobs- Oak Ridge, Tennessee)
C. **Modeler Contact Information**: (Changsheng Lu 865-220-6182 (work), 865-705-8981 (cell)
D. **Date(s) Modeling Performed**: (March 2019)
E. **Output Filename**: PD-1.OUT
F. **Purpose of Modeling**: (EMDF cover infiltration, Base case 0-200 years post-closure, Supports "Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee (UCOR-5094/R2))

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
Cover	Layer 1 - Erosion Control Layer (Gravel/Soil)	TYPE 1 - VERTICAL PERCOLATION LAYER	1		Assigned Based on Design function (Section 3.4 - EPA,1994)	Steve Fox (SEF)	SEF	
Cover	Layer 1 - Erosion Control Layer (Gravel/Soil)	MATERIAL TEXTURE NUMBER 11	11		HELP default (Table 4 - EPA, 1994)			
Cover	Layer 1 - Erosion Control Layer (Gravel/Soil)	THICKNESS	48	INCHES	design (UCOR, 2019)	SEF	SEF	
Cover	Layer 1 - Erosion Control Layer (Gravel/Soil)	POROSITY	0.464	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 1 - Erosion Control Layer (Gravel/Soil)	FIELD CAPACITY	0.31	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 1 - Erosion Control Layer (Gravel/Soil)	WILTING POINT	0.187	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 1 - Erosion Control Layer (Gravel/Soil)	INITIAL SOIL WATER CONTENT	0.3298	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Cover	Layer 1 - Erosion Control Layer (Gravel/Soil)	EFFECTIVE SAT. HYD. COND.	6.40E-05	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 2 - Granular Filter Layer	TYPE 1 - VERTICAL PERCOLATION LAYER	1		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Cover	Layer 2 - Granular Filter Layer	MATERIAL TEXTURE NUMBER 3	3		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 2 - Granular Filter Layer	THICKNESS	12	INCHES	design (UCOR, 2019)	SEF	SEF	
Cover	Layer 2 - Granular Filter Layer	POROSITY	0.457	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 2 - Granular Filter Layer	FIELD CAPACITY	0.083	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 2 - Granular Filter Layer	WILTING POINT	0.033	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 2 - Granular Filter Layer	INITIAL SOIL WATER CONTENT	0.1869	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Cover	Layer 2 - Granular Filter Layer	EFFECTIVE SAT. HYD. COND.	3.10E-03	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 3 - Bioinstusion Layer	TYPE 1 - VERTICAL PERCOLATION LAYER	1		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Cover	Layer 3 - Bioinstusion Layer	MATERIAL TEXTURE NUMBER 21	21		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 3 - Bioinstusion Layer	THICKNESS	24	INCHES	design (UCOR, 2019)	SEF	SEF	
Cover	Layer 3 - Bioinstusion Layer	POROSITY	0.397	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 3 - Bioinstusion Layer	FIELD CAPACITY	0.032	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 3 - Bioinstusion Layer	WILTING POINT	0.013	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 3 - Bioinstusion Layer	INITIAL SOIL WATER CONTENT	0.0798	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Cover	Layer 3 - Bioinstusion Layer	EFFECTIVE SAT. HYD. COND.	0.300	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 4 - lateral Drainage Layer	TYPE 2 - LATERAL DRAINAGE LAYER	2		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Cover	Layer 4 - lateral Drainage Layer	MATERIAL TEXTURE NUMBER 21	21		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 4 - lateral Drainage Layer	THICKNESS	12	INCHES	design (UCOR, 2019)	SEF	SEF	
Cover	Layer 4 - lateral Drainage Layer	POROSITY	0.397	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 4 - lateral Drainage Layer	FIELD CAPACITY	0.032	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 4 - lateral Drainage Layer	WILTING POINT	0.013	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 4 - lateral Drainage Layer	INITIAL SOIL WATER CONTENT	0.0355	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Cover	Layer 4 - lateral Drainage Layer	EFFECTIVE SAT. HYD. COND.	0.300	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 4 - lateral Drainage Layer	SLOPE	21.52	PERCENT	Calculated from Design (Calculation Package -DP)	SEF	SEF	SEF, remember this will have to be a transmittal.
Cover	Layer 4 - lateral Drainage Layer	DRAINAGE LENGTH	476.9	FEET	Calculated from Design (Calculation Package -DP)	SEF	SEF	
Cover	Layer 5 - Primary Geomembrane Liner	TYPE 4 - FLEXIBLE MEMBRANE LINER	4		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Cover	Layer 5 - Primary Geomembrane Liner	MATERIAL TEXTURE NUMBER 35	35		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 5 - Primary Geomembrane Liner	THICKNESS	0.06	INCHES	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 5 - Primary Geomembrane Liner	POROSITY	0	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 5 - Primary Geomembrane Liner	FIELD CAPACITY	0	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 5 - Primary Geomembrane Liner	WILTING POINT	0	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 5 - Primary Geomembrane Liner	INITIAL SOIL WATER CONTENT	0	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	
Cover	Layer 5 - Primary Geomembrane Liner	EFFECTIVE SAT. HYD. COND.	2.00E-13	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 5 - Primary Geomembrane Liner	FML PINHOLE DENSITY	1	HOLES/ACRE	assumption good installation (EPA, 1994)	SEF	SEF	
Cover	Layer 5 - Primary Geomembrane Liner	FML INSTALLATION DEFECTS	1	HOLES/ACRE	assumption good installation (EPA, 1994)	SEF	SEF	
Cover	Layer 5 - Primary Geomembrane Liner	FML PLACEMENT QUALITY	3	-	assumption good installation (EPA, 1994)	SEF	SEF	
Cover	Layer 6 - Amended Clay Layer	TYPE 3 - BARRIER SOIL LINER	3		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Cover	Layer 6 - Amended Clay Layer	MATERIAL TEXTURE NUMBER 0	0		Used Defined (EPA 1994)			
Cover	Layer 6 - Amended Clay Layer	THICKNESS	12	INCHES	design (UCOR, 2019)	SEF	SEF	
Cover	Layer 6 - Amended Clay Layer	POROSITY	0.427	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 6 - Amended Clay Layer	FIELD CAPACITY	0.418	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 6 - Amended Clay Layer	WILTING POINT	0.367	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 6 - Amended Clay Layer	INITIAL SOIL WATER CONTENT	0.427	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Cover	Layer 6 - Amended Clay Layer	EFFECTIVE SAT. HYD. COND.	2.50E-08	CM/SEC	Designed Assumption (UCOR, 2017)	SEF	SEF	
		TYPE 1 - VERTICAL PERCOLATION LAYER	1		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
		MATERIAL TEXTURE NUMBER 16	16		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 7 - Compacted Clay Layer	THICKNESS	12	INCHES	design (UCOR, 2019)	SEF	SEF	
Cover	Layer 7 - Compacted Clay Layer	POROSITY	0.427	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 7 - Compacted Clay Layer	FIELD CAPACITY	0.418	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 7 - Compacted Clay Layer	WILTING POINT	0.367	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 7 - Compacted Clay Layer	INITIAL SOIL WATER CONTENT	0.4094	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Cover	Layer 7 - Compacted Clay Layer	EFFECTIVE SAT. HYD. COND.	1.00E-07	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 8 - Contouring Level Layer	TYPE 1 - VERTICAL PERCOLATION LAYER	1		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Cover	Layer 8 - Contouring Level Layer	MATERIAL TEXTURE NUMBER 24	24		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 8 - Contouring Level Layer	THICKNESS	12	INCHES	design (UCOR, 2019)	SEF	SEF	
Cover	Layer 8 - Contouring Level Layer	POROSITY	0.365	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 8 - Contouring Level Layer	FIELD CAPACITY	0.305	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 8 - Contouring Level Layer	WILTING POINT	0.202	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Cover	Layer 8 - Contouring Level Layer	INITIAL SOIL WATER CONTENT	0.305	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Cover	Layer 8 - Contouring Level Layer	EFFECTIVE SAT. HYD. COND.	2.70E-06	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Waste	Layer 9 - Waste	TYPE 1 - VERTICAL PERCOLATION LAYER	1		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Waste	Layer 9 - Waste	MATERIAL TEXTURE NUMBER 22			HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Waste	Layer 9 - Waste	THICKNESS	690.45	INCHES	design (UCOR, 2019)	SEF	SEF	SEF, make sure we get this as a transmittal from Changsheng to Chad. Also, this number will have to be revised in Table C.2 in next document.
Waste	Layer 9 - Waste	POROSITY	0.419	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Waste	Layer 9 - Waste	FIELD CAPACITY	0.307	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Waste	Layer 9 - Waste	WILTING POINT	0.18	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Waste	Layer 9 - Waste	INITIAL SOIL WATER CONTENT	0.307	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	
Waste	Layer 9 - Waste	EFFECTIVE SAT. HYD. COND.	1.90E-05	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 10 - Protective Soil Layer	TYPE 1 - VERTICAL PERCOLATION LAYER	1		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Liner	Layer 10 - Protective Soil Layer	MATERIAL TEXTURE NUMBER 8	8		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 10 - Protective Soil Layer	THICKNESS	12	INCHES	design (UCOR, 2019)	SEF	SEF	
Liner	Layer 10 - Protective Soil Layer	POROSITY	0.463	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 10 - Protective Soil Layer	FIELD CAPACITY	0.232	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 10 - Protective Soil Layer	WILTING POINT	0.116	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 10 - Protective Soil Layer	INITIAL SOIL WATER CONTENT	0.232	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Liner	Layer 10 - Protective Soil Layer	EFFECTIVE SAT. HYD. COND.	3.70E-04	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
		TYPE 2 - LATERAL DRAINAGE LAYER	2		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Liner	Layer 11 - Lateral Leachate Collection Drainage	MATERIAL TEXTURE NUMBER 21	21		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 11 - Lateral Leachate Collection Drainage	THICKNESS	12	INCHES	design (UCOR, 2019)	SEF	SEF	
Liner	Layer 11 - Lateral Leachate Collection Drainage	POROSITY	0.397	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 11 - Lateral Leachate Collection Drainage	FIELD CAPACITY	0.032	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 11 - Lateral Leachate Collection Drainage	WILTING POINT	0.013	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 11 - Lateral Leachate Collection Drainage	INITIAL SOIL WATER CONTENT	0.032	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Liner	Layer 11 - Lateral Leachate Collection Drainage	EFFECTIVE SAT. HYD. COND.	0.300	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 11 - Lateral Leachate Collection Drainage	SLOPE	4.22	PERCENT	Calculated from Design (Calculation Package -DP)	SEF	SEF	
Liner	Layer 11 - Lateral Leachate Collection Drainage	DRAINAGE LENGTH	258.8	FEET	Calculated from Design (Calculation Package -DP)	SEF	SEF	
Liner	Layer 12 - Primary Geomemebrane Layer	TYPE 4 - FLEXIBLE MEMBRANE LINER	4		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Liner	Layer 12 - Primary Geomemebrane Layer	MATERIAL TEXTURE NUMBER 35	35		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 12 - Primary Geomemebrane Layer	THICKNESS	0.06	INCHES	design (UCOR, 2019)	SEF	SEF	
Liner	Layer 12 - Primary Geomemebrane Layer	POROSITY	0	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 12 - Primary Geomemebrane Layer	FIELD CAPACITY	0	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 12 - Primary Geomemebrane Layer	WILTING POINT	0	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 12 - Primary Geomemebrane Layer	INITIAL SOIL WATER CONTENT	0	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Liner	Layer 12 - Primary Geomemebrane Layer	EFFECTIVE SAT. HYD. COND.	2.00E-13	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 12 - Primary Geomemebrane Layer	FML PINHOLE DENSITY	1	HOLES/ACRE	assumption good installation (EPA, 1994)	SEF	SEF	
Liner	Layer 12 - Primary Geomemebrane Layer	FML INSTALLATION DEFECTS	1	HOLES/ACRE	assumption good installation (EPA, 1994)	SEF	SEF	
Liner	Layer 12 - Primary Geomemebrane Layer	FML PLACEMENT QUALITY	3	-	assumption good installation (EPA, 1994)	SEF	SEF	
Liner	Layer 13 - Geosynthetic Clay Liner	TYPE 3 - BARRIER SOIL LINER	3		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Liner	Layer 13 - Geosynthetic Clay Liner	MATERIAL TEXTURE NUMBER 17	17		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 13 - Geosynthetic Clay Liner	THICKNESS	0.24	INCHES	design (UCOR, 2019)	SEF	SEF	
Liner	Layer 13 - Geosynthetic Clay Liner	POROSITY	0.75	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 13 - Geosynthetic Clay Liner	FIELD CAPACITY	0.747	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 13 - Geosynthetic Clay Liner	WILTING POINT	0.4	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 13 - Geosynthetic Clay Liner	INITIAL SOIL WATER CONTENT	0.75	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Liner	Layer 13 - Geosynthetic Clay Liner	EFFECTIVE SAT. HYD. COND.	3.00E-09	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 14 - Geocomposite Drainage/Leak Detection	TYPE 2 - LATERAL DRAINAGE LAYER	2		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Liner	Layer 14 - Geocomposite Drainage/Leak Detection	MATERIAL TEXTURE NUMBER 20	20		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 14 - Geocomposite Drainage/Leak Detection	THICKNESS	0.3	INCHES	design (UCOR, 2019)	SEF	SEF	
Liner	Layer 14 - Geocomposite Drainage/Leak Detection	POROSITY	0.85	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 14 - Geocomposite Drainage/Leak Detection	FIELD CAPACITY	0.01	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 14 - Geocomposite Drainage/Leak Detection	WILTING POINT	0.005	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 14 - Geocomposite Drainage/Leak Detection	INITIAL SOIL WATER CONTENT	0.01	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Liner	Layer 14 - Geocomposite Drainage/Leak Detection	EFFECTIVE SAT. HYD. COND.	10	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 14 - Geocomposite Drainage/Leak Detection	SLOPE	4.22	PERCENT	Calculated from Design (Calculation Package -DP)	SEF	SEF	
Liner	Layer 14 - Geocomposite Drainage/Leak Detection	DRAINAGE LENGTH	258.8	FEET	Calculated from Design (Calculation Package -DP)	SEF	SEF	
Liner	Layer 15 - Secondary Geomembrane Liner	TYPE 4 - FLEXIBLE MEMBRANE LINER	4		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Liner	Layer 15 - Secondary Geomembrane Liner	MATERIAL TEXTURE NUMBER 35	35		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 15 - Secondary Geomembrane Liner	THICKNESS	0.06	INCHES	design (UCOR, 2019)	SEF	SEF	
Liner	Layer 15 - Secondary Geomembrane Liner	POROSITY	0	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 15 - Secondary Geomembrane Liner	FIELD CAPACITY	0	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 15 - Secondary Geomembrane Liner	WILTING POINT	0	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 15 - Secondary Geomembrane Liner	INITIAL SOIL WATER CONTENT	0	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Liner	Layer 15 - Secondary Geomembrane Liner	EFFECTIVE SAT. HYD. COND.	2.00E-13	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 15 - Secondary Geomembrane Liner	FML PINHOLE DENSITY	1	HOLES/ACRE	assumption good installation (EPA, 1994)	SEF	SEF	
Liner	Layer 15 - Secondary Geomembrane Liner	FML INSTALLATION DEFECTS	1	HOLES/ACRE	assumption good installation (EPA, 1994)	SEF	SEF	
Liner	Layer 15 - Secondary Geomembrane Liner	FML PLACEMENT QUALITY	3	-	assumption good installation (EPA, 1994)	SEF	SEF	
Liner	Layer 16 - Compacted Clay Liner	TYPE 3 - BARRIER SOIL LINER	3		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Liner	Layer 16 - Compacted Clay Liner	MATERIAL TEXTURE NUMBER 16	16		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 16 - Compacted Clay Liner	THICKNESS	36	INCHES	design (UCOR, 2019)	SEF	SEF	
Liner	Layer 16 - Compacted Clay Liner	POROSITY	0.427	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 16 - Compacted Clay Liner	FIELD CAPACITY	0.418	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 16 - Compacted Clay Liner	WILTING POINT	0.367	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Liner	Layer 16 - Compacted Clay Liner	INITIAL SOIL WATER CONTENT	0.427	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Liner	Layer 16 - Compacted Clay Liner	EFFECTIVE SAT. HYD. COND.	1.00E-07	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Geobuffer	Layer 17 - Compacted Clay material	TYPE 1 - VERTICAL PERCOLATION LAYER	1		Assigned Based on Design function (Section 3.4 - EPA,1994)	SEF	SEF	
Geobuffer	Layer 17 - Compacted Clay material	MATERIAL TEXTURE NUMBER 0	0		HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Geobuffer	Layer 17 - Compacted Clay material	THICKNESS	120	INCHES	design (UCOR, 2019)	SEF	SEF	
Geobuffer	Layer 17 - Compacted Clay material	POROSITY	0.419	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Geobuffer	Layer 17 - Compacted Clay material	FIELD CAPACITY	0.307	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Geobuffer	Layer 17 - Compacted Clay material	WILTING POINT	0.18	VOL/VOL	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
Geobuffer	Layer 17 - Compacted Clay material	INITIAL SOIL WATER CONTENT	0.307	VOL/VOL	COMPUTED AS NEARLY STEADY-STATE VALUES BY THE HELP PROGRAM (EPA, 1994)	SEF	SEF	checked versus the base case output
Geobuffer	Layer 17 - Compacted Clay material	EFFECTIVE SAT. HYD. COND.	1.00E-05	CM/SEC	HELP default (Table 4 - EPA, 1994)	SEF	SEF	
	GENERAL DESIGN AND EVAPORATIVE ZONE DATA	SCS RUNOFF CURVE NUMBER	82.5		CS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #11 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 22.% AND A SLOPE LENGTH OF 477. FEET.	SEF	SEF	checked versus the base case output
	GENERAL DESIGN AND EVAPORATIVE ZONE DATA	FRACTION OF AREA ALLOWING RUNOFF	100	PERCENT	Based on Design (Ucor, 2019)	SEF	SEF	
	GENERAL DESIGN AND EVAPORATIVE ZONE DATA	AREA PROJECTED ON HORIZONTAL PLANE	23.7	ACRES	Calculated from Design (Calculation Package -DP)	SEF	SEF	
Cover	GENERAL DESIGN AND EVAPORATIVE ZONE DATA	EVAPORATIVE ZONE DEPTH	21	INCHES	HELP model internally calculated for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	GENERAL DESIGN AND EVAPORATIVE ZONE DATA	INITIAL WATER IN EVAPORATIVE ZONE	6.24	INCHES	HELP model internally calculated for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	GENERAL DESIGN AND EVAPORATIVE ZONE DATA	UPPER LIMIT OF EVAPORATIVE STORAGE	9.744	INCHES	HELP model internally calculated for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	GENERAL DESIGN AND EVAPORATIVE ZONE DATA	LOWER LIMIT OF EVAPORATIVE STORAGE	3.927	INCHES	HELP model internally calculated for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	GENERAL DESIGN AND EVAPORATIVE ZONE DATA	INITIAL SNOW WATER	0	INCHES	HELP model internally calculated for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	GENERAL DESIGN AND EVAPORATIVE ZONE DATA	INITIAL WATER IN LAYER MATERIALS	301.642	INCHES	HELP model internally calculated for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	GENERAL DESIGN AND EVAPORATIVE ZONE DATA	TOTAL INITIAL WATER	301.642	INCHES	HELP model internally calculated for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	GENERAL DESIGN AND EVAPORATIVE ZONE DATA	TOTAL SUBSURFACE INFLOW	0	INCHES/YEAR	HELP model internally calculated for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover								
Cover	EVAPOTRANSPIRATION AND WEATHER DATA	STATION LATITUDE	35.49	DEGREES	HELP model Built-in Database for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	EVAPOTRANSPIRATION AND WEATHER DATA	MAXIMUM LEAF AREA INDEX	3.5		HELP model Built-in Database for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	EVAPOTRANSPIRATION AND WEATHER DATA	START OF GROWING SEASON (JULIAN DATE)	85		HELP model Built-in Database for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	EVAPOTRANSPIRATION AND WEATHER DATA	END OF GROWING SEASON (JULIAN DATE)	307		HELP model Built-in Database for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	EVAPOTRANSPIRATION AND WEATHER DATA	EVAPORATIVE ZONE DEPTH	21	INCHES	HELP model Built-in Database for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	EVAPOTRANSPIRATION AND WEATHER DATA	AVERAGE ANNUAL WIND SPEED	7.1	MPH	HELP model Built-in Database for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	EVAPOTRANSPIRATION AND WEATHER DATA	AVERAGE 1ST QUARTER RELATIVE HUMIDITY	68.00%		HELP model Built-in Database for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	EVAPOTRANSPIRATION AND WEATHER DATA	AVERAGE 2ND QUARTER RELATIVE HUMIDITY	69.00%		HELP model Built-in Database for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	EVAPOTRANSPIRATION AND WEATHER DATA	AVERAGE 3RD QUARTER RELATIVE HUMIDITY	76.00%		HELP model Built-in Database for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	EVAPOTRANSPIRATION AND WEATHER DATA	AVERAGE 4TH QUARTER RELATIVE HUMIDITY	72.00%		HELP model Built-in Database for KNOXVILLE, TENNESSEE (EPA, 1994)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY PRECIPITATION	January	4.57	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY PRECIPITATION	February	4.34	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY PRECIPITATION	March	5.68	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY PRECIPITATION	April	4.08	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY PRECIPITATION	May	4.68	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY PRECIPITATION	June	4.34	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY PRECIPITATION	July	5.45	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY PRECIPITATION	August	3.7	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
Cover	NORMAL MEAN MONTHLY PRECIPITATION	September	3.86	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY PRECIPITATION	October	3.18	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY PRECIPITATION	November	4.59	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY PRECIPITATION	December	5.3	INCHES	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	January	35	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	February	38.8	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	March	47.9	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	April	56.8	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	May	64.9	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	June	72.4	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	July	75.8	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	August	75.2	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	September	69.1	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	October	57.4	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	November	47.3	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Cover	NORMAL MEAN MONTHLY TEMPERATURE	December	38.6	DEGREES FAHRENHEIT	Oak Ridge Area-sepcific Data (Table E.2, DOE, 1998)	SEF	SEF	
Not sure where this fits?	SOLAR RADIATION DATA		NA		WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR KNOXVILLE, TENNESSEE AND STATION LATITUDE = 35.49 DEGREES (EPA,1994)			

References:

DOE (1998). Remedial Investigation/Feasibility Study for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act of 1980 Waste, DOE/OR/02-1637&D2, U.S. Department of Energy, Office of Environmental Management, Oak Ridge, TN.
EPA 1994, Schroeder et al. 1994a, P. R., C.M. Lloyd, P. A. Zappi, and N. M. Aziz, 1994a, The Hydrologic Evaluation of Landfill Performance (HELP) Model: User's Guide forVersion 3, EPA/600/R-94/168a, P. R., C.M. Lloyd, P. A. Zappi, and N. M. Aziz U.S. Environmental Protection Agency, Office of Research and Development, Washington, D.C., September.
PSWDF-RFI-010, 2019, Design Inputs for Performance Assessement, Part 1: Landfill Layours and Top of Waste

Marshall - we need to decide how we are going to reference the design document.

Comments on the Review of the Input Parameters of the HELP Model: All of the input parameters were checked versus the Base Case Scenario that represents 0 to 200 years post closure. The input parameters were checked versus "Reference or Basis for Assumption" and determined to be correct and appropriate for the Base Case Scenario and the subsequent HELP model simulations. In addition, the model input files were checked to verify that the parameters were consistent with this table.

Checked by & Date: Steve Fox

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ATTACHMENT A.2. STOMP MODEL

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A. **Model Code Used/Version Number**: STOMP
B. **Organization Performing Modeling**: (Jacobs- Oak Ridge, Tennessee)
C. **Modeler Contact Information**: (Changsheng Lu 865-220-6182 (work), 865-705-8981 (cell)
D. **Date(s) Modeling Performed**: (August 2019)
E. **Purpose of Modeling**: (Source Release and Vodose Zone Transport, Supports "Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee (UCOR-5094/R2))

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
Solution Control Card	Execution Option	Normal			Assumed	Steve Fox (SEF)	SEF	
		w/ Static Domain			Assumed	SEF	SEF	
		w/ First-Order Time Differencing			Assumed	SEF	SEF	
	Linear System Solver	SPLIB			applied	SEF	SEF	
	Preconditioner	ILU(k)			Assumed	SEF	SEF	
	Solver	BiCGStab			Assumed	SEF	SEF	
	Operational Mode	Water Mode (STOMP-W)			Assumed	SEF	SEF	
		w/ Patankar Solute Transport			needed for transport modeling	SEF	SEF	
		Number of Execution Periods	1		Assumed	SEF	SEF	
		Execution Period No. 1			Assumed	SEF	SEF	
		Execution Period Start Time, d	0		Assumed	SEF	SEF	
		Execution Period Stop Time, yr	1000000		Assumed to generate all peaks	SEF	SEF	
		Initial Time Step, d	1		Assumed	SEF	SEF	
		Maximum Time Step, yr	2000		Assumed	SEF	SEF	
		Time Step Acceleration Factor	1.25		Assumed	SEF	SEF	
		Maximum Newton Iterations per Step	98		Applied	SEF	SEF	
		Maximum Convergence Residual	1.00E-06		Applied	SEF	SEF	checked versus the base case output
Grid Geometry Card								
	Cartesian Coordinate System				Assumed based on need	SEF	SEF	
	Coordinate System Dimensions	Number of I-indexed Nodes	565		Assumed based on need	SEF	SEF	
		Number of J-indexed Nodes	1		Assumed based on need	SEF	SEF	
		Number of K-indexed Nodes	222		Assumed based on need	SEF	SEF	
		X-Direction Spacing						
		X, ft	5		Assumed based on need	SEF	SEF	
		Y-Direction Spacing						
		Y, ft	1		Assumed based on need	SEF	SEF	
		Z-Direction Spacing						
		Z, ft	Variable		Assumed based on vertical direction presentation need	SEF	SEF	
			3@10.0					
			5@5.0					
			214@1.0					
Inactive Nodes Card								
	Node Count							
		Number of Nodes	125430		model calculated based on boundary condition	Review not applicable (N/A)	N/A	
		Number of Active Nodes	80102		model calculated based on boundary condition	N/A	N/A	
		Number of Inactive Nodes	45328		model calculated based on boundary condition	N/A	N/A	
Rock/Soil Zonation Card								
	Formatted Rock/Soil Zonation File		x-a-se-nw-zone.csv		X-section 2-D matrix array constructed based on Site-specific data (design and groundwater flow model)			
	cover	Zonation Number	1		zonation number assigned for numerical presentation in model files	SEF	SEF	
	waste-c1	Zonation Number	2		zonation number assigned for numerical presentation in model files	SEF	SEF	
	waste-c2	Zonation Number	3		zonation number assigned for numerical presentation in model files	SEF	SEF	
	waste-c3	Zonation Number	4		zonation number assigned for numerical presentation in model files	SEF	SEF	
	waste-c4	Zonation Number	5		zonation number assigned for numerical presentation in model files	SEF	SEF	
	liner-fill	Zonation Number	6		zonation number assigned for numerical presentation in model files	SEF	SEF	
	liner-sand-drain	Zonation Number	7		zonation number assigned for numerical presentation in model files	SEF	SEF	
	liner-clay	Zonation Number	8		zonation number assigned for numerical presentation in model files	SEF	SEF	
	geobuffer	Zonation Number	9		zonation number assigned for numerical presentation in model files	SEF	SEF	
	saprolite-pumpkinvalley	Zonation Number	10		zonation number assigned for numerical presentation in model files	SEF	SEF	
	saprolite-maryville	Zonation Number	11		zonation number assigned for numerical presentation in model files	SEF	SEF	
	saprolite-nolichukey	Zonation Number	12		zonation number assigned for numerical presentation in model files	SEF	SEF	
	saprolite-maynardville	Zonation Number	13		zonation number assigned for numerical presentation in model files	SEF	SEF	
	bedrock-pumpkin valley	Zonation Number	14		zonation number assigned for numerical presentation in model files	SEF	SEF	

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
	bedrock-maryville	Zonation Number	15		zonation number assigned for numerical presentation in model files	SEF	SEF	
	bedrock-nolichukey	Zonation Number	16		zonation number assigned for numerical presentation in model files	SEF	SEF	
	bedrock-maynardville	Zonation Number	17		zonation number assigned for numerical presentation in model files	SEF	SEF	
	berm-fill	Zonation Number	18		zonation number assigned for numerical presentation in model files	SEF	SEF	
Rock/Soil Mechanical Properties Card								
	cover	Particle Density, mg/m^3	2.65E+09		from HELP model	SEF	SEF	
		Total Porosity	4.29E-01		from HELP model	SEF	SEF	
		Diffusive Porosity	2.98E-01		from HELP model	SEF	SEF	Steve K. had 0.324 in his table
		Specific Storage, null	9.81E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user	SEF	SEF	
	waste-c1	Particle Density, mg/m^3	3.27E+09		from HELP model	SEF	SEF	SEF, for all of the particle densities in this properties card, the values are +09 and Table E.2 has +03.
		Total Porosity	4.19E-01		from HELP model	SEF	SEF	
		Diffusive Porosity	2.34E-01		from HELP model	SEF	SEF	
		Specific Storage, null	9.80E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user	SEF	SEF	See note above
	waste-c2	Particle Density, mg/m^3	3.27E+09		from HELP model	SEF	SEF	
		Total Porosity	4.19E-01		from HELP model	SEF	SEF	
		Diffusive Porosity	2.34E-01		from HELP model	SEF	SEF	
		Specific Storage, null	9.80E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user	SEF	SEF	
	waste-c3	Particle Density, mg/m^3	3.27E+09		from HELP model	SEF	SEF	See note above
		Total Porosity	4.19E-01		from HELP model	SEF	SEF	
		Diffusive Porosity	2.34E-01		from HELP model	SEF	SEF	
		Specific Storage, null	9.80E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user	SEF	SEF	
	waste-c4	Particle Density, mg/m^3	3.27E+09		from HELP model	SEF	SEF	See note above
		Total Porosity	4.19E-01		from HELP model	SEF	SEF	
		Diffusive Porosity	2.34E-01		from HELP model	SEF	SEF	
		Specific Storage, null	9.80E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user	SEF	SEF	
	liner-fill	Particle Density, mg/m^3	2.65E+09		from HELP model	SEF	SEF	See note above
		Total Porosity	4.63E-01		from HELP model	SEF	SEF	
		Diffusive Porosity	2.94E-01		from HELP model	SEF	SEF	
		Specific Storage, null	9.81E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user	SEF	SEF	
	liner-sand-drain	Particle Density, mg/m^3	2.65E+09		from HELP model	SEF	SEF	See note above
		Total Porosity	3.97E-01		from HELP model	SEF	SEF	
		Diffusive Porosity	3.89E-01		from HELP model	SEF	SEF	
		Specific Storage, null	9.81E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user	SEF	SEF	
	liner-clay	Particle Density, mg/m^3	2.65E+09		from HELP model	SEF	SEF	See note above
		Total Porosity	4.27E-01		from HELP model	SEF	SEF	Layer 16 in Help
		Diffusive Porosity	1.95E-01		from HELP model	SEF	SEF	
		Specific Storage, null	9.80E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user	SEF	SEF	
	geobuffer	Particle Density, mg/m^3	2.65E+09		from HELP model	SEF	SEF	See note above
		Total Porosity	4.45E-01		from HELP model	SEF	SEF	For Layer 17 in Help 0.419 also in Steve K's table
		Diffusive Porosity	2.36E-01		from HELP model	SEF	SEF	
		Specific Storage, null	9.80E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user	SEF	SEF	
	saprolite-pumpkinvalley	Particle Density, mg/m^3	2.65E+09		from HELP model			See note above
		Total Porosity	2.70E-01		from HELP model			Steve K. table had 0.373
		Diffusive Porosity	2.70E-01		from HELP model			
		Specific Storage, null	9.81E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user			
	saprolite-maryville	Particle Density, mg/m^3	2.65E+09		from HELP model			See note above
		Total Porosity	2.70E-01		from HELP model			
		Diffusive Porosity	2.70E-01		from HELP model			
		Specific Storage, null	9.81E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user			

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
	saprolite-nolichukey	Particle Density, mg/m^3	2.65E+09		from HELP model			See note above
		Total Porosity	2.70E-01		from HELP model			
		Diffusive Porosity	2.70E-01		from HELP model			
		Specific Storage, null	9.81E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user			
	saprolite-maynardville	Particle Density, mg/m^3	2.65E+09		from HELP model			See note above
		Total Porosity	2.70E-01		from HELP model			
		Diffusive Porosity	2.70E-01		from HELP model			
		Specific Storage, null	9.81E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user			
	bedrock-pumpkin valley	Particle Density, mg/m^3	2.78E+09		from HELP model			See note above
		Total Porosity	2.00E-01		from HELP model			
		Diffusive Porosity	2.00E-01		from HELP model			
		Specific Storage, null	9.80E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user			
	bedrock-maryville	Particle Density, mg/m^3	2.78E+09		from HELP model			See note above
		Total Porosity	2.00E-01		from HELP model			
		Diffusive Porosity	2.00E-01		from HELP model			
		Specific Storage, null	9.80E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user			
	bedrock-nolichukey	Particle Density, mg/m^3	2.78E+09		from HELP model			See note above
		Total Porosity	2.00E-01		from HELP model			
		Diffusive Porosity	2.00E-01		from HELP model			
		Specific Storage, null	9.80E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user			
	bedrock-maynardville	Particle Density, mg/m^3	2.78E+09		from HELP model			See note above
		Total Porosity	2.00E-01		from HELP model			
		Diffusive Porosity	2.00E-01		from HELP model			
		Specific Storage, null	9.80E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user			
	berm-fill	Particle Density, mg/m^3	2.65E+09		from HELP model	SEF	SEF	C. Lu - The help model does not have input for bedrock
		Total Porosity	4.00E-01		from HELP model	SEF	SEF	
		Diffusive Porosity	3.00E-01		from HELP model	SEF	SEF	
		Specific Storage, null	9.81E-04		STOMP model calculated	N/A	N/A	
		Compressibility, 1/Pa	1.00E-07		STOMP model calculated	N/A	N/A	
		Millington and Quirk Tortuosity Function			Function selected by user			
~ Rock/Soil Hydraulic Properties Card								
	cover	X-Direction Matrix Intrinsic Permeability, hc cm/s	1.39E-07		Based on design and HELP model	SEF	SEF	
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.39E-07		Based on design and HELP model	SEF	SEF	
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	1.39E-07		Based on design and HELP model	SEF	SEF	C. Lu - is this the Layer 7 in HELP? However, in HELP, it is 1.00 -7
	waste-c1	X-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	All waste layers assumed to be same
	waste-c2	X-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	
	waste-c3	X-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	
	waste-c4	X-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	1.90E-05		Based on design and HELP model	SEF	SEF	
	liner-fill	X-Direction Matrix Intrinsic Permeability, hc cm/s	3.70E-04		Based on design and HELP model	SEF	SEF	
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	3.70E-04		Based on design and HELP model	SEF	SEF	
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	3.70E-04		Based on design and HELP model	SEF	SEF	Layer 10 of HELP model
	liner-sand-drain	X-Direction Matrix Intrinsic Permeability, hc cm/s	3.00E-01		Based on design and HELP model	SEF	SEF	
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	3.00E-01		Based on design and HELP model	SEF	SEF	
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	3.00E-01		Based on design and HELP model	SEF	SEF	Layer 11 - in HELP model
	liner-clay	X-Direction Matrix Intrinsic Permeability, hc cm/s	1.00E-07		Based on design and HELP model	SEF	SEF	
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.00E-07		Based on design and HELP model	SEF	SEF	
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	1.00E-07		Based on design and HELP model	SEF	SEF	Layer 16 in HELP model
	geobuffer	X-Direction Matrix Intrinsic Permeability, hc cm/s	1.00E-05		Based on design and HELP model	SEF	SEF	
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.00E-05		Based on design and HELP model	SEF	SEF	
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	1.00E-05		Based on design and HELP model	SEF	SEF	Layer 17 in HELP model

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
	saprolite-pumpkinvalley	X-Direction Matrix Intrinsic Permeability, hc cm/s	3.53E-05		Based on site-specific and GW model			C. Lu - where do I get these parameters for the bedrock layers?
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.76E-04		Based on site-specific and GW model			
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	3.53E-05		Based on site-specific and GW model			
	saprolite-maryville	X-Direction Matrix Intrinsic Permeability, hc cm/s	3.53E-05		Based on site-specific and GW model			C. Lu - where do I get these parameters for the bedrock layers?
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.76E-04		Based on site-specific and GW model			
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	3.53E-05		Based on site-specific and GW model			
	saprolite-nolichukey	X-Direction Matrix Intrinsic Permeability, hc cm/s	5.29E-05		Based on site-specific and GW model	These three are different that Table E.3 of PA		C. Lu - where do I get these parameters for the bedrock layers?
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	2.65E-04		Based on site-specific and GW model			
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	5.29E-05		Based on site-specific and GW model			
	saprolite-maynardville	X-Direction Matrix Intrinsic Permeability, hc cm/s	7.51E-04		Based on site-specific and GW model			C. Lu - where do I get these parameters for the bedrock layers?
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	3.76E-03		Based on site-specific and GW model			
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	7.51E-04		Based on site-specific and GW model			
	bedrock-pumpkin valley	X-Direction Matrix Intrinsic Permeability, hc cm/s	1.67E-05		Based on site-specific and GW model			C. Lu - where do I get these parameters for the bedrock layers?
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.67E-05		Based on site-specific and GW model			
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	1.67E-06		Based on site-specific and GW model			
	bedrock-maryville	X-Direction Matrix Intrinsic Permeability, hc cm/s	1.27E-05		Based on site-specific and GW model	SEF	SEF	
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.27E-05		Based on site-specific and GW model	SEF	SEF	
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	1.27E-06		Based on site-specific and GW model	SEF	SEF	
	bedrock-nolichukey	X-Direction Matrix Intrinsic Permeability, hc cm/s	3.35E-05		Based on site-specific and GW model			C. Lu - where do I get these parameters for the bedrock layers?
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	3.35E-05		Based on site-specific and GW model			
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	3.35E-06		Based on site-specific and GW model			
	bedrock-maynardville	X-Direction Matrix Intrinsic Permeability, hc cm/s	1.76E-04		Based on site-specific and GW model			C. Lu - where do I get these parameters for the bedrock layers?
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	1.76E-04		Based on site-specific and GW model			
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	1.76E-05		Based on site-specific and GW model			
	berm-fill	X-Direction Matrix Intrinsic Permeability, hc cm/s	2.00E-05		Based on design and GW model			C. Lu - where do I get these parameters for the bedrock layers?
		Y-Direction Matrix Intrinsic Permeability, hc cm/s	2.00E-05		Based on design and GW model			
		Z-Direction Matrix Intrinsic Permeability, hc cm/s	2.00E-05		Based on design and GW model	C. Lu - the App E PA had 1.00 - 5		
~ Rock/Soil Saturation Function Card								
	cover							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.50E+00		based on literature range	SEF	SEF	
		van Genuchten (n)	2.00E+00		based on literature range	SEF	SEF	
		van Genuchten (residual saturation)	6.10E-01		HELP model	SEF	SEF	Consistent with Table E.4 of Appendix E
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	waste-c1							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.50E+00		based on literature range	SEF	SEF	
		van Genuchten (n)	2.00E+00		based on literature range	SEF	SEF	
		van Genuchten (residual saturation)	7.30E-01		HELP model	0.37		C. Lu - the field capacity was 0.307. Why the difference. This is also the value presented in Steve K's 8/2 e-mail on Help based material properties
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	waste-c2							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.50E+00		based on literature range	SEF	SEF	
		van Genuchten (n)	2.00E+00		based on literature range	SEF	SEF	
		van Genuchten (residual saturation)	7.30E-01		HELP model			C. Lu - the field capacity was 0.307. Why the difference. This is also the value presented in Steve K's 8/2 e-mail on Help based material properties
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	waste-c3							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.50E+00		based on literature range	SEF	SEF	
		van Genuchten (n)	2.00E+00		based on literature range	SEF	SEF	
		van Genuchten (residual saturation)	7.30E-01		HELP model			C. Lu - the field capacity was 0.307. Why the difference. This is also the value presented in Steve K's 8/2 e-mail on Help based material properties
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	waste-c4							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.50E+00		based on literature range	SEF	SEF	
		van Genuchten (n)	2.00E+00		based on literature range	SEF	SEF	
		van Genuchten (residual saturation)	7.30E-01		HELP model	SEF	SEF	
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
	liner-fill							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.50E+00		based on literature range			
		van Genuchten (n)	2.00E+00		based on literature range			
		van Genuchten (residual saturation)	5.00E-01		HELP model			C. Lu - I could not find this value?
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	liner-sand-drain							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	3.00E+00		based on literature range			
		van Genuchten (n)	3.50E+00		based on literature range			
		van Genuchten (residual saturation)	8.00E-02		HELP model			C. Lu - I could not find this value?
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	liner-clay							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	1.00E+00		based on literature range			
		van Genuchten (n)	1.80E+00		based on literature range			
		van Genuchten (residual saturation)	9.90E-01		HELP model			C. Lu - I could not find this value?
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)			
	geobuffer							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	1.50E+00		based on literature range			
		van Genuchten (n)	1.80E+00		based on literature range			
		van Genuchten (residual saturation)	7.30E-01		HELP model			C. Lu - .3677 in Layer 17
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	saprolite-pumpkinvalley							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.00E+00		based on literature range			C. Lu - this is .25 in Table E.4
		van Genuchten (n)	2.00E+00		based on literature range			
		van Genuchten (residual saturation)	5.00E-01		Assumed	N/A	N/A	
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	saprolite-maryville							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.00E+00		based on literature range			C. Lu - this is .25 in Table E.4
		van Genuchten (n)	2.00E+00		based on literature range			
		van Genuchten (residual saturation)	5.00E-01		Assumed	N/A	N/A	
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	saprolite-nolichukey							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.00E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (n)	2.00E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (residual saturation)	5.00E-01		Assumed	N/A	N/A	
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	saprolite-maynardville							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.00E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (n)	2.00E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (residual saturation)	5.00E-01		Assumed	N/A	N/A	
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	bedrock-pumpkin valley							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.50E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (n)	2.00E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (residual saturation)	3.00E-01		Assumed	N/A	N/A	
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	bedrock-maryville							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.50E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (n)	2.00E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (residual saturation)	3.00E-01		Assumed	N/A	N/A	
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	bedrock-nolichukey							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.50E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (n)	2.00E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (residual saturation)	3.00E-01		Assumed	N/A	N/A	
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	bedrock-maynardville							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.50E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (n)	2.00E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (residual saturation)	3.00E-01		Assumed	N/A	N/A	
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	
	berm-fill							
		van Genuchten Function						
		van Genuchten (alpha), 1/m	2.00E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (n)	2.00E+00		based on literature range			C. Lu - where do these values come from?
		van Genuchten (residual saturation)	5.00E-01		Assumed	N/A	N/A	
		van Genuchten (m)	0.00E+00		model default (model will internally calculate)	N/A	N/A	

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
~ Rock/Soil Aqueous Relative Permeability Function Card								
	cover							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	waste-c1							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	waste-c2							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	waste-c3							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	waste-c4							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	liner-fill							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	liner-sand-drain							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	7.14E-01		Model calculated	N/A	N/A	
	liner-clay							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	4.44E-01		Model calculated	N/A	N/A	
	geobuffer							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	4.44E-01		Model calculated	N/A	N/A	
	saprolite-pumpkinvalley							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	saprolite-maryville							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	saprolite-nolichukey							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	saprolite-maynardville							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	bedrock-pumpkin valley							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	bedrock-maryville							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	bedrock-nolichukey							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	bedrock-maynardville							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
	berm-fill							
		Mualem Porosity Distribution Model			Model selected	N/A	N/A	
		m Parameter	5.00E-01		Model calculated	N/A	N/A	
~ Solute/Fluid Interaction Card								
	tc-99							
		Aqueous Effective Diffusion Option	Conventional Diffusion Model		user selected	SEF	SEF	
		Aqueous Molecular Diffusion Coefficient @ 20 C, cm^2/s	0.00E+00		Model default (no diffusion)	N/A	N/A	
		Solid-Aqueous Partition Option	Continuous Solid Wetting		user selected	SEF	SEF	
		Radioactive Half-Life, yr	2.11E+05		DOE 2011	SEF	SEF	
	h-3							
		Aqueous Effective Diffusion Option	Conventional Diffusion Model		user selected	SEF	SEF	
		Aqueous Molecular Diffusion Coefficient @ 20 C, cm^2/s	0.00E+00		Model default (no diffusion)	N/A	N/A	
		Solid-Aqueous Partition Option	Continuous Solid Wetting		user selected	SEF	SEF	
		Radioactive Half-Life, yr	1.23E+01		DOE 2011	SEF	SEF	
	u-234							
		Aqueous Effective Diffusion Option	Conventional Diffusion Model		user selected	SEF	SEF	
		Aqueous Molecular Diffusion Coefficient @ 20 C, cm^2/s	0.00E+00		Model default (no diffusion)	N/A	N/A	
		Solid-Aqueous Partition Option	Continuous Solid Wetting		user selected	SEF	SEF	
		Radioactive Half-Life, yr	2.46E+05		DOE 2011	SEF	SEF	
	pu-239							
		Aqueous Effective Diffusion Option	Conventional Diffusion Model		user selected	SEF	SEF	

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
		Aqueous Molecular Diffusion Coefficient @ 20 C, cm^2/s	0.00E+00		Model default (no diffusion)	N/A	N/A	
		Solid-Aqueous Partition Option	Continuous Solid Wetting		user selected	SEF	SEF	
		Radioactive Half-Life, yr	2.41E+04		DOE 2011	SEF	SEF	
	u-238							
		Aqueous Effective Diffusion Option	Conventional Diffusion Model		user selected	SEF	SEF	
		Aqueous Molecular Diffusion Coefficient @ 20 C, cm^2/s	0.00E+00		Model default (no diffusion)	N/A	N/A	
		Solid-Aqueous Partition Option	Continuous Solid Wetting		user selected	SEF	SEF	
		Radioactive Half-Life, yr	4.47E+09		DOE 2011	SEF	SEF	
	c-14							
		Aqueous Effective Diffusion Option	Conventional Diffusion Model		user selected	SEF	SEF	
		Aqueous Molecular Diffusion Coefficient @ 20 C, cm^2/s	0.00E+00		Model default (no diffusion)	N/A	N/A	
		Solid-Aqueous Partition Option	Continuous Solid Wetting		user selected	SEF	SEF	
		Radioactive Half-Life, yr	5.70E+03		DOE 2011	SEF	SEF	
	i-129							
		Aqueous Effective Diffusion Option	Conventional Diffusion Model		user selected	SEF	SEF	
		Aqueous Molecular Diffusion Coefficient @ 20 C, cm^2/s	0.00E+00		Model default (no diffusion)	N/A	N/A	
		Solid-Aqueous Partition Option	Continuous Solid Wetting		user selected	SEF	SEF	
		Radioactive Half-Life, yr	1.57E+07		DOE 2011	SEF	SEF	
~ Solute/Porous Media Interaction Card								
	Rock/Soil Name	cover		0				
	Longitudinal Dispersivity	cm	1.00E+01	1	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	3	assumed	SEF	SEF	
				5				
	Solute Name	tc-99		6				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	7	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				10				
	Solute Name	h-3		11				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	12	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				15				
	Solute Name	u-234		16				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	17	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				20				
	Solute Name	pu-239		21				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	22	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				25				
	Solute Name	u-238		26				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	27	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				30				
	Solute Name	c-14		31				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	32	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				35				

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
	Solute Name	i-129		36				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	37	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				40				
				41				
				42				
	Rock/Soil Name	waste-c1		43				
	Longitudinal Dispersivity	cm	1.00E+01	44	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	46	assumed	SEF	SEF	
				48				
	Solute Name	tc-99		49				
	Solid-Aqueous Partition Coefficient	cm^3/g	3.60E-01	50	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				53				
	Solute Name	h-3		54				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	55	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				58				
	Solute Name	u-234		59				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.50E+01	60	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				63				
	Solute Name	pu-239		64				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.00E+01	65	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				68				
	Solute Name	u-238		69				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.50E+01	70	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				73				
	Solute Name	c-14		74				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	75	SEF, Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				78				
	Solute Name	i-129		79				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.00E+00	80	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				83				
				84				
				85				
	Rock/Soil Name	waste-c2		86				
	Longitudinal Dispersivity	cm	1.00E+01	87	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	89	assumed	SEF	SEF	
				91				
	Solute Name	tc-99		92				
	Solid-Aqueous Partition Coefficient	cm^3/g	3.60E-01	93	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				96				
	Solute Name	h-3		97				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	98	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				101				
	Solute Name	u-234		102				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.50E+01	103	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				106				
	Solute Name	pu-239		107				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.00E+01	108	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				111				
	Solute Name	u-238		112				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.50E+01	113	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				116				
	Solute Name	c-14		117				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	118	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				121				
	Solute Name	i-129		122				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.00E+00	123	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				126				
				127				
				128				
	Rock/Soil Name	waste-c3		129				
	Longitudinal Dispersivity	cm	1.00E+01	130	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	132	assumed	SEF	SEF	

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
				134				
	Solute Name	tc-99		135				
	Solid-Aqueous Partition Coefficient	cm^3/g	3.60E-01	136	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				139				
	Solute Name	h-3		140				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	141	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				144				
	Solute Name	u-234		145				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.50E+01	146	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				149				
	Solute Name	pu-239		150				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.00E+01	151	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				154				
	Solute Name	u-238		155				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.50E+01	156	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				159				
	Solute Name	c-14		160				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	161	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				164				
	Solute Name	i-129		165				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.00E+00	166	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				169				
				170				
				171				
	Rock/Soil Name	waste-c4		172				
	Longitudinal Dispersivity	cm	1.00E+01	173	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	175	assumed	SEF	SEF	
				177				
	Solute Name	tc-99		178				
	Solid-Aqueous Partition Coefficient	cm^3/g	3.60E-01	179	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				182				
	Solute Name	h-3		183				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	184	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				187				
	Solute Name	u-234		188				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.50E+01	189	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				192				
	Solute Name	pu-239		193				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.00E+01	194	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				197				
	Solute Name	u-238		198				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.50E+01	199	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				202				
	Solute Name	c-14		203				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	204	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				207				
	Solute Name	i-129		208				
	Solid-Aqueous Partition Coefficient	cm^3/g	2.00E+00	209	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				212				
				213				
				214				
	Rock/Soil Name	liner-fill		215				
	Longitudinal Dispersivity	cm	1.00E+01	216	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	218	assumed	SEF	SEF	
				220				
	Solute Name	tc-99		221				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	222	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				225				
	Solute Name	h-3		226				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	227	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				230				
	Solute Name	u-234		231				

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	232	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				235				
	Solute Name	pu-239		236				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	237	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				240				
	Solute Name	u-238		241				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	242	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				245				
	Solute Name	c-14		246				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	247	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				250				
	Solute Name	i-129		251				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	252	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				255				
				256				
				257				
	Rock/Soil Name	liner-sand-drain		258				
	Longitudinal Dispersivity	cm	1.00E+01	259	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	261	assumed	SEF	SEF	
				263				
	Solute Name	tc-99		264				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	265	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				268				
	Solute Name	h-3		269				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	270	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				273				
	Solute Name	u-234		274				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	275	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				278				
	Solute Name	pu-239		279				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	280	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				283				
	Solute Name	u-238		284				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	285	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				288				
	Solute Name	c-14		289				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	290	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				293				
	Solute Name	i-129		294				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	295	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				298				
				299				
				300				
	Rock/Soil Name	liner-clay		301				
	Longitudinal Dispersivity	cm	1.00E+01	302	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	304	assumed	SEF	SEF	
				306				
	Solute Name	tc-99		307				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	308	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				311				
	Solute Name	h-3		312				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	313	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				316				
	Solute Name	u-234		317				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	318	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				321				
	Solute Name	pu-239		322				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	323	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				326				

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
	Solute Name	u-238		327				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	328	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				331				
	Solute Name	c-14		332				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	333	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				336				
	Solute Name	i-129		337				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	338	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				341				
				342				
				343				
	Rock/Soil Name	geobuffer		344				
	Longitudinal Dispersivity	cm	1.00E+01	345	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	347	assumed	SEF	SEF	
				349				
	Solute Name	tc-99		350				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	351	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				354				
	Solute Name	h-3		355				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	356	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				359				
	Solute Name	u-234		360				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	361	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				364				
	Solute Name	pu-239		365				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	366	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				369				
	Solute Name	u-238		370				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	371	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				374				
	Solute Name	c-14		375				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	376	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				379				
	Solute Name	i-129		380				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	381	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				384				
				385				
				386				
	Rock/Soil Name	saprolite-pumpkinvalley		387				
	Longitudinal Dispersivity	cm	1.00E+01	388	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	390	assumed	SEF	SEF	
				392				
	Solute Name	tc-99		393				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	394	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				397				
	Solute Name	h-3		398				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	399	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				402				
	Solute Name	u-234		403				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	404	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				407				
	Solute Name	pu-239		408				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	409	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				412				
	Solute Name	u-238		413				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	414	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				417				
	Solute Name	c-14		418				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	419	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				422				

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
	Solute Name	i-129		423				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	424	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				427				
				428				
				429				
	Rock/Soil Name	saprolite-maryville		430				
	Longitudinal Dispersivity	cm	1.00E+01	431	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	433	assumed	SEF	SEF	
				435				
	Solute Name	tc-99		436				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	437	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				440				
	Solute Name	h-3		441				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	442	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				445				
	Solute Name	u-234		446				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	447	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				450				
	Solute Name	pu-239		451				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	452	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				455				
	Solute Name	u-238		456				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	457	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				460				
	Solute Name	c-14		461				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	462	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				465				
	Solute Name	i-129		466				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	467	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				470				
				471				
				472				
	Rock/Soil Name	saprolite-nolichukey		473				
	Longitudinal Dispersivity	cm	1.00E+01	474	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	476	assumed	SEF	SEF	
				478				
	Solute Name	tc-99		479				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	480	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				483				
	Solute Name	h-3		484				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	485	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				488				
	Solute Name	u-234		489				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	490	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				493				
	Solute Name	pu-239		494				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	495	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				498				
	Solute Name	u-238		499				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	500	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				503				
	Solute Name	c-14		504				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	505	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				508				
	Solute Name	i-129		509				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	510	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19			
				513				
				514				
				515				
	Rock/Soil Name	saprolite-maynardville		516				
	Longitudinal Dispersivity	cm	1.00E+01	517	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	519	assumed	SEF	SEF	
				521				
	Solute Name	tc-99		522				

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	523	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				526				
	Solute Name	h-3		527				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	528	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				531				
	Solute Name	u-234		532				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	533	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				536				
	Solute Name	pu-239		537				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	538	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				541				
	Solute Name	u-238		542				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	543	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				546				
	Solute Name	c-14		547				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	548	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				551				
	Solute Name	i-129		552				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	553	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				556				
				557				
				558				
	Rock/Soil Name	bedrock-pumpkin valley		559				
	Longitudinal Dispersivity	cm	1.00E+01	560	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	562	assumed	SEF	SEF	
				564				
	Solute Name	tc-99		565				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	566	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				569				
	Solute Name	h-3		570				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	571	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				574				
	Solute Name	u-234		575				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	576	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				579				
	Solute Name	pu-239		580				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	581	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				584				
	Solute Name	u-238		585				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	586	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				589				
	Solute Name	c-14		590				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	591	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				594				
	Solute Name	i-129		595				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	596	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				599				
				600				
				601				
	Rock/Soil Name	bedrock-maryville		602				
	Longitudinal Dispersivity	cm	1.00E+01	603	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	605	assumed	SEF	SEF	
				607				
	Solute Name	tc-99		608				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	609	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				612				
	Solute Name	h-3		613				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	614	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				617				
	Solute Name	u-234		618				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	619	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				622				

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
	Solute Name	pu-239		623				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	624	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				627				
	Solute Name	u-238		628				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	629	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				632				
	Solute Name	c-14		633				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	634	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				637				
	Solute Name	i-129		638				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	639	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				642				
				643				
				644				
	Rock/Soil Name	bedrock-nolichukey		645				
	Longitudinal Dispersivity	cm	1.00E+01	646	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	648	assumed	SEF	SEF	
				650				
	Solute Name	tc-99		651				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	652	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				655				
	Solute Name	h-3		656				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	657	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				660				
	Solute Name	u-234		661				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	662	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				665				
	Solute Name	pu-239		666				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	667	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				670				
	Solute Name	u-238		671				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	672	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				675				
	Solute Name	c-14		676				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	677	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				680				
	Solute Name	i-129		681				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	682	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				685				
				686				
				687				
	Rock/Soil Name	bedrock-maynardville		688				
	Longitudinal Dispersivity	cm	1.00E+01	689	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	691	assumed	SEF	SEF	
				693				
	Solute Name	tc-99		694				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	695	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				698				
	Solute Name	h-3		699				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	700	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				703				
	Solute Name	u-234		704				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	705	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				708				
	Solute Name	pu-239		709				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	710	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				713				

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
	Solute Name	u-238		714				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	715	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				718				
	Solute Name	c-14		719				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	720	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				723				
	Solute Name	i-129		724				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	725				
				728				
				729				
				730				
	Rock/Soil Name	berm-fill		731				
	Longitudinal Dispersivity	cm	1.00E+01	732	assumed	SEF	SEF	
	Transverse Dispersivity	cm	1.00E+00	734	assumed	SEF	SEF	
				736				
	Solute Name	tc-99		737				
	Solid-Aqueous Partition Coefficient	cm^3/g	7.20E-01	738	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				741				
	Solute Name	h-3		742				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	743	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				746				
	Solute Name	u-234		747				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	748	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				751				
	Solute Name	pu-239		752				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+01	753	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				756				
	Solute Name	u-238		757				
	Solid-Aqueous Partition Coefficient	cm^3/g	5.00E+01	758	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				761				
	Solute Name	c-14		762				
	Solid-Aqueous Partition Coefficient	cm^3/g	0.00E+00	763	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				766				
	Solute Name	i-129		767				
	Solid-Aqueous Partition Coefficient	cm^3/g	4.00E+00	768	Steve Kenworthy, Data Transmittal 001-Rev) dated 04/16/19	SEF	SEF	
				771				
~ Initial Conditions Card:								
	Initial Saturation Option:							
	gas pressure							
	aqueous pressure							
	Initial Condition Variable(s) and Domain(s)							
		aqueous pressure, pa	1.01E+05					
		X-Direction Gradient, , null	0.0000E+00 (0.0000E+00, 1/m)					Changsheng, where have you gotten these?
		Y-Direction Gradient, , null	0.0000E+00 (0.0000E+00, 1/m)					
		Z-Direction Gradient, , 1/m	-9.7935E+03 (-9.7935E+03, 1/m)					
	Domain:							
		zonation solute1/l	1.75E-04	waste-c1				Changsheng, where have you gotten these values from ?
		zonation solute1/l	8.94E-10	waste-c1				
		zonation solute1/l	1.96E-01	waste-c1				
		zonation solute1/l	1.79E-03	waste-c1				
		zonation solute1/l	2.17E+03	waste-c1				
		zonation solute1/l	2.19E-07	waste-c1				
		zonation solute1/l	3.76E-03	waste-c1				
		zonation solute1/l	1.75E-04	waste-c2				
		zonation solute1/l	8.94E-10	waste-c2				
		zonation solute1/l	1.96E-01	waste-c2				
		zonation solute1/l	1.79E-03	waste-c2				
		zonation solute1/l	2.17E+03	waste-c2				
		zonation solute1/l	2.19E-07	waste-c2				
		zonation solute1/l	3.76E-03	waste-c2				
		zonation solute1/l	1.75E-04	waste-c3				
		zonation solute1/l	8.94E-10	waste-c3				
		zonation solute1/l	1.96E-01	waste-c3				
		zonation solute1/l	1.79E-03	waste-c3				

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
		zonation solute1/l	2.17E+03	waste-c3				
		zonation solute1/l	2.19E-07	waste-c3				
		zonation solute1/l	3.76E-03	waste-c3				
		zonation solute1/l	1.75E-04	waste-c4				
		zonation solute1/l	8.94E-10	waste-c4				
		zonation solute1/l	1.96E-01	waste-c4				
		zonation solute1/l	1.79E-03	waste-c4				
		zonation solute1/l	2.17E+03	waste-c4				
		zonation solute1/l	2.19E-07	waste-c4				
		zonation solute1/l	3.76E-03	waste-c4				
~ Boundary Conditions Card:								
		Boundary Condition Orientation						Changsheng, where have you gotten these values from?
		Boundary Condition Domain File	x-a-bc-recharge-cover.csv					
		Boundary Condition Type	Neumann Aqueous					
		Boundary Condition Times and Variables						
		Boundary Time, d	0.0000E+00 (0.0000E+00, s)					
		Volumetric Aqin/yr	-0.0000E+00 (-0.0000E+00, m^3/s)					
		Boundary Time, yr	2.0000E+02 (6.3115E+09, s)					
		Volumetric Aqin/yr	-0.0000E+00 (-0.0000E+00, m^3/s)					
		Boundary Time, yr	2.0000E+02 (6.3115E+09, s)					
		Volumetric Aqin/yr	-0.0000E+00 (-0.0000E+00, m^3/s)					
		Boundary Time, yr	1.0000E+03 (3.1558E+10, s)					
		Volumetric Aqin/yr	-8.8000E-01 (-7.0829E-10, m^3/s)					
		Boundary Time, yr	1.0000E+03 (3.1558E+10, s)					
		Volumetric Aqin/yr	-8.8000E-01 (-7.0829E-10, m^3/s)					
		Boundary Time, yr	1.0000E+06 (3.1558E+13, s)					
		Volumetric Aqin/yr	-8.8000E-01 (-7.0829E-10, m^3/s)					
		Boundary Condition Orientation						
		Boundary Condition Domain File	x-a-bc-recharge-berm.csv					
		Boundary Condition Type	Neumann Aqueous			SEF	SEF	
		Boundary Condition Times and Variables						
		Boundary Time, d	0.0000E+00 (0.0000E+00, s)					
		Volumetric Aqin/yr	-1.0000E+00 (-8.0488E-10, m^3/s)					
		Boundary Time, yr	1.0000E+06 (3.1558E+13, s)					
		Volumetric Aqin/yr	-1.0000E+00 (-8.0488E-10, m^3/s)					
		Boundary Condition Orientation						
		Boundary Condition Domain File	x-a-bc-recharge-pv.csv					
		Boundary Condition Type	Neumann Aqueous			SEF	SEF	
		Noncyclic Boundary Conditions						
		Boundary Condition Times and Variables						
		Boundary Time, d	0.0000E+00 (0.0000E+00, s)					
		Volumetric Aqin/yr	-6.1000E+00 (-4.9098E-09, m^3/s)					
		Boundary Time, yr	1.0000E+06 (3.1558E+13, s)					
		Volumetric Aqin/yr	-6.1000E+00 (-4.9098E-09, m^3/s)					
		Boundary Condition Orientation						
		Boundary Condition Domain File	x-a-bc-recharge-maryville.csv					
		Boundary Condition Type	Neumann Aqueous			SEF	SEF	
		Aqueous Concentration tc-99						
		Aqueous Concentration h-3						
		Aqueous Concentration u-234						
		Aqueous Concentration pu-239						
		Aqueous Concentration u-238						
		Aqueous Concentration c-14						
		Aqueous Concentration i-129						
		Noncyclic Boundary Conditions						
		Boundary Condition Times and Variables						
		Boundary Time, d	0.0000E+00 (0.0000E+00, s)					
		Volumetric Aqin/yr	-9.6000E+00 (-7.7268E-09, m^3/s)					
		Boundary Time, yr	1.0000E+06 (3.1558E+13, s)					

System/Profile	Model Layer/Material Description Layer Number in Base Case Model (0 to 200 years)	Input Parameter, Unit	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
		Volumetric Aqin/yr	-9.6000E+00 (-7.7268E-09, m^3/s)					
		Boundary Condition Orientation						
		Boundary Condition Domain File	x-a-bc-recharge-nolichucky.csv					
		Boundary Condition Type	Neumann Aqueous					
		Noncyclic Boundary Conditions						
		Boundary Condition Times and Variables						
		Boundary Time, d	0.0000E+00 (0.0000E+00, s)					
		Volumetric Aqin/yr	-6.6000E+00 (-5.3122E-09, m^3/s)					
		Boundary Time, yr	1.0000E+06 (3.1558E+13, s)					
		Volumetric Aqin/yr	-6.6000E+00 (-5.3122E-09, m^3/s)					
		Boundary Condition Orientation						
		Boundary Condition Domain File	x-a-bc-recharge-maynardville.csv					
		Boundary Condition Type	Neumann Aqueous					
		Boundary Condition Times and Variables						
		Boundary Time, d	0.0000E+00 (0.0000E+00, s)					
		Volumetric Aqin/yr	-1.3100E+01 (-1.0544E-08, m^3/s)					
		Boundary Time, yr	1.0000E+06 (3.1558E+13, s)					
		Volumetric Aqin/yr	-1.3100E+01 (-1.0544E-08, m^3/s)					
		Boundary Condition Orientation						
		Boundary Condition Domain File	x-a-bc-nw-hg.csv					
		Boundary Condition Type	Hydraulic Gradient Aqueous					
		Boundary Condition Times and Variables						
		Boundary Time, d	0.0000E+00 (0.0000E+00, s)					
		Base Aqueous pa	1.4461E+05 (1.4461E+05, Pa)					
		Boundary Time, yr	1.0000E+06 (3.1558E+13, s)					
		Base Aqueous pa	1.4461E+05 (1.4461E+05, Pa)					
		Boundary Condition Orientation						
		Boundary Condition Domain File	x-a-bc-se-hg.csv					
		Boundary Condition Type	Hydraulic Gradient Aqueous					
		Boundary Condition Times and Variables						
		Boundary Time, d	0.0000E+00 (0.0000E+00, s)					
		Base Aqueous pa	1.1266E+05 (1.1266E+05, Pa)					
		Boundary Time, yr	1.0000E+06 (3.1558E+13, s)					
		Base Aqueous pa	1.1266E+05 (1.1266E+05, Pa)					
		Boundary Condition Orientation						
		Boundary Condition Domain File	x-a-bc-fa.csv					
		Boundary Condition Type	X-Y-Z Seepage Face Aqueous					
		Boundary Condition Times and Variables						
		Boundary Time, d	0.0000E+00 (0.0000E+00, s)					
		Base Aqueous pa	1.0132E+05 (1.0132E+05, Pa)					
		Boundary Time, yr	1.0000E+06 (3.1558E+13, s)					
		Base Aqueous pa	1.0132E+05 (1.0132E+05, Pa)					
					Comments on the Review of the Input Parameters of the STOMP Model: All of the input parameters were checked versus the Base Case Scenario that represents 0 to 200 years post closure. In addition, the model input files were checked to verify that the parameters were consistent with this table.			
					Checked by & Date: Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 17:12:38 -05'00'			

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ATTACHMENT A.3. MODFLOW MODEL

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A. **Model Code Used/Version Number**: MODFLOW 2005
B. **Organization Performing Modeling**: (Jacobs- Oak Ridge, Tennessee)
C. **Modeler Contact Information**: (Changsheng Lu 865-220-6182 (work), 865-705-8981 (cell)
D. **Date(s) Modeling Performed**: (May 2019)
E. **Output Filename**: Various
F. **Purpose of Modeling**: Predicting Groundwater Condition for the EMDF Area to support PA

System/ Profile	Sub-group	Input Parameter	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
Model	Model Domain	Model Coordinate System	Y-12 system	ft	Oak Ridge Y-12 coordinate system to incorporate Bear Creek data	Steve Fox (SEF)		
Model Grid/Layers	Model Domain	east-west direction	8700	ft	user defined to meet modeling objectives	SEF	SEF	
Model Grid/Layers	Model Domain	North-south direction	6700	ft	user defined to meet modeling objectives	SEF	SEF	
Model Grid/Layers	Model Domain	Model Layers	9	unitless	user defined to meet modeling objectives	SEF	SEF	
Model Grid/Layers	Grid Space and discretization	Row Spacing	10	ft	user defined to meet modeling objectives	SEF	SEF	
Model Grid/Layers	Grid Space and discretization	Column spacing	10	ft	user defined to meet modeling objectives	SEF	SEF	
Model Grid/Layers	Layer Surfaces	Model Top Layer Elevation - Topography (Current condition model)	Variable	ft	DOE (2015, 2017)	SEF	SEF	
Model Grid/Layers	Layer Surfaces	Model Top Layer Elevation - Topography (Design/Future condition model)	Variable	ft	DOE (2015, 2017) and EMDF Preliminary Design data (2019)	SEF	SEF	
Model Grid/Layers	Layer Surfaces	Bottom Elevations of Model Layers	Variable	ft	Lithological data interpretation for different zones from site-specific and Bear Creek valley data	SEF	SEF	
Model Boundary Conditions	Model Exterior Boundary	No-Flow (Inactive) - Areal along north and south boundaries	variable	Unitless	Defined based on watershed definition for Bear Creek Valley (Topography - DOE, 2015).	SEF	SEF	
Model Boundary Conditions	Model Exterior Boundary	No-Flow (Inactive) - Bottom	Variable	Unitless	Defined based on conceptual model that there is no active groundwater flow below the depth (approximately 800 ft below surface)	SEF	SEF	
Model Boundary Conditions	Model Exterior Boundary	Constant Heads along east and west boundaries	Variable	ft	Derived from BCV Regional Groundwater Model result (DOE, 1997).	SEF	SEF	
Model Boundary Conditions	Model Exterior Boundary	Active - Top of the uppermost model layer	Variable	variable	Allow groundwater-surface water interaction	SEF	SEF	
Model Boundary Conditions	River Cells	Steambed elevation	Variable	ft	Mapped based on Bear Creek stream elevation	SEF	SEF	
Model Boundary Conditions	River Cells	Water stage Elevation	Variable	ft	Mapped based on Bear Creek stream water elevation	SEF	SEF	
Model Boundary Conditions	River Cells	Conductance	Variable	ft2/day	defined to allow groundwater-surface water interaction	SEF	SEF	
Model Boundary Conditions	Drain Cells	Water stage Elevation	Variable	ft	Mapped based on tributaries and wetland elevation	SEF	SEF	
Model Boundary Conditions	Drain Cells	Conductance	Variable	ft2/day	defined to allow groundwater-surface water interaction	SEF	SEF	
Model Boundary Conditions	New Drain Cells (Design/Future Condition Model)	Water stage Elevation	Variable	ft	Mapped based on EMDF Preliminary Design elevation (2019)	SEF	SEF	
Model Boundary Conditions	New Drain Cells (Design/Future Condition Model)	Conductance	Variable	ft2/day	defined to allow groundwater-surface water interaction	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Rome	0.0022	ft/day	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	

System/ Profile	Sub-group	Input Parameter	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
Model Boundary Conditions	Recharge Rate	Pumpkin Valley	0.0014	ft/day	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Maryville-Rogersville-Rutledge	0.0022	ft/day	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Nolichucky	0.0015	ft/day	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Maynardville	0.003	ft/day	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Knox (Copper Ridge)	0.001	ft/day	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Knox (Chepultepec)	0.0005	ft/day	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Soil Storage pile Area	0.0005	ft/day	Mapped based on EMDF Preliminary Design (2019)			Get reference from C. Lu
Model Boundary Conditions	Recharge Rate	Cell Berm/side slope	0.000228	ft/day	Mapped based on EMDF Preliminary Design (2019)	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Lined Area (design condition)	0	ft/day	Mapped based on EMDF Preliminary Design (2019)	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Lined Area (degraded condition)	0.000098	ft/day	Mapped based on EMDF Preliminary Design (2019)	SEF	SEF	Get reference from C. Lu
Model Boundary Conditions	Recharge Rate	Lined Area (degraded condition- Long-tern Condition)	0.0002	ft/day	Mapped based on EMDF Preliminary Design (2019)	SEF	SEF	Get reference from C. Lu
Model Properties	Material Types and Areal Distribution	Rome	Variable	Unitless	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Properties	Material Types and Areal Distribution	Pumpkin Valley	Variable	Unitless	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Properties	Material Types and Areal Distribution	Maryville-Rogersville-Rutledge	Variable	Unitless	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Properties	Material Types and Areal Distribution	Nolichucky	Variable	Unitless	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Properties	Material Types and Areal Distribution	Maynardville	Variable	Unitless	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Properties	Material Types and Areal Distribution	Knox (Copper Ridge)	Variable	Unitless	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Properties	Material Types and Areal Distribution	Knox (Chepultepec)	Variable	Unitless	Based on Geological Mapping (ORNL, 1992)	SEF	SEF	
Model Properties	Material Types and Areal Distribution	Geobuffer	Variable	Unitless	Mapped based on EMDF Preliminary Design (2019)	SEF	SEF	
Model Properties	Material Types and Areal Distribution	Berm	Variable	Unitless	Mapped based on EMDF Preliminary Design (2019)	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layer-1,Ky (Along Valley)	7.795	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layer-1,Kx & Kz (cross valley and vertical)	1.559	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layer-1,Ky/Kx Ratio	5	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layers-2,3,4,Ky	0.0918	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layers-2,3,4,Kx & Kz	0.00918	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layers-2,3,4,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	

System/ Profile	Sub-group	Input Parameter	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
Model Properties	Hydraulic Conductivity	Knox,Layers-5,6,Ky	0.02535	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layers-5,6,Kx & Kz	0.002535	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layers-5,6,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layers-7,8,Ky	0.01155	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layers-7,8,Kx & Kz	0.001155	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layers-7,8,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layer-9,Ky	0.005	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layer-9,Kx & Kz	0.0005	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Knox,Layer-9,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layer-1,Ky	10.65	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layer-1,Kx & Kz	2.13	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layer-1,Ky/Kx Ratio	5	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layers-2,3,4,Ky	5.00E-01	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layers-2,3,4,Kx & Kz	0.05	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layers-2,3,4,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layers-5,6,Ky	0.0334	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layers-5,6,Kx & Kz	0.00334	ft/day	Model calibrated based on field data			
Model Properties	Hydraulic Conductivity	Maynardville,Layers-5,6,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layers-7,8,Ky	0.0152	ft/day	Model calibrated based on field data			
Model Properties	Hydraulic Conductivity	Maynardville,Layers-7,8,Kx & Kz	0.00152	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layers-7,8,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layer-9,Ky	0.0048	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layer-9,Kx & Kz	0.00048	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maynardville,Layer-9,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layer-1,Ky	7.50E-01	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layer-1,Kx & Kz	0.15	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layer-1,Ky/Kx Ratio	5	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layers-2,3,4,Ky	0.095	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layers-2,3,4,Kx & Kz	0.0095	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layers-2,3,4,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layers-5,6,Ky	0.0252	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layers-5,6,Kx & Kz	0.00252	ft/day	Model calibrated based on field data	SEF	SEF	

System/ Profile	Sub-group	Input Parameter	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
Model Properties	Hydraulic Conductivity	Nolichucky,Layers-5,6,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layers-7,8,Ky	6.10E-03	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layers-7,8,Kx & Kz	0.00061	ft/day	Model calibrated based on field data			
Model Properties	Hydraulic Conductivity	Nolichucky,Layers-7,8,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layer-9,Ky	0.0005	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layer-9,Kx & Kz	0.00005	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Nolichucky,Layer-9,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layer-1,Ky	0.5	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layer-1,Kx & Kz	0.1	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layer-1,Ky/Kx Ratio	5	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layers-2,3,4,Ky	3.60E-02	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layers-2,3,4,Kx & Kz	0.0036	ft/day	Model calibrated based on field data	SEF		
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layers-2,3,4,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layers-5,6,Ky	0.0135	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layers-5,6,Kx & Kz	0.00135	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layers-5,6,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layers-7,8,Ky	0.0032	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layers-7,8,Kx & Kz	0.00032	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layers-7,8,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layer-9,Ky	4.50E-04	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layer-9,Kx & Kz	0.000045	ft/day	Model calibrated based on field data			
Model Properties	Hydraulic Conductivity	Maryville-Rogersville-Rutledge,Layer-9,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layer-1,Ky	0.5	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layer-1,Kx & Kz	0.1	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layer-1,Ky/Kx Ratio	5	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layers-2,3,4,Ky	0.0472	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layers-2,3,4,Kx & Kz	0.00472	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layers-2,3,4,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layers-5,6,Ky	1.75E-02	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layers-5,6,Kx & Kz	0.001746	ft/day	Model calibrated based on field data			
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layers-5,6,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layers-7,8,Ky	0.0042	ft/day	Model calibrated based on field data	SEF	SEF	

System/ Profile	Sub-group	Input Parameter	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layers-7,8,Kx & Kz	0.00042	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layers-7,8,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layer-9,Ky	0.00056	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layer-9,Kx & Kz	0.000056	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Pumpkin Valley,Layer-9,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layer-1,Ky	2	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layer-1,Kx & Kz	0.4	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layer-1,Ky/Kx Ratio	5	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layers-2,3,4,Ky	0.4	ft/day	Model calibrated based on field data			
Model Properties	Hydraulic Conductivity	Rome,Layers-2,3,4,Kx & Kz	0.04	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layers-2,3,4,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layers-5,6,Ky	0.05	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layers-5,6,Kx & Kz	0.005	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layers-5,6,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layers-7,8,Ky	0.01	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layers-7,8,Kx & Kz	0.001	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layers-7,8,Ky/Kx Ratio	1.00E+01	Unitless	Model calibrated based on field data	SEF	SEF	Why not 10?
Model Properties	Hydraulic Conductivity	Rome,Layer-9,Ky	0.005	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layer-9,Kx & Kz	0.0005	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Rome,Layer-9,Ky/Kx Ratio	10	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Compacted clay/Geobuffer,Layer-1,Ky	0.0283	ft/day	Model calibrated based on field data			
Model Properties	Hydraulic Conductivity	Compacted clay/Geobuffer,Layer-1,Kx & Kz	0.0283	ft/day	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Compacted clay/Geobuffer,Layer-1,Ky/Kx Ratio	1	Unitless	Model calibrated based on field data	SEF	SEF	
Model Properties	Hydraulic Conductivity	Berm,Layer-1,Ky	0.056	ft/day	EMDF design specification	SEF	SEF	
Model Properties	Hydraulic Conductivity	Berm,Layer-1,Kx & Kz	0.056	ft/day	EMDF design specification	SEF	SEF	
Model Properties	Hydraulic Conductivity	Berm,Layer-1,Ky/Kx Ratio	1	Unitless	EMDF design specification	SEF	SEF	
Model Properties	Leakance Between Model Layers	All model layers	Variable	ft2/day	Calculated by model based on vertical hydraulic conductivities (Kz) of neighboring layers	SEF	SEF	
Model Properties	Porosity (Total)	Model Layer 1	0.35	Volume/volume				These are from Table 3.11 of the PA
Model Properties	Porosity (Total)	Model Layers 2, 3, 4	0.15	Volume/volume				These are from Table 3.11 of the PA
Model Properties	Porosity (Total)	Model Layers 5,6	1.00E-01	Volume/volume				These are from Table 3.11 of the PA
Model Properties	Porosity (Total)	Model Layers 7,8	0.1	Volume/volume				These are from Table 3.11 of the PA

System/ Profile	Sub-group	Input Parameter	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
Model Properties	Porosity (Total)	Model layer 9	0.1	Volume/volume				These are from Table 3.11 of the PA
Model Properties	Porosity (Effective)	Model Layer 1	0.2	Volume/volume				These are from Table 3.11 of the PA
Model Properties	Porosity (Effective)	Model Layers 2, 3, 4	0.05	Volume/volume				These are from Table 3.11 of the PA
Model Properties	Porosity (Effective)	Model Layers 5,6	3.00E-02	Volume/volume				These are from Table 3.11 of the PA
Model Properties	Porosity (Effective)	Model Layers 7,8	0.02	Volume/volume				These are from Table 3.11 of the PA
Model Properties	Porosity (Effective)	Model layer 9	0.01	Volume/volume				These are from Table 3.11 of the PA
					Comments on the Review of the Input Parameters of the Modflow Model: All of the input parameters were checked versus the Base Case Scenario that represents 0 to 200 years post closure. The input parameters were checked versus "Reference or Basis for Assumption" and determined to be correct and appropriate for the Base Case Scenario and the subsequent Modflow model simulations. In addition, the model input files were checked to verify that the parameters were consistent with this table.			
					Checked by & Date: Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:32:51 -05'00'			

ATTACHMENT A.4. MT3D MODEL

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A. **Model Code Used/Version Number**: MT3D
B. **Organization Performing Modeling**: (Jacobs- Oak Ridge, Tennessee)
C. **Modeler Contact Information**: (Changsheng Lu 865-220-6182 (work)
D. **Date(s) Modeling Performed**: (June-September 2019)
E. **Output Filename**: Various
F. **Purpose of Modeling**: Predicting COC fate and transport for the EMDF Area to support PA

System/Profile	Sub-group	Input Parameter	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
Model Grid/Layers	Model Domain	Model Coordinate System	Y-12 system	ft	Oak Ridge Y-12 coordinate system to incorporate Bear Creek data	Steve Fox (SEF)	SEF	
Model Grid/Layers	Model Domain	east-west direction	8700	ft	user defined to meet modeling objectives	SEF	SEF	
Model Grid/Layers	Model Domain	North-south direction	6700	ft	user defined to meet modeling objectives	SEF	SEF	
Model Grid/Layers	Model Domain	Model Layers	9	unitless	user defined to meet modeling objectives	SEF	SEF	
Model Grid/Layers	Grid Space and discretization	Row Spacing	10	ft	user defined to meet modeling objectives	SEF	SEF	
Model Grid/Layers	Grid Space and discretization	Column spacing	10	ft	user defined to meet modeling objectives	SEF	SEF	
Model Grid/Layers	Layer Surfaces	Model Top Layer Elevation - Topography (Current condition model)	Variable	ft	DOE (2015, 2017)	SEF	SEF	
Model Grid/Layers	Layer Surfaces	Model Top Layer Elevation - Topography (Design/Future condition model)	Variable	ft	DOE (2015, 2017) and EMDF Preliminary Design data (2019)			
Model Grid/Layers	Layer Surfaces	Bottom Elevations of Model Layers	Variable	ft	Lithological data interpretation for different zones from site-specific and Bear Creek valley data	SEF	SEF	
Model Boundary Conditions	Model Exterior Boundary	No-Flow (Inactive) - Areal along north and south boundaries	variable	Unitless	Defined based on watershed definition for Bear Creek Valley (Topography - DOE, 2015).	SEF	SEF	
Model Boundary Conditions	Model Exterior Boundary	No-Flow (Inactive) - Bottom	Variable	Unitless	Defined based on conceptual model that there is no active groundwater flow below the depth (approximately 800 ft below surface)	SEF	SEF	
Model Boundary Conditions	Model Exterior Boundary	Constant Heads along east and west boundaries	Variable	ft	Derived from BCV Regional Groundwater Model result (DOE, 1997).	SEF	SEF	
Model Boundary Conditions	Model Exterior Boundary	Active - Top of the uppermost model layer	Variable	variable	Allow groundwater-surface water interaction	SEF	SEF	
Model Boundary Conditions	River Cells	Steambed elevation	Variable	ft	Mapped based on Bear Creek stream elevation	SEF	SEF	
Model Boundary Conditions	River Cells	Water stage Elevation	Variable	ft	Mapped based on Bear Creek stream water elevation	SEF	SEF	
Model Boundary Conditions	River Cells	Conductance	Variable	ft2/day	defined to allow groundwater-surface water interaction	SEF	SEF	
Model Boundary Conditions	Drain Cells	Water stage Elevation	Variable	ft	Mapped based on tributaries and wetland elevation	SEF	SEF	
Model Boundary Conditions	Drain Cells	Conductance	Variable	ft2/day	defined to allow groundwater-surface water interaction	SEF	SEF	
Model Boundary Conditions	New Drain Cells (Design/Future Condition Model)	Water stage Elevation	Variable	ft	Mapped based on EMDF Preliminary Design elevation (2019)	SEF	SEF	
Model Boundary Conditions	New Drain Cells (Design/Future Condition Model)	Conductance	Variable	ft2/day	defined to allow groundwater-surface water interaction	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Rome	0.0022	ft/day	Assumption and model calibrated	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Pumpkin Valley	0.0014	ft/day	Assumption and model calibrated	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Maryville-Rogersville-Rutledge	0.0022	ft/day	Assumption and model calibrated	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Nolichucky	0.0015	ft/day	Assumption and model calibrated	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Maynardville	0.003	ft/day	Assumption and model calibrated	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Knox (Copper Ridge)	0.001	ft/day	Assumption and model calibrated	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Knox (Chepultepec)	0.0005	ft/day	Assumption and model calibrated	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Cell Berm/side slope	0.000228	ft/day	Assumed	SEF	SEF	
Model Boundary Conditions	Recharge Rate	Lined Area (degraded condition- Long-term Condition)	0.0002	ft/day	Assumed based on HELP model result	SEF	SEF	
Model Material Properties	Porosity (Total)	Model Layer 1	0.27	Volume/volume	Based on Oak Ridge data (???)	SEF	SEF	Marshall, this is a not from Changsheng. It l
Model Material Properties	Porosity (Total)	Model Layer 2	0.20	Volume/volume	based on assumption of reduced fracture density in rock toward depth	SEF	SEF	
Model Material Properties	Porosity (Total)	Model Layer 3	0.15	Volume/volume	based on assumption of reduced fracture density in rock toward depth	SEF	SEF	
Model Material Properties	Porosity (Total)	Model Layer 4	0.10	Volume/volume	based on assumption of reduced fracture density in rock toward depth	SEF	SEF	
Model Material Properties	Porosity (Total)	Model Layer 5	0.05	Volume/volume	based on assumption of reduced fracture density in rock toward depth	SEF	SEF	
Model Material Properties	Porosity (Total)	Model Layer 6	0.04	Volume/volume	based on assumption of reduced fracture density in rock toward depth	SEF	SEF	
Model Material Properties	Porosity (Total)	Model Layer 7	0.03	Volume/volume	based on assumption of reduced fracture density in rock toward depth	SEF	SEF	
Model Material Properties	Porosity (Total)	Model Layer 8	0.02	Volume/volume	based on assumption of reduced fracture density in rock toward depth	SEF	SEF	
Model Material Properties	Porosity (Total)	Model Layer 9	0.01	Volume/volume	based on assumption of reduced fracture density in rock toward depth	SEF	SEF	
Model Material Properties	Porosity (Effective)	Model Layer 1	0.27	Volume/volume	Assume the total porosity is the effective porosity	SEF	SEF	
Model Material Properties	Porosity (Effective)	Model Layer 2	0.20	Volume/volume	Assume the total porosity is the effective porosity	SEF	SEF	
Model Material Properties	Porosity (Effective)	Model Layer 3	0.15	Volume/volume	Assume the total porosity is the effective porosity	SEF	SEF	
Model Material Properties	Porosity (Effective)	Model Layer 4	0.10	Volume/volume	Assume the total porosity is the effective porosity	SEF	SEF	
Model Material Properties	Porosity (Effective)	Model Layer 5	0.05	Volume/volume	Assume the total porosity is the effective porosity	SEF	SEF	
Model Material Properties	Porosity (Effective)	Model Layer 6	0.04	Volume/volume	Assume the total porosity is the effective porosity	SEF	SEF	
Model Material Properties	Porosity (Effective)	Model Layer 7	0.03	Volume/volume	Assume the total porosity is the effective porosity	SEF	SEF	
Model Material Properties	Porosity (Effective)	Model Layer 8	0.02	Volume/volume	Assume the total porosity is the effective porosity	SEF	SEF	
Model Material Properties	Porosity (Effective)	Model Layer 9	0.01	Volume/volume	Assume the total porosity is the effective porosity	SEF	SEF	
Model Material Properties	Bulk Density	Model Layer 1	54.78	kg/ft3	Calculated based on particle density of 2.65 **(ref...)** and porosity of the model layer	SEF	SEF	Marshall - I need help verifying these references

System/Profile	Sub-group	Input Parameter	Value	Units	Reference or Basis for Assumption	Parameter Checked Versus Reference or Assumption	Model Input verified versus Parameters	Comments
Model Material Properties	Bulk Density	Model Layer 2	62.98	kg/ft3	Calculated based on particle density of 2.78 (ref ???) and porosity of the model layer	SEF	SEF	
Model Material Properties	Bulk Density	Model Layer 3	66.91	kg/ft3	Calculated based on particle density of 2.78 (ref ???) and porosity of the model layer	SEF	SEF	
Model Material Properties	Bulk Density	Model Layer 4	70.85	kg/ft3	Calculated based on particle density of 2.78 (ref ???) and porosity of the model layer	SEF	SEF	
Model Material Properties	Bulk Density	Model Layer 5	74.78	kg/ft3	Calculated based on particle density of 2.78 (ref ???) and porosity of the model layer	SEF	SEF	
Model Material Properties	Bulk Density	Model Layer 6	75.57	kg/ft3	Calculated based on particle density of 2.78 (ref ???) and porosity of the model layer	SEF	SEF	
Model Material Properties	Bulk Density	Model Layer 7	76.36	kg/ft3	Calculated based on particle density of 2.78 (ref ???) and porosity of the model layer	SEF	SEF	
Model Material Properties	Bulk Density	Model Layer 8	77.15	kg/ft3	Calculated based on particle density of 2.78 (ref ???) and porosity of the model layer	SEF	SEF	
Model Material Properties	Bulk Density	Model Layer 9	77.93	kg/ft3	Calculated based on particle density of 2.78 (ref ???) and porosity of the model layer	SEF	SEF	
Model Material Properties	longitudinal dispersivity	All Model Layers	32.8	ft	Assumption (1/10 of 100 meter groundwater well distance of the plume)	SEF	SEF	
Model Material Properties	transverse dispersivity	All Model Layers	3.28	ft	Assumption (1/10 of longitudinal dispersivity) - typical literature assumption (Zheng and Bennett 1995)	SEF	SEF	Marshall, I got this reference from the PA
Model Material Properties	vertical transverse Dispersivity	All Model Layers	0.328	ft	Assumption (1/100 of longitudinal dispersivity) - typical literature assumption (Zheng and Bennett 1995)	SEF	SEF	Marshall, I got this reference from the PA
Radionuclide Properties	Kd	Tc-99	0.7	L/kg	PA Kd assumption for other zones, (not waste zone). UCOR-5094/R2 submittal on Kd values for EMDF.	SEF	SEF	
Radionuclide Properties	Kd	I-129	4	L/kg	PA Kd assumption for other zones, (not waste zone). UCOR-5094/R2 submittal on Kd values for EMDF.	SEF	SEF	
Radionuclide Properties	Kd	C-14	0	L/kg	PA Kd assumption for other zones, (not waste zone). UCOR-5094/R2 submittal on Kd values for EMDF.	SEF	SEF	
Radionuclide Properties	Half-Life	Tc-99	2.11E+05	year	DOE (2011)	SEF	SEF	
Radionuclide Properties	Half-Life	I-129	1.57E+07	year	DOE (2011)	SEF	SEF	
Radionuclide Properties	Half-Life	C-14	5.70E+03	year	DOE (2011)	SEF	SEF	
Radionuclide Properties	Decay in Water	Tc-99	8.99E-09	1/day	Calculated based on half-life (=LN(2)/T1/2)	SEF	SEF	check with Marshall
Radionuclide Properties	Decay in Water	I-129	1.21E-10	1/day	Calculated based on half-life (=LN(2)/T1/2)	SEF	SEF	check with Marshall
Radionuclide Properties	Decay in Water	C-14	3.33E-07	1/day	Calculated based on half-life (=LN(2)/T1/2)	SEF	SEF	check with Marshall
Radionuclide Properties	Decay on Soil	Tc-99	8.99E-09	1/day	Calculated based on half-life (=LN(2)/T1/2)	SEF	SEF	check with Marshall
Radionuclide Properties	Decay on Soil	I-129	1.21E-10	1/day	Calculated based on half-life (=LN(2)/T1/2)	SEF	SEF	check with Marshall
Radionuclide Properties	Decay on Soil	C-14	3.33E-07	1/day	Calculated based on half-life (=LN(2)/T1/2)	SEF	SEF	check with Marshall
Radionuclide Properties	Diffusion	Tc-99	0.00E+00	ft2/day	No diffusion	SEF	SEF	check with Marshall
Radionuclide Properties	Diffusion	I-129	0.00E+00	ft2/day	No diffusion	SEF	SEF	check with Marshall
Radionuclide Properties	Diffusion	C-14	0.00E+00	ft2/day	No diffusion	SEF	SEF	check with Marshall
Radionuclide Properties	Recharge Concentration	Tc-99	time-variable	pCi/L	calculated based on total mass, waste cell area, and mass depleting rate	SEF	SEF	
Radionuclide Properties	Recharge Concentration	I-129	time-variable	pCi/L	calculated based on total mass, waste cell area, and mass depleting rate	SEF	SEF	
Radionuclide Properties	Recharge Concentration	C-14	time-variable	pCi/L	calculated based on total mass, waste cell area, and mass depleting rate	SEF	SEF	
					Comments on the Review of the Input Parameters of the MT3D Model: All of the input parameters were checked versus the Base Case Scenario that represents 0 to 200 years post closure. In addition, the model input files were checked to verify that the parameters were consistent with this table.			
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ATTACHMENT A.5. RESRAD-OFFSITE MODEL

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Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Exposure duration	ED	yr	30		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Source					-					
Nuclide concentration	S1	pCi/g	varies		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Soil Conc Sheet
Release to groundwater, leach rate	-	1/yr	varies	Inactive	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	300		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.75 for C-14, H-3 0 for All Other Nuclides		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Time over which transformation to releasable form occurs	RELDUR	Years	500 for C-14, H-3 800 for All Other Nulides		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Release Mechanism	RELOPT		Instantaneous Equilibrium Sorption Desorption, 1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Initial Leach Rate	RLEACH ALEACH	1/year	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Distribution Coefficient in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Kd Sheet
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Distribution Coefficients					-					
Contaminated zone	DCACTC DCNUCC	cm^3/g	varies		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Kd Sheet
Unsaturated zone	DCACTU(1-5) DCNUCU(1-5)	cm^3/g	varies		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Kd Sheet
Saturated zone	DCACTS DCNUCS	cm^3/g	varies		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Kd Sheet
Sediment in surface water body	DCACTSWB DCNUCSWB	cm^3/g	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Fruit, grain, nonleafy fields	DCACTV1 DCNUCOF(1)	cm^3/g	varies		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Kd Sheet
Leafy vegetable fields	DCACTV2 DNUCOF(2)	cm^3/g	varies		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Kd Sheet
Pasture, silage growing areas	DCACTL1 DNUCOF(3)	cm^3/g	varies		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Kd Sheet
Livestock feed grain fields	DCACTL2 DNUCOF(4)	cm^3/g	varies		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Kd Sheet
Offsite dwelling site	DCACTDWE DCNUCDWE	cm^3/g	varies		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Kd Sheet
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Dose Conversion and Slope Factors					-					
External exposure library	-	(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Internal exposure dose library	-	mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Slope Factor (Risk) Library	-	(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Tranfer Factors Sheet
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Tranfer Factors Sheet
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Tranfer Factors Sheet
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Tranfer Factors Sheet
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Tranfer Factors Sheet
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Tranfer Factors Sheet
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Tranfer Factors Sheet
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in Tranfer Factors Sheet
Reporting Times					-					
Times at which output is reported	T()	yr	1, 200, 400, 500, 600, 800, 1000, 2000, 10000		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/30/2019	Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer	O. Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file, spot checked 10/31/2019 OW

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/30/2019	Checked in summary file
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/30/2019	Checked in summary file
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Wind speed	WIND	m/s	3.4342	Calculated	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Primary Contamination					-					
Area of primary contamination	AREA	m^2	95,900	Calculated	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer	O. Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file, spot checked 10/31/2019 OW
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file

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Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Rainfall and Runoff Factor	RAINEROS	--	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Erosion rate of clean cover	-	m/yr	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Clean Cover					-					
Thickness of clean cover	COVER0	m	3.353		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Erosion rate of clean cover	VCV	m/yr	0	Calculated	Ryan Hupfer	O. Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file, spot checked 10/31/2019 OW
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file

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Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field	AREAO(1)	m2	1024	Calculated	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Leafy Vegetable Field					-					
Area for leafy vegetable field	AREAO(2)	m^2	1024	Calculated	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file

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Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field	AREAO(3)	m^2	10000	Calculated	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Grain Field					-					
Area for grain field	AREAO(4)	m^2	10000	Calculated	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file

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Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site	AREAODWELL	m^2	1024	Calculated	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Volumetric water content for dwelling site	TMOFDWELL	--	0.3		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/30/2019	Checked in summary file
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/30/2019	Checked in summary file
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Support practice factor for dwelling site	CONVPRACDWEL	--	1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Atmospheric Transport					-		10/8/2019			Checked in summary file
Release height	AIRRELHT	m	1		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Anemometer height	ANH	m	10		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Ambient temperature	TABK	K	285		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	O. Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file, spot checked 10/31/2019 OW

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Dispersion model coefficients	IDISPMOD	--	Pasquill-Gifford		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Windspeed Terrain	IZONE	--	Rural		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Dwelling site	DWELLELEV	m	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Surface water body	SWELEV	m	0		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer	O. Warren	10/8/2019	J. Davis	10/29/2019	Checked in summary file
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	H(2)		0.305		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	H(4)		3.048		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	H(5)		4.846		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/30/2019	Checked in summary file
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	DENSUZ(2)		1.6		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	DENSUZ(3)		1.5		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	DENSUZ(4)		1.5		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	DENSUZ(5)		1.8		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	TPUZ(2)		0.397		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	TPUZ(3)		0.427		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	TPUZ(4)		0.419		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	TPUZ(5)		0.353		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	EPUZ(2)		0.389		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	EPUZ(3)		0.195		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	EPUZ(4)		0.234		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	EPUZ(5)		0.27		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FCUZ(2)		0.032		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FCUZ(3)		0.418		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FCUZ(4)		0.307		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FCUZ(5)		0.2471		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file

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Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	HCUZ(2)		94600		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	HCUZ(3)		0.315		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	HCUZ(4)		3.15		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	HCUZ(5)		16.7		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	BUZ(2)		4.05		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	BUZ(3)		11.4		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	BUZ(4)		11.4		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	BUZ(5)		10.4		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	ALPHALU(2)		0.1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	ALPHALU(3)		0.1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	ALPHALU(4)		0.1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	ALPHALU(5)		0.1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer	O. Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file, spot checked 10/31/2019 OW
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	O. Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file, spot checked 10/31/2019 OW
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file

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Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Water Use					-		10/9/2019			
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer	O. Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file, spot checked 10/31/2019 OW
Fraction of water from surface body for human consumption	FSWD	--	0		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from well for human consumption	FWWD	--	1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from well for beef cattle	FWWLV(1)	--	0		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Number of cattlefor beef cattle	NLWI(1)	--	2		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from well for dairy cows	FWWLV(2)	--	0		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Area of Plot for fruit, grain, and nonleafy vegetables	AREAO(1)	m^2	1024	Calculated	Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in summary file
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Area of Plot for leafy vegetables	AREAO(2)	m^2	1024	Calculated	Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in summary file
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Area of Plot for pasture and silage	AREAO(3)	m^2	10000	Calculated	Ryan Hupfer			J. Davis	10/31/2019	
Livestock Feed Grain					-					

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Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Area of Plot for livestock feed grain	AREAO(4)	m^2	10000	Calculated	Ryan Hupfer			J. Davis	10/31/2019	
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/30/2019	Checked in summary file
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Area of Plot for offsite dwelling site	AREAODWELL	m^2	1024	Calculated	Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in summary file
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Well pumping rate needed to support specified water use	--	m^3/yr	331.645	Calculated	Ryan Hupfer	O. Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Surface area of water in surface water body:	ALAKE	m^2	500	Calculated	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file, spot checked 10/31/2019 OW
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Ingestion Rates					-					

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Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fish consumption	DFI(1)	kg/yr	2.43		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Other aquatic food consumption	DFI(2)	kg/yr	0.0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Leafy vegetables consumption	DVI(2)	kg/yr	17.0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Meat consumption	DMI(1)	kg/yr	91.9		Ryan Hupfer	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file, spot checked 10/31/2019 OW
Milk consumption	DMI(2)	L/yr	110		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Drinking water intake from affected area	--	--	1	Calculated	Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Fish consumption from affected area	FFISH(1)	--	1.0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Other aquatic food consumption from affected area	FFISH(2)	--	0.5		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/30/2019	Checked in summary file
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Meat consumption from affected area	FMEMI(1)	--	0.25		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Milk consumption from affected area	FMEMI(2)	--	0.5		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0		Ryan Hupfer	O.Warren	10/31/2019	J. Davis	10/30/2019	Checked in summary file
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0		Ryan Hupfer	O.Warren	10/31/2019	J. Davis	10/30/2019	Checked in summary file
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Root depth of pasture and silage	DROOT(3)	m	0.90		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Duration of growing season of grain	GROWTIME(4)	yr	0.17		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1		Ryan Hupfer	O.Warren	10/31/2019	J. Davis	10/30/2019	Checked in summary file
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Root depth of grain	DROOT(4)	m	1.20		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Duration of growingseason of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/30/2019	Checked in summary file
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0		Ryan Hupfer	O.Warren	10/31/2019	J. Davis	10/30/2019	Checked in summary file
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Root depth of leafy vegetables	DROOT(2)	m	0.90		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file, spot checked 10/31/2019 OW
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Scale	-	m	598.375		Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Dwelling location coordinate in X-direction	-	m	210		Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Dwelling location coordinate in y-direction	-	m	547		Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Radius	RAD_SHAPE(1)	m	43.5833		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	RAD_SHAPE(2)		87.1667		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	RAD_SHAPE(3)		130.7500		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	RAD_SHAPE(4)		174.3333		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	RAD_SHAPE(5)		217.9167		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	RAD_SHAPE(6)		261.5000		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	RAD_SHAPE(7)		305.0833		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	RAD_SHAPE(8)		348.6667		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	RAD_SHAPE(9)		392.2500		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	RAD_SHAPE(10)		435.8333		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	RAD_SHAPE(11)		479.4167	Calculated	Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Radius	RAD_SHAPE(12)	m	523.0000		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction (Onsite)	FRACA(1)	--	0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FRACA(2)		0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FRACA(3)		0.04		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FRACA(4)		0.21		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FRACA(5)		0.22		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FRACA(6)		0.18		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FRACA(7)		0.15		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FRACA(8)		0.12		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FRACA(9)		0.11		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FRACA(10)		0.097		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FRACA(11)		0.088		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
	FRACA(12)		0.049		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	O.Warren	10/29/2019	J. Davis	10/31/2019	Checked in model
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file

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Outdoor time fraction on primary contamination	FOTD	--	0.05		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Not used
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Vertical dimension of mixing for vegetation	HMIXV	m	1.0		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fraction of vegetation carbon absorbed from air	CAIR		0.98		Ryan Hupfer	O. Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/30/2019	Checked in summary file
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file

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Local water	C12WTR	g/cm3	2.00E-05		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Leafy vegetables	C12PLANT(2)		0.09		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Pasture and Silage	C12PLANT(3)		0.09		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Livestock feed grain	C12PLANT(4)		0.40		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Meat	C12MEAT_MILK(1)		0.24		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Milk	C12MEAT_MILK(2)		0.07		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Tritium										
Humidity in air	HUMID	g/m3	8		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer	J. Davis	11/14/2019	O.Warren	10/29/2019	Checked in model
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			O. Warren	10/9/2019	Not Simulated
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			O.Warren	10/9/2019	Not Simulated
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/29/2019	Checked in model
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			O. Warren	10/9/2019	Not Simulated
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/9/2019	Checked in summary file
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			O.Warren	10/9/2019	Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/9/2019	Checked in summary file
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value

Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule

Indicates default value not available, value of 1 used in model

Source File OD/Projects/0011-D3/Parameters/Transfer Factors/Transfer_Factors_V01.xlsx

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Nd	158	158	**Ryan Hupfer**					Not Simulated
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	O.Warren	10/31/2019	J. Davis	10/29/2019	Checked in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Am-241	5.90E+01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Am-243	2.97E+00	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Ba-133	1.60E+00	STK					Not simulated, screened
Be-10	2.53E-05	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
C-14	5.40E-01	RH	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Ca-41	4.21E-02	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Cd-113m	NA	STK					Not simulated, screened
Cf-249	1.09E-06	STK					Not simulated, screened
Cf-250	7.40E-06	STK					Not simulated, screened
Cf-251	2.10E-07	STK					Not simulated, screened
Cf-252	1.31E-07	STK					Not simulated, screened
Cl-36		RH					Not simulated, no inventory value
Cm-243	4.30E-01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Cm-244	1.26E+02	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Cm-245	3.83E-02	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Cm-246	1.59E-01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Cm-247	1.04E-02	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Cm-248	5.59E-04	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Co-60	2.00E-02	STK					Not simulated, screened
Cs-134	1.06E-08	STK					Not simulated, screened
Cs-135	NA	STK					Not simulated, no inventory value
Cs-137	1.18E+03	STK					Not simlated, screened
Eu-152	2.87E+01	STK					Not simulated
Eu-154	6.49E+00	STK					Not simulated, screened
Eu-155	6.74E-03	STK					Not simulated, screened
Fe-55	8.95E-07	STK					Not simulated, screened
H-3	4.64E+00	RH	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
I-129	3.50E-01	RH	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
K-40	3.28E+00	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Kr-85	3.55E-01	STK					Not simulated, screened
Mo-100	4.20E-06	STK					Not simulated, screened
Mo-93	3.88E-01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Na-22	8.22E-07	STK					Not simulated, screened
Nb-93m	2.33E-01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Nb-94	1.63E-02	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Ni-59	3.04E+00	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Ni-63	6.73E+02	STK					Not simulated, screened
Np-237	3.25E-01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Pa-231	2.39E-01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Pb-210	3.68E+00	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Pd-107	NA	STK					Not simulated, no inventory value
Pm-146	8.84E-05	STK					Not simulated, screened
Pm-147	2.20E-04	STK					Not simulated, screened
Pu-238	9.38E+01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Pu-239	5.83E+01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Pu-240	6.20E+01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Pu-241	2.04E+02	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Pu-242	1.73E-01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Pu-244	3.68E-03	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Ra-226	8.01E-01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Ra-228	2.21E-02	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Re-187	1.71E-06	STK					Not simulated, screened
Sb-125	3.03E-08	STK					Not simulated, screened

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Se-79	NA	STK					Not simulated, no inventory value
Sm-151	NA	STK					Not simulated, no inventory value
Sn-121m	NA	STK					Not simulated, no inventory value
Sn-126	NA	STK					Not simulated, no inventory value
Sr-90	1.92E+02	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Tc-99	1.56E+00	RH	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Th-228	2.11E-06	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Th-229	5.71E+00	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Th-230	1.92E+00	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Th-232	3.52E+00	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
U-232	1.02E+01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
U-233	4.16E+01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
U-234	6.30E+02	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
U-235	3.97E+01	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
U-236	8.98E+00	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
U-238	3.81E+02	STK	O.Warren	10/9/2019	J. Davis	10/29/2019	Checked in summary file
Zr-93	NA	STK					Not simulated, no inventory value

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer					
Exposure duration	ED	yr	30		Ryan Hupfer					
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer					
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer					
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer					
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer					
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer					
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer					
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer					
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer					
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer					
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer					
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer					
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer					
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer					
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer					
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer					
Source					-					
Nuclide concentration	S1	pCi/g	varies		Ryan Hupfer					
Release to groundwater, leach rate		1/yr	varies		Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer					
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	300		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.75 for C-14, H-3 0 for All Other Nuclides		Ryan Hupfer					
Time over which transformation to releasable form occurs	RELDUR	Years	500 for C-14, H-3 800 for All Other Nulides		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer					
Release Mechanism	RELOPT		Instantaneous Equilibrium Sorption Desorption, 1		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Initial Leach Rate	RLEACH ALEACH	1/year	0		Ryan Hupfer					
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Distribution Coefficient in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer					
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer					
Distribution Coefficients					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Contaminated zone	DCACTC DCNUCC	cm^3/g	varies		Ryan Hupfer					
Unsaturated zone	DCACTU(1-5) DCNUCU(1-5)	cm^3/g	varies		Ryan Hupfer					
Saturated zone	DCACTS DCNUCS	cm^3/g	varies		Ryan Hupfer					
Sediment in surface water body	DCACTSWB DCNUCSWB	cm^3/g	0		Ryan Hupfer					
Fruit, grain, nonleafy fields	DCACTV1 DCNUCOF(1)	cm^3/g	varies		Ryan Hupfer					
Leafy vegetable fields	DCACTV2 DNUCOF(2)	cm^3/g	varies		Ryan Hupfer					
Pasture, silage growing areas	DCACTL1 DNUCOF(3)	cm^3/g	varies		Ryan Hupfer					
Livestock feed grain fields	DCACTL2 DNUCOF(4)	cm^3/g	varies		Ryan Hupfer					
Offsite dwelling site	DCACTDWE DCNUCDWE	cm^3/g	varies		Ryan Hupfer					
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Dose Conversion and Slope Factors					-					
External exposure library	N/A	(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer					
Internal exposure dose library	N/A	mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer					
Slope Factor (Risk) Library	N/A	(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer					
Transfer Factors					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer					
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times					-					
Times at which output is reported	T()	yr	1, 200, 400, 500, 600, 800, 1000, 2000, 10000		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer					
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer					
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer					
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer					
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer					
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer					
Wind speed	WIND	m/s	3.4342	Calc	Ryan Hupfer					
Primary Contamination					-					
Area of primary contamination	AREA	m^2	95,900	Calc	Ryan Hupfer					
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer					
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer					
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer					
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer					
Rainfall and Runoff Factor	RAINEROS	--	0		Ryan Hupfer					
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer					
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer					
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer					
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer					
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer			J. Davis	1/7/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer					
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer					
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer					
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer					
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer					
Clean Cover					-					
Thickness of clean cover	COVER0	m	3.353		Ryan Hupfer					
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Erosion rate of clean cover	VCV	m/yr	0	Calc	Ryan Hupfer					
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer					
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer			J. Davis	1/7/2020	Spot check
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field	AREAO(1)	m2	1024	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0		Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer					
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer					
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer					
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer					
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer					
Leafy Vegetable Field					-					
Area for leafy vegetable field	AREAO(2)	m^2	1024	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0		Ryan Hupfer					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer					
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer					
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3		Ryan Hupfer					
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer					
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer					
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer					
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field	AREAO(3)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0		Ryan Hupfer					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer					
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer					
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer					
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer					
Grain Field					-					
Area for grain field	AREAO(4)	m^2	10000	Calc	Ryan Hupfer			J. Davis	1/7/2020	Spot check
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer					
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer					
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer					
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer					
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer					
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer					
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer					
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site	AREAODWELL	m^2	1024	Calc	Ryan Hupfer					
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer					
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer					
Volumetric water content for dwelling site	TMOFDWELL	--	0.3		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer					
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer					
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer					
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Anemometer height	ANH	m	10		Ryan Hupfer					
Ambient temperature	TABK	K	285		Ryan Hupfer					
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	N. Holt	1/7/2020			Spot check
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer					
Dispersion model coefficients	IDISPMOD	--	Pasquill-Gifford		Ryan Hupfer					
Windspeed Terrain	IZONE	--	Rural		Ryan Hupfer					
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer					
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer					
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer					
Dwelling site	DWELLELEV	m	0		Ryan Hupfer					
Surface water body	SWELEV	m	0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer					
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer					
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer					
	H(2)		0.305		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer					
	H(4)		3.048		Ryan Hupfer					
	H(5)		4.846		Ryan Hupfer					
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer					
	DENSUZ(2)		1.6		Ryan Hupfer					
	DENSUZ(3)		1.5		Ryan Hupfer					
	DENSUZ(4)		1.5		Ryan Hupfer					
	DENSUZ(5)		1.8		Ryan Hupfer					
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer					
	TPUZ(2)		0.397		Ryan Hupfer					
	TPUZ(3)		0.427		Ryan Hupfer					
	TPUZ(4)		0.419		Ryan Hupfer	N. Holt	1/7/2020			Spot check
	TPUZ(5)		0.353		Ryan Hupfer					
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer					
	EPUZ(2)		0.389		Ryan Hupfer					
	EPUZ(3)		0.195		Ryan Hupfer					
	EPUZ(4)		0.234		Ryan Hupfer	N. Holt	1/7/2020			Spot check
	EPUZ(5)		0.27		Ryan Hupfer					
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer					
	FCUZ(2)		0.032		Ryan Hupfer					
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer					
	FCUZ(5)		0.2471		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer					
	HCUZ(2)		94600		Ryan Hupfer					
	HCUZ(3)		0.315		Ryan Hupfer					
	HCUZ(4)		3.15		Ryan Hupfer	N. Holt	1/7/2020			Spot check
	HCUZ(5)		16.7		Ryan Hupfer					
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer					
	BUZ(2)		4.05		Ryan Hupfer			J. Davis	1/7/2020	Spot check
	BUZ(3)		11.4		Ryan Hupfer					
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer					
	ALPHALU(2)		0.1		Ryan Hupfer	N. Holt	1/7/2020			Spot check
	ALPHALU(3)		0.1		Ryan Hupfer					
	ALPHALU(4)		0.1		Ryan Hupfer					
	ALPHALU(5)		0.1		Ryan Hupfer					
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer					
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer					
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer					
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer					
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer					
Water Use					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer					
Fraction of water from surface body for human consumption	FSWD	--	1		Ryan Hupfer			J. Davis	1/7/2020	Checked in summary file
Fraction of water from well for human consumption	FWWD	--	0		Ryan Hupfer			J. Davis	1/7/2020	Checked in summary file
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	1		Ryan Hupfer			J. Davis	1/7/2020	Checked in summary file
Fraction of water from well for use indoors of dwelling	FWWHH	--	0		Ryan Hupfer			J. Davis	1/7/2020	Checked in summary file
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Fraction of water from well for beef cattle	FWWLV(1)	--	0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer					
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Fraction of water from well for dairy cows	FWWLV(2)	--	0		Ryan Hupfer					
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer					
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer					
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer					
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer					
Area of Plot for leafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer					
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer					
Area of Plot for pasture and silage		m^2	10000	Calc	Ryan Hupfer					
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer					
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer					
Area of Plot for livestock feed grain		m^2	10000	Calc	Ryan Hupfer					
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer			J. Davis	1/7/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer					
Area of Plot for offsite dwelling site		m^2	1024	Calc	Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer					
Well pumping rate needed to support specified water use		m^3/yr	331.645	Calc	Ryan Hupfer					
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer					
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer					
Surface area of water in surface water body:	ALAKE	m^2	500	Calc	Ryan Hupfer					
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer					
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer					
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer					
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer					
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer					
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer					
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer					
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Fish consumption	DFI(1)	kg/yr	2.43		Ryan Hupfer					
Other aquatic food consumption	DFI(2)	kg/yr	0.0		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0		Ryan Hupfer					
Leafy vegetables consumption	DVI(2)	kg/yr	17.0		Ryan Hupfer	N. Holt	1/7/2020			Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Meat consumption	DMI(1)	kg/yr	91.9		Ryan Hupfer					
Milk consumption	DMI(2)	L/yr	110		Ryan Hupfer					
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Drinking water intake from affected area		--	1	Calc	Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.0		Ryan Hupfer					
Other aquatic food consumption from affected area	FFISH(2)	--	0.5		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5		Ryan Hupfer					
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5		Ryan Hupfer					
Meat consumption from affected area	FMEMI(1)	--	0.25		Ryan Hupfer					
Milk consumption from affected area	FMEMI(2)	--	0.5		Ryan Hupfer					
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50		Ryan Hupfer					
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0		Ryan Hupfer					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1		Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4		Ryan Hupfer					
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0		Ryan Hupfer					
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0		Ryan Hupfer					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4		Ryan Hupfer					
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1		Ryan Hupfer					
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Duration of growingseason of pasture and silage	GROWTIME(3)	yr	0.08		Ryan Hupfer					
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1		Ryan Hupfer					
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25		Ryan Hupfer					
Root depth of pasture and silage	DROOT(3)	m	0.90		Ryan Hupfer					
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70		Ryan Hupfer					
Duration of growing season of grain	GROWTIME(4)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1		Ryan Hupfer					
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25		Ryan Hupfer					
Root depth of grain	DROOT(4)	m	1.20		Ryan Hupfer					
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70		Ryan Hupfer					
Duration of growingseason of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1		Ryan Hupfer					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25		Ryan Hupfer					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20		Ryan Hupfer					
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50		Ryan Hupfer					
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25		Ryan Hupfer					
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1		Ryan Hupfer					
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25		Ryan Hupfer					
Root depth of leafy vegetables	DROOT(2)	m	0.90		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer					
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer					
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer					
Scale	-	m	598.375		Ryan Hupfer					
Dwelling location coordinate in X-direction	-	m	210	Calc	Ryan Hupfer					
Dwelling location coordinate in y-direction	-	m	547		Ryan Hupfer					
Radius	RAD_SHAPE(1)	m	43.5833		Ryan Hupfer			J. Davis	1/7/2020	Spot check
	RAD_SHAPE(2)		87.1667		Ryan Hupfer					
	RAD_SHAPE(3)		130.7500		Ryan Hupfer					
	RAD_SHAPE(4)		174.3333		Ryan Hupfer					
	RAD_SHAPE(5)		217.9167		Ryan Hupfer					
	RAD_SHAPE(6)		261.5000		Ryan Hupfer					
	RAD_SHAPE(7)		305.0833		Ryan Hupfer					
	RAD_SHAPE(8)		348.6667		Ryan Hupfer					
	RAD_SHAPE(9)		392.2500		Ryan Hupfer					
	RAD_SHAPE(10)		435.8333		Ryan Hupfer					
	RAD_SHAPE(11)		479.4167		Ryan Hupfer					
Radius	RAD_SHAPE(12)	m	523.0000		Ryan Hupfer					
Fraction (Onsite)	FRACA(1)	--	0		Ryan Hupfer					
	FRACA(2)		0		Ryan Hupfer					
	FRACA(3)		0.04		Ryan Hupfer					
	FRACA(4)		0.21		Ryan Hupfer					
	FRACA(5)		0.22		Ryan Hupfer					
	FRACA(6)		0.18		Ryan Hupfer					
	FRACA(7)		0.15		Ryan Hupfer	N. Holt	1/7/2020			Spot check
	FRACA(8)		0.12		Ryan Hupfer					
	FRACA(9)		0.11		Ryan Hupfer					
	FRACA(10)		0.097		Ryan Hupfer					
	FRACA(11)		0.088		Ryan Hupfer					
	FRACA(12)		0.049		Ryan Hupfer					
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer					
Outdoor time fraction on primary contamination	FOTD	--	0.05		Ryan Hupfer					
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5		Ryan Hupfer					
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1		Ryan Hupfer					
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1		Ryan Hupfer					
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1		Ryan Hupfer					
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1		Ryan Hupfer					
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer					
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer					

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Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer					
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer			J. Davis	1/7/2020	Spot check
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Vertical dimension of mixing for vegetation	HMIXV	m	1.0		Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer					
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer					
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Fraction of vegetation carbon absorbed from air	CAIR		0.98		Ryan Hupfer					
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer					
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer					
Local water	C12WTR	g/cm3	2.00E-05		Ryan Hupfer					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40		Ryan Hupfer					
Leafy vegetables	C12PLANT(2)		0.09		Ryan Hupfer					
Pasture and Silage	C12PLANT(3)		0.09		Ryan Hupfer					
Livestock feed grain	C12PLANT(4)		0.40		Ryan Hupfer					
Meat	C12MEAT_MILK(1)		0.24		Ryan Hupfer					
Milk	C12MEAT_MILK(2)		0.07		Ryan Hupfer					
Tritium										
Humidity in air	HUMID	g/m3	8		Ryan Hupfer					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8		Ryan Hupfer					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8		Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8		Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6		Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer					
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer					
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer					
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer					
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer					
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer					
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer					
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer					
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer					
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer					
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer					
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer					
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer					
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Nd	158	158	**Ryan Hupfer**					Not Simulated
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	1/7/2020	N. Holt	1/7/2020	Checked in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03	STK					
Am-241	5.90E+01	STK					
Am-243	2.97E+00	STK					
Ba-133	1.60E+00	STK					Not simulated, screened
Be-10	2.53E-05	STK					
C-14	5.40E-01	RH					
Ca-41	4.21E-02	STK					
Cd-113m	NA	STK					Not simulated, screened
Cf-249	1.09E-06	STK					Not simulated, screened
Cf-250	7.40E-06	STK					Not simulated, screened
Cf-251	2.10E-07	STK					Not simulated, screened
Cf-252	1.31E-07	STK					Not simulated, screened
Cl-36		RH					Not simulated, no inventory value
Cm-243	4.30E-01	STK					
Cm-244	1.26E+02	STK					
Cm-245	3.83E-02	STK					
Cm-246	1.59E-01	STK					
Cm-247	1.04E-02	STK					
Cm-248	5.59E-04	STK					
Co-60	2.00E-02	STK					Not simulated, screened
Cs-134	1.06E-08	STK					Not simulated, screened
Cs-135	NA	STK					Not simulated, no inventory value
Cs-137	1.18E+03	STK					Not simlated, screened
Eu-152	2.87E+01	STK					Not simulated
Eu-154	6.49E+00	STK					Not simulated, screened
Eu-155	6.74E-03	STK					Not simulated, screened
Fe-55	8.95E-07	STK					Not simulated, screened
H-3	4.64E+00	RH					
I-129	3.50E-01	RH					
K-40	3.28E+00	STK					
Kr-85	3.55E-01	STK					Not simulated, screened
Mo-100	4.20E-06	STK					Not simulated, screened
Mo-93	3.88E-01	STK					
Na-22	8.22E-07	STK					Not simulated, screened
Nb-93m	2.33E-01	STK					
Nb-94	1.63E-02	STK					
Ni-59	3.04E+00	STK					
Ni-63	6.73E+02	STK					Not simulated, screened
Np-237	3.25E-01	STK					
Pa-231	2.39E-01	STK					
Pb-210	3.68E+00	STK					
Pd-107	NA	STK					Not simulated, no inventory value
Pm-146	8.84E-05	STK					Not simulated, screened
Pm-147	2.20E-04	STK					Not simulated, screened
Pu-238	9.38E+01	STK					
Pu-239	5.83E+01	STK					
Pu-240	6.20E+01	STK					
Pu-241	2.04E+02	STK					
Pu-242	1.73E-01	STK					
Pu-244	3.68E-03	STK					
Ra-226	8.01E-01	STK					
Ra-228	2.21E-02	STK					
Re-187	1.71E-06	STK					Not simulated, screened
Sb-125	3.03E-08	STK					Not simulated, screened
Se-79	NA	STK					Not simulated, no inventory value

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Sm-151	NA	STK					Not simulated, no inventory value
Sn-121m	NA	STK					Not simulated, no inventory value
Sn-126	NA	STK					Not simulated, no inventory value
Sr-90	1.92E+02	STK					
Tc-99	1.56E+00	RH					
Th-228	2.11E-06	STK					
Th-229	5.71E+00	STK					
Th-230	1.92E+00	STK					
Th-232	3.52E+00	STK					
U-232	1.02E+01	STK					
U-233	4.16E+01	STK					
U-234	6.30E+02	STK					
U-235	3.97E+01	STK					
U-236	8.98E+00	STK					
U-238	3.81E+02	STK					
Zr-93	NA	STK					Not simulated, no inventory value

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer					
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer			J. Davis	1/9/2020	Spot check
Exposure duration	ED	yr	30		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer					
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer					
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer	N. Holt	1/7/2020			Spot check
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer					
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer			J. Davis	1/9/2020	Spot check
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer					
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer					
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer			J. Davis	1/9/2020	Spot check
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer					
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer					
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer					
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer					
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer					
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer					
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer			J. Davis	1/9/2020	Spot check
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer					
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer					
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Source					-					
Nuclide concentration	S1	pCi/g	varies		Ryan Hupfer					
Release to groundwater, leach rate		1/yr	varies		Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer					
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	300		Ryan Hupfer					
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.75 for C-14, H-3 0 for All Other Nuclides		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Time over which transformation to releasable form occurs	RELDUR	Years	500 for C-14, H-3 800 for All Other Nulides		Ryan Hupfer					
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer					
Release Mechanism	RELOPT		Instantaneous Equilibrium Sorption Desorption, 1		Ryan Hupfer					
Initial Leach Rate	RLEACH ALEACH	1/year	0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer			J. Davis	1/9/2020	Spot check
Distribution Coefficient in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer					
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer					
Distribution Coefficients					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Contaminated zone	DCACTC DCNUCC	cm^3/g	varies		Ryan Hupfer					
Unsaturated zone	DCACTU(1-5) DCNUCU(1-5)	cm^3/g	varies		Ryan Hupfer					
Saturated zone	DCACTS DCNUCS	cm^3/g	varies		Ryan Hupfer					
Sediment in surface water body	DCACTSWB DCNUCSWB	cm^3/g	0		Ryan Hupfer					
Fruit, grain, nonleafy fields	DCACTV1 DCNUCOF(1)	cm^3/g	varies		Ryan Hupfer					
Leafy vegetable fields	DCACTV2 DNUCOF(2)	cm^3/g	varies		Ryan Hupfer					
Pasture, silage growing areas	DCACTL1 DNUCOF(3)	cm^3/g	varies		Ryan Hupfer					
Livestock feed grain fields	DCACTL2 DNUCOF(4)	cm^3/g	varies		Ryan Hupfer					
Offsite dwelling site	DCACTDWE DCNUCDWE	cm^3/g	varies		Ryan Hupfer					
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer			J. Davis	1/9/2020	Spot check
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer			J. Davis	1/9/2020	Spot check
Dose Conversion and Slope Factors					-					
External exposure library	N/A	(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer					
Internal exposure dose library	N/A	mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer					
Slope Factor (Risk) Library	N/A	(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer					
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times					-					
Times at which output is reported	T()	yr	200, 1000, 10000, 20000, 30000, 40000, 50000, 80000, 100000		Ryan Hupfer	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer					
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer					
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer					
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer					
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer					
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer					
Wind speed	WIND	m/s	3.4342	Calc	Ryan Hupfer					
Primary Contamination					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Area of primary contamination	AREA	m^2	95,900	Calc	Ryan Hupfer					
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer					
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer					
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer					
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Rainfall and Runoff Factor	RAINEROS	--	0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer					
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer					
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer					
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer					
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer					
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer					
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer					
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer					
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer					
Clean Cover					-					
Thickness of clean cover	COVER0	m	3.353		Ryan Hupfer					
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer					
Erosion rate of clean cover	VCV	m/yr	0	Calc	Ryan Hupfer					
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer					
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer					
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field	AREAO(1)	m2	1024	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0		Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer					
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer					
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer					
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer					
Leafy Vegetable Field					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Area for leafy vegetable field	AREAO(2)	m^2	1024	Calc	Ryan Hupfer	N. Holt	1/7/2020			Spot check
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0		Ryan Hupfer					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer					
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer					
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3		Ryan Hupfer					
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer					
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer					
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field	AREAO(3)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0		Ryan Hupfer					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer					
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer					
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3		Ryan Hupfer					
Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer					
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer					
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer					
Grain Field					-					

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Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Area for grain field	AREAO(4)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0		Ryan Hupfer					
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer					
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer					
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer					
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer					
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site	AREAODWELL	m^2	1024	Calc	Ryan Hupfer					
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer					
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer					
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer					
Volumetric water content for dwelling site	TMOFDWELL	--	0.3		Ryan Hupfer					
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer					
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer					
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer					
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer					
Anemometer height	ANH	m	10		Ryan Hupfer					
Ambient temperature	TABK	K	285		Ryan Hupfer	N. Holt	1/7/2020			Spot check
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Dispersion model coefficients	IDISPMOD	--	Pasquill-Gifford		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Windspeed Terrain	IZONE	--	Rural		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer					
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer					
Dwelling site	DWELLELEV	m	0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Surface water body	SWELEV	m	0		Ryan Hupfer					
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer					
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer					
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer					
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer					
	H(2)		0.305		Ryan Hupfer					
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer					
	H(4)		3.048		Ryan Hupfer	N. Holt	1/7/2020			Spot check
	H(5)		4.846		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer					
	DENSUZ(2)		1.6		Ryan Hupfer					
	DENSUZ(3)		1.5		Ryan Hupfer	N. Holt	1/7/2020			Spot check
	DENSUZ(4)		1.5		Ryan Hupfer					
	DENSUZ(5)		1.8		Ryan Hupfer					
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer	N. Holt	1/7/2020	J. Davis	1/7/2020	Spot check
	TPUZ(2)		0.397		Ryan Hupfer					
	TPUZ(3)		0.427		Ryan Hupfer					
	TPUZ(4)		0.419		Ryan Hupfer					
	TPUZ(5)		0.353		Ryan Hupfer					
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer					
	EPUZ(2)		0.389		Ryan Hupfer					
	EPUZ(3)		0.195		Ryan Hupfer					
	EPUZ(4)		0.234		Ryan Hupfer	N. Holt	1/7/2020			Spot check
	EPUZ(5)		0.27		Ryan Hupfer					
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer					
	FCUZ(2)		0.032		Ryan Hupfer			J. Davis	1/7/2020	Spot check
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer	N. Holt	1/7/2020			Spot check
	FCUZ(5)		0.2471		Ryan Hupfer					
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer			J. Davis	1/7/2020	Spot check
	HCUZ(2)		94600		Ryan Hupfer					
	HCUZ(3)		0.315		Ryan Hupfer					
	HCUZ(4)		3.15		Ryan Hupfer					
	HCUZ(5)		16.7		Ryan Hupfer					
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer					
	BUZ(2)		4.05		Ryan Hupfer					
	BUZ(3)		11.4		Ryan Hupfer					
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer					
	ALPHALU(2)		0.1		Ryan Hupfer					
	ALPHALU(3)		0.1		Ryan Hupfer					
	ALPHALU(4)		0.1		Ryan Hupfer					
	ALPHALU(5)		0.1		Ryan Hupfer					
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer					
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer					
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer					
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer					
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer					
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer					
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer					
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Fraction of water from surface body for human consumption	FSWD	--	1		Ryan Hupfer					
Fraction of water from well for human consumption	FWWD	--	0		Ryan Hupfer					
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	1		Ryan Hupfer					
Fraction of water from well for use indoors of dwelling	FWWHH	--	0		Ryan Hupfer					
Beef Cattle					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Quantity of water for beef cattle	LWI(1)	L/d	50		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1		Ryan Hupfer					
Fraction of water from well for beef cattle	FWWLV(1)	--	0		Ryan Hupfer					
Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer					
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1		Ryan Hupfer					
Fraction of water from well for dairy cows	FWWLV(2)	--	0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer					
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer					
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	N. Holt	1/7/2020	J. Davis	1/9/2020	Spot check
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer					
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer					
Area of Plot for leafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer					
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer					
Area of Plot for pasture and silage		m^2	10000	Calc	Ryan Hupfer					
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer					
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Area of Plot for livestock feed grain		m^2	10000	Calc	Ryan Hupfer					
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer					
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer					
Area of Plot for offsite dwelling site		m^2	1024	Calc	Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer					
Well pumping rate needed to support specified water use		m^3/yr	331.645	Calc	Ryan Hupfer					
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer					
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer					
Surface area of water in surface water body:	ALAKE	m^2	500	Calc	Ryan Hupfer	N. Holt	1/7/2020			Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer					
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer					
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer					
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer					
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer					
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer					
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer					
Fish consumption	DFI(1)	kg/yr	2.43		Ryan Hupfer					
Other aquatic food consumption	DFI(2)	kg/yr	0.0		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0		Ryan Hupfer					
Leafy vegetables consumption	DVI(2)	kg/yr	17.0		Ryan Hupfer					
Meat consumption	DMI(1)	kg/yr	91.9		Ryan Hupfer					
Milk consumption	DMI(2)	L/yr	110		Ryan Hupfer					
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer					
Drinking water intake from affected area		--	1	Calc	Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Other aquatic food consumption from affected area	FFISH(2)	--	0.5		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5		Ryan Hupfer					
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5		Ryan Hupfer					
Meat consumption from affected area	FMEMI(1)	--	0.25		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Milk consumption from affected area	FMEMI(2)	--	0.5		Ryan Hupfer					
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50		Ryan Hupfer					
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0		Ryan Hupfer					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0		Ryan Hupfer			J. Davis	1/7/2020	Spot check
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1		Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4		Ryan Hupfer					
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0		Ryan Hupfer					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4		Ryan Hupfer					
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1		Ryan Hupfer					
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight crop yield of pasture and silage	YIELD(3)	kg/m^2	1.1		Ryan Hupfer					
Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08		Ryan Hupfer	N. Holt	1/7/2020	J. Davis	1/9/2020	Spot check
Foliage to food transfer coefficient of pasture and silage	FOLI F(3)	--	1		Ryan Hupfer					
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25		Ryan Hupfer			J. Davis	1/9/2020	Spot check
Root depth of pasture and silage	DROOT(3)	m	0.90		Ryan Hupfer					
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70		Ryan Hupfer					
Duration of growing season of grain	GROWTIME(4)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1		Ryan Hupfer					
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25		Ryan Hupfer			J. Davis	1/9/2020	Spot check
Root depth of grain	DROOT(4)	m	1.20		Ryan Hupfer					
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70		Ryan Hupfer			J. Davis	1/9/2020	Spot check
Duration of growing season of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1		Ryan Hupfer					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25		Ryan Hupfer					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20		Ryan Hupfer					
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50		Ryan Hupfer					
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25		Ryan Hupfer					
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1		Ryan Hupfer					
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25		Ryan Hupfer					
Root depth of leafy vegetables	DROOT(2)	m	0.90		Ryan Hupfer					
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer					
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer					
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer					
Scale	-	m	598.375		Ryan Hupfer					
Dwelling location coordinate in X-direction	-	m	210	Calc	Ryan Hupfer					
Dwelling location coordinate in y-direction	-	m	547		Ryan Hupfer					
Radius	RAD_SHAPE(1)	m	43.5833		Ryan Hupfer					
	RAD_SHAPE(2)		87.1667		Ryan Hupfer					
	RAD_SHAPE(3)		130.7500		Ryan Hupfer					
	RAD_SHAPE(4)		174.3333		Ryan Hupfer					
	RAD_SHAPE(5)		217.9167		Ryan Hupfer					
	RAD_SHAPE(6)		261.5000		Ryan Hupfer					
	RAD_SHAPE(7)		305.0833		Ryan Hupfer					
	RAD_SHAPE(8)		348.6667		Ryan Hupfer					
	RAD_SHAPE(9)		392.2500		Ryan Hupfer					
	RAD_SHAPE(10)		435.8333		Ryan Hupfer					
	RAD_SHAPE(11)		479.4167		Ryan Hupfer					
Radius	RAD_SHAPE(12)	m	523.0000		Ryan Hupfer					

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Fraction (Onsite)	FRACA(1)	--	0	Calc	Ryan Hupfer					
	FRACA(2)		0		Ryan Hupfer					
	FRACA(3)		0.04		Ryan Hupfer			J. Davis	1/9/2020	Spot check
	FRACA(4)		0.21		Ryan Hupfer					
	FRACA(5)		0.22		Ryan Hupfer					
	FRACA(6)		0.18		Ryan Hupfer					
	FRACA(7)		0.15		Ryan Hupfer					
	FRACA(8)		0.12		Ryan Hupfer					
	FRACA(9)		0.11		Ryan Hupfer					
	FRACA(10)		0.097		Ryan Hupfer					
	FRACA(11)		0.088		Ryan Hupfer			J. Davis	1/9/2020	Spot check
	FRACA(12)		0.049		Ryan Hupfer					
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer					
Outdoor time fraction on primary contamination	FOTD	--	0.05		Ryan Hupfer					
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5		Ryan Hupfer					
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05		Ryan Hupfer					
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1		Ryan Hupfer					
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1		Ryan Hupfer					
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1		Ryan Hupfer					
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1		Ryan Hupfer					
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer			J. Davis	1/9/2020	Spot check
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer					
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer					
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer					
Vertical dimension of mixing for vegetation	HMIXV	m	1.0		Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02		Ryan Hupfer					
Fraction of vegetation carbon absorbed from air	CAIR		0.98		Ryan Hupfer					
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer					
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer					
Local water	C12WTR	g/cm3	2.00E-05		Ryan Hupfer					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40		Ryan Hupfer					
Leafy vegetables	C12PLANT(2)		0.09		Ryan Hupfer					
Pasture and Silage	C12PLANT(3)		0.09		Ryan Hupfer	N. Holt	1/7/2020			Spot check
Livestock feed grain	C12PLANT(4)		0.40		Ryan Hupfer					
Meat	C12MEAT_MILK(1)		0.24		Ryan Hupfer					
Milk	C12MEAT_MILK(2)		0.07		Ryan Hupfer					
Tritium										
Humidity in air	HUMID	g/m3	8		Ryan Hupfer					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8		Ryan Hupfer					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8		Ryan Hupfer					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8		Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8		Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6		Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer					
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer					
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer					
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer					
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer					
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer					
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer					
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer					
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer					
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer					
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer					
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer					
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer					
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Nd	158	158	**Ryan Hupfer**					Not Simulated
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/7/2020	J. Davis	1/9/2020	Checked in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03	STK					
Am-241	5.90E+01	STK					
Am-243	2.97E+00	STK					
Ba-133	1.60E+00	STK					Not simulated, screened
Be-10	2.53E-05	STK					
C-14	5.40E-01	RH					
Ca-41	4.21E-02	STK					
Cd-113m	NA	STK					Not simulated, screened
Cf-249	1.09E-06	STK					Not simulated, screened
Cf-250	7.40E-06	STK					Not simulated, screened
Cf-251	2.10E-07	STK					Not simulated, screened
Cf-252	1.31E-07	STK					Not simulated, screened
Cl-36		RH					Not simulated, no inventory value
Cm-243	4.30E-01	STK					
Cm-244	1.26E+02	STK					
Cm-245	3.83E-02	STK					
Cm-246	1.59E-01	STK					
Cm-247	1.04E-02	STK					
Cm-248	5.59E-04	STK					
Co-60	2.00E-02	STK					Not simulated, screened
Cs-134	1.06E-08	STK					Not simulated, screened
Cs-135	NA	STK					Not simulated, no inventory value
Cs-137	1.18E+03	STK					Not simlated, screened
Eu-152	2.87E+01	STK					Not simulated
Eu-154	6.49E+00	STK					Not simulated, screened
Eu-155	6.74E-03	STK					Not simulated, screened
Fe-55	8.95E-07	STK					Not simulated, screened
H-3	4.64E+00	RH					
I-129	3.50E-01	RH					
K-40	3.28E+00	STK					
Kr-85	3.55E-01	STK					Not simulated, screened
Mo-100	4.20E-06	STK					Not simulated, screened
Mo-93	3.88E-01	STK					
Na-22	8.22E-07	STK					Not simulated, screened
Nb-93m	2.33E-01	STK					
Nb-94	1.63E-02	STK					
Ni-59	3.04E+00	STK					
Ni-63	6.73E+02	STK					Not simulated, screened
Np-237	3.25E-01	STK					
Pa-231	2.39E-01	STK					
Pb-210	3.68E+00	STK					
Pd-107	NA	STK					Not simulated, no inventory value
Pm-146	8.84E-05	STK					Not simulated, screened
Pm-147	2.20E-04	STK					Not simulated, screened
Pu-238	9.38E+01	STK					
Pu-239	5.83E+01	STK					
Pu-240	6.20E+01	STK					
Pu-241	2.04E+02	STK					
Pu-242	1.73E-01	STK					
Pu-244	3.68E-03	STK					
Ra-226	8.01E-01	STK					
Ra-228	2.21E-02	STK					
Re-187	1.71E-06	STK					Not simulated, screened
Sb-125	3.03E-08	STK					Not simulated, screened

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Se-79	NA	STK					Not simulated, no inventory value
Sm-151	NA	STK					Not simulated, no inventory value
Sn-121m	NA	STK					Not simulated, no inventory value
Sn-126	NA	STK					Not simulated, no inventory value
Sr-90	1.92E+02	STK					
Tc-99	1.56E+00	RH					
Th-228	2.11E-06	STK					
Th-229	5.71E+00	STK					
Th-230	1.92E+00	STK					
Th-232	3.52E+00	STK					
U-232	1.02E+01	STK					
U-233	4.16E+01	STK					
U-234	6.30E+02	STK					
U-235	3.97E+01	STK					
U-236	8.98E+00	STK					
U-238	3.81E+02	STK					
Zr-93	NA	STK					Not simulated, no inventory value

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer					
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Exposure duration	ED	yr	30		Ryan Hupfer					
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer			N. Holt	1/17/2020	Spot check
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer					
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer					
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer					
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer					
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer					
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer					
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer					
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer					
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer					
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer					
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer					
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer					
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer					
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Source					-					
Nuclide concentration	S1	pCi/g	varies		Ryan Hupfer					
Release to groundwater, leach rate		1/yr	varies		Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	300		Ryan Hupfer					
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.75 for C-14, H-3 0 for All Other Nuclides		Ryan Hupfer					
Time over which transformation to releasable form occurs	RELDUR	Years	500 for C-14, H-3 800 for All Other Nulides		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer					
Release Mechanism	RELOPT		Instantaneous Equilibrium Sorption Desorption, 1		Ryan Hupfer					
Initial Leach Rate	RLEACH ALEACH	1/year	0		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer					
Distribution Coefficient in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer					
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer					
Distribution Coefficients					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Contaminated zone	DCACTC DCNUCC	cm^3/g	varies		Ryan Hupfer					
Unsaturated zone	DCACTU(1-5) DCNUCU(1-5)	cm^3/g	varies		Ryan Hupfer					
Saturated zone	DCACTS DCNUCS	cm^3/g	varies		Ryan Hupfer					
Sediment in surface water body	DCACTSWB DCNUCSWB	cm^3/g	0		Ryan Hupfer					
Fruit, grain, nonleafy fields	DCACTV1 DCNUCOF(1)	cm^3/g	varies		Ryan Hupfer					
Leafy vegetable fields	DCACTV2 DNUCOF(2)	cm^3/g	varies		Ryan Hupfer					
Pasture, silage growing areas	DCACTL1 DNUCOF(3)	cm^3/g	varies		Ryan Hupfer					
Livestock feed grain fields	DCACTL2 DNUCOF(4)	cm^3/g	varies		Ryan Hupfer					
Offsite dwelling site	DCACTDWE DCNUCDWE	cm^3/g	varies		Ryan Hupfer					
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Dose Conversion and Slope Factors					-					
External exposure library	N/A	(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer					
Internal exposure dose library	N/A	mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer					
Slope Factor (Risk) Library	N/A	(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer					
Transfer Factors					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer					
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times					-					
Times at which output is reported	T()	yr	1, 200, 400, 500, 600, 800, 1000, 2000, 10000		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer					
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer					
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer					
Wind speed	WIND	m/s	3.4342	Calc	Ryan Hupfer					
Primary Contamination					-					
Area of primary contamination	AREA	m^2	95,900	Calc	Ryan Hupfer					
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer					
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer					
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer					
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer					
Rainfall and Runoff Factor	RAINEROS	--	0		Ryan Hupfer					
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer					
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer					
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer					
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer					
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer					
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer					
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer					
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer					
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Clean Cover					-					
Thickness of clean cover	COVER0	m	3.353		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Erosion rate of clean cover	VCV	m/yr	0	Calc	Ryan Hupfer	J. Davis	1/17/2020			Spot check
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer					
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer					
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field	AREAO(1)	m2	1024	Calc	Ryan Hupfer			N. Holt	1/17/2020	Spot check
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0		Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer					
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer					
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer					
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer					
Leafy Vegetable Field					-					
Area for leafy vegetable field	AREAO(2)	m^2	1024	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0		Ryan Hupfer					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer					
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer					
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3		Ryan Hupfer					
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer					
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer					
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer					
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer	J. Davis	1/17/2020			Spot check
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field	AREAO(3)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer					
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer					
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3		Ryan Hupfer	J. Davis	1/17/2020			Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer					
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer					
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer	J. Davis	1/17/2020			Spot check
Grain Field					-					
Area for grain field	AREAO(4)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0		Ryan Hupfer					
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer					
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer					
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer					
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer					
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer					
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer					
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site	AREAODWELL	m^2	1024	Calc	Ryan Hupfer					
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer					
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer					
Volumetric water content for dwelling site	TMOFDWELL	--	0.3		Ryan Hupfer					
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer					
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer					
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer					
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer					
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer					
Anemometer height	ANH	m	10		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Ambient temperature	TABK	K	285		Ryan Hupfer					
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer					
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer					
Dispersion model coefficients	IDISPMOD	--	Pasquill-Gifford		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Windspeed Terrain	IZONE	--	Rural		Ryan Hupfer					
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer					
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer					
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer					
Dwelling site	DWELLELEV	m	0		Ryan Hupfer					
Surface water body	SWELEV	m	0		Ryan Hupfer					
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer					
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer					
Unsaturated Zone Parameters					-			N. Holt	1/17/2020	Spot check
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer					
	H(2)		0.305		Ryan Hupfer					
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer					
	H(4)		3.048		Ryan Hupfer					
	H(5)		4.846		Ryan Hupfer					
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer			N. Holt	1/17/2020	Spot check
	DENSUZ(2)		1.6		Ryan Hupfer					
	DENSUZ(3)		1.5		Ryan Hupfer					
	DENSUZ(4)		1.5		Ryan Hupfer					
	DENSUZ(5)		1.8		Ryan Hupfer					
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer					
	TPUZ(2)		0.397		Ryan Hupfer	J. Davis	1/17/2020			Spot check
	TPUZ(3)		0.427		Ryan Hupfer					
	TPUZ(4)		0.419		Ryan Hupfer			N. Holt	1/17/2020	Spot check
	TPUZ(5)		0.353		Ryan Hupfer					
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer					
	EPUZ(2)		0.389		Ryan Hupfer	J. Davis	1/17/2020			Spot check
	EPUZ(3)		0.195		Ryan Hupfer					
	EPUZ(4)		0.234		Ryan Hupfer					
	EPUZ(5)		0.27		Ryan Hupfer					
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer					
	FCUZ(2)		0.032		Ryan Hupfer			N. Holt	1/17/2020	Spot check
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer					
	FCUZ(5)		0.2471		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer					
	HCUZ(2)		94600		Ryan Hupfer					
	HCUZ(3)		0.315		Ryan Hupfer					
	HCUZ(4)		3.15		Ryan Hupfer					
	HCUZ(5)		16.7		Ryan Hupfer					
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer					
	BUZ(2)		4.05		Ryan Hupfer					
	BUZ(3)		11.4		Ryan Hupfer					
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer					
	ALPHALU(2)		0.1		Ryan Hupfer					
	ALPHALU(3)		0.1		Ryan Hupfer					
	ALPHALU(4)		0.1		Ryan Hupfer			N. Holt	1/17/2020	Spot check
	ALPHALU(5)		0.1		Ryan Hupfer					
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer					
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer					
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer					
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer					
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer					
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer					
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer					
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer					
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer					
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer					
Water Use					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer					
Fraction of water from surface body for human consumption	FSWD	--	1		Ryan Hupfer					
Fraction of water from well for human consumption	FWWD	--	0		Ryan Hupfer					
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	1		Ryan Hupfer					
Fraction of water from well for use indoors of dwelling	FWWHH	--	0		Ryan Hupfer					
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50		Ryan Hupfer					
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1		Ryan Hupfer					
Fraction of water from well for beef cattle	FWWLV(1)	--	0		Ryan Hupfer					
Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer					
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Fraction of water from well for dairy cows	FWWLV(2)	--	0		Ryan Hupfer					
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer					
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer					
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer					
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer					
Area of Plot for leafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer					
Area of Plot for pasture and silage		m^2	10000	Calc	Ryan Hupfer					
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer					
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer					
Area of Plot for livestock feed grain		m^2	10000	Calc	Ryan Hupfer					
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Area of Plot for offsite dwelling site		m^2	1024	Calc	Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer					
Well pumping rate needed to support specified water use		m^3/yr	331.645	Calc	Ryan Hupfer					
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer					
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer					
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer					
Surface area of water in surface water body:	ALAKE	m^2	500	Calc	Ryan Hupfer					
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer					
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer					
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer					
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer					
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer					
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Fish consumption	DFI(1)	kg/yr	2.43		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Other aquatic food consumption	DFI(2)	kg/yr	0.0		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0		Ryan Hupfer					
Leafy vegetables consumption	DVI(2)	kg/yr	17.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Meat consumption	DMI(1)	kg/yr	91.9		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Milk consumption	DMI(2)	L/yr	110		Ryan Hupfer					
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer					
Drinking water intake from affected area		--	1	Calc	Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.0		Ryan Hupfer					
Other aquatic food consumption from affected area	FFISH(2)	--	0.5		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5		Ryan Hupfer					
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5		Ryan Hupfer					
Meat consumption from affected area	FMEMI(1)	--	0.25		Ryan Hupfer					
Milk consumption from affected area	FMEMI(2)	--	0.5		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50		Ryan Hupfer					
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0		Ryan Hupfer					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0		Ryan Hupfer					
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1		Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4		Ryan Hupfer					
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0		Ryan Hupfer					
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0		Ryan Hupfer					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4		Ryan Hupfer					
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1		Ryan Hupfer					
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight crop yield of pasture and silage	YIELD(3)	kg/m^2	1.1		Ryan Hupfer					
Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08		Ryan Hupfer					
Foliage to food transfer coefficient of pasture and silage	FOLI F(3)	--	1		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25		Ryan Hupfer					
Root depth of pasture and silage	DROOT(3)	m	0.90		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70		Ryan Hupfer					
Duration of growing season of grain	GROWTIME(4)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1		Ryan Hupfer					
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25		Ryan Hupfer					
Root depth of grain	DROOT(4)	m	1.20		Ryan Hupfer					
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70		Ryan Hupfer					
Duration of growingseason of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25		Ryan Hupfer					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20		Ryan Hupfer					
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25		Ryan Hupfer					
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1		Ryan Hupfer					
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25		Ryan Hupfer					
Root depth of leafy vegetables	DROOT(2)	m	0.90		Ryan Hupfer					
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer					
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer			N. Holt	1/17/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer					
Scale	-	m	598.375		Ryan Hupfer					
Dwelling location coordinate in X-direction	-	m	210		Ryan Hupfer					
Dwelling location coordinate in y-direction	-	m	547		Ryan Hupfer					
	RAD SHAPE(1)		43.5833		Ryan Hupfer					
	RAD SHAPE(2)		87.1667		Ryan Hupfer					
	RAD SHAPE(3)		130.7500		Ryan Hupfer					
	RAD SHAPE(4)		174.3333		Ryan Hupfer					
	RAD SHAPE(5)		217.9167		Ryan Hupfer					
Radius	RAD SHAPE(6)	m	261.5000		Ryan Hupfer			N. Holt	1/17/2020	Spot check
	RAD SHAPE(7)		305.0833		Ryan Hupfer					
	RAD SHAPE(8)		348.6667		Ryan Hupfer					
	RAD SHAPE(9)		392.2500		Ryan Hupfer					
	RAD SHAPE(10)		435.8333	Calc	Ryan Hupfer					
	RAD SHAPE(11)		479.4167		Ryan Hupfer					
Radius	RAD SHAPE(12)	m	523.0000		Ryan Hupfer					
	FRACA(1)		0		Ryan Hupfer					
	FRACA(2)		0		Ryan Hupfer					
	FRACA(3)		0.04		Ryan Hupfer					
	FRACA(4)		0.21		Ryan Hupfer					
	FRACA(5)		0.22		Ryan Hupfer					
	FRACA(6)		0.18		Ryan Hupfer					
Fraction (Onsite)	FRACA(7)	--	0.15		Ryan Hupfer					
	FRACA(8)		0.12		Ryan Hupfer					
	FRACA(9)		0.11		Ryan Hupfer					
	FRACA(10)		0.097		Ryan Hupfer					
	FRACA(11)		0.088		Ryan Hupfer					
	FRACA(12)		0.049		Ryan Hupfer					
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer					
Outdoor time fraction on primary contamination	FOTD	--	0.05		Ryan Hupfer					
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05		Ryan Hupfer					
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1		Ryan Hupfer					
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1		Ryan Hupfer					
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1		Ryan Hupfer					
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1		Ryan Hupfer					
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer					
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer					
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer					
Vertical dimension of mixing for vegetation	HMIXV	m	1.0		Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer					
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer					
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02		Ryan Hupfer					
Fraction of vegetation carbon absorbed from air	CAIR		0.98		Ryan Hupfer					
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer					
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer	J. Davis	1/17/2020			Spot check
Local water	C12WTR	g/cm3	2.00E-05		Ryan Hupfer					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40		Ryan Hupfer					
Leafy vegetables	C12PLANT(2)		0.09		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Pasture and Silage	C12PLANT(3)		0.09		Ryan Hupfer					
Livestock feed grain	C12PLANT(4)		0.40		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Meat	C12MEAT_MILK(1)		0.24		Ryan Hupfer					
Milk	C12MEAT_MILK(2)		0.07		Ryan Hupfer					
Tritium										
Humidity in air	HUMID	g/m3	8		Ryan Hupfer					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8		Ryan Hupfer					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8		Ryan Hupfer			N. Holt	1/17/2020	Spot check
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8		Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8		Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6		Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer					
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer					
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer					
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer					
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer					
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer					
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer					
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer					
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer					
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer					
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer					
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer					
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer					
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Am	2000	4100[a]	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Ba	28	55	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Be	400	800	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
C	0	0	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Ca	15	30	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Cd	100	200	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Cf	20	40	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Cl	N/A[c]	N/A[c]	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Cm	20	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Co	400	800	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Cs	1500	3000	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Eu	20	40	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Fe	450	890	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Gd	410	820	Information/Data Transfer Transmittal 001 rev1					Not Simulated
H	0	0	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
I	2	4	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
K	15	30	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Mo	45	90	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Na	5	10	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Nb	50	100	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Nd	158	158	Ryan Hupfer					Not Simulated
Ni	1000	2000	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Np	20	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Pa	200	400	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Pb	50	100	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Pd	1000	2000	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Pm	410	820	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Pu	20	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Ra	1500	3000	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Re	20	40	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Sb	75	150	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Se	250	500	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Sm	500	1000	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Sn	50	100	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Sr	15	30	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Tc	0.36	0.72	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Th	1500	3000	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
U	25	50	Information/Data Transfer Transmittal 001 rev1	J. Davis	1/17/2020	N. Holt	1/17/2020	Checked in summary file
Zr	25	50	Information/Data Transfer Transmittal 001 rev1					Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03	STK					
Am-241	5.90E+01	STK					
Am-243	2.97E+00	STK					
Ba-133	1.60E+00	STK					Not simulated, screened
Be-10	2.53E-05	STK					
C-14	5.40E-01	RH					
Ca-41	4.21E-02	STK					
Cd-113m	NA	STK					Not simulated, screened
Cf-249	1.09E-06	STK					Not simulated, screened
Cf-250	7.40E-06	STK					Not simulated, screened
Cf-251	2.10E-07	STK					Not simulated, screened
Cf-252	1.31E-07	STK					Not simulated, screened
Cl-36		RH					Not simulated, no inventory value
Cm-243	4.30E-01	STK					
Cm-244	1.26E+02	STK					
Cm-245	3.83E-02	STK					
Cm-246	1.59E-01	STK					
Cm-247	1.04E-02	STK					
Cm-248	5.59E-04	STK					
Co-60	2.00E-02	STK					Not simulated, screened
Cs-134	1.06E-08	STK					Not simulated, screened
Cs-135	NA	STK					Not simulated, no inventory value
Cs-137	1.18E+03	STK					Not simlated, screened
Eu-152	2.87E+01	STK					Not simulated
Eu-154	6.49E+00	STK					Not simulated, screened
Eu-155	6.74E-03	STK					Not simulated, screened
Fe-55	8.95E-07	STK					Not simulated, screened
H-3	4.64E+00	RH					
I-129	3.50E-01	RH					
K-40	3.28E+00	STK					
Kr-85	3.55E-01	STK					Not simulated, screened
Mo-100	4.20E-06	STK					Not simulated, screened
Mo-93	3.88E-01	STK					
Na-22	8.22E-07	STK					Not simulated, screened
Nb-93m	2.33E-01	STK					
Nb-94	1.63E-02	STK					
Ni-59	3.04E+00	STK					
Ni-63	6.73E+02	STK					Not simulated, screened
Np-237	3.25E-01	STK					
Pa-231	2.39E-01	STK					
Pb-210	3.68E+00	STK					
Pd-107	NA	STK					Not simulated, no inventory value
Pm-146	8.84E-05	STK					Not simulated, screened
Pm-147	2.20E-04	STK					Not simulated, screened
Pu-238	9.38E+01	STK					
Pu-239	5.83E+01	STK					
Pu-240	6.20E+01	STK					
Pu-241	2.04E+02	STK					
Pu-242	1.73E-01	STK					
Pu-244	3.68E-03	STK					
Ra-226	8.01E-01	STK					
Ra-228	2.21E-02	STK					
Re-187	1.71E-06	STK					Not simulated, screened
Sb-125	3.03E-08	STK					Not simulated, screened

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Se-79	NA	STK					Not simulated, no inventory value
Sm-151	NA	STK					Not simulated, no inventory value
Sn-121m	NA	STK					Not simulated, no inventory value
Sn-126	NA	STK					Not simulated, no inventory value
Sr-90	1.92E+02	STK					
Tc-99	1.56E+00	RH					
Th-228	2.11E-06	STK					
Th-229	5.71E+00	STK					
Th-230	1.92E+00	STK					
Th-232	3.52E+00	STK					
U-232	1.02E+01	STK					
U-233	4.16E+01	STK					
U-234	6.30E+02	STK					
U-235	3.97E+01	STK					
U-236	8.98E+00	STK					
U-238	3.81E+02	STK					
Zr-93	NA	STK					Not simulated, no inventory value

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer	J. Davis	2/6/2020			Checked in model
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer	J. Davis	2/6/2020			Checked in model
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Exposure duration	ED	yr	30		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer	J. Davis	2/6/2020			Checked in model
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
X dimension of Primary contamination	SOURCEXY(1)	m	313.25		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Y dimension of Primary contamination	SOURCEXY(2)	m	306.16		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Source										
Nuclide concentration	S1	pCi/g	varies		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Release to groundwater, leach rate		1/yr	varies		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	300		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.75 for C-14, H-3 0 for All Other Nuclides		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Time over which transformation to releasable form occurs	RELDUR	Years	500 for C-14, H-3 800 for All Other Nulides		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Release Mechanism	RELOPT		Instantaneous Equilibrium Sorption Desorption, 1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Initial Leach Rate	RLEACH ALEACH	1/year	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Distribution Coefficient in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer	J. Davis	2/5/2020			Checked in model

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Distribution Coefficients										
Contaminated zone	DCACTC DCNUCC	cm^3/g	varies		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Unsaturated zone	DCACTU(1-5) DCNUCU(1-5)	cm^3/g	varies		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Saturated zone	DCACTS DCNUCS	cm^3/g	varies		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Sediment in surface water body	DCACTSWB DCNUCSWB	cm^3/g	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fruit, grain, nonleafy fields	DCACTV1 DCNUCOF(1)	cm^3/g	varies		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Leafy vegetable fields	DCACTV2 DNUCOF(2)	cm^3/g	varies		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Pasture, silage growing areas	DCACTL1 DNUCOF(3)	cm^3/g	varies		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Livestock feed grain fields	DCACTL2 DNUCOF(4)	cm^3/g	varies		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Offsite dwelling site	DCACTDWE DCNUCDWE	cm^3/g	varies		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Deposition Velocities										
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Dose Conversion and Slope Factors					Ryan Hupfer					
External exposure library	N/A	(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Internal exposure dose library	N/A	mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Slope Factor (Risk) Library	N/A	(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Transfer Factors										

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Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Reporting Times										
Times at which output is reported	T()	yr	1, 200, 400, 500, 600, 800, 1000, 2000, 10000		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Storage Times										
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

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Physical and Hydrological										
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Wind speed	WIND	m/s	3.4342	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Primary Contamination										
Area of primary contamination	AREA	m^2	95,900	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Length of contamination parallel to aquifer flow	LCZPAQ	m	319.14		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Rainfall and Runoff Factor	RAINEROS	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Contaminated Zone										
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

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Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Clean Cover					Ryan Hupfer					
Thickness of clean cover	COVER0	m	3.353		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Erosion rate of clean cover	VCV	m/yr	0	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Agriculture Area Parameters										
Fruit, Grain, and Non-leafy Vegetables Field										
Area for fruit, grain, and non-leafy vegetables field	AREAO(1)	m2	1024	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check

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Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Leafy Vegetable Field										
Area for leafy vegetable field	AREAO(2)	m^2	1024	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Livestock Feed Growing Area Parameters Pasture										
Silage Field										
Area for pasture and silage field	AREAO(3)	m^2	10000	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

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Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Grain Field										
Area for grain field	AREAO(4)	m^2	10000	Calc	Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Offsite Dwelling Area Parameters										
Area of offsite dwelling site	AREAODWELL	m^2	1024	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Volumetric water content for dwelling site	TMOFDWELL	--	0.3		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

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Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Atmospheric Transport										
Release height	AIRRELHT	m	1		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Anemometer height	ANH	m	10		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Ambient temperature	TABK	K	285		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Dispersion model coefficients	IDISPMOD	--	Pasquill-Gifford		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Windspeed Terrain	IZONE	--	Rural		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Dwelling site	DWELLELEV	m	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Surface water body	SWELEV	m	0		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Unsaturated Zone Parameters										
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	H(2)		0.305		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	H(4)		3.048		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	H(5)		4.846		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	DENSUZ(2)		1.6		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	DENSUZ(3)		1.5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	DENSUZ(4)		1.5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	DENSUZ(5)		1.8		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	TPUZ(2)		0.397		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	TPUZ(3)		0.427		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	TPUZ(4)		0.419		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	TPUZ(5)		0.353		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	EPUZ(2)		0.389		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	EPUZ(3)		0.195		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	EPUZ(4)		0.234		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	EPUZ(5)		0.27		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

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Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FCUZ(2)		0.032		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	FCUZ(3)		0.418		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	FCUZ(4)		0.307		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	FCUZ(5)		0.2471		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	HCUZ(2)		94600		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	HCUZ(3)		0.315		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	HCUZ(4)		3.15		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	HCUZ(5)		16.7		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	BUZ(2)		4.05		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	BUZ(3)		11.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	BUZ(4)		11.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	BUZ(5)		10.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	ALPHALU(2)		0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	ALPHALU(3)		0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
	ALPHALU(4)		0.1		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	ALPHALU(5)		0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Saturated Zone Hydrological Data										
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

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Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Water Use										
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from surface body for human consumption	FSWD	--	0		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Fraction of water from well for human consumption	FWWD	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Beef Cattle										
Quantity of water for beef cattle	LWI(1)	L/d	50		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from well for beef cattle	FWWLV(1)	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Dairy Cows										
Quantity of water for dairy cows	LWI(2)	L/d	160		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from well for dairy cows	FWWLV(2)	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Fruit, grain, non-leafy vegetables										
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Leafy Vegetables										
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Area of Plot for leafy vegetables		m^2	1024	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Pasture and Silage										
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Area of Plot for pasture and silage		m^2	10000	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Livestock Feed Grain										
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

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Area of Plot for livestock feed grain		m^2	10000	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Offsite Dwelling Site										
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Area of Plot for offsite dwelling site		m^2	1024	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Well pumping rate needed to support specified water use		m^3/yr	331.645	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Surface Water Body Parameters										
Sediment delivery ratio	SDR	--	1		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Surface area of water in surface water body:	ALAKE	m^2	500	Calc	Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Ingestion Rates										
Consumption Rate										
Drinking water intake	DWI	L/yr	730		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fish consumption	DFI(1)	kg/yr	2.43		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Other aquatic food consumption	DFI(2)	kg/yr	0.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

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Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Leafy vegetables consumption	DVI(2)	kg/yr	17.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Meat consumption	DMI(1)	kg/yr	91.9		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Milk consumption	DMI(2)	L/yr	110		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Drinking water intake from affected area		--	1	Calc	Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Fish consumption from affected area	FFISH(1)	--	1.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Other aquatic food consumption from affected area	FFISH(2)	--	0.5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Meat consumption from affected area	FMEMI(1)	--	0.25		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Milk consumption from affected area	FMEMI(2)	--	0.5		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Livestock Intakes										
Beef Cattle					Ryan Hupfer					
Water intake for beef cattle	LWI(1)	L/d	50		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Dairy Cows										
Water intake for dairy cows	LWI(2)	L/d	160		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Livestock Feed Factors										
Pasture and Silage										
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Duration of growingseason of pasture and silage	GROWTIME(3)	yr	0.08		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Root depth of pasture and silage	DROOT(3)	m	0.90		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Grain										
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Duration of growing season of grain	GROWTIME(4)	yr	0.17		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Root depth of grain	DROOT(4)	m	1.20		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Plant Factors										
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Duration of growingseason of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Leafy Vegetables										
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Root depth of leafy vegetables	DROOT(2)	m	0.90		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Inhalation and External Gamma Data										
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer	J. Davis	2/5/2020			Checked in model

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
External Radiation Shape and Area Factors										
Dwelling location	-		Offsite		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Scale	-	m	598.375		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Dwelling location coordinate in X-direction	-	m	239	Calc	Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in model
Dwelling location coordinate in y-direction	-	m	568		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in model
Radius	RAD_SHAPE(1)	m	39.75		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(2)		79.50		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(3)		119.25		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(4)		159.00		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(5)		198.75		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(6)		238.50		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(7)		278.25		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(8)		318.00		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(9)		357.75		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(10)		397.50		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(11)		437.25		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Radius	RAD_SHAPE(12)	m	477.00		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Fraction (Onsite)	FRACA(1)	--	0.000		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(2)		0.000		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(3)		0.003		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(4)		0.180		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(5)		0.230		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(6)		0.230		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(7)		0.220		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(8)		0.180		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(9)		0.160		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(10)		0.140		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(11)		0.110		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(12)		0.018		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer	J. Davis	2/5/2020			Checked in model
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in model
Occupancy Factors										
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Outdoor time fraction on primary contamination	FOTD	--	0.05		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05		Ryan Hupfer	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3			J. Davis	2/5/2020			Checked in summary file
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Vertical dimension of mixing for vegetation	HMIXV	m	1.0		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fraction of vegetation carbon absorbed from air	CAIR		0.98		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Local water	C12WTR	g/cm3	2.00E-05		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Leafy vegetables	C12PLANT(2)		0.09		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Pasture and Silage	C12PLANT(3)		0.09		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Livestock feed grain	C12PLANT(4)		0.40		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Meat	C12MEAT_MILK(1)		0.24		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Milk	C12MEAT_MILK(2)		0.07		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Tritium					Ryan Hupfer					
Humidity in air	HUMID	g/m3	8		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer	J. Davis	2/5/2020			Checked in summary file

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.31E-03	1.00E+00	1.00E+00	Ryan Hupfer	J. Davis	3/10/2020			Checked in summary file
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Am	2000	4100[a]	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Ba	28	55	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Be	400	800	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
C	0	0	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Ca	15	30	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Cd	100	200	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Cf	20	40	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Cl	N/A[c]	N/A[c]	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Cm	20	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Co	400	800	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Cs	1500	3000	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Eu	20	40	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Fe	450	890	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Gd	410	820	Information/Data Transfer Transmittal 001 rev1					Not Simulated
H	0	0	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
I	2	4	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
K	15	30	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Mo	45	90	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Na	5	10	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Nb	50	100	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Nd	158	158	Ryan Hupfer					Not Simulated
Ni	1000	2000	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Np	20	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Pa	200	400	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Pb	50	100	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Pd	1000	2000	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Pm	410	820	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Pu	20	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Ra	1500	3000	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Re	20	40	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Sb	75	150	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Se	250	500	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Sm	500	1000	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Sn	50	100	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Sr	15	30	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Tc	0.36	0.72	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Th	1500	3000	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
U	25	50	Information/Data Transfer Transmittal 001 rev1	J. Davis	2/5/2020	O. Warren	3/10/2020	Checked in summary file
Zr	25	50	Information/Data Transfer Transmittal 001 rev1					Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03	STK	J. Davis	2/5/2020			Source checked in summary file
Am-241	5.90E+01	STK	J. Davis	2/5/2020			Source checked in summary file
Am-243	2.97E+00	STK	J. Davis	2/5/2020			Source checked in summary file
Ba-133	1.60E+00	STK					Not simulated, screened
Be-10	2.53E-05	STK	J. Davis	2/5/2020			Source checked in summary file
C-14	5.40E-01	RH	J. Davis	2/5/2020			Source checked in summary file
Ca-41	4.21E-02	STK	J. Davis	2/5/2020			Source checked in summary file
Cd-113m	NA	STK					Not simulated, screened
Cf-249	1.09E-06	STK					Not simulated, screened
Cf-250	7.40E-06	STK					Not simulated, screened
Cf-251	2.10E-07	STK					Not simulated, screened
Cf-252	1.31E-07	STK					Not simulated, screened
Cl-36		RH					Not simulated, no inventory value
Cm-243	4.30E-01	STK	J. Davis	2/5/2020			Source checked in summary file
Cm-244	1.26E+02	STK	J. Davis	2/5/2020			Source checked in summary file
Cm-245	3.83E-02	STK	J. Davis	2/5/2020			Source checked in summary file
Cm-246	1.59E-01	STK	J. Davis	2/5/2020			Source checked in summary file
Cm-247	1.04E-02	STK	J. Davis	2/5/2020			Source checked in summary file
Cm-248	5.59E-04	STK	J. Davis	2/5/2020			Source checked in summary file
Co-60	2.00E-02	STK					Not simulated, screened
Cs-134	1.06E-08	STK					Not simulated, screened
Cs-135	NA	STK					Not simulated, no inventory value
Cs-137	1.18E+03	STK					Not simlated, screened
Eu-152	2.87E+01	STK					Not simulated
Eu-154	6.49E+00	STK					Not simulated, screened
Eu-155	6.74E-03	STK					Not simulated, screened
Fe-55	8.95E-07	STK					Not simulated, screened
H-3	4.64E+00	RH	J. Davis	2/5/2020			Source checked in summary file
I-129	3.50E-01	RH	J. Davis	2/5/2020			Source checked in summary file
K-40	3.28E+00	STK	J. Davis	2/5/2020			Source checked in summary file
Kr-85	3.55E-01	STK					Not simulated, screened
Mo-100	4.20E-06	STK					Not simulated, screened
Mo-93	3.88E-01	STK	J. Davis	2/5/2020			Source checked in summary file
Na-22	8.22E-07	STK					Not simulated, screened
Nb-93m	2.33E-01	STK	J. Davis	2/5/2020			Source checked in summary file
Nb-94	1.63E-02	STK	J. Davis	2/5/2020			Source checked in summary file
Ni-59	3.04E+00	STK	J. Davis	2/5/2020			Source checked in summary file
Ni-63	6.73E+02	STK					Not simulated, screened
Np-237	3.25E-01	STK	J. Davis	2/5/2020			Source checked in summary file
Pa-231	2.39E-01	STK	J. Davis	2/5/2020			Source checked in summary file
Pb-210	3.68E+00	STK	J. Davis	2/5/2020			Source checked in summary file
Pd-107	NA	STK					Not simulated, no inventory value
Pm-146	8.84E-05	STK					Not simulated, screened
Pm-147	2.20E-04	STK					Not simulated, screened
Pu-238	9.38E+01	STK	J. Davis	2/5/2020			Source checked in summary file
Pu-239	5.83E+01	STK	J. Davis	2/5/2020			Source checked in summary file
Pu-240	6.20E+01	STK	J. Davis	2/5/2020			Source checked in summary file
Pu-241	2.04E+02	STK	J. Davis	2/5/2020			Source checked in summary file
Pu-242	1.73E-01	STK	J. Davis	2/5/2020			Source checked in summary file
Pu-244	3.68E-03	STK	J. Davis	2/5/2020			Source checked in summary file
Ra-226	8.01E-01	STK	J. Davis	2/5/2020			Source checked in summary file
Ra-228	2.21E-02	STK	J. Davis	2/5/2020			Source checked in summary file
Re-187	1.71E-06	STK					Not simulated, screened
Sb-125	3.03E-08	STK					Not simulated, screened

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Se-79	NA	STK					Not simulated, no inventory value
Sm-151	NA	STK					Not simulated, no inventory value
Sn-121m	NA	STK					Not simulated, no inventory value
Sn-126	NA	STK					Not simulated, no inventory value
Sr-90	1.92E+02	STK	J. Davis	2/5/2020			Source checked in summary file
Tc-99	1.56E+00	RH	J. Davis	2/5/2020			Source checked in summary file
Th-228	2.11E-06	STK	J. Davis	2/5/2020			Source checked in summary file
Th-229	5.71E+00	STK	J. Davis	2/5/2020			Source checked in summary file
Th-230	1.92E+00	STK	J. Davis	2/5/2020			Source checked in summary file
Th-232	3.52E+00	STK	J. Davis	2/5/2020			Source checked in summary file
U-232	1.02E+01	STK	J. Davis	2/5/2020			Source checked in summary file
U-233	4.16E+01	STK	J. Davis	2/5/2020			Source checked in summary file
U-234	6.30E+02	STK	J. Davis	2/5/2020			Source checked in summary file
U-235	3.97E+01	STK	J. Davis	2/5/2020			Source checked in summary file
U-236	8.98E+00	STK	J. Davis	2/5/2020			Source checked in summary file
U-238	3.81E+02	STK	J. Davis	2/5/2020			Source checked in summary file
Zr-93	NA	STK					Not simulated, no inventory value

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer					
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Exposure duration	ED	yr	30		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer					
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer					
X dimension of Primary contamination	SOURCEXY(1)	m	200.48		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Y dimension of Primary contamination	SOURCEXY(2)	m	478.375		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer					
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer					
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer					
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer					
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer					
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer					
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer					
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer	J. Davis	2/6/2020			Checked in summary file
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer					
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer			O. Warren	3/10/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer					
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer					
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer					
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Source										
Nuclide concentration	S1	pCi/g	varies		Ryan Hupfer					
Release to groundwater, leach rate		1/yr	varies		Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer					
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	300		Ryan Hupfer					
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.75 for C-14, H-3 0 for All Other Nuclides		Ryan Hupfer					
Time over which transformation to releasable form occurs	RELDUR	Years	500 for C-14, H-3 800 for All Other Nulides		Ryan Hupfer					
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer					
Release Mechanism	RELOPT		Instantaneous Equilibrium Sorption Desorption, 1		Ryan Hupfer					
Initial Leach Rate	RLEACH ALEACH	1/year	0		Ryan Hupfer					
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer					
Distribution Coefficient in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer					
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Distribution Coefficients										
Contaminated zone	DCACTC DCNUCC	cm^3/g	varies		Ryan Hupfer					
Unsaturated zone	DCACTU(1-5) DCNUCU(1-5)	cm^3/g	varies		Ryan Hupfer					
Saturated zone	DCACTS DCNUCS	cm^3/g	varies		Ryan Hupfer					
Sediment in surface water body	DCACTSWB DCNUCSWB	cm^3/g	0		Ryan Hupfer					
Fruit, grain, nonleafy fields	DCACTV1 DCNUCOF(1)	cm^3/g	varies		Ryan Hupfer					
Leafy vegetable fields	DCACTV2 DNUCOF(2)	cm^3/g	varies		Ryan Hupfer					
Pasture, silage growing areas	DCACTL1 DNUCOF(3)	cm^3/g	varies		Ryan Hupfer					
Livestock feed grain fields	DCACTL2 DNUCOF(4)	cm^3/g	varies		Ryan Hupfer					
Offsite dwelling site	DCACTDWE DCNUCDWE	cm^3/g	varies		Ryan Hupfer					
Deposition Velocities										
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Dose Conversion and Slope Factors					Ryan Hupfer					
External exposure library	N/A	(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer					
Internal exposure dose library	N/A	mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer					
Slope Factor (Risk) Library	N/A	(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer					
Transfer Factors										

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer					
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times										
Times at which output is reported	T()	yr	1, 200, 400, 500, 600, 800, 1000, 2000, 10000		Ryan Hupfer					
Storage Times										
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer					
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer					
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer					
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer					
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer					
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer			O. Warren	3/10/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Physical and Hydrological										
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer					
Wind speed	WIND	m/s	3.4342	Calc	Ryan Hupfer					
Primary Contamination										
Area of primary contamination	AREA	m^2	95,900	Calc	Ryan Hupfer					
Length of contamination parallel to aquifer flow	LCZPAQ	m	498.7		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer					
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer					
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer					
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer					
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer					
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer					
Rainfall and Runoff Factor	RAINEROS	--	0		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer					
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer					
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer					
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer					
Contaminated Zone										
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer					
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer					
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer					
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer			O. Warren	3/10/2020	Spot Check
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Clean Cover					Ryan Hupfer					
Thickness of clean cover	COVER0	m	3.353		Ryan Hupfer					
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Erosion rate of clean cover	VCV	m/yr	0	Calc	Ryan Hupfer					
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer					
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer					
Agriculture Area Parameters										
Fruit, Grain, and Non-leafy Vegetables Field										
Area for fruit, grain, and non-leafy vegetables field	AREAO(1)	m2	1024	Calc	Ryan Hupfer			O. Warren	3/10/2020	Spot check
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0		Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer					
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer					
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer					
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Leafy Vegetable Field										
Area for leafy vegetable field	AREAO(2)	m^2	1024	Calc	Ryan Hupfer			O. Warren	3/10/2020	Spot check
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0		Ryan Hupfer					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer					
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3		Ryan Hupfer					
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer					
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer					
Livestock Feed Growing Area Parameters Pasture										
Silage Field										
Area for pasture and silage field	AREAO(3)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0		Ryan Hupfer					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer					
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3		Ryan Hupfer					

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Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer					
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer					
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer					
Grain Field										
Area for grain field	AREAO(4)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0		Ryan Hupfer					
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer					
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer					
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer					
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer					
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer					
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer					
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer					
Offsite Dwelling Area Parameters										
Area of offsite dwelling site	AREAODWELL	m^2	1024	Calc	Ryan Hupfer					
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer					
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer					
Volumetric water content for dwelling site	TMOFDWELL	--	0.3		Ryan Hupfer					
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer					
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer			O. Warren	3/10/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer					
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer					
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer					
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport										
Release height	AIRRELHT	m	1		Ryan Hupfer					
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer					
Anemometer height	ANH	m	10		Ryan Hupfer					
Ambient temperature	TABK	K	285		Ryan Hupfer					
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer			O. Warren	3/10/2020	Spot Check
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Dispersion model coefficients	IDISPMOD	--	Pasquill-Gifford		Ryan Hupfer					
Windspeed Terrain	IZONE	--	Rural		Ryan Hupfer					
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer					
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer					
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer					
Dwelling site	DWELLELEV	m	0		Ryan Hupfer					
Surface water body	SWELEV	m	0		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer					
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer					
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer					
Unsaturated Zone Parameters										
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer					
	H(2)		0.305		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer					
	H(4)		3.048		Ryan Hupfer					
	H(5)		4.846		Ryan Hupfer					
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer					
	DENSUZ(2)		1.6		Ryan Hupfer					
	DENSUZ(3)		1.5		Ryan Hupfer					
	DENSUZ(4)		1.5		Ryan Hupfer			O. Warren	3/10/2020	Spot check
	DENSUZ(5)		1.8		Ryan Hupfer					
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer					
	TPUZ(2)		0.397		Ryan Hupfer					
	TPUZ(3)		0.427		Ryan Hupfer					
	TPUZ(4)		0.419		Ryan Hupfer					
	TPUZ(5)		0.353		Ryan Hupfer					
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer					
	EPUZ(2)		0.389		Ryan Hupfer					
	EPUZ(3)		0.195		Ryan Hupfer			O. Warren	3/10/2020	Spot check
	EPUZ(4)		0.234		Ryan Hupfer					
	EPUZ(5)		0.27		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer					
	FCUZ(2)		0.032		Ryan Hupfer					
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer					
	FCUZ(5)		0.2471		Ryan Hupfer					
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer			O. Warren	3/10/2020	Spot check
	HCUZ(2)		94600		Ryan Hupfer					
	HCUZ(3)		0.315		Ryan Hupfer					
	HCUZ(4)		3.15		Ryan Hupfer					
	HCUZ(5)		16.7		Ryan Hupfer					
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer					
	BUZ(2)		4.05		Ryan Hupfer					
	BUZ(3)		11.4		Ryan Hupfer					
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
	ALPHALU(2)		0.1		Ryan Hupfer					
	ALPHALU(3)		0.1		Ryan Hupfer					
	ALPHALU(4)		0.1		Ryan Hupfer			O. Warren	3/10/2020	Spot check
	ALPHALU(5)		0.1		Ryan Hupfer					
Saturated Zone Hydrological Data										
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer					
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer			O. Warren	3/10/2020	Spot Check
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer			O. Warren	3/10/2020	Spot Check
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer					
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer					
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer					
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer					
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer					
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer					
Water Use										
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer					
Fraction of water from surface body for human consumption	FSWD	--	0		Ryan Hupfer			O. Warren	3/10/2020	Spot Check
Fraction of water from well for human consumption	FWWD	--	1		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer					
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer					
Beef Cattle										
Quantity of water for beef cattle	LWI(1)	L/d	50		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1		Ryan Hupfer					
Fraction of water from well for beef cattle	FWWLV(1)	--	0		Ryan Hupfer					
Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer					
Dairy Cows										
Quantity of water for dairy cows	LWI(2)	L/d	160		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1		Ryan Hupfer					
Fraction of water from well for dairy cows	FWWLV(2)	--	0		Ryan Hupfer					
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer					
Fruit, grain, non-leafy vegetables										
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer					
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer					
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Leafy Vegetables										
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer			O. Warren	3/10/2020	Spot Check
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Area of Plot for leafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Pasture and Silage										
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer					
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Area of Plot for pasture and silage		m^2	10000	Calc	Ryan Hupfer					
Livestock Feed Grain										
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer					
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer	J. Davis	2/6/2020			Spot Check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Area of Plot for livestock feed grain		m^2	10000	Calc	Ryan Hupfer					
Offsite Dwelling Site										
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer					
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer					
Area of Plot for offsite dwelling site		m^2	1024	Calc	Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Well pumping rate needed to support specified water use		m^3/yr	331.645	Calc	Ryan Hupfer					
Surface Water Body Parameters										
Sediment delivery ratio	SDR	--	1		Ryan Hupfer					
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer					
Surface area of water in surface water body:	ALAKE	m^2	500	Calc	Ryan Hupfer					
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer					
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer					
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer					
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer					
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer					
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer					
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer					
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer					
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates										
Consumption Rate										
Drinking water intake	DWI	L/yr	730		Ryan Hupfer					
Fish consumption	DFI(1)	kg/yr	2.43		Ryan Hupfer					
Other aquatic food consumption	DFI(2)	kg/yr	0.0		Ryan Hupfer			O. Warren	3/10/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0		Ryan Hupfer					
Leafy vegetables consumption	DVI(2)	kg/yr	17.0		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Meat consumption	DMI(1)	kg/yr	91.9		Ryan Hupfer					
Milk consumption	DMI(2)	L/yr	110		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer					
Drinking water intake from affected area		--	1	Calc	Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.0		Ryan Hupfer					
Other aquatic food consumption from affected area	FFISH(2)	--	0.5		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5		Ryan Hupfer					
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Meat consumption from affected area	FMEMI(1)	--	0.25		Ryan Hupfer					
Milk consumption from affected area	FMEMI(2)	--	0.5		Ryan Hupfer					
Livestock Intakes										
Beef Cattle					Ryan Hupfer					
Water intake for beef cattle	LWI(1)	L/d	50		Ryan Hupfer					
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0		Ryan Hupfer					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1		Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4		Ryan Hupfer					
Dairy Cows										
Water intake for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0		Ryan Hupfer					
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0		Ryan Hupfer					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4		Ryan Hupfer					
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1		Ryan Hupfer					
Livestock Feed Factors										
Pasture and Silage										
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Duration of growingseason of pasture and silage	GROWTIME(3)	yr	0.08		Ryan Hupfer					
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Root depth of pasture and silage	DROOT(3)	m	0.90		Ryan Hupfer					
Grain										
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70		Ryan Hupfer					
Duration of growing season of grain	GROWTIME(4)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1		Ryan Hupfer					
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25		Ryan Hupfer					
Root depth of grain	DROOT(4)	m	1.20		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Plant Factors										
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70		Ryan Hupfer					
Duration of growingseason of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1		Ryan Hupfer					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25		Ryan Hupfer					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20		Ryan Hupfer					
Leafy Vegetables										
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25		Ryan Hupfer					
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1		Ryan Hupfer					
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25		Ryan Hupfer					
Root depth of leafy vegetables	DROOT(2)	m	0.90		Ryan Hupfer					
Inhalation and External Gamma Data										
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer			O. Warren	3/10/2020	Spot Check
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer					
External Radiation Shape and Area Factors										
Dwelling location	-		Offsite		Ryan Hupfer					
Scale	-	m	598.375		Ryan Hupfer	J. Davis	2/6/2020			Checked in model
Dwelling location coordinate in X-direction	-	m	295		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in model
Dwelling location coordinate in y-direction	-	m	654		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in model
Radius	RAD_SHAPE(1)	m	50.3333		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(2)		100.6667		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(3)		151.0000		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(4)		201.3333		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(5)		251.6667		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(6)		302.0000		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(7)		352.3333		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(8)		402.6667		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(9)		453.0000		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(10)		503.3333	Calc	Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	RAD_SHAPE(11)		553.6667		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Radius	RAD_SHAPE(12)	m	604.0000		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Fraction (Onsite)	FRACA(1)	--	0.000		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(2)		0.000		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(3)		0.100		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(4)		0.190		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(5)		0.150		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(6)		0.120		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(7)		0.100		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(8)		0.086		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(9)		0.075		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(10)		0.068		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(11)		0.061		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
	FRACA(12)		0.049		Ryan Hupfer	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file, Spot check
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors										
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer					
Outdoor time fraction on primary contamination	FOTD	--	0.05		Ryan Hupfer					
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5		Ryan Hupfer					
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1		Ryan Hupfer					
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1		Ryan Hupfer					
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1		Ryan Hupfer					
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer					
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer					
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer			O. Warren	3/10/2020	Spot check
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3			J. Davis	2/6/2020			Spot Check
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer					
Vertical dimension of mixing for vegetation	HMIXV	m	1.0		Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer					
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer					
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02		Ryan Hupfer					
Fraction of vegetation carbon absorbed from air	CAIR		0.98		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer					
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer					
Local water	C12WTR	g/cm3	2.00E-05		Ryan Hupfer	J. Davis	2/6/2020			Spot Check
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40		Ryan Hupfer					
Leafy vegetables	C12PLANT(2)		0.09		Ryan Hupfer					
Pasture and Silage	C12PLANT(3)		0.09		Ryan Hupfer					
Livestock feed grain	C12PLANT(4)		0.40		Ryan Hupfer					
Meat	C12MEAT_MILK(1)		0.24		Ryan Hupfer					
Milk	C12MEAT_MILK(2)		0.07		Ryan Hupfer					
Tritium					Ryan Hupfer					
Humidity in air	HUMID	g/m3	8		Ryan Hupfer					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8		Ryan Hupfer					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8		Ryan Hupfer					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8		Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8		Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6		Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer					
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer					
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer					
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer					
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.31E-03	1.00E+00	1.00E+00	Ryan Hupfer					
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer					
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer					
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer					
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer					
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer					
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer					
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer					
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer					
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Nd	158	158	**Ryan Hupfer**					Not Simulated
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/6/2020	O. Warren	3/10/2020	Checked in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03	STK					
Am-241	5.90E+01	STK					
Am-243	2.97E+00	STK					
Ba-133	1.60E+00	STK					Not simulated, screened
Be-10	2.53E-05	STK					
C-14	5.40E-01	RH					
Ca-41	4.21E-02	STK					
Cd-113m	NA	STK					Not simulated, screened
Cf-249	1.09E-06	STK					Not simulated, screened
Cf-250	7.40E-06	STK					Not simulated, screened
Cf-251	2.10E-07	STK					Not simulated, screened
Cf-252	1.31E-07	STK					Not simulated, screened
Cl-36		RH					Not simulated, no inventory value
Cm-243	4.30E-01	STK					
Cm-244	1.26E+02	STK					
Cm-245	3.83E-02	STK					
Cm-246	1.59E-01	STK					
Cm-247	1.04E-02	STK					
Cm-248	5.59E-04	STK					
Co-60	2.00E-02	STK					Not simulated, screened
Cs-134	1.06E-08	STK					Not simulated, screened
Cs-135	NA	STK					Not simulated, no inventory value
Cs-137	1.18E+03	STK					Not simlated, screened
Eu-152	2.87E+01	STK					Not simulated
Eu-154	6.49E+00	STK					Not simulated, screened
Eu-155	6.74E-03	STK					Not simulated, screened
Fe-55	8.95E-07	STK					Not simulated, screened
H-3	4.64E+00	RH					
I-129	3.50E-01	RH					
K-40	3.28E+00	STK					
Kr-85	3.55E-01	STK					Not simulated, screened
Mo-100	4.20E-06	STK					Not simulated, screened
Mo-93	3.88E-01	STK					
Na-22	8.22E-07	STK					Not simulated, screened
Nb-93m	2.33E-01	STK					
Nb-94	1.63E-02	STK					
Ni-59	3.04E+00	STK					
Ni-63	6.73E+02	STK					Not simulated, screened
Np-237	3.25E-01	STK					
Pa-231	2.39E-01	STK					
Pb-210	3.68E+00	STK					
Pd-107	NA	STK					Not simulated, no inventory value
Pm-146	8.84E-05	STK					Not simulated, screened
Pm-147	2.20E-04	STK					Not simulated, screened
Pu-238	9.38E+01	STK					
Pu-239	5.83E+01	STK					
Pu-240	6.20E+01	STK					
Pu-241	2.04E+02	STK					
Pu-242	1.73E-01	STK					
Pu-244	3.68E-03	STK					
Ra-226	8.01E-01	STK					
Ra-228	2.21E-02	STK					
Re-187	1.71E-06	STK					Not simulated, screened
Sb-125	3.03E-08	STK					Not simulated, screened
Se-79	NA	STK					Not simulated, no inventory value

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Sm-151	NA	STK					Not simulated, no inventory value
Sn-121m	NA	STK					Not simulated, no inventory value
Sn-126	NA	STK					Not simulated, no inventory value
Sr-90	1.92E+02	STK					
Tc-99	1.56E+00	RH					
Th-228	2.11E-06	STK					
Th-229	5.71E+00	STK					
Th-230	1.92E+00	STK					
Th-232	3.52E+00	STK					
U-232	1.02E+01	STK					
U-233	4.16E+01	STK					
U-234	6.30E+02	STK					
U-235	3.97E+01	STK					
U-236	8.98E+00	STK					
U-238	3.81E+02	STK					
Zr-93	NA	STK					Not simulated, no inventory value

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Basic radiation dose limit	BRDL	mrem/yr	100		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW
Exposure duration	ED	yr	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
X dimension of Primary contamination	SOURCEXY(1)	m	46.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Y dimension of Primary contamination	SOURCEXY(2)	m	46.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	46.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	46.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	46.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	46.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	46.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	46.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	46.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	46.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Larger x coordinate of the dwelling site	DWELLXY(2)	m	31.2		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Larger y coordinate of the dwelling site	DWELLXY(4)	m	32.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Source					-					
Nuclide concentration	-	pCi/g	varies		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Soil Conc Sheet
Release to groundwater, leach rate		1/yr	varies	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	1.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Time over which transformation to releasable form occurs	RELDUR	Years	10000		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Release Mechanism	RELOPT		First Order Rate Controlled, 0			J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
Initial Leach Rate	RLEACH	1/year	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Distribution Coefficient in the contaminated zone	DCACTC	cc/g	varies		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Kd Sheet
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer	J. Davis	10/31/2019	O.Warren	10/29/2019	Checked in model
Distribution Coefficients					-					
Contaminated zone	DCACTC	cm^3/g	varies		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Kd Sheet
Unsaturated zone	DCACTU	cm^3/g	varies		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Kd Sheet
Saturated zone	DCACTS	cm^3/g	varies		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Kd Sheet
Sediment in surface water body	DCACTSWB	cm^3/g	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Kd Sheet

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Kd Sheet
Leafy vegetable fields	DCACTV2	cm^3/g	varies		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Kd Sheet
Pasture, silage growing areas	DCACTL1	cm^3/g	varies		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Kd Sheet
Livestock feed grain fields	DCACTL2	cm^3/g	varies		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Kd Sheet
Offsite dwelling site	DCACTDWE	cm^3/g	varies		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Kd Sheet
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Dose Conversion and Slope Factors					-					
External exposure library		(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Internal exposure dose library		mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Slope Factor (Risk) Library		(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/(pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in Transfer Factors Sheet
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/(pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Transfer Factors Sheet
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Transfer Factors Sheet

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Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Transfer Factors Sheet
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Transfer Factors Sheet
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Transfer Factors Sheet
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Transfer Factors Sheet
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in Transfer Factors Sheet
Reporting Times					-					
Times at which output is reported	T()	yr	1, 100, 300, 500, 800, 1000, 1100, 2000, 10000		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file

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Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	0.000001		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Wind speed		m/s	3.4342	Calculated	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Primary Contamination					-					
Area of primary contamination		m^2	2199.6	Calculated	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Length of contamination parallel to aquifer flow	LCZPAQ	m	47.06		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Depth of soil mixing layer (m)	DM	m	0.3048		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW
Mass loading of all particulates	MLFD	g/m^3	0.001		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file

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Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Rainfall and Runoff Factor	RAINEROS	--	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	0.3048		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW
Erosion rate of clean cover		m/yr	0	Calculated	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/31/2019	Checked in summary file
Longitudinal Dispersivity	ALPHALCZ	m	0.03048		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Depth of primary contamination below water table		--	0.000	Calculated	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Clean Cover					-					
Thickness of clean cover	COVER0	m	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file, not used
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file

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Erosion rate of clean cover		m/yr	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file, not used
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field		m2	2199.6	Calculated	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.00		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.625		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.3048		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMDF(1)	--	0.3		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Erosion rate for fruit, grain, and nonleafy vegetable field		m/yr	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.4	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file, not used
Leafy Vegetable Field					-					
Area for leafy vegetable field		m^2	2199.6	Calculated	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.00		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.625		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.3048		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file

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Volumetric water content for leafy vegetable field	TMDF(2)	--	0.3		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Erosion rate for leafy vegetable field		m/yr	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file, not used
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field		m^2	2199.6	Calculated	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.00		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.625		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.3048		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Volumetric water content for pasture and silage field	TMDF(3)	--	0.3		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Erosion rate for pasture and silage field		m/yr	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file, not used
Grain Field					-					
Area for grain field		m^2	2199.6	Calculated	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.00		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Runoff coefficient for grain field	RUNOF(4)	--	0.625		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.3048		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Volumetric water content for grain field	TMDF(4)	--	0.3		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Erosion rate		m/yr	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file

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Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file, not used
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site		m^2	998.4	Calculated	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.625		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.3048		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Volumetric water content for dwelling site	TMDFDWELL	--	0.3		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Erosion rate for dwelling site		m/yr	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file, not used
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Anemometer height	ANH	m	10		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Ambient temperature	TABK	K	285		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Dispersion model coefficients	-	--	Pasquill-Gifford		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Windspeed Terrain	-	--	Rural		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Dwelling site	DWELLELEV	m	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Surface water body	SWELEV	m	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	H(2)		0.305		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	H(4)		3.048		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	H(5)		4.846		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	DENSUZ(2)		1.6		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	DENSUZ(3)		1.5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	DENSUZ(4)		1.5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	DENSUZ(5)		1.8		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	TPUS(2)		0.397		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	TPUS(3)		0.427		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	TPUS(4)		0.419		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
	TPUS(5)		0.353		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	EPUZ(2)		0.389		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	EPUZ(3)		0.195		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	EPUZ(4)		0.234		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
	EPUZ(5)		0.27		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	FCUZ(2)		0.032		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	FCUZ(3)		0.418		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	FCUZ(4)		0.307		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
	FCUZ(5)		0.2471		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	HCUZ(2)		94600		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	HCUZ(3)		0.315		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	HCUZ(4)		3.15		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
	HCUZ(5)		16.7		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/25/2019	Checked in summary file
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	BUZ(2)		4.05		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	BUZ(3)		11.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	BUZ(4)		11.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
	BUZ(5)		10.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/25/2019	Checked in summary file
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	ALPHALU(2)		0.1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	ALPHALU(3)		0.1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	ALPHALU(4)		0.1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	ALPHALU(5)		0.1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file, not used
Fraction of water from surface body for human consumption	FSWD	--	0	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file, not used
Fraction of water from well for human consumption	FWWD	--	1	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file, not used
Number of household individuals consuming and using water	NDWI	--	4	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/29/2019	Checked in model
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/29/2019	Checked in model
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from well for beef cattle	FWWLV(1)	--	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Number of cattlefor beef cattle	NLWI(1)	--	2		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/29/2019	Checked in model
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from well for dairy cows	FWWLV(2)	--	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/29/2019	Checked in model
Fruit, grain, non-leafy vegetables					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	2199.6		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Area of Plot for leafy vegetables		m^2	2199.6		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Area of Plot for pasture and silage		m^2	2199.6		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Area of Plot for livestock feed grain		m^2	2199.6		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Area of Plot for offsite dwelling site		m^2	998.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Well pumping rate needed to support specified water use		m^3/yr	0.9	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Surface area of water in surface water body:		m^2	500	Calculated	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file, not used
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file, not used
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file, not used
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Leafy vegetables consumption	DVI(2)	kg/yr	17.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Meat consumption	DMI(1)	kg/yr	91.9		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Milk consumption	DMI(2)	L/yr	110		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Drinking water intake from affected area		--	1	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/29/2019	Checked in model
Fish consumption from affected area	FFISH(1)	--	1.0	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Other aquatic food consumption from affected area	FFISH(2)	--	0.5	Inactive	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Meat consumption from affected area	FMEMI(1)	--	0.25		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Milk consumption from affected area	FMEMI(2)	--	0.5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Root depth of pasture and silage	DROOT(3)	m	0.90		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Duration of growing season of grain	GROWTIME(4)	yr	0.17		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Root depth of grain	DROOT(4)	m	1.20		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.7		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Duration of growing season of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Root depth of fruit, grain, and nonleafy	DROOT(1)	m	1.20		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.5		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Root depth of leafy vegetables	DROOT(2)	m	0.90		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Inhalation and External Gamma Data					-					

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Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Mass loading for inhalation	MLFD	g/m^3	0.001		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
External Radiation Shape and Area Factors					-					
Dwelling location	-		Onsite		Ryan Hupfer	J. Davis	10/31/2019	O.Warren	10/28/2019	Dweilling is onsite
Scale	-	m	200.000		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Dwelling location coordinate in X-direction	-	m	23		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Dwelling location coordinate in y-direction	-	m	23		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Radius	RAD_SHAPE(1)	m	2.9167	Calculated	Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	RAD_SHAPE(2)		5.8333		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	RAD_SHAPE(3)		8.7500		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	RAD_SHAPE(4)		11.6667		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	RAD_SHAPE(5)		14.5833		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	RAD_SHAPE(6)		17.5000		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	RAD_SHAPE(7)		20.4167		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	RAD_SHAPE(8)		23.3333		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	RAD_SHAPE(9)		26.2500		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	RAD_SHAPE(10)		29.1667		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	RAD_SHAPE(11)		32.0833		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Radius	RAD_SHAPE(12)	m	35.0000		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Fraction (Onsite)	FRACA(1)	--	1.000		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	FRACA(2)		1.000		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	FRACA(3)		1.000		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	FRACA(4)		1.000		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	FRACA(5)		0.980		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	FRACA(6)		0.940		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	FRACA(7)		1.000		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	FRACA(8)		0.970		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	FRACA(9)		0.690		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	FRACA(10)		0.320		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	FRACA(11)		0.140		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
	FRACA(12)		0.017		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW
Outdoor time fraction on primary contamination	FOTD	--	0.1667		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.0		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.04167		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.04167		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.04167		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.04167		Ryan Hupfer	J. Davis	5/9/2019	O.Warren	10/28/2019	Checked in summary file
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file, not used
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Vertical dimension of mixing for vegetation	HMIXV	m	1.0		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/31/2019	Checked in summary file, spot checked 10/31/2019 OW
Fraction of vegetation carbon absorbed from air	CAIR		0.98		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Local water	C12WTR	g/cm3	2.00E-05		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Leafy vegetables	C12PLANT(2)		0.09		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pasture and Silage	C12PLANT(3)		0.09		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Livestock feed grain	C12PLANT(4)		0.40		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Meat	C12MEAT_MILK(1)		0.24		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Milk	C12MEAT_MILK(2)		0.07		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Tritium										
Humidity in air	HUMID	g/m3	8		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/29/2019	Checked in model/summary file
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.31E-03	1.00E+00	1.00E+00	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/29/2019	Checked in summary file
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not Simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by	Checked by	Date	Checked by	Date	Notes
	Waste Zone	Saprolite and Bedrock zones						
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019			Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019			Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019			Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Nd	158	158	**Ryan Hupfer**	JD	11/14/2019	O.Warren	10/31/2019	
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019			Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019			Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	JD	5/9/2019	O.Warren	10/31/2019	
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated

Isotope Name	Chronic Drilling Scenario Concentrations (pCi/g)	Checked by	Date	Checked by	Date	Notes
Ac-227	6.66E-06	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Am-241	1.34E-01	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Am-243	6.76E-03	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Ba-133	3.65E-03	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Be-10	5.76E-08	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
C-14*	1.23E-03	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Ca-41	9.59E-05	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cd-113m	NA					Not simulated, no inventory value
Cf-249	2.48E-09	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cf-250	1.69E-08	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cf-251	4.79E-10	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cf-252	2.98E-10					Not simulated, screened
Cm-243	9.80E-04	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cm-244	2.88E-01	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cm-245	8.72E-05	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cm-246	3.62E-04	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cm-247	2.37E-05	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cm-248	1.27E-06	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Co-60	4.55E-05	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Cs-134	2.41E-11					Not simulated, screened
Cs-135	NA					Not simulated, no inventory value
Cs-137	2.69E+00	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Eu-152	6.54E-02	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Eu-154	1.48E-02	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Eu-155	1.54E-05					Not simulated, screened
Fe-55	2.04E-09					Not simulated, screened
H-3*	1.06E-02	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
I-129*	7.98E-04	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
K-40	7.47E-03	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Kr-85	8.10E-04					Not simulated
Mo-100	9.58E-09					Not simulated
Mo-93	8.83E-04	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Na-22	1.87E-09					Not simulated, screened
Nb-93m	5.31E-04	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Nb-94	3.71E-05	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Ni-59	6.93E-03	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Ni-63	1.53E+00	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Np-237	7.40E-04	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pa-231	5.44E-04	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pb-210	8.39E-03	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pd-107	NA					Not simulated, no inventory value
Pm-146	2.01E-07	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pm-147	5.00E-07					Not simulated, screened
Pu-238	2.14E-01	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pu-239	1.33E-01	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pu-240	1.41E-01	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pu-241	4.64E-01	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pu-242	3.94E-04	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Pu-244	8.39E-06	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Ra-226	1.83E-03	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Ra-228	5.03E-05	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Re-187	3.89E-09	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Sb-125	6.91E-11					Not simulated, screened
Se-79	NA					Not simulated, no inventory value
Sm-151	NA					Not simulated, no inventory value

Isotope Name	Chronic Drilling Scenario Concentrations (pCi/g)	Checked by	Date	Checked by	Date	Notes
Sn-121m	NA					Not simulated, no inventory value
Sn-126	NA					Not simulated, no inventory value
Sr-90	4.38E-01	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Tc-99*	3.56E-03	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Th-228	4.81E-09	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Th-229	1.30E-02	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Th-230	4.37E-03	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Th-232	8.01E-03	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-232	2.32E-02	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-233	9.48E-02	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-234	1.44E+00	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-235	9.04E-02	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-236	2.05E-02	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
U-238	8.69E-01	J. Davis	10/29/2019	O.Warren	10/28/2019	Checked in summary file
Zr-93	NA					Not simulated, no inventory value

* Indicates value IHI soil concentration based on Post-operational soil concentration

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Basic radiation dose limit	BRDL	mrem/yr	500		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Exposure duration	ED	yr	1		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	12/30/2019	Spot check
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	0.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	32.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	12/30/2019	Spot check
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	12/30/2019	Spot check
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Smaller x coordinate of the surface-water body	SWXY(1)	m	-50.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Larger x coordinate of the surface-water body	SWXY(2)	m	50.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	12/30/2019	Spot check
Source					-					
Nuclide concentration	-	pCi/g	varies		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in the Soil Conc sheet
Release to groundwater, leach rate		1/yr	varies	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in the Kd sheet
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in the Kd sheet
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	10000		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Time over which transformation to releasable form occurs	RELDUR	Years	10000		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Release Mechanism	RELOPT		First Order Rate Controlled, 0		Ryan Hupfer	J. Davis	10/29/2019	O. Warren	10/25/2019	Checked in summary file
Initial Leach Rate	RLEACH	1/year	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Listed as "ALEACH" in summary document
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	varies		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in the Kd sheet
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer	J. Davis	10/31/2019	O. Warren	10/29/2019	Checked in model
Distribution Coefficients					-					
Contaminated zone	DCACTC	cm^3/g	varies		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in the Kd sheet

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Unsaturated zone	DCACTU	cm^3/g	varies		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in the Kd sheet
Saturated zone	DCACTS	cm^3/g	varies		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in the Kd sheet
Sediment in surface water body	DCACTSWB	cm^3/g	0		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in the Kd sheet
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in the Kd sheet
Leafy vegetable fields	DCACTV2	cm^3/g	varies		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in the Kd sheet
Pasture, silage growing areas	DCACTL1	cm^3/g	varies		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in the Kd sheet
Livestock feed grain fields	DCACTL2	cm^3/g	varies		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in the Kd sheet
Offsite dwelling site	DCACTDWE	cm^3/g	varies		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in the Kd sheet
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Dose Conversion and Slope Factors					-					
External exposure library		(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Internal exposure dose library		mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Slope Factor (Risk) Library		(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Transfer Factors					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/(pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in Transfer Factors sheet
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/(pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in Transfer Factors sheet
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in Transfer Factors sheet
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in Transfer Factors sheet
Meat transfer factor	I_M(,1)	(pCi/kg)/(pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in Transfer Factors sheet
Milk transfer factor	I_M(,2)	(pCi/L)/(pCi/d)	PNNL 2003 Milk		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in Transfer Factors sheet
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/(pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in Transfer Factors sheet
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/(pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in Transfer Factors sheet
Reporting Times					-					
Times at which output is reported	T()	yr	1, 100, 300, 500, 800, 1000, 1100, 2000, 10000		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	12/30/2019	Spot check
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	12/30/2019	Spot check
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	0.000001		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Wind speed		m/s	3.4342	Calculated	Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Primary Contamination					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Area of primary contamination		m^2	95,900	Calculated	Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer	J. Davis	12/17/19	O. Warren	10/22/2019	Checked in summary file
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	12/30/2019	Spot check
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Rainfall Erosion Index	RAINEROS	--	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	12/30/2019	Spot check
Erosion rate of clean cover		m/yr	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	12/30/2019	Spot check
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	12/30/2019	Spot check
Depth of primary contamination below water table		--	0.000	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in model, inactive
Clean Cover					-					
Thickness of clean cover	COVER0	m	0.9144		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Erosion rate of clean cover		m/yr	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	12/30/2019	Spot check
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field		m2	1024		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.00		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.625		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMDF(1)	--	0.3		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	12/30/2019	Spot check
Erosion rate for fruit, grain, and nonleafy vegetable field		m/yr	0.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in file summary
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Leafy Vegetable Field					-					
Area for leafy vegetable field		m^2	1024		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	12/30/2019	Spot check
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.00		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.625		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Volumetric water content for leafy vegetable field	TMDF(2)	--	0.3		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Listed as TMOF(2)
Erosion rate for leafy vegetable field		m/yr	0.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					

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Area for pasture and silage field		m^2	10000		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	12/30/2019	Spot check
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file, not used
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.00		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.625		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Volumetric water content for pasture and silage field	TMDF(3)	--	0.3		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Listed as TMOF(3)
Erosion rate for pasture and silage field		m/yr	0.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Grain Field					-					
Area for grain field		m^2	10000		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.00		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Runoff coefficient for grain field	RUNOF(4)	--	0.625		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Volumetric water content for grain field	TMDF(4)	--	0.3		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Listed as TMOF(4)
Erosion rate		m/yr	0.0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	12/30/2019	Spot check
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site		m^2	1024		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.625		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Volumetric water content for dwelling site	TMDFDWELL	--	0.3		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Listed as TMOFDWELL
Erosion rate for dwelling site		m/yr	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	12/30/2019	Spot check
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Anemometer height	ANH	m	10		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Ambient temperature	TABK	K	285		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Dispersion model coefficients	-	--	Pasquill-Gifford		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Windspeed Terrain	-	--	Rural		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	12/30/2019	Spot check

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Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Dwelling site	DWELLELEV	m	0		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Surface water body	SWELEV	m	0		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer	J. Davis	5/13/2019	O. Warren	10/22/2019	Checked in summary file
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	H(2)		0.305		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
	H(4)		3.048		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	H(5)		4.846		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
	DENSUZ(2)		1.6		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	12/30/2019	Spot check
	DENSUZ(3)		1.5		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	DENSUZ(4)		1.5		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	DENSUZ(5)		1.8		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	TPUS(2)		0.397		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	TPUS(3)		0.427		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	12/30/2019	Spot check
	TPUS(4)		0.419		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
	TPUS(5)		0.353		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
	EPUZ(2)		0.389		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	EPUZ(3)		0.195		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	EPUZ(4)		0.234		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
	EPUZ(5)		0.27		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	12/30/2019	Spot check
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FCUZ(2)		0.032		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FCUZ(3)		0.418		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FCUZ(4)		0.307		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
	FCUZ(5)		0.2471		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	HCUZ(2)		94600		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	HCUZ(3)		0.315		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
	HCUZ(4)		3.15		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	12/30/2019	Spot check
	HCUZ(5)		16.7		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	BUZ(2)		4.05		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
	BUZ(3)		11.4		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	BUZ(4)		11.4		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	BUZ(5)		10.4		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	ALPHALU(2)		0.1		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	ALPHALU(3)		0.1		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	ALPHALU(4)		0.1		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	ALPHALU(5)		0.1		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	12/30/2019	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	12/30/2019	Spot check
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to surface water l	ALPHATSW	m	3.15		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	12/30/2019	Spot check
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Fraction of water from surface body for human consumption	FSWD	--	0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Fraction of water from well for human consumption	FWWD	--	1	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	12/30/2019	Spot check
Number of household individuals consuming and using water	NDWI	--	4	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in model
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file, not used
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Number of cattle for beef cattle	NLWI(1)	--	2	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in model
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	12/30/2019	Spot check
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file, not used
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Number of cows for dairy cows	NLWI(2)	--	2	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in model
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.0		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.0		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	12/30/2019	Spot check
Area of Plot for leafy vegetables		m^2	1024		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.0		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Area of Plot for pasture and silage		m^2	10000		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.0		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	12/30/2019	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Area of Plot for livestock feed grain		m^2	10000		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.0		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Area of Plot for offsite dwelling site		m^2	1024		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	12/30/2019	Spot check
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	0.9	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in model, inactive
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Surface area of water in surface water body:	ALAKE	m^2	500	Calculated	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer	J. Davis	3.16E+02	O. Warren	10/22/2019	Checked in summary file
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	O. Warren	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	O. Warren	Checked in model

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	O. Warren	Checked in model
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	O. Warren	Checked in model
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file, not used
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	12/30/2019	Spot check
Meat consumption	DMI(1)	kg/yr	91.9	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Milk consumption	DMI(2)	L/yr	110	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Soil (incidental) ingestion rate	SOIL	g/yr	36.53	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Drinking water intake from affected area		--	1	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in model, not used
Fish consumption from affected area	FFISH(1)	--	1.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Other aquatic food consumption from affected area	FFISH(2)	--	0.50	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.50	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Leafy vegetables consumption from affected area	FVEG(2)	--	0.50	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Milk consumption from affected area	FMEMI(2)	--	0.50	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	12/30/2019	Spot check
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Livestock Feed Factors					-					

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Pasture and Silage					-					
Wet weight crop yield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliage to food transfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Duration of growing season of grain	GROWTIME(4)	yr	0.17	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Root depth of grain	DROOT(4)	m	1.20	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.7	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file, not used
Duration of growing season of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.5	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file, not used
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file

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Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file, not used
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in model
Scale	-	m	1,000.000		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Dwelling location coordinate in X-direction	-	m	500.00		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Dwelling location coordinate in y-direction	-	m	500.00		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
Radius	RAD_SHAPE(1)	m	19.41667	Calculated	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
	RAD_SHAPE(2)		38.83333		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	RAD_SHAPE(3)		58.25000		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	RAD_SHAPE(4)		77.66666		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	RAD_SHAPE(5)		97.08333		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
	RAD_SHAPE(6)		116.50000		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	RAD_SHAPE(7)		135.91667		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	RAD_SHAPE(8)		155.33333		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	RAD_SHAPE(9)		174.75000		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	RAD_SHAPE(10)		194.16666		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	RAD_SHAPE(11)		213.58333		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Radius	RAD_SHAPE(12)	m	233.00000		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Fraction (Onsite)	FRACA(1)	--	1.000		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FRACA(2)		1.000		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FRACA(3)		1.000		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FRACA(4)		0.980		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FRACA(5)		1.000		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	12/30/2019	Spot check
	FRACA(6)		0.970		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FRACA(7)		0.900		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FRACA(8)		0.650		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FRACA(9)		0.550		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FRACA(10)		0.460		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FRACA(11)		0.200		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
	FRACA(12)		0.036		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	12/30/2019	Spot check
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in model
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in model
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in model
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Outdoor time fraction on primary contamination	FOTD	--	0.0091		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.0		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.0		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.0		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.0		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	12/30/2019	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.0		Ryan Hupfer	J. Davis	5/14/2019	O. Warren	10/22/2019	Checked in summary file
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.0		Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Vertical dimension of mixing	HMIX	m	2	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file, not used
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file, not used
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	12/30/2019	Spot check
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer	J. Davis	12/17/2019	O. Warren	10/22/2019	Checked in summary file
Vertical dimension of mixing for inhalation	HMIX	m	2.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Vertical dimension of mixing for vegetation	HMIXV	m	1.0	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Fraction of vegetation carbon absorbed from air	CAIR		0.98	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Contaminated soil	C12CZ	g/g	0.03	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Local water	C12WTR	g/cm3	2.00E-05	Inactive	Ryan Hupfer	J. Davis	12/16/2019	O. Warren	10/22/2019	Checked in summary file, not used
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Leafy vegetables	C12PLANT(2)		0.09	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Pasture and Silage	C12PLANT(3)		0.09	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Livestock feed grain	C12PLANT(4)		0.40	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Meat	C12MEAT_MILK(1)		0.24	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Milk	C12MEAT_MILK(2)		0.07	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Tritium										
Humidity in air	HUMID	g/m3	8	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used
Vertical dimension of mixing for inhalation	HMIX	m	2	Inactive	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file, not used

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	9.81E-03	5.00E+04	9.10E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in model/summary file
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.75E-03	4.31E-03	1.00E+00	1.00E+00	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not Simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Nd	158	158	**Ryan Hupfer**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	O. Warren	12/30/2019	Checked in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated

Isotope Name	Acute Discovery (As-Disposed) Concentration (pCi/g)	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Am-241	5.90E+01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Am-243	2.97E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Ba-133	1.60E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Be-10	2.53E-05	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
C-14*	5.40E-01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Ca-41	4.21E-02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cd-113m	NA					Not simulated, no inventory value
Cf-249	1.09E-06	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cf-250	7.40E-06	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cf-251	2.10E-07	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cf-252	1.31E-07					Not simulated, screened
Cm-243	4.30E-01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cm-244	1.26E+02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cm-245	3.83E-02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cm-246	1.59E-01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cm-247	1.04E-02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cm-248	5.59E-04	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Co-60	2.00E-02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Cs-134	1.06E-08					Not simulated, screened
Cs-135	NA					Not simulated, no inventory value
Cs-137	1.18E+03	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Eu-152	2.87E+01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Eu-154	6.49E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Eu-155	6.74E-03					Not simulated, screened
Fe-55	8.95E-07					Not simulated, screened
H-3*	4.64E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
I-129*	3.50E-01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
K-40	3.28E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Kr-85	3.55E-01					Not simulated
Mo-100	4.20E-06					Not simulated
Mo-93	3.88E-01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Na-22	8.22E-07					Not simulated, screened
Nb-93m	2.33E-01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Nb-94	1.63E-02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Ni-59	3.04E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Ni-63	6.73E+02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Np-237	3.25E-01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pa-231	2.39E-01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pb-210	3.68E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pd-107	NA					Not simulated, no inventory value
Pm-146	8.84E-05	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pm-147	2.20E-04					Not simulated, screened
Pu-238	9.38E+01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pu-239	5.83E+01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pu-240	6.20E+01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pu-241	2.04E+02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pu-242	1.73E-01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Pu-244	3.68E-03	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Ra-226	8.01E-01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Ra-228	2.21E-02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Re-187	1.71E-06	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Sb-125	3.03E-08					Not simulated, screened
Se-79	NA					Not simulated, no inventory value
Sm-151	NA					Not simulated, no inventory value
Sn-121m	NA					Not simulated, no inventory value
Sn-126	NA					Not simulated, no inventory value
Sr-90	1.92E+02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file

Isotope Name	Acute Discovery (As-Disposed) Concentration (pCi/g)	Checked By	Date	Checked By	Date	Notes
Tc-99*	1.56E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Th-228	2.11E-06	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Th-229	5.71E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Th-230	1.92E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Th-232	3.52E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-232	1.02E+01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-233	4.16E+01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-234	6.30E+02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-235	3.97E+01	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-236	8.98E+00	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
U-238	3.81E+02	J. Davis	10/22/2019	O. Warren	10/22/2019	Checked in summary file
Zr-93	NA					Not simulated, no inventory value

* Indicates value IHI soil concentration based on Post-operational soil concentration

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi						
Radiological units for dose	-	rem and Sv	mrem						
Basic radiation dose limit	BRDL	mrem/yr	500				N. Holt	12/19/2019	Spot check
Exposure duration	ED	yr	1						
Number of unsaturated zone(s)	NS	--	5						
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0						
Default Release Mechanism	-		Version 2 Release Methodology						
Bearing of X axis	NXBEARING	degrees	90						
X dimension of Primary contamination	SOURCEXY(1)	m	250.6				N. Holt	12/19/2019	Spot check
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7						
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		J. Davis	12/17/2019			Spot check
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00						
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0				N. Holt	12/19/2019	Spot check
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0						
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	0.0						
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	32.0						
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0						
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0						
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0						
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0				N. Holt	12/19/2019	Spot check
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0						
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		J. Davis	12/17/2019			Spot check
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0						
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0						
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0						
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0						
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00						
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0				N. Holt	12/19/2019	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0						
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0						
Smaller x coordinate of the surface-water body	SWXY(1)	m	-50.0						
Larger x coordinate of the surface-water body	SWXY(2)	m	50.0						
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		J. Davis	12/17/2019			Spot check
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		J. Davis	12/17/2019			Spot check
Source									
Nuclide concentration	-	pCi/g	varies						
Release to groundwater, leach rate		1/yr	varies	Inactive					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)				N. Holt	12/19/2019	Spot check
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear						
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	10000						
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0				N. Holt	12/19/2019	Spot check
Time over which transformation to releasable form occurs	RELDUR	Years	10000						
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	0						
Release Mechanism	RELOPT		First Order Rate Controlled, 0						
Initial Leach Rate	RLEACH	1/year	0						
Final Leach Rate	RLEACHF	1/year	0						
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	varies				N. Holt	12/19/2019	Checked in Kd sheet
Release to Atmospheric	--		In the same manner as for release to groundwater						
Distribution Coefficients									

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Contaminated zone	DCACTC	cm^3/g	varies				N. Holt	12/19/2019	Checked in Kd sheet
Unsaturated zone	DCACTU	cm^3/g	varies				N. Holt	12/19/2019	Checked in Kd sheet
Saturated zone	DCACTS	cm^3/g	varies				N. Holt	12/19/2019	Checked in Kd sheet
Sediment in surface water body	DCACTSWB	cm^3/g	0		J. Davis	12/17/2019			Spot check
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies				N. Holt	12/19/2019	Checked in Kd sheet
Leafy vegetable fields	DCACTV2	cm^3/g	varies				N. Holt	12/19/2019	Checked in Kd sheet
Pasture, silage growing areas	DCACTL1	cm^3/g	varies				N. Holt	12/19/2019	Checked in Kd sheet
Livestock feed grain fields	DCACTL2	cm^3/g	varies				N. Holt	12/19/2019	Checked in Kd sheet
Offsite dwelling site	DCACTDWE	cm^3/g	varies				N. Holt	12/19/2019	Checked in Kd sheet
Deposition Velocities									
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		J. Davis	12/17/2019			Spot check
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		J. Davis	12/17/2019			Spot check
Dose Conversion and Slope Factors									
External exposure library		(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Internal exposure dose library		mrem/pCi	DOE STD-1196-2011 (Reference Person)						
Slope Factor (Risk) Library		(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017						
Transfer Factors									
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/(pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)						
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/(pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)						
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)						
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)						
Meat transfer factor	I_M(,1)	(pCi/kg)/(pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg						
Milk transfer factor	I_M(,2)	(pCi/L)/(pCi/d)	PNNL 2003 Milk						
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/(pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)						
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/(pCi/L)	RESRAD default values for all isotopes						
Reporting Times									
Times at which output is reported	T()	yr	1, 100, 300, 500, 800, 1000, 1100, 2000, 10000		J. Davis	12/17/2019			Spot check
Storage Times									
Storage time for surface water	STOR_T(1)	d	1						
Storage time for well water	STOR_T(2)	d	1						
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		J. Davis	12/17/2019			Spot check
Storage time for leafy vegetables	STOR_T(4)	d	1						
Storage time for pasture and silage	STOR_T(5)	d	1						
Storage time for livestock feed grain	STOR_T(6)	d	45				N. Holt	12/19/2019	Spot check
Storage time for meat	STOR_T(7)	d	20						
Storage time for milk	STOR_T(8)	d	1						
Storage time for fish	STOR_T(9)	d	7						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Storage time for crustacea and mollusks	STOR_T(10)	d	7		J. Davis	12/17/2019			Spot check
Physical and Hydrological									
Precipitation	PRECIP	m/yr	0.000001						
Wind speed		m/s	3.4342	Calculated					
Primary Contamination									
Area of primary contamination		m^2	95,900	Calculated					
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9						
Depth of soil mixing layer (m)	DM	m	0.15						
Mass loading of all particulates	MLFD	g/m^3	0.0001				N. Holt	12/19/2019	Spot check
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001						
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive					
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001	Inactive					
Irrigation applied per year (m/yr)	RI	m/yr	0						
Evapotranspiration coefficient	EVAPTR	--	0.568						
Runoff coefficient	RUNOFF	--	0.963						
Rainfall Erosion Index	RAINEROS	--	0						
Slope-length-steepness factor	SLPLENSTPPC	--	0.4						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Cover and management factor	CRPMANGPC	--	0.003						
Support practice factor	CONVPRACPC	--	0.0				N. Holt	12/19/2019	Spot check
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0						
Contaminated Zone									
Thickness of contaminated zone	THICK0	m	17.5						
Total porosity of contaminated zone	TPCZ	--	0.419						
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9						
Erosion rate of clean cover		m/yr	0						
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000						
Field capacity of contaminated zone	FCCZ	--	0.307		J. Davis	12/17/2019			Spot check
Soil b parameter of contaminated zone	BCZ	--	7.75						
Longitudinal Dispersivity	ALPHALCZ	m	1.80						
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99						
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8						
CZ effective porosity	EPCZ	--	0.234						
Depth of primary contamination below water table		--	0.000	Inactive					
Clean Cover									
Thickness of clean cover	COVER0	m	0.9144				N. Holt	12/19/2019	Spot check
Total porosity of clean cover	TPCV	--	0.4	Inactive					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5						
Erosion rate of clean cover		m/yr	0						
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		J. Davis	12/17/2019			Spot check
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive					
Agriculture Area Parameters									
Fruit, Grain, and Non-leafy Vegetables Field									
Area for fruit, grain, and non-leafy vegetables field		m2	1024						
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.00						
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568						
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.625						
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500				N. Holt	12/19/2019	Spot check
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMDF(1)	--	0.3						
Erosion rate for fruit, grain, and nonleafy vegetable field		m/yr	0.0						
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		J. Davis	12/17/2019			Spot check
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		J. Davis	12/17/2019			Spot check
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4						
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003						
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1						
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive					
Leafy Vegetable Field									
Area for leafy vegetable field		m^2	1024						
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.00						
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568				N. Holt	12/19/2019	Spot check
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.625						
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500						
Volumetric water content for leafy vegetable field	TMDF(2)	--	0.3						
Erosion rate for leafy vegetable field		m/yr	0.0						
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		J. Davis	12/17/2019			Spot check
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4						
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003						
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1						
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive			N. Holt	12/19/2019	Spot check
Livestock Feed Growing Area Parameters Pasture									
Silage Field									
Area for pasture and silage field		m^2	10000						
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.00						
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568						
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.625		J. Davis	12/17/2019			Spot check
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15						
Volumetric water content for pasture and silage field	TMDF(3)	--	0.3						
Erosion rate for pasture and silage field		m/yr	0.0						
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50						
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		J. Davis	12/17/2019			Spot check
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4						
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003				N. Holt	12/19/2019	Spot check
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1						
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive					
Grain Field									
Area for grain field		m^2	10000						
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive					
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.00						
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568						
Runoff coefficient for grain field	RUNOF(4)	--	0.625		J. Davis	12/17/2019			Spot check
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Volumetric water content for grain field	TMDF(4)	--	0.3						
Erosion rate		m/yr	0.0						
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50						
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4				N. Holt	12/19/2019	Spot check
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4						
Cover and management factor for grain field	CRPMANG(4)	--	0.003						
Support practice factor for grain field	CONVPRAC(4)	--	1						
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive					
Offsite Dwelling Area Parameters									
Area of offsite dwelling site		m^2	1024						
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0						
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568				N. Holt	12/19/2019	Spot check
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.625						
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15						
Volumetric water content for dwelling site	TMDFDWELL	--	0.3						
Erosion rate for dwelling site		m/yr	0						
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5				N. Holt	12/19/2019	Spot check
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0						
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		J. Davis	12/17/2019			Spot check
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003						
Support practice factor for dwelling site	CONVPRACDWELL	--	1						
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive					
Atmospheric Transport									
Release height	AIRRELHT	m	1						
Release heat flux	HEATFLX	cal/s	0						
Anemometer height	ANH	m	10						
Ambient temperature	TABK	K	285		J. Davis	12/17/2019			Spot check
AM atmospheric mixing height	AMIX	m	400		J. Davis	12/17/2019			Spot check
PM atmospheric mixing height	PMIX	m	1,600						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Dispersion model coefficients	-	--	Pasquill-Gifford						
Windspeed Terrain	-	--	Rural						
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0						
Leafy vegetable plot	AGRIELEV(2)	m	0						
Pasture, silage growing area	AGRIELEV(3)	m	0						
Grain fields	AGRIELEV(4)	m	0						
Dwelling site	DWELLELEV	m	0						
Surface water body	SWELEV	m	0						
Grid spacing for areal integration	ATGRID	m	10						
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)						
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52						
Unsaturated Zone Parameters									
Unsaturated zone thickness	H(1)	m	0.305						
	H(2)		0.305				N. Holt	12/19/2019	Spot check
Unsaturated zone thickness	H(3)	m	0.9144						
	H(4)		3.048						
	H(5)		4.846						
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4				N. Holt	12/19/2019	Spot check
	DENSUZ(2)		1.6						
	DENSUZ(3)		1.5						
	DENSUZ(4)		1.5						
	DENSUZ(5)		1.8						
Unsaturated zone total porosity	TPUZ(1)	--	0.463						
	TPUZ(2)		0.397		J. Davis	12/17/2019			Spot check
	TPUZ(3)		0.427						
	TPUZ(4)		0.419						
	TPUZ(5)		0.353						
Unsaturated zone effective porosity	EPUZ(1)	--	0.294						
	EPUZ(2)		0.389						
	EPUZ(3)		0.195				N. Holt	12/19/2019	Spot check
	EPUZ(4)		0.234						
	EPUZ(5)		0.27						
Unsaturated zone field capacity	FCUZ(1)	--	0.232						
	FCUZ(2)		0.032						
	FCUZ(3)		0.418						
	FCUZ(4)		0.307						
	FCUZ(5)		0.2471						
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		J. Davis	12/17/2019			Spot check
	HCUZ(2)		94600						
	HCUZ(3)		0.315						
	HCUZ(4)		3.15						
	HCUZ(5)		16.7						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Unsaturated zone soil b parameter	BUZ(1)	--	5.4						
	BUZ(2)		4.05						
	BUZ(3)		11.4						
	BUZ(4)		11.4						
	BUZ(5)		10.4						
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1						
	ALPHALU(2)		0.1						
	ALPHALU(3)		0.1						
	ALPHALU(4)		0.1						
	ALPHALU(5)		0.1						
Saturated Zone Hydrological Data									
Thickness of saturated zone	DPTHAQ	m	60.96				N. Holt	12/19/2019	Spot check
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1						
Saturated zone total porosity	TPSZ	--	0.24						
Saturated zone effective porosity	EPSZ	--	0.20						
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		J. Davis	12/17/2019			Spot check
Saturated zone hydraulic gradient to well	HGW	--	0.054						
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		J. Davis	12/17/2019			Spot check
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1						
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1						
Depth of aquifer contributing to well	DWIBWT	m	40		J. Davis	12/17/2019			Spot check
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036						
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5				N. Holt	12/19/2019	Spot check
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15						
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315						
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		J. Davis	12/17/2019			Spot check
Water Use									
Quantity of water consumed by an individual	DWI	L/yr	730	Inactive					
Fraction of water from surface body for human consumption	FSWD	--	0	Inactive					
Fraction of water from well for human consumption	FWWD	--	1	Inactive					
Number of household individuals consuming and using water	NDWI	--	4	Inactive					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225						
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Fraction of water from well for use indoors of dwelling	FWWHH	--	1				N. Holt	12/19/2019	Spot check
Beef Cattle									
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive					
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive	J. Davis	12/17/2019			Spot check
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive					
Number of cattle for beef cattle	NLWI(1)	--	2	Inactive					
Dairy Cows									
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive					
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive					
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive					
Number of cows for dairy cows	NLWI(2)	--	2	Inactive					
Fruit, grain, non-leafy vegetables									
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.0						
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1						
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0				N. Holt	12/19/2019	Spot check
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024						
Leafy Vegetables									
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.0						
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		J. Davis	12/17/2019			Spot check
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0						
Area of Plot for leafy vegetables		m^2	1024						
Pasture and Silage									
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.0				N. Holt	12/19/2019	Spot check
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1						
Fraction of water from well for pasture and silage	FWWIR(3)	--	0						
Area of Plot for pasture and silage		m^2	10000						
Livestock Feed Grain									
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.0						
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1						
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0						
Area of Plot for livestock feed grain		m^2	10000						
Offsite Dwelling Site									
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.0						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1						
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0						
Area of Plot for offsite dwelling site		m^2	1024						
Well pumping rate	UW	m^3/yr	332						
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	0.9	Inactive					
Surface Water Body Parameters									
Sediment delivery ratio	SDR	--	1				N. Holt	12/19/2019	Spot check
Volume of surface water body	VLAKE	m^3	250		J. Davis	12/17/2019			Spot check
Mean residence time of water in surface water body	TLAKE	yr	0.0001						
Surface area of water in surface water body:	ALAKE	m^2	500	Calculated					
Groundwater Transport Parameters									
Distance from Downgradient Edge of Contamination to:									
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100						
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468						
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0				N. Holt	12/19/2019	Spot check
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50						
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50						
Convergence criterion (fractional accuracy desired)	EPS	--	0						
Main sub zones in primary contamination	NPCZ	--	5						
Main sub zones in submerged primary contamination	NSPCZ	--	5						
Main sub zones in saturated zone	NPSS	--	5				N. Holt	12/19/2019	Spot check
Main sub zones in each partially saturated zone	NAQS	--	5						
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes						
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No						
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No						
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6						
Ingestion Rates									
Consumption Rate									
Drinking water intake	DWI	L/yr	730	Inactive	J. Davis	12/17/2019			Spot check
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	J. Davis	12/17/2019			Spot check
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive					
Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive					
Meat consumption	DMI(1)	kg/yr	91.9	Inactive					
Milk consumption	DMI(2)	L/yr	110	Inactive			N. Holt	12/19/2019	Spot check
Soil (incidental) ingestion rate	SOIL	g/yr	36.53	Inactive					
Drinking water intake from affected area		--	1	Inactive					
Fish consumption from affected area	FFISH(1)	--	1.0	Inactive	J. Davis	12/17/2019			Spot check
Other aquatic food consumption from affected area	FFISH(2)	--	0.50	Inactive	J. Davis	12/17/2019			Spot check
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.50	Inactive					
Leafy vegetables consumption from affected area	FVEG(2)	--	0.50	Inactive					
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	J. Davis	12/17/2019			Spot check
Milk consumption from affected area	FMEMI(2)	--	0.50	Inactive					
Livestock Intakes									
Beef Cattle									
Water intake for beef cattle	LWI(1)	L/d	50	Inactive					
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive					
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.0	Inactive					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.0	Inactive					
Dairy Cows									
Water intake for dairy cows	LWI(2)	L/d	160	Inactive			N. Holt	12/19/2019	Spot check
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0	Inactive					
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0	Inactive					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.0	Inactive					
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.0	Inactive					
Livestock Feed Factors									
Pasture and Silage									
Wet weight crop yield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive					
Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08	Inactive					
Foliage to food transfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive					
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive					
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive					
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive					
Grain									
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70	Inactive					
Duration of growing season of grain	GROWTIME(4)	yr	0.17	Inactive					
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1	Inactive					
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0	Inactive					
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive	J. Davis	12/17/2019			Spot check
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive					
Root depth of grain	DROOT(4)	m	1.20	Inactive					
Plant Factors									
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.7	Inactive					
Duration of growing season of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17	Inactive					
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive					
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive					
Leafy Vegetables									
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.5	Inactive					
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive					
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive					
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20	Inactive					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive					
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive			N. Holt	12/19/2019	Spot check
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive					
Inhalation and External Gamma Data									
Inhalation rate	INHALR	m^3/yr	8,400	Inactive					
Mass loading for inhalation	MLFD	g/m^3	0.0001				N. Holt	12/19/2019	Spot check
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive					
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y						
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N						
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4	Inactive					
External gamma shielding (penetration) factor	SHF1	--	0.7		J. Davis	12/17/2019			Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
External Radiation Shape and Area Factors									
Dwelling location	-		Offsite						
Scale	-	m	1,000.000						
Dwelling location coordinate in X-direction	-	m	500.00						
Dwelling location coordinate in y-direction	-	m	500.00						
Radius	RAD_SHAPE(1)	m	19.41667	Calculated					
	RAD_SHAPE(2)		38.83333		J. Davis	12/17/2019			Spot check
	RAD_SHAPE(3)		58.25000						
	RAD_SHAPE(4)		77.66666						
	RAD_SHAPE(5)		97.08333						
	RAD_SHAPE(6)		116.50000						
	RAD_SHAPE(7)		135.91667						
	RAD_SHAPE(8)		155.33333				N. Holt	12/19/2019	Spot check
	RAD_SHAPE(9)		174.75000						
	RAD_SHAPE(10)		194.16666						
	RAD_SHAPE(11)		213.58333						
Radius	RAD_SHAPE(12)	m	233.00000						
Fraction (Onsite)	FRACA(1)	--	1.000						
	FRACA(2)		1.000						
	FRACA(3)		1.000						
	FRACA(4)		0.980				N. Holt	12/19/2019	Spot check
	FRACA(5)		1.000						
	FRACA(6)		0.970						
	FRACA(7)		0.900						
	FRACA(8)		0.650						
	FRACA(9)		0.550		J. Davis	12/17/2019			Spot check
	FRACA(10)		0.460		J. Davis	12/17/2019			Spot check
	FRACA(11)		0.200						
	FRACA(12)		0.036						
Shape of the primary contamination	-	--	Polygonal						
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive					
Occupancy Factors									
Indoor time fraction on primary contamination	FIND	--	0						
Outdoor time fraction on primary contamination	FOTD	--	0.0091				N. Holt	12/19/2019	Spot check
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.0		J. Davis	12/17/2019			Spot check
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.0						
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.0						
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.0						
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.0						
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.0						
Radon									
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Reviewed By	Date	Notes
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive					
Total porosity of floor and foundation	TPFL		0.10	Inactive					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive					
Depth of foundation below ground level	DMFL	m	-1	Inactive					
Vertical dimension of mixing	HMIX	m	2	Inactive					
Building room height	HRM	m	2.50	Inactive					
Building air exchange rate	REXG	/hr	0.50	Inactive					
Building indoor area factor	FAI		0	Inactive					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive					
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive			N. Holt	12/19/2019	Spot check
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive					
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive					
Carbon-14									
Thickness of evasion layer for C-14 in soil	DMC	m	0.3				N. Holt	12/19/2019	Spot check
Vertical dimension of mixing for inhalation	HMIX	m	2.0	Inactive					
Vertical dimension of mixing for vegetation	HMIXV	m	1.0	Inactive					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07						
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10						
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02	Inactive					
Fraction of vegetation carbon absorbed from air	CAIR		0.98	Inactive					
Mass Fractions of Carbon-12									
Atmosphere	C12AIR	g/m3	0.18	Inactive	J. Davis	12/17/2019			Spot check
Contaminated soil	C12CZ	g/g	0.03	Inactive					
Local water	C12WTR	g/cm3	2.00E-05	Inactive					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive			N. Holt	12/19/2019	Spot check
Leafy vegetables	C12PLANT(2)		0.09	Inactive					
Pasture and Silage	C12PLANT(3)		0.09	Inactive					
Livestock feed grain	C12PLANT(4)		0.40	Inactive					
Meat	C12MEAT_MILK(1)		0.24	Inactive					
Milk	C12MEAT_MILK(2)		0.07	Inactive					
Tritium							N. Holt	12/19/2019	Spot check
Humidity in air	HUMID	g/m3	8	Inactive					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8	Inactive					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8	Inactive					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8	Inactive					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8	Inactive					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6	Inactive					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive					
Vertical dimension of mixing for inhalation	HMIX	m	2	Inactive					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer					
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer					
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	9.81E-03	5.00E+04	9.10E+03	Ryan Hupfer					
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer					
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.75E-03	4.31E-03	1.00E+00	1.00E+00	Ryan Hupfer					
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer					
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer					
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer					
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer					
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer					
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer					
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not Simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer					
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer					
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Nd	158	158	**Ryan Hupfer**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/19/2019	Verified in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated

Isotope Name	Acute Discovery (As-Disposed) Concentration (pCi/g)	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03					
Am-241	5.90E+01					
Am-243	2.97E+00					
Ba-133	1.60E+00					
Be-10	2.53E-05					
C-14*	5.40E-01					
Ca-41	4.21E-02					
Cd-113m	NA					Not simulated, no inventory value
Cf-249	1.09E-06					
Cf-250	7.40E-06					
Cf-251	2.10E-07					
Cf-252	1.31E-07					Not simulated, screened
Cm-243	4.30E-01					
Cm-244	1.26E+02					
Cm-245	3.83E-02					
Cm-246	1.59E-01					
Cm-247	1.04E-02					
Cm-248	5.59E-04					
Co-60	2.00E-02					
Cs-134	1.06E-08					Not simulated, screened
Cs-135	NA					Not simulated, no inventory value
Cs-137	1.18E+03					
Eu-152	2.87E+01					
Eu-154	6.49E+00					
Eu-155	6.74E-03					Not simulated, screened
Fe-55	8.95E-07					Not simulated, screened
H-3*	4.64E+00					
I-129*	3.50E-01					
K-40	3.28E+00					
Kr-85	3.55E-01					Not simulated
Mo-100	4.20E-06					Not simulated
Mo-93	3.88E-01					
Na-22	8.22E-07					Not simulated, screened
Nb-93m	2.33E-01					
Nb-94	1.63E-02					
Ni-59	3.04E+00					
Ni-63	6.73E+02					
Np-237	3.25E-01					
Pa-231	2.39E-01					
Pb-210	3.68E+00					
Pd-107	NA					Not simulated, no inventory value
Pm-146	8.84E-05					
Pm-147	2.20E-04					Not simulated, screened
Pu-238	9.38E+01					
Pu-239	5.83E+01					
Pu-240	6.20E+01					
Pu-241	2.04E+02					
Pu-242	1.73E-01					
Pu-244	3.68E-03					
Ra-226	8.01E-01					
Ra-228	2.21E-02					
Re-187	1.71E-06					
Sb-125	3.03E-08					Not simulated, screened
Se-79	NA					Not simulated, no inventory value

Isotope Name	Acute Discovery (As-Disposed) Concentration (pCi/g)	Checked By	Date	Checked By	Date	Notes
Sm-151	NA					Not simulated, no inventory value
Sn-121m	NA					Not simulated, no inventory value
Sn-126	NA					Not simulated, no inventory value
Sr-90	1.92E+02					
Tc-99*	1.56E+00					
Th-228	2.11E-06					
Th-229	5.71E+00					
Th-230	1.92E+00					
Th-232	3.52E+00					
U-232	1.02E+01					
U-233	4.16E+01					
U-234	6.30E+02					
U-235	3.97E+01					
U-236	8.98E+00					
U-238	3.81E+02					
Zr-93	NA					Not simulated, no inventory value

* Indicates value IHI soil concentration based on Post-operational soil concentration

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Radiological units for activity	-	Ci, Bq, dps,	pCi		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Basic radiation dose limit	BRDL	mrem/yr	500		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Exposure duration	ED	yr	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/28/2019	Checked in model
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
X dimension of Primary contamination	SOURCEXY(1)	m	14.142		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Y dimension of Primary contamination	SOURCEXY(2)	m	14.142		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	54.8		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	86.04		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-199.9		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-167.9		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	101.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	132.6		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-202.6		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-170.6		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	232.9		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	332.8		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-144.5		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-44.57		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	112.3		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	212.2		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-152.7		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-52.79		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	10.96		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Larger x coordinate of the dwelling site	DWELLXY(2)	m	42.2		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-197.1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-165.1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller x coordinate of the surface-water body	SWXY(1)	m	-50.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Larger x coordinate of the surface-water body	SWXY(2)	m	50.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Source					-					
Nuclide concentration	-	pCi/g	varies		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in Soil Conc sheet
Release to groundwater, leach rate		1/yr	varies	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Not found in summary document/Inactive
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Not found in summary document/Inactive
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Radionuclide bearing material becomes releasable		N/A	Linear		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	1.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Time over which transformation to releasable form occurs	RELDUR	Years	10000		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Release Mechanism	RELOPT		First Order Rate Controlled, 0		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Initial Leach Rate	RLEACH	1/year	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Listed as "ALEACH" in summary document
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	Waste Zone kd		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in KD Sheet
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer	J. Davis	10/31/2019	O.Warren	10/29/2019	Checked in model
Distribution Coefficients					-					
Contaminated zone	DCACTC	cm^3/g	varies		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in KD Sheet
Unsaturated zone	DCACTU	cm^3/g	varies		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in KD Sheet
Saturated zone	DCACTS	cm^3/g	varies		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in KD Sheet
Sediment in surface water body	DCACTSWB	cm^3/g	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Listed as DCNUCSWB
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in KD Sheet

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Leafy vegetable fields	DCACTV2	cm^3/g	varies		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in KD Sheet
Pasture, silage growing areas	DCACTL1	cm^3/g	varies		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in KD Sheet
Livestock feed grain fields	DCACTL2	cm^3/g	varies		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in KD Sheet
Offsite dwelling site	DCACTDWE	cm^3/g	varies		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in KD Sheet
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Dose Conversion and Slope Factors					-					
External exposure library		(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Internal exposure dose library		mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Slope Factor (Risk) Library		(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg) / (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)	Changed on 10/16/19	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in Transfer Factors
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg) / (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in Transfer Factors
Pasture and silage transfer factor	RTF(,3)	(pCi/kg) / (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in Transfer Factors
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg) / (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in Transfer Factors
Meat transfer factor	I_M(,1)	(pCi/kg) / (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in Transfer Factors

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Milk transfer factor	I_M(,2)	(pCi/L)/(pCi/d)	PNNL 2003 Milk		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in Transfer Factors
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/(pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in Transfer Factors
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/(pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in Transfer Factors
Reporting Times					-					
Times at which output is reported	T()	yr	1, 100, 300, 500, 800, 1000, 1100, 2000, 10000		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	0.000001		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Wind speed		m/s	3.4342	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Primary Contamination					-					
Area of primary contamination		m^2	200	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Length of contamination parallel to aquifer flow	LCZPAQ	m	14.142		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Depth of soil mixing layer (m)	DM	m	0.0605		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Mass loading of all particulates	MLFD	g/m^3	0.001		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Rainfall Erosion Index	RAINEROS	--	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	0.0605		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Erosion rate of clean cover		m/yr	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Longitudinal Dispersivity	ALPHALCZ	m	0.006050		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Depth of primary contamination below water table		--	0.000		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Listed as SUBMERGEDDEPTH
Clean Cover					-					
Thickness of clean cover	COVER0	m	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file

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Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Erosion rate of clean cover		m/yr	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field		m2	999.68	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.00		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.625		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMDF(1)	--	0.3		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Listed as TMOF(1)
Erosion rate for fruit, grain, and nonleafy vegetable field		m/yr	0.0	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Leafy Vegetable Field					-					
Area for leafy vegetable field		m^2	998.4	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.00		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file

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Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.625		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Volumetric water content for leafy vegetable field	TMDF(2)	--	0.3		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Listed as TMOF(2)
Erosion rate for leafy vegetable field		m/yr	0.0	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field		m^2	9983	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.00		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.625		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Volumetric water content for pasture and silage field	TMDF(3)	--	0.3		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Listed as TMOF(3)
Erosion rate for pasture and silage field		m/yr	0.0	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Grain Field					-					
Area for grain field		m^2	9981	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.00		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file

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Runoff coefficient for grain field	RUNOF(4)	--	0.625		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Volumetric water content for grain field	TMDF(4)	--	0.3		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Listed as TMOF(4)
Erosion rate		m/yr	0.0	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site		m^2	999.68	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.625		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Volumetric water content for dwelling site	TMDFDWELL	--	0.3		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Listed as TMOFDWELL
Erosion rate for dwelling site	EROSNDWELL	m/yr	0	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5	Changed on 10/16/19	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Anemometer height	ANH	m	10		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file

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Ambient temperature	TABK	K	285		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Dispersion model coefficients	-	--	Pasquill-Gifford		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Windspeed Terrain	-	--	Rural		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Dwelling site	DWELLELEV	m	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Surface water body	SWELEV	m	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	H(2)		0.305		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	H(4)		3.048		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	H(5)		4.846		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	DENSUZ(2)		1.6		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	DENSUZ(3)		1.5		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	DENSUZ(4)		1.5		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	DENSUZ(5)		1.8		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	TPUS(2)		0.397		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	TPUS(3)		0.427		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	TPUS(4)		0.419		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
	TPUS(5)		0.353		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	EPUZ(2)		0.389		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	EPUZ(3)		0.195		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	EPUZ(4)		0.234		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
	EPUZ(5)		0.27		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FCUZ(2)		0.032		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FCUZ(3)		0.418		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FCUZ(4)		0.307		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
	FCUZ(5)		0.2471		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	HCUZ(2)		94600		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	HCUZ(3)		0.315		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	HCUZ(4)		3.15		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
	HCUZ(5)		16.7		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file

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Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	BUZ(2)		4.05		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	BUZ(3)		11.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	BUZ(4)		11.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	BUZ(5)		10.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	ALPHALU(2)		0.1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	ALPHALU(3)		0.1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	ALPHALU(4)		0.1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	ALPHALU(5)		0.1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Fraction of water from surface body for human consumption	FSWD	--	0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Fraction of water from well for human consumption	FWWD	--	1	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Number of household individuals consuming and using water	NDWI	--	4	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Number of cattle for beef cattle	NLWI(1)	--	2	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model, inactive
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Number of cows for dairy cows	NLWI(2)	--	2	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model, inactive
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	999.68		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Area of Plot for leafy vegetables		m^2	998.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Area of Plot for pasture and silage		m^2	9983		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Area of Plot for livestock feed grain		m^2	9981		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Area of Plot for offsite dwelling site		m^2	999.68		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	0.9	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Surface area of water in surface water body:	ALAKE	m^2	500		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Meat consumption	DMI(1)	kg/yr	91.9	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Milk consumption	DMI(2)	L/yr	110	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Drinking water intake from affected area		--	1	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model

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Fish consumption from affected area	FFISH(1)	--	1.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Other aquatic food consumption from affected area	FFISH(2)	--	0.50	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.50	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Leafy vegetables consumption from affected area	FVEG(2)	--	0.50	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Milk consumption from affected area	FMEMI(2)	--	0.50	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Grain intake for dairy cows	LFI(2,2)	kg/d	11	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight crop yield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliage to food transfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Grain					-				10/24/2019	Checked in summary file, not used
Wet weight cropyield of grain	YIELD(4)	kg/m^2	0.70	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Duration of growingseason of grain	GROWTIME(4)	yr	0.17	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliage to foodtransfer coefficient of grain	FOLI F(4)	--	0.1	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliar interceptionfactor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliar interceptionfactor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Root depth of grain	DROOT(4)	m	1.20	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Plant Factors					-				10/24/2019	Checked in summary file, not used
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.7	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Duration of growingseason of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.5	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file, not used
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Mass loading for inhalation	MLFD	g/m^3	0.001		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer	J. Davis	10/31/2019			Dweilling is offsite
Scale	-	m	50		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Dwelling locationcoordinate in X-direction	-	m	7.00		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Dwelling location coordinate in y-direction	-	m	7.00		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Radius	RAD_SHAPE(1)	m	0.917	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	RAD_SHAPE(2)		1.833		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	RAD_SHAPE(3)		2.750		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	RAD_SHAPE(4)		3.667		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	RAD_SHAPE(5)		4.583		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	RAD_SHAPE(6)		5.500		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	RAD_SHAPE(7)		6.417		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	RAD_SHAPE(8)		7.333		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	RAD_SHAPE(9)		8.250		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	RAD_SHAPE(10)		9.167		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	RAD_SHAPE(11)		10.083		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Radius	RAD_SHAPE(12)	m	11.000		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fraction (Onsite)	FRACA(1)	--	1.000	Calculated	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FRACA(2)		1.000		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FRACA(3)		1.000		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FRACA(4)		0.960		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FRACA(5)		0.930		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FRACA(6)		0.920		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FRACA(7)		0.940		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FRACA(8)		0.940		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FRACA(9)		0.520		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FRACA(10)		0.260		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FRACA(11)		0.088		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
	FRACA(12)		0.0055		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/29/2019	Checked in model
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Outdoor time fraction on primary contamination	FOTD	--	0.0034		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.0		Ryan Hupfer	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Vertical dimension of mixing for vegetation	HMIXV	m	1.0	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Fraction of vegetation carbon absorbed from air	CAIR		0.98	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Local water	C12WTR	g/cm3	2.00E-05	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used

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Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Leafy vegetables	C12PLANT(2)		0.09	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Pasture and Silage	C12PLANT(3)		0.09	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Livestock feed grain	C12PLANT(4)		0.40	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Meat	C12MEAT_MILK(1)		0.24	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Milk	C12MEAT_MILK(2)		0.07	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Tritium										
Humidity in air	HUMID	g/m3	8		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file, not used

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/29/2019	Checked in model/summary file
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.75E-03	4.31E-03	1.00E+00	1.00E+00	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not Simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019			Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019			Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019			Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019			Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Nd	158	158	**Ryan Hupfer**	J. Davis	11/14/2019	O.Warren	10/29/2019	Checked in summary file
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019			Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019			Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019			Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019			Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019	O.Warren	10/24/2019	Checked in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/10/2019			Not Simulated

Isotope Name	Acute Drilling Scenario Concentrations (pCi/g)	Checked By	Date	Checked By	Date	Notes
Ac-227	8.30E-04	J. Davis	10/29/2019	O. Warren	10/24/2019	Checked in summary file
Am-241	1.68E+01	J. Davis	10/29/2019	O. Warren	10/24/2019	Checked in summary file
Am-243	8.43E-01	J. Davis	10/29/2019	O. Warren	10/24/2019	Checked in summary file
Ba-133	4.56E-01	J. Davis	10/29/2019	O. Warren	10/24/2019	Checked in summary file
Be-10	7.18E-06	J. Davis	10/29/2019	O. Warren	10/24/2019	Checked in summary file
C-14*	1.53E-01	J. Davis	10/29/2019	O. Warren	10/24/2019	Checked in summary file
Ca-41	1.20E-02	J. Davis	10/29/2019	O. Warren	10/24/2019	Checked in summary file
Cd-113m	NA					Not simulated, no inventory value
Cf-249	3.09E-07	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cf-250	2.10E-06	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cf-251	5.98E-08	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cf-252	3.72E-08					Not simulated, screened
Cm-243	1.22E-01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cm-244	3.59E+01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cm-245	1.09E-02	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cm-246	4.51E-02	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cm-247	2.96E-03	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cm-248	1.59E-04	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Co-60	5.67E-03	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Cs-134	3.00E-09					Not simulated, screened
Cs-135	NA					Not simulated, no inventory value
Cs-137	3.35E+02	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Eu-152	8.15E+00	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Eu-154	1.84E+00	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Eu-155	1.91E-03					Not simulated, screened
Fe-55	2.54E-07					Not simulated, screened
H-3*	1.32E+00	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
I-129*	9.94E-02	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
K-40	9.32E-01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Kr-85	1.01E-01					Not simulated
Mo-100	1.19E-06					Not simulated
Mo-93	1.10E-01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Na-22	2.33E-07					Not simulated, screened
Nb-93m	6.62E-02	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Nb-94	4.63E-03	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Ni-59	8.64E-01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Ni-63	1.91E+02	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Np-237	9.23E-02	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pa-231	6.78E-02	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pb-210	1.05E+00	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pd-107	NA					Not simulated, no inventory value
Pm-146	2.51E-05	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pm-147	6.24E-05					Not simulated, screened
Pu-238	2.67E+01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pu-239	1.66E+01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pu-240	1.76E+01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pu-241	5.78E+01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pu-242	4.91E-02	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Pu-244	1.05E-03	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Ra-226	2.28E-01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Ra-228	6.27E-03	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Re-187	4.85E-07	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Sb-125	8.61E-09					Not simulated, screened
Se-79	NA					Not simulated, no inventory value

Isotope Name	Acute Drilling Scenario Concentrations (pCi/g)	Checked By	Date	Checked By	Date	Notes
Sm-151	NA					Not simulated, no inventory value
Sn-121m	NA					Not simulated, no inventory value
Sn-126	NA					Not simulated, no inventory value
Sr-90	5.46E+01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Tc-99*	4.43E-01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Th-228	6.00E-07	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Th-229	1.62E+00	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Th-230	5.45E-01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Th-232	9.99E-01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-232	2.90E+00	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-233	1.18E+01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-234	1.79E+02	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-235	1.13E+01	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-236	2.55E+00	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
U-238	1.08E+02	J. Davis	10/29/2019	O.Warren	10/24/2019	Checked in summary file
Zr-93	NA					Not simulated, no inventory value

* Indicates value IHI soil concentration based on Post-operational soil concentration

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer					
Basic radiation dose limit	BRDL	mrem/yr	500		Ryan Hupfer	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file (spot check)
Exposure duration	ED	yr	1		Ryan Hupfer					
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer					
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer					
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer					
X dimension of Primary contamination	SOURCEXY(1)	m	14.142		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Y dimension of Primary contamination	SOURCEXY(2)	m	14.142		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	54.8		Ryan Hupfer					
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	86.04		Ryan Hupfer					
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-199.9		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-167.9		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	101.4		Ryan Hupfer					
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	132.6		Ryan Hupfer					
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-202.6		Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-170.6		Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	232.9		Ryan Hupfer					
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	332.8		Ryan Hupfer					
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-144.5		Ryan Hupfer					
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-44.57		Ryan Hupfer					
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	112.3		Ryan Hupfer					
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	212.2		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-152.7		Ryan Hupfer					
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-52.79		Ryan Hupfer					
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	10.96		Ryan Hupfer					
Larger x coordinate of the dwelling site	DWELLXY(2)	m	42.2		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-197.1		Ryan Hupfer					
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-165.1		Ryan Hupfer					
Smaller x coordinate of the surface-water body	SWXY(1)	m	-50.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Larger x coordinate of the surface-water body	SWXY(2)	m	50.0		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Source					-					
Nuclide concentration	-	pCi/g	varies		Ryan Hupfer					
Release to groundwater, leach rate		1/yr	varies	Inactive	Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Radionuclide bearing material becomes releasable		N/A	Linear		Ryan Hupfer					
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	0		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	1.0		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Time over which transformation to releasable form occurs	RELDUR	Years	10000		Ryan Hupfer					
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer					
Release Mechanism	RELOPT		First Order Rate Controlled, 0		Ryan Hupfer					
Initial Leach Rate	RLEACH	1/year	0		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer					
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	Waste Zone kd		Ryan Hupfer					
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer					
Distribution Coefficients					-					
Contaminated zone	DCACTC	cm^3/g	varies		Ryan Hupfer					
Unsaturated zone	DCACTU	cm^3/g	varies		Ryan Hupfer					
Saturated zone	DCACTS	cm^3/g	varies		Ryan Hupfer					
Sediment in surface water body	DCACTSWB	cm^3/g	0		Ryan Hupfer					
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies		Ryan Hupfer					

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Leafy vegetable fields	DCACTV2	cm^3/g	varies		Ryan Hupfer					
Pasture, silage growing areas	DCACTL1	cm^3/g	varies		Ryan Hupfer					
Livestock feed grain fields	DCACTL2	cm^3/g	varies		Ryan Hupfer					
Offsite dwelling site	DCACTDWE	cm^3/g	varies		Ryan Hupfer					
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Dose Conversion and Slope Factors					-					
External exposure library		(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer					
Internal exposure dose library		mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer					
Slope Factor (Risk) Library		(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer					
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/(pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)	Changed on 10/16/19	Ryan Hupfer					
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/(pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg)/(pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					

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Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times					-					
Times at which output is reported	T()	yr	1, 100, 300, 500, 800, 1000, 1100, 2000, 10000		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer					
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer					
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer					
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer					
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer					
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer					
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	0.000001		Ryan Hupfer					
Wind speed		m/s	3.4342	Calculated	Ryan Hupfer					
Primary Contamination					-					
Area of primary contamination		m^2	200	Calculated	Ryan Hupfer					
Length of contamination parallel to aquifer flow	LCZPAQ	m	14.142		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Depth of soil mixing layer (m)	DM	m	0.0605		Ryan Hupfer					
Mass loading of all particulates	MLFD	g/m^3	0.001		Ryan Hupfer					
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer					
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer					
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer					
Rainfall Erosion Index	RAINEROS	--	0		Ryan Hupfer					
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer					
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer					
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer					
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer					
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	0.0605		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer					
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer					
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Longitudinal Dispersivity	ALPHALCZ	m	0.006050		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer					
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer					
Depth of primary contamination below water table		--	0.000		Ryan Hupfer					
Clean Cover					-					
Thickness of clean cover	COVER0	m	0		Ryan Hupfer					

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Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer					
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer					
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field		m2	999.68	Calculated	Ryan Hupfer					
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.00		Ryan Hupfer					
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer					
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.625		Ryan Hupfer					
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer					
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMDF(1)	--	0.3		Ryan Hupfer					
Erosion rate for fruit, grain, and nonleafy vegetable field		m/yr	0.0	Calculated	Ryan Hupfer					
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer					
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Leafy Vegetable Field					-					
Area for leafy vegetable field		m^2	998.4	Calculated	Ryan Hupfer					
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.00		Ryan Hupfer					
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer					

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Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.625		Ryan Hupfer					
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer					
Volumetric water content for leafy vegetable field	TMDF(2)	--	0.3		Ryan Hupfer					
Erosion rate for leafy vegetable field		m/yr	0.0	Calculated	Ryan Hupfer					
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer					
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer					
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer					
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field		m^2	9983	Calculated	Ryan Hupfer					
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.00		Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer					
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.625		Ryan Hupfer					
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer					
Volumetric water content for pasture and silage field	TMDF(3)	--	0.3		Ryan Hupfer					
Erosion rate for pasture and silage field		m/yr	0.0	Calculated	Ryan Hupfer					
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer					
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer					
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer					
Grain Field					-					
Area for grain field		m^2	9981	Calculated	Ryan Hupfer					
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.00		Ryan Hupfer					
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer					

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Runoff coefficient for grain field	RUNOF(4)	--	0.625		Ryan Hupfer					
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Volumetric water content for grain field	TMDF(4)	--	0.3		Ryan Hupfer					
Erosion rate		m/yr	0.0	Calculated	Ryan Hupfer					
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer					
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer					
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer					
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site		m^2	999.68	Calculated	Ryan Hupfer					
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0		Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.625		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0		Ryan Hupfer					
Volumetric water content for dwelling site	TMDFDWELL	--	0.3		Ryan Hupfer					
Erosion rate for dwelling site	EROSNDWELL	m/yr	0	Calculated	Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5	Changed on 10/16/19	Ryan Hupfer					
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer					
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer					
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer					
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer					
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer					
Anemometer height	ANH	m	10		Ryan Hupfer					
Ambient temperature	TABK	K	285		Ryan Hupfer					
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer					
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Dispersion model coefficients	-	--	Pasquill-Gifford		Ryan Hupfer					
Windspeed Terrain	-	--	Rural		Ryan Hupfer					

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Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer					
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer					
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer					
Dwelling site	DWELLELEV	m	0		Ryan Hupfer					
Surface water body	SWELEV	m	0		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer					
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer					
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer					
	H(2)		0.305		Ryan Hupfer					
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
	H(4)		3.048		Ryan Hupfer					
	H(5)		4.846		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
	DENSUZ(2)		1.6		Ryan Hupfer					
	DENSUZ(3)		1.5		Ryan Hupfer					
	DENSUZ(4)		1.5		Ryan Hupfer					
	DENSUZ(5)		1.8		Ryan Hupfer					
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer					
	TPUS(2)		0.397		Ryan Hupfer					
	TPUS(3)		0.427		Ryan Hupfer					
	TPUS(4)		0.419		Ryan Hupfer					
	TPUS(5)		0.353		Ryan Hupfer					
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer					
	EPUZ(2)		0.389		Ryan Hupfer					
	EPUZ(3)		0.195		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
	EPUZ(4)		0.234		Ryan Hupfer					
	EPUZ(5)		0.27		Ryan Hupfer					
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer					
	FCUZ(2)		0.032		Ryan Hupfer					
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer					
	FCUZ(5)		0.2471		Ryan Hupfer					
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer					
	HCUZ(2)		94600		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
	HCUZ(3)		0.315		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
	HCUZ(4)		3.15		Ryan Hupfer					
	HCUZ(5)		16.7		Ryan Hupfer					
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
	BUZ(2)		4.05		Ryan Hupfer					
	BUZ(3)		11.4		Ryan Hupfer					
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer					
	ALPHALU(2)		0.1		Ryan Hupfer					
	ALPHALU(3)		0.1		Ryan Hupfer					
	ALPHALU(4)		0.1		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
	ALPHALU(5)		0.1		Ryan Hupfer					

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Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer					
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer					
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer					
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer					
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer					
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer					
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer					
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer					
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer					
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730	Inactive	Ryan Hupfer					
Fraction of water from surface body for human consumption	FSWD	--	0	Inactive	Ryan Hupfer					
Fraction of water from well for human consumption	FWWD	--	1	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Number of household individuals consuming and using water	NDWI	--	4	Inactive	Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer					
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer					
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer					
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive	Ryan Hupfer					
Number of cattle for beef cattle	NLWI(1)	--	2	Inactive	Ryan Hupfer					
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive	Ryan Hupfer					
Number of cows for dairy cows	NLWI(2)	--	2	Inactive	Ryan Hupfer					
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.0		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer					
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	999.68		Ryan Hupfer					
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.0		Ryan Hupfer					
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer					
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Area of Plot for leafy vegetables		m^2	998.4		Ryan Hupfer					
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.0		Ryan Hupfer					
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer					
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer					
Area of Plot for pasture and silage		m^2	9983		Ryan Hupfer					
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.0		Ryan Hupfer					
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer					
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer					
Area of Plot for livestock feed grain		m^2	9981		Ryan Hupfer					
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.0		Ryan Hupfer					
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer					
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Area of Plot for offsite dwelling site		m^2	999.68		Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	0.9	Calculated	Ryan Hupfer					
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer					
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer					
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer					
Surface area of water in surface water body:	ALAKE	m^2	500		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Groundwater Transport Parameters										

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer					
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer					
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer					
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer					
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer					
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730	Inactive	Ryan Hupfer					
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive	Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive	Ryan Hupfer					
Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive	Ryan Hupfer					
Meat consumption	DMI(1)	kg/yr	91.9	Inactive	Ryan Hupfer					
Milk consumption	DMI(2)	L/yr	110	Inactive	Ryan Hupfer					
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer					
Drinking water intake from affected area		--	1	Inactive	Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.0	Inactive	Ryan Hupfer					
Other aquatic food consumption from affected area	FFISH(2)	--	0.50	Inactive	Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.50	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Leafy vegetables consumption from affected area	FVEG(2)	--	0.50	Inactive	Ryan Hupfer					
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	Ryan Hupfer					
Milk consumption from affected area	FMEMI(2)	--	0.50	Inactive	Ryan Hupfer					
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer					
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive	Ryan Hupfer					
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1	Inactive	Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.0	Inactive	Ryan Hupfer					
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44	Inactive	Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Grain intake for dairy cows	LFI(2,2)	kg/d	11	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.0	Inactive	Ryan Hupfer					
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.0	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight crop yield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive	Ryan Hupfer					
Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08	Inactive	Ryan Hupfer					
Foliage to food transfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive	Ryan Hupfer					
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive	Ryan Hupfer					
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Grain					-					
Wet weight cropyield of grain	YIELD(4)	kg/m^2	0.70	Inactive	Ryan Hupfer					
Duration of growingseason of grain	GROWTIME(4)	yr	0.17	Inactive	Ryan Hupfer					
Foliage to foodtransfer coefficient of grain	FOLI F(4)	--	0.1	Inactive	Ryan Hupfer					
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0	Inactive	Ryan Hupfer					
Foliar interceptionfactor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interceptionfactor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of grain	DROOT(4)	m	1.20	Inactive	Ryan Hupfer					
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.7	Inactive	Ryan Hupfer					
Duration of growing season of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17	Inactive	Ryan Hupfer					
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive	Ryan Hupfer					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.5	Inactive	Ryan Hupfer					
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20	Inactive	Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive	Ryan Hupfer					
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Mass loading for inhalation	MLFD	g/m^3	0.001		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer					
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer					
Scale	-	m	50		Ryan Hupfer					
Dwelling location coordinate in X-direction	-	m	7.00		Ryan Hupfer					
Dwelling location coordinate in y-direction	-	m	7.00		Ryan Hupfer					
Radius	RAD_SHAPE(1)	m	0.917	Calculated	Ryan Hupfer					
	RAD_SHAPE(2)		1.833		Ryan Hupfer					
	RAD_SHAPE(3)		2.750		Ryan Hupfer					
	RAD_SHAPE(4)		3.667		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
	RAD_SHAPE(5)		4.583		Ryan Hupfer					
	RAD_SHAPE(6)		5.500		Ryan Hupfer					
	RAD_SHAPE(7)		6.417		Ryan Hupfer					
	RAD_SHAPE(8)		7.333		Ryan Hupfer					
	RAD_SHAPE(9)		8.250		Ryan Hupfer					
	RAD_SHAPE(10)		9.167		Ryan Hupfer					
	RAD_SHAPE(11)		10.083		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Radius	RAD_SHAPE(12)	m	11.000		Ryan Hupfer					
Fraction (Onsite)	FRACA(1)	--	1.000		Ryan Hupfer					
	FRACA(2)		1.000		Ryan Hupfer					
	FRACA(3)		1.000		Ryan Hupfer					
	FRACA(4)		0.960		Ryan Hupfer					
	FRACA(5)		0.930		Ryan Hupfer					
	FRACA(6)		0.920		Ryan Hupfer					
	FRACA(7)		0.940		Ryan Hupfer					
	FRACA(8)		0.940		Ryan Hupfer					
	FRACA(9)		0.520		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
	FRACA(10)		0.260		Ryan Hupfer					
	FRACA(11)		0.088		Ryan Hupfer					
	FRACA(12)		0.0055		Ryan Hupfer					
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer					
Outdoor time fraction on primary contamination	FOTD	--	0.0034		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed by	Date	Notes
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.0		Ryan Hupfer					
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.0		Ryan Hupfer					
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.0		Ryan Hupfer					
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.0		Ryan Hupfer					
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.0		Ryan Hupfer					
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.0		Ryan Hupfer					
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer					
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer					
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer					
Vertical dimension of mixing for vegetation	HMIXV	m	1.0	Inactive	Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer					
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer	N. Holt	11/18/2019			Checked in summary file (spot check)
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02	Inactive	Ryan Hupfer					
Fraction of vegetation carbon absorbed from air	CAIR		0.98	Inactive	Ryan Hupfer					
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer					
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer			J. Davis	12/30/2019	Checked in summary file (spot check)
Local water	C12WTR	g/cm3	2.00E-05	Inactive	Ryan Hupfer					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive	Ryan Hupfer					
Leafy vegetables	C12PLANT(2)		0.09	Inactive	Ryan Hupfer					
Pasture and Silage	C12PLANT(3)		0.09	Inactive	Ryan Hupfer					
Livestock feed grain	C12PLANT(4)		0.40	Inactive	Ryan Hupfer					
Meat	C12MEAT_MILK(1)		0.24	Inactive	Ryan Hupfer					
Milk	C12MEAT_MILK(2)		0.07	Inactive	Ryan Hupfer					
Tritium										
Humidity in air	HUMID	g/m3	8		Ryan Hupfer					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6	Inactive	Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive	Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer					
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer					
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer					
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer					
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.75E-03	4.31E-03	1.00E+00	1.00E+00	Ryan Hupfer					
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer					
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer					
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer					
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer					
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer					
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer					
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not Simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer					
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer					
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019			Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019			Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019			Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019			Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Nd	158	158	**Ryan Hupfer**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019			Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019			Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019			Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019			Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019	J. Davis	12/30/2019	Checked in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	11/18/2019			Not Simulated

Isotope Name	Acute Drilling Scenario Concentrations (pCi/g)	Checked By	Date	Checked By	Date	Notes
Ac-227	8.30E-04					
Am-241	1.68E+01					
Am-243	8.43E-01					
Ba-133	4.56E-01					
Be-10	7.18E-06					
C-14*	1.53E-01					
Ca-41	1.20E-02					
Cd-113m	NA					Not simulated, no inventory value
Cf-249	3.09E-07					
Cf-250	2.10E-06					
Cf-251	5.98E-08					
Cf-252	3.72E-08					Not simulated, screened
Cm-243	1.22E-01					
Cm-244	3.59E+01					
Cm-245	1.09E-02					
Cm-246	4.51E-02					
Cm-247	2.96E-03					
Cm-248	1.59E-04					
Co-60	5.67E-03					
Cs-134	3.00E-09					Not simulated, screened
Cs-135	NA					Not simulated, no inventory value
Cs-137	3.35E+02					
Eu-152	8.15E+00					
Eu-154	1.84E+00					
Eu-155	1.91E-03					Not simulated, screened
Fe-55	2.54E-07					Not simulated, screened
H-3*	1.32E+00					
I-129*	9.94E-02					
K-40	9.32E-01					
Kr-85	1.01E-01					Not simulated
Mo-100	1.19E-06					Not simulated
Mo-93	1.10E-01					
Na-22	2.33E-07					Not simulated, screened
Nb-93m	6.62E-02					
Nb-94	4.63E-03					
Ni-59	8.64E-01					
Ni-63	1.91E+02					
Np-237	9.23E-02					
Pa-231	6.78E-02					
Pb-210	1.05E+00					
Pd-107	NA					Not simulated, no inventory value
Pm-146	2.51E-05					
Pm-147	6.24E-05					Not simulated, screened
Pu-238	2.67E+01					
Pu-239	1.66E+01					
Pu-240	1.76E+01					
Pu-241	5.78E+01					
Pu-242	4.91E-02					
Pu-244	1.05E-03					
Ra-226	2.28E-01					
Ra-228	6.27E-03					
Re-187	4.85E-07					
Sb-125	8.61E-09					Not simulated, screened
Se-79	NA					Not simulated, no inventory value
Sm-151	NA					Not simulated, no inventory value

Isotope Name	Acute Drilling Scenario Concentrations (pCi/g)	Checked By	Date	Checked By	Date	Notes
Sn-121m	NA					Not simulated, no inventory value
Sn-126	NA					Not simulated, no inventory value
Sr-90	5.46E+01					
Tc-99*	4.43E-01					
Th-228	6.00E-07					
Th-229	1.62E+00					
Th-230	5.45E-01					
Th-232	9.99E-01					
U-232	2.90E+00					
U-233	1.18E+01					
U-234	1.79E+02					
U-235	1.13E+01					
U-236	2.55E+00					
U-238	1.08E+02					
Zr-93	NA					Not simulated, no inventory value

* Indicates value IHI soil concentration based on Post-operational soil concentration

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer					
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer					
Exposure duration	ED	yr	30		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer					
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer					
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer			N. Holt	12/20/2019	Spot check
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer					
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer					
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer					
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer					
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer					
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer					
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer					
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer					
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer					
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer					
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer					
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer					
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Source					-					
Nuclide concentration	S1	pCi/g	varies		Ryan Hupfer					
Release to groundwater, leach rate		1/yr	varies		Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer					
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	300		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.75 for C-14, H-3 0 for All Other Nuclides		Ryan Hupfer					
Time over which transformation to releasable form occurs	RELDUR	Years	500 for C-14, H-3 800 for All Other Nulides		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer					
Release Mechanism	RELOPT		Instantaneous Equilibrium Sorption Desorption, 1		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Initial Leach Rate	RLEACH ALEACH	1/year	0		Ryan Hupfer					
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Distribution Coefficient in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Distribution Coefficients					-					
Contaminated zone	DCACTC DCNUCC	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Unsaturated zone	DCACTU(1-5) DCNUCU(1-5)	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Saturated zone	DCACTS DCNUCS	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Sediment in surface water body	DCACTSWB DCNUCSWB	cm^3/g	0		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Fruit, grain, nonleafy fields	DCACTV1 DCNUCOF(1)	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Leafy vegetable fields	DCACTV2 DNUCOF(2)	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Pasture, silage growing areas	DCACTL1 DNUCOF(3)	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Livestock feed grain fields	DCACTL2 DNUCOF(4)	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Offsite dwelling site	DCACTDWE DCNUCDWE	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Dose Conversion and Slope Factors					-					
External exposure library	N/A	(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer					
Internal exposure dose library	N/A	mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer					
Slope Factor (Risk) Library	N/A	(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer					
Transfer Factors					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer					
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times					-					
Times at which output is reported	T()	yr	200; 1,000; 10,000; 20,000; 30,000; 40,000; 50,000; 80,000; 100,000		Ryan Hupfer	J. Davis	12/17/2019	N. Holt	12/20/2019	Spot check
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer					
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer					
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer					
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer					
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer					
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer					
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer					
Wind speed	WIND	m/s	3.4342	Calc	Ryan Hupfer					
Primary Contamination					-					
Area of primary contamination	AREA	m^2	95,900	Calc	Ryan Hupfer					
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer					
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer					
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer					
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer					
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer					
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer					
Rainfall and Runoff Factor	RAINEROS	--	0		Ryan Hupfer					
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer					
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer					
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer					
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer					
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer					
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer			N. Holt	12/20/2019	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer					
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer					
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer					
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer					
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer					
Clean Cover					-					
Thickness of clean cover	COVER0	m	3.353		Ryan Hupfer					
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer					
Erosion rate of clean cover	VCV	m/yr	0	Calc	Ryan Hupfer					
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer					
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer					
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field	AREAO(1)	m2	1024	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0		Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer					
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer					
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer					
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer					
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer					
Leafy Vegetable Field					-					
Area for leafy vegetable field	AREAO(2)	m^2	1024	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0		Ryan Hupfer					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer					
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer					
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer					
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer					
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer					
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field	AREAO(3)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0		Ryan Hupfer					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer					
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer					
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer					
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer					
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer					
Grain Field					-					
Area for grain field	AREAO(4)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0		Ryan Hupfer					
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer					
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer					
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer					
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer					
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer	J. Davis	12/17/2019			Spot check
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site	AREAODWELL	m^2	1024	Calc	Ryan Hupfer					
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer					
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer					
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer					
Volumetric water content for dwelling site	TMOFDWELL	--	0.3		Ryan Hupfer					
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer					
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer					

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Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer					
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer					
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer					
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer					
Anemometer height	ANH	m	10		Ryan Hupfer					
Ambient temperature	TABK	K	285		Ryan Hupfer	J. Davis	12/17/2019			Spot check
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer					
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer					
Dispersion model coefficients	IDISPMOD	--	Pasquill-Gifford		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Windspeed Terrain	IZONE	--	Rural		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer					
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer					
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer					
Dwelling site	DWELLELEV	m	0		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Surface water body	SWELEV	m	0		Ryan Hupfer					
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer					
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer					
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer					
	H(2)		0.305		Ryan Hupfer					
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer					
	H(4)		3.048		Ryan Hupfer					
	H(5)		4.846		Ryan Hupfer					
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer					
	DENSUZ(2)		1.6		Ryan Hupfer					
	DENSUZ(3)		1.5		Ryan Hupfer					
	DENSUZ(4)		1.5		Ryan Hupfer					
	DENSUZ(5)		1.8		Ryan Hupfer					
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer	J. Davis	12/17/2019			Spot check
	TPUZ(2)		0.397		Ryan Hupfer					
	TPUZ(3)		0.427		Ryan Hupfer					
	TPUZ(4)		0.419		Ryan Hupfer			N. Holt	12/20/2019	Spot check
	TPUZ(5)		0.353		Ryan Hupfer					
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer					
	EPUZ(2)		0.389		Ryan Hupfer	J. Davis	12/17/2019			Spot check
	EPUZ(3)		0.195		Ryan Hupfer					
	EPUZ(4)		0.234		Ryan Hupfer			N. Holt	12/20/2019	Spot check
	EPUZ(5)		0.27		Ryan Hupfer					

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Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer	J. Davis	12/17/2019			Spot check
	FCUZ(2)		0.032		Ryan Hupfer	J. Davis	12/17/2019			Spot check
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer			N. Holt	12/20/2019	Spot check
	FCUZ(5)		0.2471		Ryan Hupfer					
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer					
	HCUZ(2)		94600		Ryan Hupfer					
	HCUZ(3)		0.315		Ryan Hupfer					
	HCUZ(4)		3.15		Ryan Hupfer					
	HCUZ(5)		16.7		Ryan Hupfer					
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer					
	BUZ(2)		4.05		Ryan Hupfer	J. Davis	12/17/2019			Spot check
	BUZ(3)		11.4		Ryan Hupfer					
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer					
	ALPHALU(2)		0.1		Ryan Hupfer					
	ALPHALU(3)		0.1		Ryan Hupfer			N. Holt	12/20/2019	Spot check
	ALPHALU(4)		0.1		Ryan Hupfer					
	ALPHALU(5)		0.1		Ryan Hupfer					
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer					
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer					
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer					
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer					
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer					
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer					
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer					
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer					
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer					
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer					
Fraction of water from surface body for human consumption	FSWD	--	0		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Fraction of water from well for human consumption	FWWD	--	1		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer					
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer					
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50		Ryan Hupfer					
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1		Ryan Hupfer					
Fraction of water from well for beef cattle	FWWLV(1)	--	0		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer					
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1		Ryan Hupfer					
Fraction of water from well for dairy cows	FWWLV(2)	--	0		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer					
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer					
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer					
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer					
Area of Plot for leafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer					
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer					
Area of Plot for pasture and silage		m^2	10000	Calc	Ryan Hupfer					
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer					
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Area of Plot for livestock feed grain		m^2	10000	Calc	Ryan Hupfer					
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer					
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer					
Area of Plot for offsite dwelling site		m^2	1024	Calc	Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer					
Well pumping rate needed to support specified water use		m^3/yr	331.645	Calc	Ryan Hupfer					
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer					
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer					
Surface area of water in surface water body:	ALAKE	m^2	500	Calc	Ryan Hupfer	J. Davis	12/17/2019			Spot check
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer					
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer					
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer					
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer					
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer					
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer					
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer					
Fish consumption	DFI(1)	kg/yr	2.43		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Other aquatic food consumption	DFI(2)	kg/yr	0.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0		Ryan Hupfer					
Leafy vegetables consumption	DVI(2)	kg/yr	17.0		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Meat consumption	DMI(1)	kg/yr	91.9		Ryan Hupfer					
Milk consumption	DMI(2)	L/yr	110		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer					
Drinking water intake from affected area		--	1	Calc	Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.0		Ryan Hupfer					
Other aquatic food consumption from affected area	FFISH(2)	--	0.5		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5		Ryan Hupfer					
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5		Ryan Hupfer					
Meat consumption from affected area	FMEMI(1)	--	0.25		Ryan Hupfer					
Milk consumption from affected area	FMEMI(2)	--	0.5		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50		Ryan Hupfer					
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0		Ryan Hupfer					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0		Ryan Hupfer					
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1		Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4		Ryan Hupfer					
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0		Ryan Hupfer					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4		Ryan Hupfer					
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1		Ryan Hupfer					
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1		Ryan Hupfer					
Duration of growingseason of pasture and silage	GROWTIME(3)	yr	0.08		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1		Ryan Hupfer					
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25		Ryan Hupfer					
Root depth of pasture and silage	DROOT(3)	m	0.90		Ryan Hupfer					
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70		Ryan Hupfer					
Duration of growing season of grain	GROWTIME(4)	yr	0.17		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1		Ryan Hupfer					
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25		Ryan Hupfer					
Root depth of grain	DROOT(4)	m	1.20		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70		Ryan Hupfer					
Duration of growingseason of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1		Ryan Hupfer					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25		Ryan Hupfer					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20		Ryan Hupfer					
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50		Ryan Hupfer					
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25		Ryan Hupfer					
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1		Ryan Hupfer					
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25		Ryan Hupfer					
Root depth of leafy vegetables	DROOT(2)	m	0.90		Ryan Hupfer					
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer					
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer					
Scale	-	m	598.375		Ryan Hupfer					
Dwelling location coordinate in X-direction	-	m	210	Calc	Ryan Hupfer					
Dwelling location coordinate in y-direction	-	m	547		Ryan Hupfer					
Radius	RAD_SHAPE(1)	m	43.5833		Ryan Hupfer					
	RAD_SHAPE(2)		87.1667		Ryan Hupfer					
	RAD_SHAPE(3)		130.7500		Ryan Hupfer					
	RAD_SHAPE(4)		174.3333		Ryan Hupfer					
	RAD_SHAPE(5)		217.9167		Ryan Hupfer			N. Holt	12/20/2019	Spot check
	RAD_SHAPE(6)		261.5000		Ryan Hupfer					
	RAD_SHAPE(7)		305.0833		Ryan Hupfer	J. Davis	12/17/2019			Spot check
	RAD_SHAPE(8)		348.6667		Ryan Hupfer					
	RAD_SHAPE(9)		392.2500		Ryan Hupfer					
	RAD_SHAPE(10)		435.8333		Ryan Hupfer					
	RAD_SHAPE(11)		479.4167		Ryan Hupfer					
Radius	RAD_SHAPE(12)	m	523.0000		Ryan Hupfer					
Fraction (Onsite)	FRACA(1)	--	0		Ryan Hupfer					
	FRACA(2)		0		Ryan Hupfer					
	FRACA(3)		0.04		Ryan Hupfer					
	FRACA(4)		0.21		Ryan Hupfer					
	FRACA(5)		0.22		Ryan Hupfer					
	FRACA(6)		0.18		Ryan Hupfer					
	FRACA(7)		0.15		Ryan Hupfer					
	FRACA(8)		0.12		Ryan Hupfer					
	FRACA(9)		0.11		Ryan Hupfer					
	FRACA(10)		0.097		Ryan Hupfer					
	FRACA(11)		0.088		Ryan Hupfer					
	FRACA(12)		0.049		Ryan Hupfer					
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer					
Outdoor time fraction on primary contamination	FOTD	--	0.05		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5		Ryan Hupfer					
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05		Ryan Hupfer					
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1		Ryan Hupfer					
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1		Ryan Hupfer					
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1		Ryan Hupfer					
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer			N. Holt	12/20/2019	Spot check
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer					
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer					
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer					
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	12/17/2019			Spot check
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer					
Vertical dimension of mixing for vegetation	HMIXV	m	1.0		Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer	J. Davis	12/17/2019			Spot check
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer					
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02		Ryan Hupfer	J. Davis	12/17/2019			Spot check
Fraction of vegetation carbon absorbed from air	CAIR		0.98		Ryan Hupfer					
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer					
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer					
Local water	C12WTR	g/cm3	2.00E-05		Ryan Hupfer					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Leafy vegetables	C12PLANT(2)		0.09		Ryan Hupfer					
Pasture and Silage	C12PLANT(3)		0.09		Ryan Hupfer					
Livestock feed grain	C12PLANT(4)		0.40		Ryan Hupfer					
Meat	C12MEAT_MILK(1)		0.24		Ryan Hupfer					
Milk	C12MEAT_MILK(2)		0.07		Ryan Hupfer					
Tritium										
Humidity in air	HUMID	g/m3	8		Ryan Hupfer					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8		Ryan Hupfer					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8		Ryan Hupfer					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8		Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8		Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6		Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer					
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer					
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer					
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer					
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer					
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer					
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer					
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer					
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer					
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer					
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer					
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer					
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer					
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Nd	158	158	**Ryan Hupfer**					Not Simulated
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/17/2019	N. Holt	12/20/2019	Checked in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03	STK					
Am-241	5.90E+01	STK					
Am-243	2.97E+00	STK					
Ba-133	1.60E+00	STK					Not simulated, screened
Be-10	2.53E-05	STK					
C-14	5.40E-01	RH					
Ca-41	4.21E-02	STK					
Cd-113m	NA	STK					Not simulated, screened
Cf-249	1.09E-06	STK					Not simulated, screened
Cf-250	7.40E-06	STK					Not simulated, screened
Cf-251	2.10E-07	STK					Not simulated, screened
Cf-252	1.31E-07	STK					Not simulated, screened
Cl-36		RH					Not simulated, no inventory value
Cm-243	4.30E-01	STK					
Cm-244	1.26E+02	STK					
Cm-245	3.83E-02	STK					
Cm-246	1.59E-01	STK					
Cm-247	1.04E-02	STK					
Cm-248	5.59E-04	STK					
Co-60	2.00E-02	STK					Not simulated, screened
Cs-134	1.06E-08	STK					Not simulated, screened
Cs-135	NA	STK					Not simulated, no inventory value
Cs-137	1.18E+03	STK					Not simlated, screened
Eu-152	2.87E+01	STK					Not simulated
Eu-154	6.49E+00	STK					Not simulated, screened
Eu-155	6.74E-03	STK					Not simulated, screened
Fe-55	8.95E-07	STK					Not simulated, screened
H-3	4.64E+00	RH					
I-129	3.50E-01	RH					
K-40	3.28E+00	STK					
Kr-85	3.55E-01	STK					Not simulated, screened
Mo-100	4.20E-06	STK					Not simulated, screened
Mo-93	3.88E-01	STK					
Na-22	8.22E-07	STK					Not simulated, screened
Nb-93m	2.33E-01	STK					
Nb-94	1.63E-02	STK					
Ni-59	3.04E+00	STK					
Ni-63	6.73E+02	STK					Not simulated, screened
Np-237	3.25E-01	STK					
Pa-231	2.39E-01	STK					
Pb-210	3.68E+00	STK					
Pd-107	NA	STK					Not simulated, no inventory value
Pm-146	8.84E-05	STK					Not simulated, screened
Pm-147	2.20E-04	STK					Not simulated, screened
Pu-238	9.38E+01	STK					
Pu-239	5.83E+01	STK					
Pu-240	6.20E+01	STK					
Pu-241	2.04E+02	STK					
Pu-242	1.73E-01	STK					
Pu-244	3.68E-03	STK					
Ra-226	8.01E-01	STK					
Ra-228	2.21E-02	STK					
Re-187	1.71E-06	STK					Not simulated, screened
Sb-125	3.03E-08	STK					Not simulated, screened

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Se-79	NA	STK					Not simulated, no inventory value
Sm-151	NA	STK					Not simulated, no inventory value
Sn-121m	NA	STK					Not simulated, no inventory value
Sn-126	NA	STK					Not simulated, no inventory value
Sr-90	1.92E+02	STK					
Tc-99	1.56E+00	RH					
Th-228	2.11E-06	STK					
Th-229	5.71E+00	STK					
Th-230	1.92E+00	STK					
Th-232	3.52E+00	STK					
U-232	1.02E+01	STK					
U-233	4.16E+01	STK					
U-234	6.30E+02	STK					
U-235	3.97E+01	STK					
U-236	8.98E+00	STK					
U-238	3.81E+02	STK					
Zr-93	NA	STK					Not simulated, no inventory value

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer					
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer					
Exposure duration	ED	yr	30		Ryan Hupfer					
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer					
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer					
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer					
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer					
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer					
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer					
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer					
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer					
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer					
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer					
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer					
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer					
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer					
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer					
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Source					-					
Nuclide concentration	S1	pCi/g	varies		Ryan Hupfer					
Release to groundwater, leach rate		1/yr	varies		Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer			N. Holt	12/20/2019	Spot check
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	300		Ryan Hupfer					
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.75 for C-14, H-3 0 for All Other Nuclides		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Time over which transformation to releasable form occurs	RELDUR	Years	500 for C-14, H-3 800 for All Other Nulides		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer					
Release Mechanism	RELOPT		Instantaneous Equilibrium Sorption Desorption, 1		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Initial Leach Rate	RLEACH ALEACH	1/year	0		Ryan Hupfer					
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer					
Distribution Coefficient in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer					
Distribution Coefficients					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Contaminated zone	DCACTC DCNUCC	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Unsaturated zone	DCACTU(1-5) DCNUCU(1-5)	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Saturated zone	DCACTS DCNUCS	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Sediment in surface water body	DCACTSWB DCNUCSWB	cm^3/g	0		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Fruit, grain, nonleafy fields	DCACTV1 DCNUCOF(1)	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Leafy vegetable fields	DCACTV2 DNUCOF(2)	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Pasture, silage growing areas	DCACTL1 DNUCOF(3)	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Livestock feed grain fields	DCACTL2 DNUCOF(4)	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Offsite dwelling site	DCACTDWE DCNUCDWE	cm^3/g	varies		Ryan Hupfer			N. Holt	12/20/2019	Checked in Kd sheet
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Dose Conversion and Slope Factors					-					
External exposure library	N/A	(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer					
Internal exposure dose library	N/A	mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer					
Slope Factor (Risk) Library	N/A	(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer					
Transfer Factors					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer					
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times					-					
Times at which output is reported	T()	yr	200; 1,000; 10,000; 20,000; 30,000; 40,000; 50,000; 80,000; 100,000		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer					
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer					
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer					
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer					
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer					
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer					
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Wind speed	WIND	m/s	3.4342	Calc	Ryan Hupfer					
Primary Contamination					-					
Area of primary contamination	AREA	m^2	95,900	Calc	Ryan Hupfer			N. Holt	12/20/2019	Spot check
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer					
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer					
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer					
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer					
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer					
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer					
Rainfall and Runoff Factor	RAINEROS	--	0		Ryan Hupfer					
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer					
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer					
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer					
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer					
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer			N. Holt	12/20/2019	Spot check
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer					
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer					
Clean Cover					-					
Thickness of clean cover	COVER0	m	3.353		Ryan Hupfer					
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Erosion rate of clean cover	VCV	m/yr	0	Calc	Ryan Hupfer					
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer					
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer					
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field	AREAO(1)	m2	1024	Calc	Ryan Hupfer			N. Holt	12/20/2019	Spot check
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0		Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer					
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer					
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer					
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer					
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	J. Davis	12/19/2019			Spot check
Leafy Vegetable Field					-					
Area for leafy vegetable field	AREAO(2)	m^2	1024	Calc	Ryan Hupfer	J. Davis	12/19/2019			Spot check
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0		Ryan Hupfer					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer					
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer					
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3		Ryan Hupfer					
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer					
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer					
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer					
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer	J. Davis	12/19/2019			Spot check
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field	AREAO(3)	m^2	10000	Calc	Ryan Hupfer	J. Davis	12/19/2019			Spot check
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0		Ryan Hupfer					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer					
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer					
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer					
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer					
Grain Field					-					
Area for grain field	AREAO(4)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer					
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer					
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer					
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer					
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer					
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer					
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site	AREAODWELL	m^2	1024	Calc	Ryan Hupfer					
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer					
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer					
Volumetric water content for dwelling site	TMOFDWELL	--	0.3		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer					
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer					
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer					

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Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer					
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer					
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer					
Anemometer height	ANH	m	10		Ryan Hupfer					
Ambient temperature	TABK	K	285		Ryan Hupfer					
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer			N. Holt	12/20/2019	Spot check
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer					
Dispersion model coefficients	IDISPMOD	--	Pasquill-Gifford		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Windspeed Terrain	IZONE	--	Rural		Ryan Hupfer					
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer					
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer					
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer					
Dwelling site	DWELLELEV	m	0		Ryan Hupfer					
Surface water body	SWELEV	m	0		Ryan Hupfer					
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer					
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer					
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer					
	H(2)		0.305		Ryan Hupfer					
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer					
	H(4)		3.048		Ryan Hupfer					
	H(5)		4.846		Ryan Hupfer					
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer					
	DENSUZ(2)		1.6		Ryan Hupfer					
	DENSUZ(3)		1.5		Ryan Hupfer			N. Holt	12/20/2019	Spot check
	DENSUZ(4)		1.5		Ryan Hupfer					
	DENSUZ(5)		1.8		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer					
	TPUZ(2)		0.397		Ryan Hupfer					
	TPUZ(3)		0.427		Ryan Hupfer					
	TPUZ(4)		0.419		Ryan Hupfer					
	TPUZ(5)		0.353		Ryan Hupfer					
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer	J. Davis	12/19/2019			Spot check
	EPUZ(2)		0.389		Ryan Hupfer	J. Davis	12/19/2019			Spot check
	EPUZ(3)		0.195		Ryan Hupfer					
	EPUZ(4)		0.234		Ryan Hupfer					
	EPUZ(5)		0.27		Ryan Hupfer					

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Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer					
	FCUZ(2)		0.032		Ryan Hupfer					
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer	J. Davis	12/19/2019			Spot check
	FCUZ(5)		0.2471		Ryan Hupfer					
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer					
	HCUZ(2)		94600		Ryan Hupfer	J. Davis	12/19/2019			Spot check
	HCUZ(3)		0.315		Ryan Hupfer					
	HCUZ(4)		3.15		Ryan Hupfer					
	HCUZ(5)		16.7		Ryan Hupfer					
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer					
	BUZ(2)		4.05		Ryan Hupfer					
	BUZ(3)		11.4		Ryan Hupfer			N. Holt	12/20/2019	Spot check
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer					
	ALPHALU(2)		0.1		Ryan Hupfer					
	ALPHALU(3)		0.1		Ryan Hupfer					
	ALPHALU(4)		0.1		Ryan Hupfer					
	ALPHALU(5)		0.1		Ryan Hupfer					
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer					
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer					
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer					
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer					
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer					
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer					
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer					
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer			N. Holt	12/20/2019	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer					
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Fraction of water from surface body for human consumption	FSWD	--	0		Ryan Hupfer					
Fraction of water from well for human consumption	FWWD	--	1		Ryan Hupfer					
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer					
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer					
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1		Ryan Hupfer					
Fraction of water from well for beef cattle	FWWLV(1)	--	0		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer					
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1		Ryan Hupfer					
Fraction of water from well for dairy cows	FWWLV(2)	--	0		Ryan Hupfer					
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer					
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer					
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer					
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer					
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer					
Area of Plot for leafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer					
Area of Plot for pasture and silage		m^2	10000	Calc	Ryan Hupfer					
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer					
Area of Plot for livestock feed grain		m^2	10000	Calc	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer					
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer					
Area of Plot for offsite dwelling site		m^2	1024	Calc	Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer					
Well pumping rate needed to support specified water use		m^3/yr	331.645	Calc	Ryan Hupfer					
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer					
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer					
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Surface area of water in surface water body:	ALAKE	m^2	500	Calc	Ryan Hupfer					
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer					
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer					
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer					
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer					
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer					
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer					
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer					
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer					
Fish consumption	DFI(1)	kg/yr	2.43		Ryan Hupfer					
Other aquatic food consumption	DFI(2)	kg/yr	0.0		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0		Ryan Hupfer			N. Holt	12/20/2019	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Leafy vegetables consumption	DVI(2)	kg/yr	17.0		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Meat consumption	DMI(1)	kg/yr	91.9		Ryan Hupfer					
Milk consumption	DMI(2)	L/yr	110		Ryan Hupfer					
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Drinking water intake from affected area		--	1	Calc	Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.0		Ryan Hupfer					
Other aquatic food consumption from affected area	FFISH(2)	--	0.5		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5		Ryan Hupfer					
Meat consumption from affected area	FMEMI(1)	--	0.25		Ryan Hupfer					
Milk consumption from affected area	FMEMI(2)	--	0.5		Ryan Hupfer					
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0		Ryan Hupfer					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0		Ryan Hupfer					
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1		Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0		Ryan Hupfer					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4		Ryan Hupfer					
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1		Ryan Hupfer					
Duration of growingseason of pasture and silage	GROWTIME(3)	yr	0.08		Ryan Hupfer					
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25		Ryan Hupfer					
Root depth of pasture and silage	DROOT(3)	m	0.90		Ryan Hupfer					
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70		Ryan Hupfer					
Duration of growing season of grain	GROWTIME(4)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25		Ryan Hupfer					
Root depth of grain	DROOT(4)	m	1.20		Ryan Hupfer					
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70		Ryan Hupfer					
Duration of growingseason of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1		Ryan Hupfer					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25		Ryan Hupfer					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20		Ryan Hupfer					
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50		Ryan Hupfer					
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25		Ryan Hupfer					
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25		Ryan Hupfer					
Root depth of leafy vegetables	DROOT(2)	m	0.90		Ryan Hupfer					
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer					
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					

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Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer					
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer					
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer					
Scale	-	m	598.375		Ryan Hupfer					
Dwelling location coordinate in X-direction	-	m	210	Calc	Ryan Hupfer					
Dwelling location coordinate in y-direction	-	m	547		Ryan Hupfer					
Radius	RAD_SHAPE(1)	m	43.5833		Ryan Hupfer					
	RAD_SHAPE(2)		87.1667		Ryan Hupfer					
	RAD_SHAPE(3)		130.7500		Ryan Hupfer					
	RAD_SHAPE(4)		174.3333		Ryan Hupfer					
	RAD_SHAPE(5)		217.9167		Ryan Hupfer					
	RAD_SHAPE(6)		261.5000		Ryan Hupfer					
	RAD_SHAPE(7)		305.0833		Ryan Hupfer					
	RAD_SHAPE(8)		348.6667		Ryan Hupfer					
	RAD_SHAPE(9)		392.2500		Ryan Hupfer					
	RAD_SHAPE(10)		435.8333		Ryan Hupfer					
	RAD_SHAPE(11)		479.4167		Ryan Hupfer					
Radius	RAD_SHAPE(12)	m	523.0000		Ryan Hupfer					
Fraction (Onsite)	FRACA(1)	--	0		Ryan Hupfer					
	FRACA(2)		0		Ryan Hupfer					
	FRACA(3)		0.04		Ryan Hupfer					
	FRACA(4)		0.21		Ryan Hupfer					
	FRACA(5)		0.22		Ryan Hupfer					
	FRACA(6)		0.18		Ryan Hupfer					
	FRACA(7)		0.15		Ryan Hupfer					
	FRACA(8)		0.12		Ryan Hupfer					
	FRACA(9)		0.11		Ryan Hupfer					
	FRACA(10)		0.097		Ryan Hupfer			N. Holt	12/20/2019	Spot check
	FRACA(11)		0.088		Ryan Hupfer					
	FRACA(12)		0.049		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer					
Outdoor time fraction on primary contamination	FOTD	--	0.05		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5		Ryan Hupfer	J. Davis	12/19/2019			Spot check
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05		Ryan Hupfer					
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1		Ryan Hupfer					
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1		Ryan Hupfer					
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer					
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer	J. Davis	12/19/2019			Spot check
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer					
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer	J. Davis	12/19/2019			Spot check
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer					
Vertical dimension of mixing for vegetation	HMIXV	m	1.0		Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer					
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer					
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02		Ryan Hupfer					
Fraction of vegetation carbon absorbed from air	CAIR		0.98		Ryan Hupfer					
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer					
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer					
Local water	C12WTR	g/cm3	2.00E-05		Ryan Hupfer					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40		Ryan Hupfer					
Leafy vegetables	C12PLANT(2)		0.09		Ryan Hupfer					
Pasture and Silage	C12PLANT(3)		0.09		Ryan Hupfer			N. Holt	12/20/2019	Spot check
Livestock feed grain	C12PLANT(4)		0.40		Ryan Hupfer					
Meat	C12MEAT_MILK(1)		0.24		Ryan Hupfer					
Milk	C12MEAT_MILK(2)		0.07		Ryan Hupfer					
Tritium										
Humidity in air	HUMID	g/m3	8		Ryan Hupfer					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8		Ryan Hupfer					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8		Ryan Hupfer					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8		Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8		Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6		Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer					
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer					
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer					
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer					
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer					
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer					
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer					
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer					
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer					
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer					
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer					
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer					
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer					
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Nd	158	158	**Ryan Hupfer**					Not Simulated
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	12/19/2019	N. Holt	12/20/2019	Checked in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03	STK					
Am-241	5.90E+01	STK					
Am-243	2.97E+00	STK					
Ba-133	1.60E+00	STK					Not simulated, screened
Be-10	2.53E-05	STK					
C-14	5.40E-01	RH					
Ca-41	4.21E-02	STK					
Cd-113m	NA	STK					Not simulated, screened
Cf-249	1.09E-06	STK					Not simulated, screened
Cf-250	7.40E-06	STK					Not simulated, screened
Cf-251	2.10E-07	STK					Not simulated, screened
Cf-252	1.31E-07	STK					Not simulated, screened
Cl-36		RH					Not simulated, no inventory value
Cm-243	4.30E-01	STK					
Cm-244	1.26E+02	STK					
Cm-245	3.83E-02	STK					
Cm-246	1.59E-01	STK					
Cm-247	1.04E-02	STK					
Cm-248	5.59E-04	STK					
Co-60	2.00E-02	STK					Not simulated, screened
Cs-134	1.06E-08	STK					Not simulated, screened
Cs-135	NA	STK					Not simulated, no inventory value
Cs-137	1.18E+03	STK					Not simlated, screened
Eu-152	2.87E+01	STK					Not simulated
Eu-154	6.49E+00	STK					Not simulated, screened
Eu-155	6.74E-03	STK					Not simulated, screened
Fe-55	8.95E-07	STK					Not simulated, screened
H-3	4.64E+00	RH					
I-129	3.50E-01	RH					
K-40	3.28E+00	STK					
Kr-85	3.55E-01	STK					Not simulated, screened
Mo-100	4.20E-06	STK					Not simulated, screened
Mo-93	3.88E-01	STK					
Na-22	8.22E-07	STK					Not simulated, screened
Nb-93m	2.33E-01	STK					
Nb-94	1.63E-02	STK					
Ni-59	3.04E+00	STK					
Ni-63	6.73E+02	STK					Not simulated, screened
Np-237	3.25E-01	STK					
Pa-231	2.39E-01	STK					
Pb-210	3.68E+00	STK					
Pd-107	NA	STK					Not simulated, no inventory value
Pm-146	8.84E-05	STK					Not simulated, screened
Pm-147	2.20E-04	STK					Not simulated, screened
Pu-238	9.38E+01	STK					
Pu-239	5.83E+01	STK					
Pu-240	6.20E+01	STK					
Pu-241	2.04E+02	STK					
Pu-242	1.73E-01	STK					
Pu-244	3.68E-03	STK					
Ra-226	8.01E-01	STK					
Ra-228	2.21E-02	STK					
Re-187	1.71E-06	STK					Not simulated, screened
Sb-125	3.03E-08	STK					Not simulated, screened
Se-79	NA	STK					Not simulated, no inventory value

Sm-151	NA	STK					Not simulated, no inventory value
Sn-121m	NA	STK					Not simulated, no inventory value
Sn-126	NA	STK					Not simulated, no inventory value
Sr-90	1.92E+02	STK					
Tc-99	1.56E+00	RH					
Th-228	2.11E-06	STK					
Th-229	5.71E+00	STK					
Th-230	1.92E+00	STK					
Th-232	3.52E+00	STK					
U-232	1.02E+01	STK					
U-233	4.16E+01	STK					
U-234	6.30E+02	STK					
U-235	3.97E+01	STK					
U-236	8.98E+00	STK					
U-238	3.81E+02	STK					
Zr-93	NA	STK					Not simulated, no inventory value

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Review	Date	Model Review	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	8/6/2019	Checked in summary file, OW spot check
Exposure duration	ED	yr	30		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Y dimension of Primary contamination	SOURCEXY(2)	m	93.4		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Checked in summary file
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used, JD spot check
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Review	Date	Model Review	Date	Notes
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/18/2019	J. Davis Spot Check
Source					-					
Nuclide concentration	S1	pCi/g	varies		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Soil Conc sheet
Release to groundwater, leach rate		1/yr	varies	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linearly over time		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/18/2019	J. Davis Spot Check
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.000		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Time over which transformation to releasable form occurs	RELDUR	Years	4.850		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.000		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Release Mechanism	RELOPT	--	1			J. Davis	7/19/2019	O.Warren	7/18/2019	Checked in summary file
Initial Leach Rate	RLEACH ALEACH	1/year	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	Equal to Waste Zone Kd		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Kd sheet
Release to Atmospheric	--	--	in the same manner as release to groundwater			J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in model
Distribution Coefficients					-					
Contaminated zone	DCACTC DCNUCC	cm^3/g	varies		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Kd sheet
Unsaturated zone	DCACTU(1-5) DCNUCU(1-5)	cm^3/g	varies		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Kd sheet
Saturated zone	DCACTS DCNUCS	cm^3/g	varies		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Kd sheet
Sediment in surface water body	DCACTSWB DCNUCSWB	cm^3/g	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Kd sheet

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Review	Date	Model Review	Date	Notes
Fruit, grain, nonleafy fields	DCACTV1 DNUCOF(1)	cm^3/g	varies		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Kd sheet
Leafy vegetable fields	DCACTV2 DNUCOF(2)	cm^3/g	varies		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Kd sheet
Pasture, silage growing areas	DCACTL1 DNUCOF(3)	cm^3/g	varies		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Kd sheet
Livestock feed grain fields	DCACTL2 DNUCOF(4)	cm^3/g	varies		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Kd sheet
Offsite dwelling site	DCACTDWE DNUCDWE	cm^3/g	varies		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Kd sheet
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	8/6/2019	Checked in summary file, OW spot check
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/18/2019	J. Davis Spot Check
Dose Conversion and Slope Factors					-					
External exposure library	N/A	N/A	DCFPAK3.02 - DOE STD-5002-2017 (default values available)		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Internal exposure dose library	N/A	N/A	DOE STD-1196-2011 (Reference Person) (default values available)		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Slope factor (Risk) library	N/A	N/A	DCFPAK3.02 Morbidity - DOE STD-5002-2017 (default values available)		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/(pCi/kg)	PNNL 2003, Highest Value of Fruits, Grains, Root Vegetables (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Transfer Factors sheet
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/(pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Transfer Factors sheet
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Transfer Factors sheet

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Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Transfer Factors sheet
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Transfer Factors sheet
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Transfer Factors sheet
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Transfer Factors sheet
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in Transfer Factors sheet
Reporting Times					-					
Times at which output is reported	T()	yr	1, 2, 4, 4.85, 6, 8, 10, 20, 25		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file

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Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Wind speed	WIND	m/s	3.4342	Calculated	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Primary Contamination					-					
Area of primary contamination	AREA	m^2	23,410	Calculated	Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Checked in summary file
Length of contamination parallel to aquifer flow	LCZPAQ	m	97.3		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Checked in summary file
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	8/6/2019	Checked in summary file, OW spot check
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Runoff coefficient	RUNOFF	--	0.029		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Checked in summary file
Rainfall Erosion Index	RAINEROS	--	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	8/6/2019	Checked in summary file, OW spot check
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/18/2019	J. Davis Spot Check

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Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	13.9		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Checked in summary file
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	8/6/2019	Checked in summary file, OW spot check
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Erosion rate of clean cover		m/yr	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Checked in summary file, JD spot check
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Checked in summary file, JD spot check
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
Longitudinal Dispersivity	ALPHALCZ	m	1.39		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	83.6		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Depth of primary contamination below water table		--	0.000		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Clean Cover					-					
Thickness of clean cover	COVER0	m	0.3048		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	8/6/2019	Checked in summary file, OW spot check
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Erosion rate of clean cover	VCV	m/yr	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field	AREAO(1)	m2	1024	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Not used, OW checked in model
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.702	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used

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Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Leafy Vegetable Field					-					
Area for leafy vegetable field	AREAO(2)	m^2	1024	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Not used, OW checked in model
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.702	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field	AREAO(3)	m^2	10000	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Not used, OW checked in model
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used

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Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.702	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used, JD spot check
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Grain Field					-					
Area for grain field	AREAO(4)	m^2	10000	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Not used, OW checked in model
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Runoff coefficient for grain field	RUNOF(4)	--	0.702	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Volumetric water content for grain field	TMOF(4)	--	0.3	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Erosion rate	EROSN(4)	m/yr	0.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Cover and management factor for grain field	CRPMANG(4)	--	0.003	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used, JD spot check
Support practice factor for grain field	CONVPRAC(4)	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Review	Date	Model Review	Date	Notes
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site	AREAODWELL	m^2	1024	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Not used, OW checked in model
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.702	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Volumetric water content for dwelling site	TMOFDWELL	--	0.3	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Erosion rate for dwelling site	EROSNDWELL	m/yr	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Support practice factor for dwelling site	CONVPRACDWELL	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Anemometer height	ANH	m	10		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Ambient temperature	TABK	K	285		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/18/2019	J Davis Spot Check
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Dispersion model coefficients	IDISPMOD	--	Pasquill-Gifford, 1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Windspeed Terrain/Population Zone	IZONE	--	Rural, 1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Leafy vegetable plot	AGRIELEV(2)	m	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used

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Pasture, silage growing area	AGRIELEV(3)	m	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Grain fields	AGRIELEV(4)	m	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Dwelling site	DWELLELEV	m	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Surface water body	SWELEV	m	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	H(2)		0.305		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	H(4)		3.048		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	H(5)		4.846		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Checked in summary file
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	DENSUZ(2)		1.6		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	DENSUZ(3)		1.5		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	DENSUZ(4)		1.5		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	DENSUZ(5)		1.8		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	TPUS(2)		0.397		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	TPUS(3)		0.427		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	TPUS(4)		0.419		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
	TPUS(5)		0.353		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	EPUZ(2)		0.389		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	EPUZ(3)		0.195		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	EPUZ(4)		0.234		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
	EPUZ(5)		0.27		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	FCUZ(2)		0.032		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	FCUZ(3)		0.418		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	FCUZ(4)		0.307		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
	FCUZ(5)		0.2471		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	HCUZ(2)		94600		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	HCUZ(3)		0.6		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Checked in summary file
	HCUZ(4)		3.15		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
	HCUZ(5)		16.7		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file

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Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	8/6/2019	Checked in summary file, OW spot check
	BUZ(2)		4.05		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	BUZ(3)		11.4		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	BUZ(4)		11.4		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	BUZ(5)		10.4		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	ALPHALU(2)		0.1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	ALPHALU(3)		0.1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	ALPHALU(4)		0.1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
	ALPHALU(5)		0.1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Dry bulk density of saturated zone	DENSAQ	g/cm^3	1.8		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Saturated zone total porosity	TPSZ	--	0.35		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Saturated zone effective porosity	EPSZ	--	0.27		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
Saturated zone hydraulic conductivity	HCSZ	m/yr	83.6		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Saturated zone hydraulic gradient to well	HGW	--	0.036		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Checked in summary file
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Depth of aquifer contributing to well	DWIBWT	m	40.00		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Checked in summary file
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	8/6/2019	Checked in summary file, OW spot check
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Checked in summary file, JD spot check
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	8/6/2019	Checked in summary file, OW spot check
Fraction of water from surface body for human consumption	FSWD	--	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Fraction of water from well for human consumption	FWWD	--	1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model

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Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/18/2019	J. Davis Spot Check
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Number of cattle for beef cattle	NLWI(1)	--	2	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Not used, checked in model
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Number of cows for dairy cows	NLWI(2)	--	2	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Not used, checked in model
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1	Inactive	Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/18/2019	J. Davis Spot Check
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Not used, checked in model
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Area of Plot for leafy vegetables		m^2	1024	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Not used, checked in model
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used

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Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fraction of water from well for pasture and silage	FWWIR(3)	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Area of Plot for pasture and silage		m^2	10000	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used, checked in model
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Area of Plot for livestock feed grain		m^2	10000	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Not used, checked in model
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Area of Plot for offsite dwelling site		m^2	1024	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Not used, checked in model
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	8/6/2019	Checked in summary file, OW spot check
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	331.645	Calculated	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Surface area of water in surface water body:	ALAKE	m^2	500	Calculated	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Checked in summary file, JD spot check
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Checked in summary file
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in summary file
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Checked in summary file, JD spot check
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model

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Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	0		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Meat consumption	DMI(1)	kg/yr	91.9	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Milk consumption	DMI(2)	L/yr	110	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Soil (incidental) ingestion rate	SOIL	g/yr	36.53	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Drinking water intake from affected area		--	1		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Fish consumption from affected area	FFISH(1)	--	1.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Other aquatic food consumption from affected area	FFISH(2)	--	0.5	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5	Inactive	Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/18/2019	J. Davis Spot Check
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Milk consumption from affected area	FMEMI(2)	--	0.5	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used, JD spot check
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	41.5	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Grain intake for dairy cows	LFI(2,2)	kg/d	8.5	Inactive	Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/18/2019	J. Davis Spot Check
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used

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Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliage to food transfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Duration of growing season of grain	GROWTIME(4)	yr	0.17	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliage to food transfer coefficient of grain	FOLI F(4)	--	1.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Root depth of grain	DROOT(4)	m	1.20	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Duration of growing season of fruit, grain, and nonleafy vegeta	GROWTIME(1)	yr	0.17	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	18.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Checked in model
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
External gamma shielding (penetration) factor	SHF1	--	0.7	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer					
Scale	-	m	598.375		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
Dwelling location coordinate in X-direction	-	m	270		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Checked in model
Dwelling location coordinate in y-direction	-	m	462		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Checked in model

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Radius	RAD_SHAPE(1)	m	21.66667	Inactive	Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	RAD_SHAPE(2)		43.33333		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	RAD_SHAPE(3)		65.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	RAD_SHAPE(4)		86.6667		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	RAD_SHAPE(5)		108.3333		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	RAD_SHAPE(6)		130.0		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	RAD_SHAPE(7)		151.6667		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	RAD_SHAPE(8)		173.3333		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	RAD_SHAPE(9)		195.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	RAD_SHAPE(10)		216.6667		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	RAD_SHAPE(11)		238.3333		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
Radius	RAD_SHAPE(12)	m	260		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
Fraction (Onsite)	FRACA(1)	--	0.000		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	FRACA(2)		0.000		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	FRACA(3)		0.000		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	FRACA(4)		0.000		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	FRACA(5)		0.000		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	FRACA(6)		0.068		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	FRACA(7)		0.190		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	FRACA(8)		0.230		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	FRACA(9)		0.230		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	FRACA(10)		0.190		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	FRACA(11)		0.065		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
	FRACA(12)		0.015		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/18/2019	Not used
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/19/2019	Checked in model
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used, OW checked in model
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used, OW checked in model
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Outdoor time fraction on primary contamination	FOTD	--	0.05	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1	Inactive	Ryan Hupfer	J. Davis	4/30/2019	O.Warren	7/18/2019	Not used
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/18/2019	J. Davis Spot Check
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used, JD spot check
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Vertical dimension of mixing	HMIX	m	2	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used

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Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Vertical dimension of mixing for inhalation	HMIX	m	2.0	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Vertical dimension of mixing for vegetation	HMIXV	m	1.0	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Fraction of vegetation carbon absorbed from soil	CAIR		0.02	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Fraction of vegetation carbon absorbed from air	CSOIL		0.98	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Contaminated soil	C12CZ	g/g	0.03	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Local water	C12WTR	g/cm3	2.00E-05	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Leafy vegetables	C12PLANT(2)		0.09	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Pasture and Silage	C12PLANT(3)		0.09	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Livestock feed grain	C12PLANT(4)		0.40	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Meat	C12MEAT_MILK(1)		0.24	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Milk	C12MEAT_MILK(2)		0.07	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Tritium										
Humidity in air	HUMID	g/m3	8	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used
Vertical dimension of mixing for inhalation	HMIX	m	2	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/18/2019	Not used

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Notes	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer			Not Simulated	--	--	Not Simulated
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	9.81E-03	5.00E+04	9.10E+03	Ryan Hupfer	J. Davis	7/19/2019	Fish Only	O.Warren	7/18/2019	
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer	J. Davis	7/19/2019		O.Warren	7/18/2019	
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer	J. Davis	7/19/2019		O.Warren	7/18/2019	
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Notes	Checked by	Date	Notes
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer	J. Davis	7/19/2019		O.Warren	7/18/2019	
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer			Not Simulated	--	--	Not Simulated
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer			Not Simulated	--	--	Not Simulated
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer			Not Simulated	--	--	Not Simulated
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer			Not Simulated	--	--	Not Simulated
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer			Not Simulated	--	--	Not Simulated
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer			Not Simulated	--	--	Not Simulated
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer			Not Simulated	--	--	Not Simulated
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer			Not Simulated	--	--	Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by						
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Notes	Checked by	Date	Notes
Ac	20	40	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Am	2000	4100[a]	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Ba	28	55	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Be	400	800	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
C	0	0	Information/Data Transfer Transmittal 001 rev1	J. Davis	4/30/2019	Reverified on 3/11/2020	O.Warren	7/18/2019	
Ca	15	30	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Cd	100	200	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Cf	20	40	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Cl	N/A[c]	N/A[c]	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Cm	20	40	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Co	400	800	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Cs	1500	3000	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Eu	20	40	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Fe	450	890	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Gd	410	820	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
H	0	0	Information/Data Transfer Transmittal 001 rev1	J. Davis	4/30/2019	Reverified on 3/11/2020	O.Warren	7/18/2019	
I	2	4	Information/Data Transfer Transmittal 001 rev1	J. Davis	4/30/2019	Reverified on 3/11/2020	O.Warren	7/18/2019	
K	15	30	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Mo	45	90	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Na	5	10	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Nb	50	100	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Nd	158	158	Ryan Hupfer			Not Simulated	-	-	Not Simulated
Ni	1000	2000	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Np	20	40	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Pa	200	400	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Pb	50	100	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Pd	1000	2000	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Pm	410	820	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Pu	20	40	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Ra	1500	3000	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Re	20	40	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Sb	75	150	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Se	250	500	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Sm	500	1000	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Sn	50	100	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Sr	15	30	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Tc	0.36	0.72	Information/Data Transfer Transmittal 001 rev1	J. Davis	4/30/2019	Reverified on 3/11/2020	O.Warren	7/18/2019	
Th	1500	3000	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
U	25	50	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated
Zr	25	50	Information/Data Transfer Transmittal 001 rev1	--	--	Not Simulated	--	--	Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Notes	Checked By	Date	Notes
Ac-227	2.92E-03	STK			Not Simulated			Not Simulated
Am-241	5.90E+01	STK			Not Simulated			Not Simulated
Am-243	2.97E+00	STK			Not Simulated			Not Simulated
Ba-133	1.60E+00	STK			Not Simulated			Not Simulated
Be-10	2.53E-05	STK			Not Simulated			Not Simulated
C-14	2.88E+00	STK	J. Davis	7/19/2019		O. Warren	7/18/2019	
Ca-41	4.21E-02	STK			Not Simulated			Not Simulated
Cd-113m	NA	STK			Not Simulated			Not Simulated
Cf-249	1.09E-06	STK			Not Simulated			Not Simulated
Cf-250	7.40E-06	STK			Not Simulated			Not Simulated
Cf-251	2.10E-07	STK			Not Simulated			Not Simulated
Cf-252	1.31E-07	STK			Not Simulated			Not Simulated
Cm-243	4.30E-01	STK			Not Simulated			Not Simulated
Cm-244	1.26E+02	STK			Not Simulated			Not Simulated
Cm-245	3.83E-02	STK			Not Simulated			Not Simulated
Cm-246	1.59E-01	STK			Not Simulated			Not Simulated
Cm-247	1.04E-02	STK			Not Simulated			Not Simulated
Cm-248	5.59E-04	STK			Not Simulated			Not Simulated
Co-60	2.00E-02	STK			Not Simulated			Not Simulated
Cs-134	1.06E-08	STK			Not Simulated			Not Simulated
Cs-135	NA	STK			Not Simulated			Not Simulated
Cs-137	1.18E+03	STK			Not Simulated			Not Simulated
Eu-152	2.87E+01	STK			Not Simulated			Not Simulated
Eu-154	6.49E+00	STK			Not Simulated			Not Simulated
Eu-155	6.74E-03	STK			Not Simulated			Not Simulated
Fe-55	8.95E-07	STK			Not Simulated			Not Simulated
H-3	1.12E+01	STK	J. Davis	7/19/2019		O. Warren	7/18/2019	
I-129	4.07E-01	STK	J. Davis	7/19/2019		O. Warren	7/18/2019	
K-40	3.28E+00	STK			Not Simulated			Not Simulated
Kr-85	3.55E-01	STK			Not Simulated			Not Simulated
Mo-100	4.20E-06	STK			Not Simulated			Not Simulated
Mo-93	3.88E-01	STK			Not Simulated			Not Simulated
Na-22	8.22E-07	STK			Not Simulated			Not Simulated
Nb-93m	2.33E-01	STK			Not Simulated			Not Simulated
Nb-94	1.63E-02	STK			Not Simulated			Not Simulated
Ni-59	3.04E+00	STK			Not Simulated			Not Simulated
Ni-63	6.73E+02	STK			Not Simulated			Not Simulated
Np-237	3.25E-01	STK			Not Simulated			Not Simulated
Pa-231	2.39E-01	STK			Not Simulated			Not Simulated
Pb-210	3.68E+00	STK			Not Simulated			Not Simulated
Pd-107	NA	STK			Not Simulated			Not Simulated
Pm-146	8.84E-05	STK			Not Simulated			Not Simulated
Pm-147	2.20E-04	STK			Not Simulated			Not Simulated
Pu-238	9.38E+01	STK			Not Simulated			Not Simulated
Pu-239	5.83E+01	STK			Not Simulated			Not Simulated
Pu-240	6.20E+01	STK			Not Simulated			Not Simulated
Pu-241	2.04E+02	STK			Not Simulated			Not Simulated
Pu-242	1.73E-01	STK			Not Simulated			Not Simulated
Pu-244	3.68E-03	STK			Not Simulated			Not Simulated
Ra-226	8.01E-01	STK			Not Simulated			Not Simulated
Ra-228	2.21E-02	STK			Not Simulated			Not Simulated
Re-187	1.71E-06	STK			Not Simulated			Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Notes	Checked By	Date	Notes
Sb-125	3.03E-08	STK			Not Simulated			Not Simulated
Se-79	NA	STK			Not Simulated			Not Simulated
Sm-151	NA	STK			Not Simulated			Not Simulated
Sn-121m	NA	STK			Not Simulated			Not Simulated
Sn-126	NA	STK			Not Simulated			Not Simulated
Sr-90	1.92E+02	STK			Not Simulated			Not Simulated
Tc-99	2.80E+00	STK	J. Davis	7/19/2019		O.Warren	7/18/2019	
Th-228	2.11E-06	STK			Not Simulated			Not Simulated
Th-229	5.71E+00	STK			Not Simulated			Not Simulated
Th-230	1.92E+00	STK			Not Simulated			Not Simulated
Th-232	3.52E+00	STK			Not Simulated			Not Simulated
U-232	1.02E+01	STK			Not Simulated			Not Simulated
U-233	4.16E+01	STK			Not Simulated			Not Simulated
U-234	6.30E+02	STK			Not Simulated			Not Simulated
U-235	3.97E+01	STK			Not Simulated			Not Simulated
U-236	8.98E+00	STK			Not Simulated			Not Simulated
U-238	3.81E+02	STK			Not Simulated			Not Simulated
Zr-93	NA	STK			Not Simulated			Not Simulated

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer					
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Exposure duration	ED	yr	30		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer					
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer					
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer					
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD
Y dimension of Primary contamination	SOURCEXY(2)	m	103.6		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0	Inactive	Ryan Hupfer					
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00	Inactive	Ryan Hupfer	J. Davis	7/19/2019			Not used, JD spot check
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0	Inactive	Ryan Hupfer					
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0	Inactive	Ryan Hupfer					
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0	Inactive	Ryan Hupfer					
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0	Inactive	Ryan Hupfer	J. Davis	5/1/2019			Not used, JD spot check
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0	Inactive	Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0	Inactive	Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0	Inactive	Ryan Hupfer					
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0	Inactive	Ryan Hupfer					
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0	Inactive	Ryan Hupfer					
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00	Inactive	Ryan Hupfer					
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0	Inactive	Ryan Hupfer	J. Davis	8/9/2019			Not used, JD spot check
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0	Inactive	Ryan Hupfer					
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0	Inactive	Ryan Hupfer					
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0	Inactive	Ryan Hupfer	J. Davis	5/1/2019			Not used, JD spot check
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00	Inactive	Ryan Hupfer					
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0	Inactive	Ryan Hupfer					
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0	Inactive	Ryan Hupfer					
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0	Inactive	Ryan Hupfer					
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD spot check
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer					
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer					
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer					
Source					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Nuclide concentration	-	pCi/g	varies		Ryan Hupfer					
Release to groundwater, leach rate		1/yr	varies	Inactive	Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linearly over time		Ryan Hupfer	J. Davis	5/1/2019	O.Warren	7/19/2019	Checked in summary file, spot check
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	0		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.000		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD
Time over which transformation to releasable form occurs	RELDUR	Years	7.425		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.000		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD
Release Mechanism	RELOPT	--	1							
Initial Leach Rate	RLEACH	1/year	varies		Ryan Hupfer					
Final Leach Rate	RLEACHF	1/year	varies		Ryan Hupfer					
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	Equal to Waste Zone Kd		Ryan Hupfer					
Release to Atmospheric	--	--	in the same manner as release to groundwater							
Distribution Coefficients					-					
Contaminated zone	DCACTC	cm^3/g	varies		Ryan Hupfer					
Unsaturated zone	DCACTU	cm^3/g	varies		Ryan Hupfer					
Saturated zone	DCACTS	cm^3/g	varies		Ryan Hupfer					
Sediment in surface water body	DCACTSWB	cm^3/g	0		Ryan Hupfer					
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies		Ryan Hupfer					
Leafy vegetable fields	DCACTV2	cm^3/g	varies		Ryan Hupfer					
Pasture, silage growing areas	DCACTL1	cm^3/g	varies		Ryan Hupfer					
Livestock feed grain fields	DCACTL2	cm^3/g	varies		Ryan Hupfer					
Offsite dwelling site	DCACTDWE	cm^3/g	varies		Ryan Hupfer					
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer			O. Warren	8/6/2019	Checked in summary file, OW spot check
Dose Conversion and Slope Factors					-					
External exposure library	N/A	N/A	N/A		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Internal exposure dose library	N/A	N/A	N/A		Ryan Hupfer					
Slope factor (Risk) library	N/A	N/A	N/A		Ryan Hupfer					
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/(pCi/kg)	PNNL 2003, Highest Value of Fruits, Grains, Root Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/(pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg)/(pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					
Milk transfer factor	I_M(,2)	(pCi/L)/(pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/(pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/(pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times					-					
Times at which output is reported	T()	yr	1, 2, 4, 6, 7.425, 8, 10, 20, 25		Ryan Hupfer	J. Davis	5/1/2019	O.Warren	7/19/2019	Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer					
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer					
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	J. Davis	7/19/2019			Checked in summary file, JD spot check
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer					
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer					
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD spot check
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer					
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Wind speed		m/s	3.4342	Calculated	Ryan Hupfer					
Primary Contamination					-					
Area of primary contamination		m^2	25,962.2	Calculated	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Length of contamination parallel to aquifer flow	LCZPAQ	m	108		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer					
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer					
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive	Ryan Hupfer					
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001	Inactive	Ryan Hupfer					
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer			O. Warren	8/6/2019	Checked in summary file, OW spot check
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer					
Runoff coefficient	RUNOFF	--	0.029		Ryan Hupfer	J. Davis	5/29/2019			Checked in summary file, JD
Rainfall Erosion Index	RAINEROS	--	0		Ryan Hupfer					
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer					
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer					
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer					
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer					
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	19.2		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer					
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer					
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
Longitudinal Dispersivity	ALPHALCZ	m	1.92		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	83.6		Ryan Hupfer	J. Davis	7/19/2019			Checked in summary file, JD spot check
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Depth of primary contamination below water table		--	0.000		Ryan Hupfer					
Clean Cover					-					
Thickness of clean cover	COVER0	m	0.3048		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Checked in summary file
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer					
Erosion rate of clean cover	VCV	m/yr	0		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer					
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field		m2	1024	Inactive	Ryan Hupfer					
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.10	Inactive	Ryan Hupfer					
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568	Inactive	Ryan Hupfer					
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.702	Inactive	Ryan Hupfer					
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500	Inactive	Ryan Hupfer					
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMDF(1)	--	0.3	Inactive	Ryan Hupfer					
Erosion rate for fruit, grain, and nonleafy vegetable field		m/yr	0.0	Inactive	Ryan Hupfer					
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50	Inactive	Ryan Hupfer					
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4	Inactive	Ryan Hupfer					
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4	Inactive	Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003	Inactive	Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1	Inactive	Ryan Hupfer					
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer					
Leafy Vegetable Field					-					
Area for leafy vegetable field		m^2	1024	Inactive	Ryan Hupfer					
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.10	Inactive	Ryan Hupfer					
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568	Inactive	Ryan Hupfer					
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.702	Inactive	Ryan Hupfer					
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500	Inactive	Ryan Hupfer	J. Davis	7/19/2019			Not used, JD spot check
Volumetric water content for leafy vegetable field	TMDF(2)	--	0.3	Inactive	Ryan Hupfer					
Erosion rate for leafy vegetable field		m/yr	0.0	Inactive	Ryan Hupfer					
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50	Inactive	Ryan Hupfer					
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4	Inactive	Ryan Hupfer					
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4	Inactive	Ryan Hupfer					
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003	Inactive	Ryan Hupfer					
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1	Inactive	Ryan Hupfer					
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer					
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field		m^2	10000	Inactive	Ryan Hupfer					
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.10	Inactive	Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568	Inactive	Ryan Hupfer					
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.702	Inactive	Ryan Hupfer					
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15	Inactive	Ryan Hupfer					
Volumetric water content for pasture and silage field	TMDF(3)	--	0.3	Inactive	Ryan Hupfer					
Erosion rate for pasture and silage field		m/yr	0.0	Inactive	Ryan Hupfer					
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50	Inactive	Ryan Hupfer					
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4	Inactive	Ryan Hupfer					
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4	Inactive	Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003	Inactive	Ryan Hupfer					
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1	Inactive	Ryan Hupfer					
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer					
Grain Field					-					
Area for grain field		m^2	10000	Inactive	Ryan Hupfer					
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.10	Inactive	Ryan Hupfer					
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568	Inactive	Ryan Hupfer					
Runoff coefficient for grain field	RUNOF(4)	--	0.702	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500	Inactive	Ryan Hupfer					
Volumetric water content for grain field	TMDF(4)	--	0.3	Inactive	Ryan Hupfer					
Erosion rate		m/yr	0.0	Inactive	Ryan Hupfer					
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50	Inactive	Ryan Hupfer					
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4	Inactive	Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4	Inactive	Ryan Hupfer					
Cover and management factor for grain field	CRPMANG(4)	--	0.003	Inactive	Ryan Hupfer					
Support practice factor for grain field	CONVPRAC(4)	--	1	Inactive	Ryan Hupfer					
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer					
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site		m^2	1024	Inactive	Ryan Hupfer					
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0	Inactive	Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568	Inactive	Ryan Hupfer					
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.702	Inactive	Ryan Hupfer					
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15	Inactive	Ryan Hupfer					
Volumetric water content for dwelling site	TMDFDWELL	--	0.3	Inactive	Ryan Hupfer					
Erosion rate for dwelling site		m/yr	0	Inactive	Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5	Inactive	Ryan Hupfer					
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0	Inactive	Ryan Hupfer					
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4	Inactive	Ryan Hupfer					
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003	Inactive	Ryan Hupfer					
Support practice factor for dwelling site	CONVPRACDWELL	--	1	Inactive	Ryan Hupfer					
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer	J. Davis	7/19/2019			Checked in summary file, JD spot check
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Anemometer height	ANH	m	10		Ryan Hupfer	J. Davis	8/9/2019			Checked in summary file, JD spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Ambient temperature	TABK	K	285		Ryan Hupfer					
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD spot check
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer					
Dispersion model coefficients	-	--	-		Ryan Hupfer					
Windspeed Terrain	-	--	Rural		Ryan Hupfer					
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0	Inactive	Ryan Hupfer	J. Davis	7/19/2019			Not used, JD spot check
Leafy vegetable plot	AGRIELEV(2)	m	0	Inactive	Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0	Inactive	Ryan Hupfer					
Grain fields	AGRIELEV(4)	m	0	Inactive	Ryan Hupfer					
Dwelling site	DWELLELEV	m	0	Inactive	Ryan Hupfer					
Surface water body	SWELEV	m	0		Ryan Hupfer					
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer					
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer					
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer	J. Davis	7/19/2019			Checked in summary file, JD spot check
	H(2)		0.305		Ryan Hupfer					
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer					
	H(4)		3.048		Ryan Hupfer			O. Warren	8/6/2019	Checked in summary file, OW spot check
	H(5)		4.846		Ryan Hupfer	J. Davis	5/29/2019			Checked in summary file, JD
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer					
	DENSUZ(2)		1.6		Ryan Hupfer					
	DENSUZ(3)		1.5		Ryan Hupfer					
	DENSUZ(4)		1.5		Ryan Hupfer	J. Davis	7/19/2019			Checked in summary file, JD spot check
	DENSUZ(5)		1.8		Ryan Hupfer					
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer					
	TPUZ(2)		0.397		Ryan Hupfer	J. Davis	8/9/2019			Checked in summary file, JD spot check
	TPUZ(3)		0.427		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD spot check
	TPUZ(4)		0.419		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
	TPUZ(5)		0.353		Ryan Hupfer					
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer					
	EPUZ(2)		0.389		Ryan Hupfer					
	EPUZ(3)		0.195		Ryan Hupfer					
	EPUZ(4)		0.234		Ryan Hupfer	J. Davis	8/9/2019	O. Warren	8/6/2019	Checked in summary file
	EPUZ(5)		0.27		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD spot check
	FCUZ(2)		0.032		Ryan Hupfer					
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer	J. Davis	8/9/2019	O. Warren	8/6/2019	Checked in summary file
	FCUZ(5)		0.2471		Ryan Hupfer					
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer					
	HCUZ(2)		94600		Ryan Hupfer					
	HCUZ(3)		0.6		Ryan Hupfer	J. Davis	5/29/2019			Checked in summary file, JD
	HCUZ(4)		3.15		Ryan Hupfer	J. Davis	8/9/2019	O. Warren	8/6/2019	Checked in summary file
	HCUZ(5)		16.7		Ryan Hupfer	J. Davis	8/9/2019	O. Warren	8/6/2019	Checked in summary file
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer					
	BUZ(2)		4.05		Ryan Hupfer					
	BUZ(3)		11.4		Ryan Hupfer					
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer					
	ALPHALU(2)		0.1		Ryan Hupfer					
	ALPHALU(3)		0.1		Ryan Hupfer					
	ALPHALU(4)		0.1		Ryan Hupfer					
	ALPHALU(5)		0.1		Ryan Hupfer					
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer					
Dry bulk density of saturated zone	DENSAQ	g/cm^3	1.8		Ryan Hupfer					
Saturated zone total porosity	TPSZ	--	0.35		Ryan Hupfer					
Saturated zone effective porosity	EPSZ	--	0.27		Ryan Hupfer	J. Davis	8/9/2019	O. Warren	8/6/2019	Checked in summary file
Saturated zone hydraulic conductivity	HCSZ	m/yr	83.6		Ryan Hupfer					
Saturated zone hydraulic gradient to well	HGW	--	0.036		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer					
Depth of aquifer contributing to well	DWIBWT	m	40.00		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer					
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer					
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer					
Fraction of water from surface body for human consumption	FSWD	--	0		Ryan Hupfer			O. Warren	8/6/2019	Checked in summary file, OW spot check
Fraction of water from well for human consumption	FWWD	--	1		Ryan Hupfer					
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer					

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Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer					
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer					
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive	Ryan Hupfer					
Number of cattle for beef cattle	NLWI(1)	--	2	Inactive	Ryan Hupfer					
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer					
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive	Ryan Hupfer	J. Davis	5/1/2019			Not used, JD spot check
Number of cows for dairy cows	NLWI(2)	--	2	Inactive	Ryan Hupfer					
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15	Inactive	Ryan Hupfer					
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0	Inactive	Ryan Hupfer					
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Inactive	Ryan Hupfer					
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	5/1/2019			Not used, JD spot check
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0	Inactive	Ryan Hupfer					
Area of Plot for leafy vegetables		m^2	1024	Inactive	Ryan Hupfer					
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15	Inactive	Ryan Hupfer					
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for pasture and silage	FWWIR(3)	--	0	Inactive	Ryan Hupfer					
Area of Plot for pasture and silage		m^2	10000	Inactive	Ryan Hupfer					
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15	Inactive	Ryan Hupfer					
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0	Inactive	Ryan Hupfer					
Area of Plot for livestock feed grain		m^2	10000	Inactive	Ryan Hupfer					
Offsite Dwelling Site					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015	Inactive	Ryan Hupfer					
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0	Inactive	Ryan Hupfer					
Area of Plot for offsite dwelling site		m^2	1024	Inactive	Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer	J. Davis	7/19/2019			Checked in summary file, JD spot check
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	331.645	Calculated	Ryan Hupfer					
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer	J. Davis	8/9/2019			Checked in summary file, JD spot check
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer					
Surface area of water in surface water body:		m^2	500	Calculated	Ryan Hupfer					
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer					
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer					
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer					
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer					
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer					
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer					
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer			O. Warren	8/6/2019	Checked in summary file, OW spot check
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	0		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	0		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer					
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	Ryan Hupfer					
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive	Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive	Ryan Hupfer					

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Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive	Ryan Hupfer					
Meat consumption	DMI(1)	kg/yr	91.9	Inactive	Ryan Hupfer					
Milk consumption	DMI(2)	L/yr	110	Inactive	Ryan Hupfer					
Soil (incidental) ingestion rate	SOIL	g/yr	36.53	Inactive	Ryan Hupfer					
Drinking water intake from affected area		--	1		Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.0	Inactive	Ryan Hupfer					
Other aquatic food consumption from affected area	FFISH(2)	--	0.5	Inactive	Ryan Hupfer	J. Davis	5/1/2019			Not used, JD spot check
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5	Inactive	Ryan Hupfer					
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5	Inactive	Ryan Hupfer					
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Not used, OW checked in model
Milk consumption from affected area	FMEMI(2)	--	0.5	Inactive	Ryan Hupfer					
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer					
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive	Ryan Hupfer					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive	Ryan Hupfer					
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1	Inactive	Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4	Inactive	Ryan Hupfer					
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	J. Davis	7/19/2019			Not used, JD spot check
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	41.5	Inactive	Ryan Hupfer					
Grain intake for dairy cows	LFI(2,2)	kg/d	8.5	Inactive	Ryan Hupfer					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4	Inactive	Ryan Hupfer					
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1	Inactive	Ryan Hupfer	J. Davis	8/9/2019			Not used, JD Spot Check
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive	Ryan Hupfer	J. Davis	5/1/2019			Not used, JD spot check
Duration of growingseason of pasture and silage	GROWTIME(3)	yr	0.08	Inactive	Ryan Hupfer					
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive	Ryan Hupfer					
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive	Ryan Hupfer					
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive	Ryan Hupfer					
Grain					-					
Wet weight cropyield of grain	YIELD(4)	kg/m^2	0.70	Inactive	Ryan Hupfer					
Duration of growingseason of grain	GROWTIME(4)	yr	0.17	Inactive	Ryan Hupfer					
Foliage to foodtransfer coefficient of grain	FOLI F(4)	--	1.0	Inactive	Ryan Hupfer					
Weatheringremoval constant ofgrain	RWEATHER(4)	1/yr	20.0	Inactive	Ryan Hupfer					
Foliar interceptionfactor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interceptionfactor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of grain	DROOT(4)	m	1.20	Inactive	Ryan Hupfer					
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70	Inactive	Ryan Hupfer					

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Duration of growing season of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17	Inactive	Ryan Hupfer					
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive	Ryan Hupfer					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive	Ryan Hupfer					
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive	Ryan Hupfer					
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50	Inactive	Ryan Hupfer					
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive	Ryan Hupfer					
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive	Ryan Hupfer					
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	18.4	Inactive	Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive	Ryan Hupfer	J. Davis	8/9/2019			Not Used. Spot Check.
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400	Inactive	Ryan Hupfer					
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive	Ryan Hupfer					
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4	Inactive	Ryan Hupfer					
External gamma shielding (penetration) factor	SHF1	--	0.7	Inactive	Ryan Hupfer					
External Radiation Shape and Area Factors					-					
Dwelling location	-		Onsite		Ryan Hupfer	J. Davis	5/29/2019			Checked in model, JD
Scale	-	m	598.375		Ryan Hupfer	J. Davis	5/29/2019			Checked in model, JD
Dwelling location coordinate in X-direction	-	m	270		Ryan Hupfer	J. Davis	5/29/2019			Checked in model, JD
Dwelling location coordinate in y-direction	-	m	467		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Checked in model
	RAD_SHAPE(1)		22.5		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	RAD_SHAPE(2)		45.0		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	RAD_SHAPE(3)		67.5		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	RAD_SHAPE(4)		90.0		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	RAD_SHAPE(5)		112.5		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
Radius	RAD_SHAPE(6)	m	135.0		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	RAD_SHAPE(7)		157.5		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	RAD_SHAPE(8)		180.0		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/19/2019	Not used. JD Spot Check
	RAD_SHAPE(9)		202.5		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	RAD_SHAPE(10)		225.0		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	RAD_SHAPE(11)		247.5		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
Radius	RAD_SHAPE(12)	m	270.0		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	FRACA(1)		0.000	Inactive	Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	FRACA(2)		0.000		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	FRACA(3)		0.000		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	FRACA(4)		0.000		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	FRACA(5)		0.000		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	FRACA(6)		0.099		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
Fraction (Onsite)	FRACA(7)	--	0.210		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	FRACA(8)		0.230		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	FRACA(9)		0.230		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	FRACA(10)		0.200		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	FRACA(11)		0.071		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, checked in model
	FRACA(12)		0.015		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/19/2019	Not used. JD Spot Check

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Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0	Inactive	Ryan Hupfer	J. Davis	8/9/2019			Not used. Spot Check
Outdoor time fraction on primary contamination	FOTD	--	0.05	Inactive	Ryan Hupfer					
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5	Inactive	Ryan Hupfer					
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05	Inactive	Ryan Hupfer					
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1	Inactive	Ryan Hupfer					
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1	Inactive	Ryan Hupfer					
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1	Inactive	Ryan Hupfer					
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1	Inactive	Ryan Hupfer					
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer					
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer					
Vertical dimension of mixing	HMIX	m	2	Inactive	Ryan Hupfer					
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2.0	Inactive	Ryan Hupfer					
Vertical dimension of mixing for vegetation	HMIXV	m	1.0	Inactive	Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer					
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer					
Fraction of vegetation carbon absorbed from soil	CAIR		0.02	Inactive	Ryan Hupfer					
Fraction of vegetation carbon absorbed from air	CSOIL		0.98	Inactive	Ryan Hupfer					
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18	Inactive	Ryan Hupfer					
Contaminated soil	C12CZ	g/g	0.03	Inactive	Ryan Hupfer					
Local water	C12WTR	g/cm3	2.00E-05	Inactive	Ryan Hupfer					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive	Ryan Hupfer					
Leafy vegetables	C12PLANT(2)		0.09	Inactive	Ryan Hupfer					
Pasture and Silage	C12PLANT(3)		0.09	Inactive	Ryan Hupfer					
Livestock feed grain	C12PLANT(4)		0.40	Inactive	Ryan Hupfer					
Meat	C12MEAT_MILK(1)		0.24	Inactive	Ryan Hupfer	J. Davis	8/9/2019			Not used. JD Spot Check
Milk	C12MEAT_MILK(2)		0.07	Inactive	Ryan Hupfer					
Tritium										
Humidity in air	HUMID	g/m3	8	Inactive	Ryan Hupfer					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6	Inactive	Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive	Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	1	Inactive	Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Checked by	Date	Notes	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02			Not Simulated	--	--	Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01			Not Simulated	--	--	Not Simulated
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	9.81E-03	5.00E+04	9.10E+03	J. Davis	7/19/2019		O.Warren	7/19/2019	
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02			Not Simulated	--	--	Not Simulated
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03			Not Simulated	--	--	Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03			Not Simulated	--	--	Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02			Not Simulated	--	--	Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02			Not Simulated	--	--	Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02			Not Simulated	--	--	Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02			Not Simulated	--	--	Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	J. Davis	7/19/2019		O.Warren	7/19/2019	
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	J. Davis	7/19/2019		O.Warren	7/19/2019	
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02			Not Simulated	--	--	Not Simulated
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01			Not Simulated	--	--	Not Simulated
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02			Not Simulated	--	--	Not Simulated
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02			Not Simulated	--	--	Not Simulated
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02			Not Simulated	--	--	Not Simulated
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02			Not Simulated	--	--	Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02			Not Simulated	--	--	Not Simulated
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02			Not Simulated	--	--	Not Simulated
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02			Not Simulated	--	--	Not Simulated
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02			Not Simulated	--	--	Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02			Not Simulated	--	--	Not Simulated
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02			Not Simulated	--	--	Not Simulated
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00			Not Simulated	--	--	Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02			Not Simulated	--	--	Not Simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Checked by	Date	Notes	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03			Not Simulated	--	--	Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03			Not Simulated	--	--	Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	J. Davis	7/19/2019		O.Warren	7/19/2019	
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02			Not Simulated	--	--	Not Simulated
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02			Not Simulated	--	--	Not Simulated
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02			Not Simulated	--	--	Not Simulated
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02			Not Simulated	--	--	Not Simulated
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00			Not Simulated	--	--	Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by						
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Notes	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Nd	158	158	**Ryan Hupfer**			Not Simulated			Not Simulated
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Notes	Checked By	Date	Notes
Ac-227	2.92E-03	STK			Not Simulated			Not Simulated
Am-241	5.90E+01	STK			Not Simulated			Not Simulated
Am-243	2.97E+00	STK			Not Simulated			Not Simulated
Ba-133	1.60E+00	STK			Not Simulated			Not Simulated
Be-10	2.53E-05	STK			Not Simulated			Not Simulated
C-14	2.88E+00	STK	J. Davis	7/19/2019		O.Warren	7/19/2019	
Ca-41	4.21E-02	STK			Not Simulated			Not Simulated
Cd-113m	NA	STK			Not Simulated			Not Simulated
Cf-249	1.09E-06	STK			Not Simulated			Not Simulated
Cf-250	7.40E-06	STK			Not Simulated			Not Simulated
Cf-251	2.10E-07	STK			Not Simulated			Not Simulated
Cf-252	1.31E-07	STK			Not Simulated			Not Simulated
Cm-243	4.30E-01	STK			Not Simulated			Not Simulated
Cm-244	1.26E+02	STK			Not Simulated			Not Simulated
Cm-245	3.83E-02	STK			Not Simulated			Not Simulated
Cm-246	1.59E-01	STK			Not Simulated			Not Simulated
Cm-247	1.04E-02	STK			Not Simulated			Not Simulated
Cm-248	5.59E-04	STK			Not Simulated			Not Simulated
Co-60	2.00E-02	STK			Not Simulated			Not Simulated
Cs-134	1.06E-08	STK			Not Simulated			Not Simulated
Cs-135	NA	STK			Not Simulated			Not Simulated
Cs-137	1.18E+03	STK			Not Simulated			Not Simulated
Eu-152	2.87E+01	STK			Not Simulated			Not Simulated
Eu-154	6.49E+00	STK			Not Simulated			Not Simulated
Eu-155	6.74E-03	STK			Not Simulated			Not Simulated
Fe-55	8.95E-07	STK			Not Simulated			Not Simulated
H-3	1.12E+01	STK	J. Davis	7/19/2019		O.Warren	7/19/2019	
I-129	4.07E-01	STK	J. Davis	7/19/2019		O.Warren	7/19/2019	
K-40	3.28E+00	STK			Not Simulated			Not Simulated
Kr-85	3.55E-01	STK			Not Simulated			Not Simulated
Mo-100	4.20E-06	STK			Not Simulated			Not Simulated
Mo-93	3.88E-01	STK			Not Simulated			Not Simulated
Na-22	8.22E-07	STK			Not Simulated			Not Simulated
Nb-93m	2.33E-01	STK			Not Simulated			Not Simulated
Nb-94	1.63E-02	STK			Not Simulated			Not Simulated
Ni-59	3.04E+00	STK			Not Simulated			Not Simulated
Ni-63	6.73E+02	STK			Not Simulated			Not Simulated
Np-237	3.25E-01	STK			Not Simulated			Not Simulated
Pa-231	2.39E-01	STK			Not Simulated			Not Simulated
Pb-210	3.68E+00	STK			Not Simulated			Not Simulated
Pd-107	NA	STK			Not Simulated			Not Simulated
Pm-146	8.84E-05	STK			Not Simulated			Not Simulated
Pm-147	2.20E-04	STK			Not Simulated			Not Simulated
Pu-238	9.38E+01	STK			Not Simulated			Not Simulated
Pu-239	5.83E+01	STK			Not Simulated			Not Simulated
Pu-240	6.20E+01	STK			Not Simulated			Not Simulated
Pu-241	2.04E+02	STK			Not Simulated			Not Simulated
Pu-242	1.73E-01	STK			Not Simulated			Not Simulated
Pu-244	3.68E-03	STK			Not Simulated			Not Simulated
Ra-226	8.01E-01	STK			Not Simulated			Not Simulated
Ra-228	2.21E-02	STK			Not Simulated			Not Simulated
Re-187	1.71E-06	STK			Not Simulated			Not Simulated
Sb-125	3.03E-08	STK			Not Simulated			Not Simulated
Se-79	NA	STK			Not Simulated			Not Simulated
Sm-151	NA	STK			Not Simulated			Not Simulated
Sn-121m	NA	STK			Not Simulated			Not Simulated
Sn-126	NA	STK			Not Simulated			Not Simulated

Sr-90	1.92E+02	STK			Not Simulated			Not Simulated
Tc-99	2.80E+00	STK	J. Davis	7/19/2019		O.Warren	7/19/2019	
Th-228	2.11E-06	STK			Not Simulated			Not Simulated
Th-229	5.71E+00	STK			Not Simulated			Not Simulated
Th-230	1.92E+00	STK			Not Simulated			Not Simulated
Th-232	3.52E+00	STK			Not Simulated			Not Simulated
U-232	1.02E+01	STK			Not Simulated			Not Simulated
U-233	4.16E+01	STK			Not Simulated			Not Simulated
U-234	6.30E+02	STK			Not Simulated			Not Simulated
U-235	3.97E+01	STK			Not Simulated			Not Simulated
U-236	8.98E+00	STK			Not Simulated			Not Simulated
U-238	3.81E+02	STK			Not Simulated			Not Simulated
Zr-93	NA	STK			Not Simulated			Not Simulated

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer					
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer					
Exposure duration	ED	yr	30		Ryan Hupfer					
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer					
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer			O.Warren	8/6/2019	Checked in summry file, OW spot check
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD
Y dimension of Primary contamination	SOURCEXY(2)	m	82.4		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0	Inactive	Ryan Hupfer					
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00	Inactive	Ryan Hupfer					
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0	Inactive	Ryan Hupfer					
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0	Inactive	Ryan Hupfer					
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0	Inactive	Ryan Hupfer					
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0	Inactive	Ryan Hupfer					
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0	Inactive	Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0	Inactive	Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0	Inactive	Ryan Hupfer	J. Davis	5/1/2019			Not used, JD spot check
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0	Inactive	Ryan Hupfer					
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0	Inactive	Ryan Hupfer					
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00	Inactive	Ryan Hupfer					
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0	Inactive	Ryan Hupfer					
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0	Inactive	Ryan Hupfer					
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0	Inactive	Ryan Hupfer					
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0	Inactive	Ryan Hupfer					
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00	Inactive	Ryan Hupfer					
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0	Inactive	Ryan Hupfer					
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0	Inactive	Ryan Hupfer					
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer					
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer					
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer					
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer					
Source					-					
Nuclide concentration	-	pCi/g	varies		Ryan Hupfer					
Release to groundwater, leach rate	-	1/yr	varies	Inactive	Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linearly over time		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	0		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.000		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD
Time over which transformation to releasable form occurs	RELDUR	Years	6.425		Ryan Hupfer	J. Davis	5/1/2019	O.Warren	7/19/2019	Checked in summary file
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.000		Ryan Hupfer	J. Davis	5/1/2019			Chceked in summary file, JD
Release Mechanism	RELOPT	--	1		Ryan Hupfer	J. Davis	7/19/2019			Checked in summary file, JD spot check
Initial Leach Rate	RLEACH	1/year	varies		Ryan Hupfer					
Final Leach Rate	RLEACHF	1/year	varies		Ryan Hupfer					
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	Equal to Waste Zone Kd		Ryan Hupfer					
Release to Atmospheric	--	--	in the same manner as release to groundwater							
Distribution Coefficients					-					
Contaminated zone	DCACTC	cm^3/g	varies		Ryan Hupfer					
Unsaturated zone	DCACTU	cm^3/g	varies		Ryan Hupfer					
Saturated zone	DCACTS	cm^3/g	varies		Ryan Hupfer					
Sediment in surface water body	DCACTSWB	cm^3/g	0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies		Ryan Hupfer					
Leafy vegetable fields	DCACTV2	cm^3/g	varies		Ryan Hupfer					
Pasture, silage growing areas	DCACTL1	cm^3/g	varies		Ryan Hupfer					
Livestock feed grain fields	DCACTL2	cm^3/g	varies		Ryan Hupfer					
Offsite dwelling site	DCACTDWE	cm^3/g	varies		Ryan Hupfer					
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD spot check
Dose Conversion and Slope Factors					-					
External exposure library	N/A	N/A	N/A		Ryan Hupfer					
Internal exposure dose library	N/A	N/A	N/A		Ryan Hupfer					
Slope factor (Risk) library	N/A	N/A	N/A		Ryan Hupfer					
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/(pCi/kg)	PNNL 2003, Highest Value of Fruits, Grains, Root Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/(pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg)/(pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times					-					
Times at which output is reported	T()	yr	1, 2, 4, 6, 6.425, 8, 10, 20, 25		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer			O. Warren	8/6/2019	Checked in summary file, OW spot check
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer					
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	J. Davis	8/9/2019			Checked in summary file, JD Spot Check
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer					
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer					
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer					
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer					
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer					
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer	J. Davis	7/19/2019			Checked in summary file, JD spot check
Physical and Hydrological					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check
Wind speed	-	m/s	3.4342	Calculated	Ryan Hupfer					
Primary Contamination					-					
Area of primary contamination	-	m^2	20,649	Calculated	Ryan Hupfer	J. Davis	7/19/2019			Checked in summary file, JD
Length of contamination parallel to aquifer flow	LCZPAQ	m	85.9		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer					
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer					
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive	Ryan Hupfer					
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001	Inactive	Ryan Hupfer					
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer			O. Warren	8/6/2019	Checked in summary file, OW spot check
Runoff coefficient	RUNOFF	--	0.029		Ryan Hupfer	J. Davis	5/29/2019			Checked in summary file, JD
Rainfall Erosion Index	RAINEROS	--	0		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer					
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer					
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer					
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer					
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	20.9		Ryan Hupfer	J. Davis	5/29/2019			Checked in summary file, JD
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer					
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer					
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
Longitudinal Dispersivity	ALPHALCZ	m	2.09		Ryan Hupfer	J. Davis	5/29/2019			Checked in summary file, JD

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	83.6		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD spot check
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check
Depth of primary contamination below water table	-	--	0.000		Ryan Hupfer					
Clean Cover					-					
Thickness of clean cover	COVER0	m	0.3048		Ryan Hupfer	J. Davis	5/29/2019			Checked in summary file, JD
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer					
Erosion rate of clean cover	VCV	m/yr	0		Ryan Hupfer					
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer					
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer	J. Davis	5/1/2019			Not used, JD spot check
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field		m2	1024	Inactive	Ryan Hupfer					
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.10	Inactive	Ryan Hupfer					
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568	Inactive	Ryan Hupfer					
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.702	Inactive	Ryan Hupfer					
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500	Inactive	Ryan Hupfer					
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMDF(1)	--	0.3	Inactive	Ryan Hupfer					
Erosion rate for fruit, grain, and nonleafy vegetable field		m/yr	0.0	Inactive	Ryan Hupfer					
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50	Inactive	Ryan Hupfer					
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4	Inactive	Ryan Hupfer					
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4	Inactive	Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003	Inactive	Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1	Inactive	Ryan Hupfer					
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer					
Leafy Vegetable Field					-					
Area for leafy vegetable field		m^2	1024	Inactive	Ryan Hupfer					
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.10	Inactive	Ryan Hupfer					
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.702	Inactive	Ryan Hupfer					
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500	Inactive	Ryan Hupfer					
Volumetric water content for leafy vegetable field	TMDF(2)	--	0.3	Inactive	Ryan Hupfer					
Erosion rate for leafy vegetable field		m/yr	0.0	Inactive	Ryan Hupfer					
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50	Inactive	Ryan Hupfer					
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4	Inactive	Ryan Hupfer					
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4	Inactive	Ryan Hupfer					
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003	Inactive	Ryan Hupfer					
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1	Inactive	Ryan Hupfer					
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer					
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field		m^2	10000	Inactive	Ryan Hupfer					
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.10	Inactive	Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568	Inactive	Ryan Hupfer					
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.702	Inactive	Ryan Hupfer					
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15	Inactive	Ryan Hupfer					
Volumetric water content for pasture and silage field	TMDF(3)	--	0.3	Inactive	Ryan Hupfer					
Erosion rate for pasture and silage field		m/yr	0.0	Inactive	Ryan Hupfer					
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50	Inactive	Ryan Hupfer					
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4	Inactive	Ryan Hupfer					
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4	Inactive	Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003	Inactive	Ryan Hupfer					
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1	Inactive	Ryan Hupfer					
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer					
Grain Field					-					
Area for grain field		m^2	10000	Inactive	Ryan Hupfer					
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.10	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568	Inactive	Ryan Hupfer					
Runoff coefficient for grain field	RUNOF(4)	--	0.702	Inactive	Ryan Hupfer					
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500	Inactive	Ryan Hupfer					
Volumetric water content for grain field	TMDF(4)	--	0.3	Inactive	Ryan Hupfer					
Erosion rate		m/yr	0.0	Inactive	Ryan Hupfer					
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50	Inactive	Ryan Hupfer					
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4	Inactive	Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4	Inactive	Ryan Hupfer					
Cover and management factor for grain field	CRPMANG(4)	--	0.003	Inactive	Ryan Hupfer					
Support practice factor for grain field	CONVPRAC(4)	--	1	Inactive	Ryan Hupfer					
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer					
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site		m^2	1024	Inactive	Ryan Hupfer					
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0	Inactive	Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568	Inactive	Ryan Hupfer					
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.702	Inactive	Ryan Hupfer					
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15	Inactive	Ryan Hupfer					
Volumetric water content for dwelling site	TMDFDWELL	--	0.3	Inactive	Ryan Hupfer					
Erosion rate for dwelling site		m/yr	0	Inactive	Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOJ. DavisWELL	g/cm^3	1.5	Inactive	Ryan Hupfer					
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4	Inactive	Ryan Hupfer					
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003	Inactive	Ryan Hupfer	J. Davis	5/1/2019			Not used, JD spot check
Support practice factor for dwelling site	CONVPRACDWELL	--	1	Inactive	Ryan Hupfer					
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer					
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer					
Anemometer height	ANH	m	10		Ryan Hupfer					
Ambient temperature	TABK	K	285		Ryan Hupfer					
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer					
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file, spot check
Dispersion model coefficients	-	--	-		Ryan Hupfer					
Windspeed Terrain	-	--	Rural		Ryan Hupfer					
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0	Inactive	Ryan Hupfer					
Leafy vegetable plot	AGRIELEV(2)	m	0	Inactive	Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0	Inactive	Ryan Hupfer					
Grain fields	AGRIELEV(4)	m	0	Inactive	Ryan Hupfer					
Dwelling site	DWELLELEV	m	0	Inactive	Ryan Hupfer					
Surface water body	SWELEV	m	0		Ryan Hupfer					
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer					
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer					
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD spot check
	H(2)		0.305		Ryan Hupfer	J. Davis	8/9/2019			Checked in summary file, JD spot check
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer					
	H(4)		3.048		Ryan Hupfer					
	H(5)		4.846		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Checked in summary file
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer					
	DENSUZ(2)		1.6		Ryan Hupfer					
	DENSUZ(3)		1.5		Ryan Hupfer					
	DENSUZ(4)		1.5		Ryan Hupfer					
	DENSUZ(5)		1.8		Ryan Hupfer					
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer					
	TPUS(2)		0.397		Ryan Hupfer					
	TPUS(3)		0.427		Ryan Hupfer					
	TPUS(4)		0.419		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
	TPUS(5)		0.353		Ryan Hupfer					
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer					
	EPUZ(2)		0.389		Ryan Hupfer					
	EPUZ(3)		0.195		Ryan Hupfer					
	EPUZ(4)		0.234		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
	EPUZ(5)		0.27		Ryan Hupfer					
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer					
	FCUZ(2)		0.032		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
	FCUZ(5)		0.2471		Ryan Hupfer					
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer					
	HCUZ(2)		94600		Ryan Hupfer					
	HCUZ(3)		0.6		Ryan Hupfer	J. Davis	5/29/2019			Checked in summary file, JD
	HCUZ(4)		3.15		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
	HCUZ(5)		16.7		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer					
	BUZ(2)		4.05		Ryan Hupfer			O.Warren	8/6/2019	Checked in summary file, OW spot check
	BUZ(3)		11.4		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD spot check
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer	J. Davis	5/1/2019	O.Warren	7/19/2019	Checked in summary file, spot check
	ALPHALU(2)		0.1		Ryan Hupfer					
	ALPHALU(3)		0.1		Ryan Hupfer					
	ALPHALU(4)		0.1		Ryan Hupfer					
	ALPHALU(5)		0.1		Ryan Hupfer					
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer					
Dry bulk density of saturated zone	DENSAQ	g/cm^3	1.8		Ryan Hupfer					
Saturated zone total porosity	TPSZ	--	0.35		Ryan Hupfer	J. Davis	7/19/2019			Checked in summary file, JD spot check
Saturated zone effective porosity	EPSZ	--	0.27		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	8/6/2019	Checked in summary file
Saturated zone hydraulic conductivity	HCSZ	m/yr	83.6		Ryan Hupfer	J. Davis	8/9/2019			Checked in summary file, JD spot check
Saturated zone hydraulic gradient to well	HGW	--	0.036		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer					

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Depth of aquifer contributing to well	DWIBWT	m	40.00		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer	J. Davis	8/9/2019			Checked in summary file, JD spot check
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer					
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Fraction of water from surface body for human consumption	FSWD	--	0		Ryan Hupfer					
Fraction of water from well for human consumption	FWWD	--	1		Ryan Hupfer					
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer					
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer	J. Davis	5/1/2019			Checked in summary file, JD spot check
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer					
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive	Ryan Hupfer					
Number of cattle for beef cattle	NLWI(1)	--	2	Inactive	Ryan Hupfer					
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer					
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive	Ryan Hupfer	J. Davis	8/9/2019			Not used, JD Spot Checks
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive	Ryan Hupfer					
Number of cows for dairy cows	NLWI(2)	--	2	Inactive	Ryan Hupfer					
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15	Inactive	Ryan Hupfer					
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1	Inactive	Ryan Hupfer	J. Davis	7/19/2019			Not used, JD spot check
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Inactive	Ryan Hupfer					
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	7/19/2019			Not used, JD spot check
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0	Inactive	Ryan Hupfer					
Area of Plot for leafy vegetables		m^2	1024	Inactive	Ryan Hupfer					
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15	Inactive	Ryan Hupfer					
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for pasture and silage	FWWIR(3)	--	0	Inactive	Ryan Hupfer					
Area of Plot for pasture and silage		m^2	10000	Inactive	Ryan Hupfer					
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15	Inactive	Ryan Hupfer					
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0	Inactive	Ryan Hupfer					
Area of Plot for livestock feed grain		m^2	10000	Inactive	Ryan Hupfer					
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015	Inactive	Ryan Hupfer					
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0	Inactive	Ryan Hupfer					
Area of Plot for offsite dwelling site		m^2	1024	Inactive	Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer					
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	331.645	Calculated	Ryan Hupfer					
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer					
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer					
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer					
Surface area of water in surface water body:		m^2	500	Calculated	Ryan Hupfer					
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer					

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Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer					
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer					
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer					
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer					
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Checked in summary file
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer					
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	0		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	0		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer					
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	Ryan Hupfer					
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive	Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive	Ryan Hupfer	J. Davis	8/9/2019			Not used, JD Spot Check
Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive	Ryan Hupfer					
Meat consumption	DMI(1)	kg/yr	91.9	Inactive	Ryan Hupfer					
Milk consumption	DMI(2)	L/yr	110	Inactive	Ryan Hupfer					
Soil (incidental) ingestion rate	SOIL	g/yr	36.53	Inactive	Ryan Hupfer	J. Davis	7/19/2019			Not used, JD spot check
Drinking water intake from affected area		--	1		Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.0	Inactive	Ryan Hupfer					
Other aquatic food consumption from affected area	FFISH(2)	--	0.5	Inactive	Ryan Hupfer	J. Davis	7/19/2019			Not used, JD spot check
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5	Inactive	Ryan Hupfer					
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5	Inactive	Ryan Hupfer					
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	7/19/2019	O.Warren	7/19/2019	Not used, OW checked in model
Milk consumption from affected area	FMEMI(2)	--	0.5	Inactive	Ryan Hupfer	J. Davis	7/19/2019			Not used, JD spot check
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive	Ryan Hupfer					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive	Ryan Hupfer					
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1	Inactive	Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4	Inactive	Ryan Hupfer					
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer					
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	41.5	Inactive	Ryan Hupfer					
Grain intake for dairy cows	LFI(2,2)	kg/d	8.5	Inactive	Ryan Hupfer					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4	Inactive	Ryan Hupfer	J. Davis	5/1/2019			Not used, JD spot check
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1	Inactive	Ryan Hupfer					
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight crop yield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive	Ryan Hupfer					
Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08	Inactive	Ryan Hupfer					
Foliage to food transfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive	Ryan Hupfer					
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive	Ryan Hupfer					
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive	Ryan Hupfer					
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70	Inactive	Ryan Hupfer					
Duration of growing season of grain	GROWTIME(4)	yr	0.17	Inactive	Ryan Hupfer					
Foliage to food transfer coefficient of grain	FOLI F(4)	--	1.0	Inactive	Ryan Hupfer					
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0	Inactive	Ryan Hupfer					
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of grain	DROOT(4)	m	1.20	Inactive	Ryan Hupfer					
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70	Inactive	Ryan Hupfer					
Duration of growing season of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17	Inactive	Ryan Hupfer					
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive	Ryan Hupfer					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive	Ryan Hupfer					
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50	Inactive	Ryan Hupfer					
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive	Ryan Hupfer					
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive	Ryan Hupfer					
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	18.4	Inactive	Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive	Ryan Hupfer					
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400	Inactive	Ryan Hupfer					
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer			O.Warren	7/19/2019	Checked in summary file, OW spot check
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive	Ryan Hupfer					
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4	Inactive	Ryan Hupfer					
External gamma shielding (penetration) factor	SHF1	--	0.7	Inactive	Ryan Hupfer					
External Radiation Shape and Area Factors					-					
Dwelling location	-		Onsite		Ryan Hupfer	J. Davis	5/29/2019			Checked in model, JD
Scale	-	m	598.375		Ryan Hupfer	J. Davis	5/29/2019			Checked in model, JD
Dwelling location coordinate in X-direction	-	m	270		Ryan Hupfer	J. Davis	5/29/2019			Checked in model, JD
Dwelling location coordinate in y-direction	-	m	456		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Checked in model
Radius	RAD_SHAPE(1)	m	21.00	Inactive	Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	RAD_SHAPE(2)		42.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	RAD_SHAPE(3)		63.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	RAD_SHAPE(4)		84.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	RAD_SHAPE(5)		105.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	RAD_SHAPE(6)		126.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	RAD_SHAPE(7)		147.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	RAD_SHAPE(8)		168.00		Ryan Hupfer	J. Davis	8/9/2019	O.Warren	7/19/2019	Not used, JD spot check
	RAD_SHAPE(9)		189.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	RAD_SHAPE(10)		210.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	RAD_SHAPE(11)		231.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
Radius	RAD_SHAPE(12)	m	252.00		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
Fraction (Onsite)	FRACA(1)	--	0		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	FRACA(2)		0		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	FRACA(3)		0		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	FRACA(4)		0		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	FRACA(5)		0		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	FRACA(6)		0.043		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	FRACA(7)		0.180		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	FRACA(8)		0.220		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	FRACA(9)		0.230		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	FRACA(10)		0.180		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	FRACA(11)		0.055		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
	FRACA(12)		0.012		Ryan Hupfer	J. Davis	5/29/2019	O.Warren	7/19/2019	Not used, OW checked in model
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0	Inactive	Ryan Hupfer	J. Davis	7/19/2019			Not used, JD spot check
Outdoor time fraction on primary contamination	FOTD	--	0.05	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5	Inactive	Ryan Hupfer					
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05	Inactive	Ryan Hupfer					
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1	Inactive	Ryan Hupfer					
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1	Inactive	Ryan Hupfer					
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1	Inactive	Ryan Hupfer					
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1	Inactive	Ryan Hupfer					
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer					
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer	J. Davis	8/9/2019			Not used, JD Spot Check
Vertical dimension of mixing	HMIX	m	2	Inactive	Ryan Hupfer					
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer	J. Davis	8/9/2019			Not used, JD Spot Check
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	8/9/2019			Not used, JD Spot Check
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2.0	Inactive	Ryan Hupfer					
Vertical dimension of mixing for vegetation	HMIXV	m	1.0	Inactive	Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer					
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer					
Fraction of vegetation carbon absorbed from soil	CAIR		0.02	Inactive	Ryan Hupfer					
Fraction of vegetation carbon absorbed from air	CSOIL		0.98	Inactive	Ryan Hupfer					
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18	Inactive	Ryan Hupfer					
Contaminated soil	C12CZ	g/g	0.03	Inactive	Ryan Hupfer					
Local water	C12WTR	g/cm3	2.00E-05	Inactive	Ryan Hupfer					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive	Ryan Hupfer					
Leafy vegetables	C12PLANT(2)		0.09	Inactive	Ryan Hupfer					
Pasture and Silage	C12PLANT(3)		0.09	Inactive	Ryan Hupfer					
Livestock feed grain	C12PLANT(4)		0.40	Inactive	Ryan Hupfer					
Meat	C12MEAT_MILK(1)		0.24	Inactive	Ryan Hupfer					
Milk	C12MEAT_MILK(2)		0.07	Inactive	Ryan Hupfer					
Tritium										
Humidity in air	HUMID	g/m3	8	Inactive	Ryan Hupfer					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6	Inactive	Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive	Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2	Inactive	Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Checked by	Date	Notes	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02			Not Simulated	--	--	Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01			Not Simulated	--	--	Not Simulated
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	9.81E-03	5.00E+04	9.10E+03	J. Davis	7/19/2019		O.Warren	7/19/2019	
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02			Not Simulated	--	--	Not Simulated
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03			Not Simulated	--	--	Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03			Not Simulated	--	--	Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02			Not Simulated	--	--	Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02			Not Simulated	--	--	Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02			Not Simulated	--	--	Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02			Not Simulated	--	--	Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	J. Davis	7/19/2019		O.Warren	7/19/2019	
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	J. Davis	7/19/2019		O.Warren	7/19/2019	
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02			Not Simulated	--	--	Not Simulated
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01			Not Simulated	--	--	Not Simulated
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02			Not Simulated	--	--	Not Simulated
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02			Not Simulated	--	--	Not Simulated
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02			Not Simulated	--	--	Not Simulated
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02			Not Simulated	--	--	Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02			Not Simulated	--	--	Not Simulated
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02			Not Simulated	--	--	Not Simulated
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02			Not Simulated	--	--	Not Simulated
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02			Not Simulated	--	--	Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02			Not Simulated	--	--	Not Simulated
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02			Not Simulated	--	--	Not Simulated
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00			Not Simulated	--	--	Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02			Not Simulated	--	--	Not Simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03			Not Simulated	--	--	Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Checked by	Date	Notes	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03			Not Simulated	--	--	Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03			Not Simulated	--	--	Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02			Not Simulated	--	--	Not Simulated
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	J. Davis	7/19/2019		O.Warren	7/19/2019	
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02			Not Simulated	--	--	Not Simulated
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02			Not Simulated	--	--	Not Simulated
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02			Not Simulated	--	--	Not Simulated
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02			Not Simulated	--	--	Not Simulated
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01			Not Simulated	--	--	Not Simulated
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00			Not Simulated	--	--	Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by						
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Notes	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Nd	158	158	**Ryan Hupfer**	--	--	Not Simulated			Not Simulated
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Notes	Checked By	Date	Notes
Ac-227	2.92E-03	STK			Not Simulated			Not Simulated
Am-241	5.90E+01	STK			Not Simulated			Not Simulated
Am-243	2.97E+00	STK			Not Simulated			Not Simulated
Ba-133	1.60E+00	STK			Not Simulated			Not Simulated
Be-10	2.53E-05	STK			Not Simulated			Not Simulated
C-14	2.88E+00	STK	J. Davis	7/19/2019		O.Warren	7/19/2019	
Ca-41	4.21E-02	STK			Not Simulated			Not Simulated
Cd-113m	NA	STK			Not Simulated			Not Simulated
Cf-249	1.09E-06	STK			Not Simulated			Not Simulated
Cf-250	7.40E-06	STK			Not Simulated			Not Simulated
Cf-251	2.10E-07	STK			Not Simulated			Not Simulated
Cf-252	1.31E-07	STK			Not Simulated			Not Simulated
Cm-243	4.30E-01	STK			Not Simulated			Not Simulated
Cm-244	1.26E+02	STK			Not Simulated			Not Simulated
Cm-245	3.83E-02	STK			Not Simulated			Not Simulated
Cm-246	1.59E-01	STK			Not Simulated			Not Simulated
Cm-247	1.04E-02	STK			Not Simulated			Not Simulated
Cm-248	5.59E-04	STK			Not Simulated			Not Simulated
Co-60	2.00E-02	STK			Not Simulated			Not Simulated
Cs-134	1.06E-08	STK			Not Simulated			Not Simulated
Cs-135	NA	STK			Not Simulated			Not Simulated
Cs-137	1.18E+03	STK			Not Simulated			Not Simulated
Eu-152	2.87E+01	STK			Not Simulated			Not Simulated
Eu-154	6.49E+00	STK			Not Simulated			Not Simulated
Eu-155	6.74E-03	STK			Not Simulated			Not Simulated
Fe-55	8.95E-07	STK			Not Simulated			Not Simulated
H-3	1.12E+01	STK	J. Davis	7/19/2019		O.Warren	7/19/2019	
I-129	4.07E-01	STK	J. Davis	7/19/2019		O.Warren	7/19/2019	
K-40	3.28E+00	STK			Not Simulated			Not Simulated
Kr-85	3.55E-01	STK			Not Simulated			Not Simulated
Mo-100	4.20E-06	STK			Not Simulated			Not Simulated
Mo-93	3.88E-01	STK			Not Simulated			Not Simulated
Na-22	8.22E-07	STK			Not Simulated			Not Simulated
Nb-93m	2.33E-01	STK			Not Simulated			Not Simulated
Nb-94	1.63E-02	STK			Not Simulated			Not Simulated
Ni-59	3.04E+00	STK			Not Simulated			Not Simulated
Ni-63	6.73E+02	STK			Not Simulated			Not Simulated
Np-237	3.25E-01	STK			Not Simulated			Not Simulated
Pa-231	2.39E-01	STK			Not Simulated			Not Simulated
Pb-210	3.68E+00	STK			Not Simulated			Not Simulated
Pd-107	NA	STK			Not Simulated			Not Simulated
Pm-146	8.84E-05	STK			Not Simulated			Not Simulated
Pm-147	2.20E-04	STK			Not Simulated			Not Simulated
Pu-238	9.38E+01	STK			Not Simulated			Not Simulated
Pu-239	5.83E+01	STK			Not Simulated			Not Simulated
Pu-240	6.20E+01	STK			Not Simulated			Not Simulated
Pu-241	2.04E+02	STK			Not Simulated			Not Simulated
Pu-242	1.73E-01	STK			Not Simulated			Not Simulated
Pu-244	3.68E-03	STK			Not Simulated			Not Simulated
Ra-226	8.01E-01	STK			Not Simulated			Not Simulated
Ra-228	2.21E-02	STK			Not Simulated			Not Simulated
Re-187	1.71E-06	STK			Not Simulated			Not Simulated
Sb-125	3.03E-08	STK			Not Simulated			Not Simulated
Se-79	NA	STK			Not Simulated			Not Simulated
Sm-151	NA	STK			Not Simulated			Not Simulated
Sn-121m	NA	STK			Not Simulated			Not Simulated
Sn-126	NA	STK			Not Simulated			Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Notes	Checked By	Date	Notes
Sr-90	1.92E+02	STK			Not Simulated			Not Simulated
Tc-99	2.80E+00	STK	J. Davis	7/19/2019		O.Warren	7/19/2019	
Th-228	2.11E-06	STK			Not Simulated			Not Simulated
Th-229	5.71E+00	STK			Not Simulated			Not Simulated
Th-230	1.92E+00	STK			Not Simulated			Not Simulated
Th-232	3.52E+00	STK			Not Simulated			Not Simulated
U-232	1.02E+01	STK			Not Simulated			Not Simulated
U-233	4.16E+01	STK			Not Simulated			Not Simulated
U-234	6.30E+02	STK			Not Simulated			Not Simulated
U-235	3.97E+01	STK			Not Simulated			Not Simulated
U-236	8.98E+00	STK			Not Simulated			Not Simulated
U-238	3.81E+02	STK			Not Simulated			Not Simulated
Zr-93	NA	STK			Not Simulated			Not Simulated

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi							
Radiological units for dose	-	rem and Sv	mrem							
Basic radiation dose limit	BRDL	mrem/yr	25					O.Warren	8/6/2019	Checked in summary file, OW spot check
Exposure duration	ED	yr	30							
Number of unsaturated zone(s)	NS	--	5							
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		J. Davis	8/9/2019	Spot Check			
Default Release Mechanism	-		Version 2 Release Methodology							
Bearing of X axis	NXBEARING	degrees	90							
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		J. Davis	5/1/2019				
Y dimension of Primary contamination	SOURCEXY(2)	m	103.4		J. Davis	5/29/2019				
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0	Inactive						
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00	Inactive						
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0	Inactive						
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0	Inactive						
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0	Inactive	J. Davis	5/1/2019	Spot Check			
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0	Inactive						
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0	Inactive						
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0	Inactive						
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0	Inactive						
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0	Inactive						
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0	Inactive						
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00	Inactive						
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0	Inactive						
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0	Inactive						
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0	Inactive						
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0	Inactive						
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00	Inactive						
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0	Inactive						
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0	Inactive						
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0	Inactive						
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4					O.Warren	8/6/2019	Checked in summary file, OW spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		J. Davis	8/9/2019	Spot Check			
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4							
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4							
Source										
Nuclide concentration	-	pCi/g	varies							
Release to groundwater, leach rate		1/yr	varies	Inactive						
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive						
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)							
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linearly over time							
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	0		J. Davis	5/1/2019				
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.000		J. Davis	5/1/2019				
Time over which transformation to releasable form occurs	RELDUR	Years	6.300		J. Davis	5/1/2019				
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.000		J. Davis	5/1/2019				
Release Mechanism	RELOPT	--	1					O.Warren	8/6/2019	Checked in summary file, OW spot check
Initial Leach Rate	RLEACH	1/year	varies							
Final Leach Rate	RLEACHF	1/year	varies							
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	Equal to Waste Zone Kd							
Release to Atmospheric	--	--	in the same manner as release to groundwater							
Distribution Coefficients										
Contaminated zone	DCACTC	cm^3/g	varies							
Unsaturated zone	DCACTU	cm^3/g	varies							
Saturated zone	DCACTS	cm^3/g	varies							
Sediment in surface water body	DCACTSWB	cm^3/g	0							
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies							

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Leafy vegetable fields	DCACTV2	cm^3/g	varies							
Pasture, silage growing areas	DCACTL1	cm^3/g	varies							
Livestock feed grain fields	DCACTL2	cm^3/g	varies							
Offsite dwelling site	DCACTDWE	cm^3/g	varies							
Deposition Velocities										
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)							
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)							
Dose Conversion and Slope Factors										
External exposure library	N/A	N/A	N/A							
Internal exposure dose library	N/A	N/A	N/A							
Slope factor (Risk) library	N/A	N/A	N/A							
Transfer Factors										
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/(pCi/kg)	PNNL 2003, Highest Value of Fruits, Grains, Root Vegetables (C-14, H-3 Calculated)							
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/(pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)							
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)							
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)							
Meat transfer factor	I_M(,1)	(pCi/kg)/(pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg							
Milk transfer factor	I_M(,2)	(pCi/L)/(pCi/d)	PNNL 2003 Milk							
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/(pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)							
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/(pCi/L)	RESRAD default values for all isotopes							
Reporting Times										

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Times at which output is reported	T()	yr	1, 2, 4, 6, 6.3, 8, 10, 20, 25		J. Davis	5/1/2019				
Storage Times										
Storage time for surface water	STOR_T(1)	d	1		J. Davis	8/9/2019	Spot Check			
Storage time for well water	STOR_T(2)	d	1							
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14							
Storage time for leafy vegetables	STOR_T(4)	d	1							
Storage time for pasture and silage	STOR_T(5)	d	1					O.Warren	8/6/2019	Checked in summary file, OW spot check
Storage time for livestock feed grain	STOR_T(6)	d	45							
Storage time for meat	STOR_T(7)	d	20							
Storage time for milk	STOR_T(8)	d	1							
Storage time for fish	STOR_T(9)	d	7							
Storage time for crustacea and mollusks	STOR_T(10)	d	7							
Physical and Hydrological										
Precipitation	PRECIP	m/yr	1.382							
Wind speed		m/s	3.4342	Calculated				O.Warren	7/19/2019	Checked in summary file, OW spot check
Primary Contamination										
Area of primary contamination		m^2	25,910	Calculated	J. Davis	5/29/2019				

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Length of contamination parallel to aquifer flow	LCZPAQ	m	107.8		J. Davis	5/29/2019				
Depth of soil mixing layer (m)	DM	m	0.15					O.Warren	8/6/2019	Checked in summary file, OW spot check
Mass loading of all particulates	MLFD	g/m^3	0.0001							
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001							
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive						
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001	Inactive						
Irrigation applied per year (m/yr)	RI	m/yr	0		J. Davis	8/9/2019	Spot Check			
Evapotranspiration coefficient	EVAPTR	--	0.568							
Runoff coefficient	RUNOFF	--	0.029		J. Davis	5/29/2019		O.Warren	8/6/2019	Checked in summary file, OW spot check
Rainfall Erosion Index	RAINEROS	--	0							
Slope-length-steepness factor	SLPLENSTPPC	--	0.4							
Cover and management factor	CRPMANGPC	--	0.003							
Support practice factor	CONVPRACPC	--	0.0							
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0							
Contaminated Zone										
Thickness of contaminated zone	THICK0	m	16.4		J. Davis	5/29/2019		O.Warren	7/19/2019	Checked in summary file, OW spot check
Total porosity of contaminated zone	TPCZ	--	0.419							
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9							
Erosion rate of clean cover		m/yr	0							
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000							
Field capacity of contaminated zone	FCCZ	--	0.307					O.Warren	8/6/2019	Checked in summary file, OW spot check
Soil b parameter of contaminated zone	BCZ	--	7.75		J. Davis	8/9/2019		O.Warren	8/6/2016	Checked in summary file
Longitudinal Dispersivity	ALPHALCZ	m	1.64		J. Davis	5/29/2019				
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99							
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	83.6							
CZ effective porosity	EPCZ	--	0.234							

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Depth of primary contamination below water table		--	0.000							
Clean Cover										
Thickness of clean cover	COVER0	m	0.3048		J. Davis	5/29/2019				
Total porosity of clean cover	TPCV	--	0.4	Inactive						
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5							
Erosion rate of clean cover	VCV	m/yr	0					O.Warren	8/6/2019	Checked in summary file, OW spot check
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0							
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	J. Davis	8/9/2019	Not used, spot check			
Agriculture Area Parameters										
Fruit, Grain, and Non-leafy Vegetables Field										
Area for fruit, grain, and non-leafy vegetables field		m2	1024	Inactive						
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive						
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.10	Inactive						
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568	Inactive						
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.702	Inactive						
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500	Inactive						
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMDF(1)	--	0.3	Inactive						
Erosion rate for fruit, grain, and nonleafy vegetable field		m/yr	0.0	Inactive						
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50	Inactive						
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4	Inactive						
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4	Inactive						
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003	Inactive						
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1	Inactive						
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive						
Leafy Vegetable Field										
Area for leafy vegetable field		m^2	1024	Inactive						
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive						
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.10	Inactive						
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568	Inactive						
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.702	Inactive						
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500	Inactive						
Volumetric water content for leafy vegetable field	TMDF(2)	--	0.3	Inactive						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Erosion rate for leafy vegetable field		m/yr	0.0	Inactive						
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50	Inactive						
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4	Inactive						
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4	Inactive						
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003	Inactive						
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1	Inactive						
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive						
Livestock Feed Growing Area Parameters Pasture										
Silage Field										
Area for pasture and silage field		m^2	10000	Inactive						
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive						
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.10	Inactive						
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568	Inactive						
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.702	Inactive						
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15	Inactive						
Volumetric water content for pasture and silage field	TMDF(3)	--	0.3	Inactive						
Erosion rate for pasture and silage field		m/yr	0.0	Inactive						
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50	Inactive						
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4	Inactive						
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4	Inactive						
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003	Inactive						
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1	Inactive						
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive						
Grain Field										
Area for grain field		m^2	10000	Inactive						
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive						
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.10	Inactive						
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568	Inactive						
Runoff coefficient for grain field	RUNOF(4)	--	0.702	Inactive						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500	Inactive						
Volumetric water content for grain field	TMDF(4)	--	0.3	Inactive						
Erosion rate		m/yr	0.0	Inactive						
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50	Inactive						
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4	Inactive						
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4	Inactive						
Cover and management factor for grain field	CRPMANG(4)	--	0.003	Inactive						
Support practice factor for grain field	CONVPRAC(4)	--	1	Inactive						
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive						
Offsite Dwelling Area Parameters										
Area of offsite dwelling site		m^2	1024	Inactive						
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0	Inactive						
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568	Inactive						
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.702	Inactive						
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15	Inactive						
Volumetric water content for dwelling site	TMDFDWELL	--	0.3	Inactive						
Erosion rate for dwelling site		m/yr	0	Inactive						
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5	Inactive						
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0	Inactive						
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4	Inactive						
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003	Inactive						
Support practice factor for dwelling site	CONVPRACDWELL	--	1	Inactive						
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive						
Atmospheric Transport										
Release height	AIRRELHT	m	1		J. Davis	5/1/2019	Spot Check			

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Release heat flux	HEATFLX	cal/s	0							
Anemometer height	ANH	m	10					O.Warren	7/19/2019	Checked in summary file, OW spot check
Ambient temperature	TABK	K	285					O.Warren	8/6/2019	Checked in summary file, OW spot check
AM atmospheric mixing height	AMIX	m	400					O.Warren	7/19/2019	Checked in summary file, OW spot check
PM atmospheric mixing height	PMIX	m	1,600					O.Warren	8/6/2019	Checked in summary file, OW spot check
Dispersion model coefficients	-	--	-							
Windspeed Terrain	-	--	Rural							
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0	Inactive						
Leafy vegetable plot	AGRIELEV(2)	m	0	Inactive						
Pasture, silage growing area	AGRIELEV(3)	m	0	Inactive						
Grain fields	AGRIELEV(4)	m	0	Inactive						
Dwelling site	DWELLELEV	m	0	Inactive						
Surface water body	SWELEV	m	0		J. Davis	8/9/2019	Spot Check			
Grid spacing for areal integration	ATGRID	m	10		J. Davis	5/1/2019	Spot Check			
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)							
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52							
Unsaturated Zone Parameters										
Unsaturated zone thickness	H(1)	m	0.305							
	H(2)		0.305							
Unsaturated zone thickness	H(3)	m	0.9144							
	H(4)		3.048					O.Warren	7/19/2019	Checked in summary file, OW spot check
	H(5)		4.846		J. Davis	5/29/2019				
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4							
	DENSUZ(2)		1.6							
	DENSUZ(3)		1.5							
	DENSUZ(4)		1.5							
	DENSUZ(5)		1.8							
Unsaturated zone total porosity	TPUZ(1)	--	0.463							
	TPUZ(2)		0.397							
	TPUZ(3)		0.427							
	TPUZ(4)		0.419		J. Davis	8/9/2019		O.Warren	8/6/2019	Checked in summary file
	TPUZ(5)		0.353							

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Unsaturated zone effective porosity	EPUZ(1)	--	0.294							
	EPUZ(2)		0.389							
	EPUZ(3)		0.195							
	EPUZ(4)		0.234		J. Davis	8/9/2019		O.Warren	8/6/2019	Checked in summary file
	EPUZ(5)		0.27							
Unsaturated zone field capacity	FCUZ(1)	--	0.232							
	FCUZ(2)		0.032		J. Davis	8/9/2019	Spot Check			
	FCUZ(3)		0.418							
	FCUZ(4)		0.307		J. Davis	8/9/2019		O. Warren	8/6/2019	Checked in summary file
	FCUZ(5)		0.2471							
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117					O.Warren	7/19/2019	Checked in summary file, OW spot check
	HCUZ(2)		94600							
	HCUZ(3)		0.6		J. Davis	5/29/2019				
	HCUZ(4)		3.15		J. Davis	8/9/2019		O.Warren	8/6/2019	Checked in summary file
	HCUZ(5)		16.7		J. Davis	8/9/2019		O.Warren	8/6/2019	Checked in summary file
Unsaturated zone soil b parameter	BUZ(1)	--	5.4							
	BUZ(2)		4.05							
	BUZ(3)		11.4							
	BUZ(4)		11.4							
	BUZ(5)		10.4							
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1							
	ALPHALU(2)		0.1							
	ALPHALU(3)		0.1							
	ALPHALU(4)		0.1							
	ALPHALU(5)		0.1							
Saturated Zone Hydrological Data										
Thickness of saturated zone	DPTHAQ	m	60.96							
Dry bulk density of saturated zone	DENSAQ	g/cm^3	1.8							
Saturated zone total porosity	TPSZ	--	0.35							
Saturated zone effective porosity	EPSZ	--	0.27		J. Davis	8/9/2019		O.Warren	8/6/2019	Checked in summary file, OW
Saturated zone hydraulic conductivity	HCSZ	m/yr	83.6							
Saturated zone hydraulic gradient to well	HGW	--	0.036		J. Davis	3/10/2020		O.Warren	7/19/2019	Checked in summary file, OW
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10							
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1							
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1							
Depth of aquifer contributing to well	DWIBWT	m	40.00		J. Davis	3/10/2020		O.Warren	7/19/2019	Checked in summary file, OW
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		J. Davis	3/10/2020		O.Warren	7/19/2019	Checked in summary file, OW
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5							
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15							
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315							
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48					O.Warren	7/19/2019	Checked in summary file, OW spot check
Water Use										
Quantity of water consumed by an individual	DWI	L/yr	730							

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Fraction of water from surface body for human consumption	FSWD	--	0							
Fraction of water from well for human consumption	FWWD	--	1							
Number of household individuals consuming and using water	NDWI	--	4							
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225							
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0							
Fraction of water from well for use indoors of dwelling	FWWHH	--	1							
Beef Cattle										
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive						
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive						
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive						
Number of cattle for beef cattle	NLWI(1)	--	2	Inactive						
Dairy Cows										
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive						
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive						
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive						
Number of cows for dairy cows	NLWI(2)	--	2	Inactive						
Fruit, grain, non-leafy vegetables										
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15	Inactive						
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1	Inactive						
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0	Inactive						
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Inactive						
Leafy Vegetables										
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15	Inactive						
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1	Inactive						
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0	Inactive						
Area of Plot for leafy vegetables		m^2	1024	Inactive						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Pasture and Silage										
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15	Inactive						
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1	Inactive						
Fraction of water from well for pasture and silage	FWWIR(3)	--	0	Inactive						
Area of Plot for pasture and silage		m^2	10000	Inactive						
Livestock Feed Grain										
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15	Inactive						
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1	Inactive						
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0	Inactive						
Area of Plot for livestock feed grain		m^2	10000	Inactive						
Offsite Dwelling Site										
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015	Inactive						
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1	Inactive						
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0	Inactive						
Area of Plot for offsite dwelling site		m^2	1024	Inactive						
Well pumping rate	UW	m^3/yr	332					O.Warren	7/19/2019	Checked in summary file, OW spot check
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	331.645	Calculated						
Surface Water Body Parameters										
Sediment delivery ratio	SDR	--	1							
Volume of surface water body	VLAKE	m^3	250					O.Warren	7/19/2019	Checked in summary file, OW spot check
Mean residence time of water in surface water body	TLAKE	yr	0.0001		J. Davis	5/1/2019	Spot Check			
Surface area of water in surface water body:		m^2	500	Calculated						
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100							
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468							
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0							
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50							
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50							
Convergence criterion (fractional accuracy desired)	EPS	--	0		J. Davis	3/10/2020		O.Warren	7/19/2019	Checked in summary file, OW
Main sub zones in primary contamination	NPCZ	--	5							
Main sub zones in submerged primary contamination	NSPCZ	--	5							
Main sub zones in saturated zone	NPSS	--	5							
Main sub zones in each partially saturated zone	NAQS	--	5					O.Warren	7/19/2019	Checked in summary file, OW spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes							
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	0							
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	0							
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6							
Ingestion Rates										
Consumption Rate										
Drinking water intake	DWI	L/yr	730							
Fish consumption	DFI(1)	kg/yr	2.43	Inactive						
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive						
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive						
Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive						
Meat consumption	DMI(1)	kg/yr	91.9	Inactive						
Milk consumption	DMI(2)	L/yr	110	Inactive						
Soil (incidental) ingestion rate	SOIL	g/yr	36.53	Inactive						
Drinking water intake from affected area		--	1							
Fish consumption from affected area	FFISH(1)	--	1.0	Inactive						
Other aquatic food consumption from affected area	FFISH(2)	--	0.5	Inactive						
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5	Inactive						
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5	Inactive						
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	J. Davis	3/10/2020		O.Warren	7/19/2019	Not used, OW checked in model
Milk consumption from affected area	FMEMI(2)	--	0.5	Inactive						
Livestock Intakes										
Beef Cattle										
Water intake for beef cattle	LWI(1)	L/d	50	Inactive						
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive						
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive						
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1	Inactive						
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4	Inactive						
Dairy Cows										
Water intake for dairy cows	LWI(2)	L/d	160	Inactive						
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	41.5	Inactive						
Grain intake for dairy cows	LFI(2,2)	kg/d	8.5	Inactive						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4	Inactive						
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1	Inactive						
Livestock Feed Factors										
Pasture and Silage										
Wet weight crop yield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive						
Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08	Inactive						
Foliage to food transfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive						
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive						
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive						
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive						
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive						
Grain										
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70	Inactive	J. Davis	5/1/2019	Spot Check			
Duration of growing season of grain	GROWTIME(4)	yr	0.17	Inactive						
Foliage to food transfer coefficient of grain	FOLI F(4)	--	1.0	Inactive						
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0	Inactive						
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive						
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive						
Root depth of grain	DROOT(4)	m	1.20	Inactive	J. Davis	5/1/2019	Spot Check			
Plant Factors										
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70	Inactive						
Duration of growing season of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17	Inactive						
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive						
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive						
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive						
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive						
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive						
Leafy Vegetables										
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50	Inactive						
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive						
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive						
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	18.4	Inactive						
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive						
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive						
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive						
Inhalation and External Gamma Data										
Inhalation rate	INHALR	m^3/yr	8,400	Inactive						
Mass loading for inhalation	MLFD	g/m^3	0.0001							
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive						
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y							
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N							
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4	Inactive						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
External gamma shielding (penetration) factor	SHF1	--	0.7	Inactive	J. Davis	5/1/2019	Spot Check			
External Radiation Shape and Area Factors										
Dwelling location	-		Onsite							
Scale	-	m	598.375							
Dwelling location coordinate in X-direction	-	m	270		J. Davis	5/29/2019	Not found in summary document/Verified in model			
Dwelling location coordinate in y-direction	-	m	467		J. Davis	5/29/2019	Not found in summary document/Verified in model			
Radius	RAD_SHAPE(1)	m	22.500	Inactive	J. Davis	5/29/2019				
	RAD_SHAPE(2)		45.000		J. Davis	5/29/2019				
	RAD_SHAPE(3)		67.500		J. Davis	5/29/2019				
	RAD_SHAPE(4)		90.000		J. Davis	5/29/2019				
	RAD_SHAPE(5)		112.500		J. Davis	5/29/2019				
	RAD_SHAPE(6)		135.000		J. Davis	5/29/2019				
	RAD_SHAPE(7)		157.500		J. Davis	5/29/2019				
	RAD_SHAPE(8)		180.000		J. Davis	8/9/2019	Spot Check			
	RAD_SHAPE(9)		202.500		J. Davis	5/29/2019				
	RAD_SHAPE(10)		225.000		J. Davis	5/29/2019				
	RAD_SHAPE(11)		247.500		J. Davis	5/29/2019				
Radius	RAD_SHAPE(12)	m	270.000		J. Davis	5/29/2019				
Fraction (Onsite)	FRACA(1)	--	0.000		J. Davis	5/29/2019				
	FRACA(2)		0.000		J. Davis	5/29/2019				
	FRACA(3)		0.000		J. Davis	5/29/2019				
	FRACA(4)		0.000		J. Davis	5/29/2019				
	FRACA(5)		0.000		J. Davis	5/29/2019				
	FRACA(6)		0.099		J. Davis	5/29/2019				
	FRACA(7)		0.210		J. Davis	5/29/2019				
	FRACA(8)		0.230		J. Davis	5/29/2019				
	FRACA(9)		0.230		J. Davis	5/29/2019				
	FRACA(10)		0.200		J. Davis	5/29/2019				
	FRACA(11)		0.071		J. Davis	5/29/2019				
	FRACA(12)		0.015		J. Davis	5/29/2019				
Shape of the primary contamination	-	--	Polygonal							
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive						
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive						
Occupancy Factors										
Indoor time fraction on primary contamination	FIND	--	0	Inactive	J. Davis	5/1/2019	Spot Check			
Outdoor time fraction on primary contamination	FOTD	--	0.05	Inactive						
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5	Inactive						
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05	Inactive						
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1	Inactive						
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1	Inactive						
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1	Inactive						
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1	Inactive						
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive						
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive						
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive						
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive						
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive						
Total porosity of floor and foundation	TPFL		0.10	Inactive						
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive						
Depth of foundation below ground level	DMFL	m	-1	Inactive						
Vertical dimension of mixing	HMIX	m	2	Inactive						

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Reviewed By	Date	Notes	Reviewed By	Date	Notes
Building room height	HRM	m	2.50	Inactive						
Building air exchange rate	REXG	/hr	0.50	Inactive						
Building indoor area factor	FAI		0	Inactive						
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive						
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive						
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive						
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive						
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive						
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive						
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive						
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3							
Vertical dimension of mixing for inhalation	HMIX	m	2.0	Inactive						
Vertical dimension of mixing for vegetation	HMIXV	m	1.0	Inactive	J. Davis	8/9/2019	Spot Check			
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07							
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		J. Davis	8/9/2019	Spot Check			
Fraction of vegetation carbon absorbed from soil	CAIR		0.02	Inactive						
Fraction of vegetation carbon absorbed from air	CSOIL		0.98	Inactive						
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18	Inactive						
Contaminated soil	C12CZ	g/g	0.03	Inactive						
Local water	C12WTR	g/cm3	2.00E-05	Inactive						
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive						
Leafy vegetables	C12PLANT(2)		0.09	Inactive						
Pasture and Silage	C12PLANT(3)		0.09	Inactive						
Livestock feed grain	C12PLANT(4)		0.40	Inactive						
Meat	C12MEAT_MILK(1)		0.24	Inactive						
Milk	C12MEAT_MILK(2)		0.07	Inactive						
Tritium										
Humidity in air	HUMID	g/m3	8	Inactive						
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8	Inactive						
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8	Inactive						
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8	Inactive						
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8	Inactive						
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6	Inactive						
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive						
Vertical dimension of mixing for inhalation	HMIX	m	2	Inactive						

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Notes	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	9.81E-03	5.00E+04	9.10E+03	Ryan Hupfer	O.Warren	7/19/2019	Fish Only	J. Davis	7/30/2019	Fish Only
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer	O.Warren	7/19/2019		J. Davis	7/30/2019	
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer	O.Warren	7/19/2019		J. Davis	7/30/2019	
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Notes	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer	O.Warren	7/19/2019		J. Davis	7/30/2019	
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer	--	--	Not Simulated	--	--	Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by	Checked by	Date	Notes	Checked by	Date	Notes
	Waste Zone	Saprolite and Bedrock zones							
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Nd	158	158	**Ryan Hupfer**	--	--	Not Simulated			Not Simulated
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	5/1/2019	Reverified on 3/11/2020			
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**	--	--	Not Simulated	--	--	Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Notes	Checked By	Date	Notes
Ac-227	2.92E-03	STK			Not Simulated			Not Simulated
Am-241	5.90E+01	STK			Not Simulated			Not Simulated
Am-243	2.97E+00	STK			Not Simulated			Not Simulated
Ba-133	1.60E+00	STK			Not Simulated			Not Simulated
Be-10	2.53E-05	STK			Not Simulated			Not Simulated
C-14	2.88E+00	STK	J. Davis	7/30/2019		O.Warren	7/19/2109	
Ca-41	4.21E-02	STK			Not Simulated			Not Simulated
Cd-113m	NA	STK			Not Simulated			Not Simulated
Cf-249	1.09E-06	STK			Not Simulated			Not Simulated
Cf-250	7.40E-06	STK			Not Simulated			Not Simulated
Cf-251	2.10E-07	STK			Not Simulated			Not Simulated
Cf-252	1.31E-07	STK			Not Simulated			Not Simulated
Cm-243	4.30E-01	STK			Not Simulated			Not Simulated
Cm-244	1.26E+02	STK			Not Simulated			Not Simulated
Cm-245	3.83E-02	STK			Not Simulated			Not Simulated
Cm-246	1.59E-01	STK			Not Simulated			Not Simulated
Cm-247	1.04E-02	STK			Not Simulated			Not Simulated
Cm-248	5.59E-04	STK			Not Simulated			Not Simulated
Co-60	2.00E-02	STK			Not Simulated			Not Simulated
Cs-134	1.06E-08	STK			Not Simulated			Not Simulated
Cs-135	NA	STK			Not Simulated			Not Simulated
Cs-137	1.18E+03	STK			Not Simulated			Not Simulated
Eu-152	2.87E+01	STK			Not Simulated			Not Simulated
Eu-154	6.49E+00	STK			Not Simulated			Not Simulated
Eu-155	6.74E-03	STK			Not Simulated			Not Simulated
Fe-55	8.95E-07	STK			Not Simulated			Not Simulated
H-3	1.12E+01	STK	J. Davis	7/30/2019		O.Warren	7/19/2019	
I-129	4.07E-01	STK	J. Davis	7/30/2019		O.Warren	7/19/2019	
K-40	3.28E+00	STK			Not Simulated			Not Simulated
Kr-85	3.55E-01	STK			Not Simulated			Not Simulated
Mo-100	4.20E-06	STK			Not Simulated			Not Simulated
Mo-93	3.88E-01	STK			Not Simulated			Not Simulated
Na-22	8.22E-07	STK			Not Simulated			Not Simulated
Nb-93m	2.33E-01	STK			Not Simulated			Not Simulated
Nb-94	1.63E-02	STK			Not Simulated			Not Simulated
Ni-59	3.04E+00	STK			Not Simulated			Not Simulated
Ni-63	6.73E+02	STK			Not Simulated			Not Simulated
Np-237	3.25E-01	STK			Not Simulated			Not Simulated
Pa-231	2.39E-01	STK			Not Simulated			Not Simulated
Pb-210	3.68E+00	STK			Not Simulated			Not Simulated
Pd-107	NA	STK			Not Simulated			Not Simulated
Pm-146	8.84E-05	STK			Not Simulated			Not Simulated
Pm-147	2.20E-04	STK			Not Simulated			Not Simulated
Pu-238	9.38E+01	STK			Not Simulated			Not Simulated
Pu-239	5.83E+01	STK			Not Simulated			Not Simulated
Pu-240	6.20E+01	STK			Not Simulated			Not Simulated
Pu-241	2.04E+02	STK			Not Simulated			Not Simulated
Pu-242	1.73E-01	STK			Not Simulated			Not Simulated
Pu-244	3.68E-03	STK			Not Simulated			Not Simulated
Ra-226	8.01E-01	STK			Not Simulated			Not Simulated
Ra-228	2.21E-02	STK			Not Simulated			Not Simulated
Re-187	1.71E-06	STK			Not Simulated			Not Simulated
Sb-125	3.03E-08	STK			Not Simulated			Not Simulated
Se-79	NA	STK			Not Simulated			Not Simulated
Sm-151	NA	STK			Not Simulated			Not Simulated
Sn-121m	NA	STK			Not Simulated			Not Simulated
Sn-126	NA	STK			Not Simulated			Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Notes	Checked By	Date	Notes
Sr-90	1.92E+02	STK			Not Simulated			Not Simulated
Tc-99	2.80E+00	STK	J. Davis	7/30/2019		O.Warren	7/19/2019	
Th-228	2.11E-06	STK			Not Simulated			Not Simulated
Th-229	5.71E+00	STK			Not Simulated			Not Simulated
Th-230	1.92E+00	STK			Not Simulated			Not Simulated
Th-232	3.52E+00	STK			Not Simulated			Not Simulated
U-232	1.02E+01	STK			Not Simulated			Not Simulated
U-233	4.16E+01	STK			Not Simulated			Not Simulated
U-234	6.30E+02	STK			Not Simulated			Not Simulated
U-235	3.97E+01	STK			Not Simulated			Not Simulated
U-236	8.98E+00	STK			Not Simulated			Not Simulated
U-238	3.81E+02	STK			Not Simulated			Not Simulated
Zr-93	NA	STK			Not Simulated			Not Simulated

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer					
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer			J. Davis	1/21/2020	Spot Check
Exposure duration	ED	yr	30		Ryan Hupfer					
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer					
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer					
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer	N. Holt	1/13/2020			Spot check
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer					
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer			J. Davis	1/21/2020	Spot Check
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer					
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer			J. Davis	1/21/2020	Spot Check
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer					
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer					
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer					
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer			J. Davis	1/21/2020	Spot Check
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer					
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer					
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer			J. Davis	1/21/2020	Spot Check
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer					
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer					
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer					
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer					
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer			J. Davis	1/21/2020	Spot Check
Source					-					
Nuclide concentration	S1	pCi/g	varies		Ryan Hupfer					
Release to groundwater, leach rate		1/yr	varies		Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer					
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	300		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.75 for C-14, H-3 0 for All Other Nuclides		Ryan Hupfer					
Time over which transformation to releasable form occurs	RELDUR	Years	500 for C-14, H-3 800 for All Other Nulides		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer					
Release Mechanism	RELOPT		Instantaneous Equilibrium Sorption Desorption, 1		Ryan Hupfer					
Initial Leach Rate	RLEACH ALEACH	1/year	0		Ryan Hupfer					
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer					
Distribution Coefficient in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer	N. Holt	1/13/2020			Checked in Kd sheet
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer					
Distribution Coefficients					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Contaminated zone	DCACTC DCNUCC	cm^3/g	varies		Ryan Hupfer	N. Holt	1/13/2020			Checked in Kd sheet
Unsaturated zone	DCACTU(1-5) DCNUCU(1-5)	cm^3/g	varies		Ryan Hupfer	N. Holt	1/13/2020			Checked in Kd sheet
Saturated zone	DCACTS DCNUCS	cm^3/g	varies		Ryan Hupfer	N. Holt	1/13/2020			Checked in Kd sheet
Sediment in surface water body	DCACTSWB DCNUCSWB	cm^3/g	0		Ryan Hupfer	N. Holt	1/13/2020			Checked in Kd sheet
Fruit, grain, nonleafy fields	DCACTV1 DCNUCOF(1)	cm^3/g	varies		Ryan Hupfer	N. Holt	1/13/2020			Checked in Kd sheet
Leafy vegetable fields	DCACTV2 DNUCOF(2)	cm^3/g	varies		Ryan Hupfer	N. Holt	1/13/2020			Checked in Kd sheet
Pasture, silage growing areas	DCACTL1 DNUCOF(3)	cm^3/g	varies		Ryan Hupfer	N. Holt	1/13/2020			Checked in Kd sheet
Livestock feed grain fields	DCACTL2 DNUCOF(4)	cm^3/g	varies		Ryan Hupfer	N. Holt	1/13/2020			Checked in Kd sheet
Offsite dwelling site	DCACTDWE DCNUCDWE	cm^3/g	varies		Ryan Hupfer	N. Holt	1/13/2020			Checked in Kd sheet
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Dose Conversion and Slope Factors					-					
External exposure library	N/A	(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer					
Internal exposure dose library	N/A	mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer					
Slope Factor (Risk) Library	N/A	(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer					
Transfer Factors					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer					
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times					-					
Times at which output is reported	T()	yr	200, 300, 400, 500, 600, 700, 800, 900, 1000		Ryan Hupfer	N. Holt	1/13/2020			Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer					
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer					
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer					
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer					
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer					
Wind speed	WIND	m/s	3.4342	Calc	Ryan Hupfer					
Primary Contamination					-					
Area of primary contamination	AREA	m^2	95,900	Calc	Ryan Hupfer					
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer					
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer					
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer					
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Rainfall and Runoff Factor	RAINEROS	--	0		Ryan Hupfer					
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer					
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer					
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer					
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer					
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer					
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer					
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer					
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer					
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer					
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer					
Clean Cover					-					
Thickness of clean cover	COVER0	m	3.353		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer					
Erosion rate of clean cover	VCV	m/yr	0	Calc	Ryan Hupfer					
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer					
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer					
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field	AREAO(1)	m2	1024	Calc	Ryan Hupfer	N. Holt	1/13/2020			Spot check
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0		Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer					
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer					
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer			J. Davis	1/21/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer					
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer					
Leafy Vegetable Field					-					
Area for leafy vegetable field	AREAO(2)	m^2	1024	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0		Ryan Hupfer					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer					
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3		Ryan Hupfer					
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer					
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer					
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer					
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field	AREAO(3)	m^2	10000	Calc	Ryan Hupfer			J. Davis	1/21/2020	Spot check
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0		Ryan Hupfer					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer					
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer					
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer					
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer					
Grain Field					-					
Area for grain field	AREAO(4)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0		Ryan Hupfer					
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer					
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer					
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer					
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer					
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer					
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer					
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer					
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site	AREAODWELL	m^2	1024	Calc	Ryan Hupfer					
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer					
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer					
Volumetric water content for dwelling site	TMOFDWELL	--	0.3		Ryan Hupfer					
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer					
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer					

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Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer					
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer					
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer					
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer					
Anemometer height	ANH	m	10		Ryan Hupfer					
Ambient temperature	TABK	K	285		Ryan Hupfer	N. Holt	1/13/2020			Spot check
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer					
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer					
Dispersion model coefficients	IDISPMOD	--	Pasquill-Gifford		Ryan Hupfer					
Windspeed Terrain	IZONE	--	Rural		Ryan Hupfer					
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer					
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer					
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer					
Dwelling site	DWELLELEV	m	0		Ryan Hupfer					
Surface water body	SWELEV	m	0		Ryan Hupfer					
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer					
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer					
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer			J. Davis	1/21/2020	Spot check
	H(2)		0.305		Ryan Hupfer					
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer					
	H(4)		3.048		Ryan Hupfer					
	H(5)		4.846		Ryan Hupfer					
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer	N. Holt	1/13/2020			Spot check
	DENSUZ(2)		1.6		Ryan Hupfer					
	DENSUZ(3)		1.5		Ryan Hupfer					
	DENSUZ(4)		1.5		Ryan Hupfer					
	DENSUZ(5)		1.8		Ryan Hupfer					
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer			J. Davis	1/21/2020	Spot check
	TPUZ(2)		0.397		Ryan Hupfer					
	TPUZ(3)		0.427		Ryan Hupfer					
	TPUZ(4)		0.419		Ryan Hupfer					
	TPUZ(5)		0.353		Ryan Hupfer					
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer					
	EPUZ(2)		0.389		Ryan Hupfer					
	EPUZ(3)		0.195		Ryan Hupfer	N. Holt	1/13/2020			Spot check
	EPUZ(4)		0.234		Ryan Hupfer					
	EPUZ(5)		0.27		Ryan Hupfer					

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Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer					
	FCUZ(2)		0.032		Ryan Hupfer					
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer					
	FCUZ(5)		0.2471		Ryan Hupfer					
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer					
	HCUZ(2)		94600		Ryan Hupfer					
	HCUZ(3)		0.315		Ryan Hupfer					
	HCUZ(4)		3.15		Ryan Hupfer			J. Davis	1/21/2020	Spot check
	HCUZ(5)		16.7		Ryan Hupfer					
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer					
	BUZ(2)		4.05		Ryan Hupfer					
	BUZ(3)		11.4		Ryan Hupfer			J. Davis	1/21/2020	Spot check
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer					
	ALPHALU(2)		0.1		Ryan Hupfer					
	ALPHALU(3)		0.1		Ryan Hupfer					
	ALPHALU(4)		0.1		Ryan Hupfer					
	ALPHALU(5)		0.1		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer					
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer					
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer					
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer					
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer					
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer					
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer			J. Davis	1/21/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer					
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer					
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer					
Fraction of water from surface body for human consumption	FSWD	--	0		Ryan Hupfer					
Fraction of water from well for human consumption	FWWD	--	1		Ryan Hupfer					
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer					
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer					
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50		Ryan Hupfer					
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Fraction of water from well for beef cattle	FWWLV(1)	--	0		Ryan Hupfer					
Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer					
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1		Ryan Hupfer					
Fraction of water from well for dairy cows	FWWLV(2)	--	0		Ryan Hupfer					
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer					
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer					
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer					
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer					
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Area of Plot for leafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer					
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer					
Area of Plot for pasture and silage		m^2	10000	Calc	Ryan Hupfer					
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer					
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Area of Plot for livestock feed grain		m^2	10000	Calc	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer					
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer					
Area of Plot for offsite dwelling site		m^2	1024	Calc	Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer					
Well pumping rate needed to support specified water use		m^3/yr	331.645	Calc	Ryan Hupfer					
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer					
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer					
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer					
Surface area of water in surface water body:	ALAKE	m^2	500	Calc	Ryan Hupfer					
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer					
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer					
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer					
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer					
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer					
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer					
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer					
Fish consumption	DFI(1)	kg/yr	2.43		Ryan Hupfer					
Other aquatic food consumption	DFI(2)	kg/yr	0.0		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Leafy vegetables consumption	DVI(2)	kg/yr	17.0		Ryan Hupfer					
Meat consumption	DMI(1)	kg/yr	91.9		Ryan Hupfer					
Milk consumption	DMI(2)	L/yr	110		Ryan Hupfer					
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer					
Drinking water intake from affected area		--	1	Calc	Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.0		Ryan Hupfer					
Other aquatic food consumption from affected area	FFISH(2)	--	0.5		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5		Ryan Hupfer					
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5		Ryan Hupfer					
Meat consumption from affected area	FMEMI(1)	--	0.25		Ryan Hupfer					
Milk consumption from affected area	FMEMI(2)	--	0.5		Ryan Hupfer					
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50		Ryan Hupfer					
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0		Ryan Hupfer					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0		Ryan Hupfer					
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1		Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4		Ryan Hupfer					
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0		Ryan Hupfer					
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0		Ryan Hupfer					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1		Ryan Hupfer					
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Duration of growingseason of pasture and silage	GROWTIME(3)	yr	0.08		Ryan Hupfer					
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1		Ryan Hupfer					
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25		Ryan Hupfer					
Root depth of pasture and silage	DROOT(3)	m	0.90		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70		Ryan Hupfer					
Duration of growing season of grain	GROWTIME(4)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1		Ryan Hupfer					
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Root depth of grain	DROOT(4)	m	1.20		Ryan Hupfer					
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70		Ryan Hupfer					
Duration of growingseason of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1		Ryan Hupfer					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20		Ryan Hupfer					
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50		Ryan Hupfer					
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1		Ryan Hupfer					
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25		Ryan Hupfer					
Root depth of leafy vegetables	DROOT(2)	m	0.90		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer					
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer					

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Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer					
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer					
Scale	-	m	598.375		Ryan Hupfer					
Dwelling location coordinate in X-direction	-	m	210	Calc	Ryan Hupfer					
Dwelling location coordinate in y-direction	-	m	547		Ryan Hupfer					
Radius	RAD_SHAPE(1)	m	43.5833		Ryan Hupfer			J. Davis	1/21/2020	Spot check
	RAD_SHAPE(2)		87.1667		Ryan Hupfer					
	RAD_SHAPE(3)		130.7500		Ryan Hupfer					
	RAD_SHAPE(4)		174.3333		Ryan Hupfer					
	RAD_SHAPE(5)		217.9167		Ryan Hupfer	N. Holt	1/13/2020			Spot check
	RAD_SHAPE(6)		261.5000		Ryan Hupfer					
	RAD_SHAPE(7)		305.0833		Ryan Hupfer					
	RAD_SHAPE(8)		348.6667		Ryan Hupfer					
	RAD_SHAPE(9)		392.2500		Ryan Hupfer					
	RAD_SHAPE(10)		435.8333		Ryan Hupfer			J. Davis	1/21/2020	Spot check
	RAD_SHAPE(11)		479.4167		Ryan Hupfer					
Radius	RAD_SHAPE(12)	m	523.0000		Ryan Hupfer					
Fraction (Onsite)	FRACA(1)	--	0		Ryan Hupfer					
	FRACA(2)		0		Ryan Hupfer					
	FRACA(3)		0.04		Ryan Hupfer					
	FRACA(4)		0.21		Ryan Hupfer					
	FRACA(5)		0.22		Ryan Hupfer					
	FRACA(6)		0.18		Ryan Hupfer					
	FRACA(7)		0.15		Ryan Hupfer					
	FRACA(8)		0.12		Ryan Hupfer					
	FRACA(9)		0.11		Ryan Hupfer			J. Davis	1/21/2020	Spot check
	FRACA(10)		0.097		Ryan Hupfer			J. Davis	1/21/2020	Spot check
	FRACA(11)		0.088		Ryan Hupfer					
	FRACA(12)		0.049		Ryan Hupfer					
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer					
Outdoor time fraction on primary contamination	FOTD	--	0.05		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5		Ryan Hupfer					
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05		Ryan Hupfer					
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1		Ryan Hupfer					
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1		Ryan Hupfer					
Radon										

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer					
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer					
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer					
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer					
Vertical dimension of mixing for vegetation	HMIXV	m	1.0		Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer					
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer					
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02		Ryan Hupfer					
Fraction of vegetation carbon absorbed from air	CAIR		0.98		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer			J. Davis	1/21/2020	Spot check
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Local water	C12WTR	g/cm3	2.00E-05		Ryan Hupfer					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40		Ryan Hupfer					
Leafy vegetables	C12PLANT(2)		0.09		Ryan Hupfer					
Pasture and Silage	C12PLANT(3)		0.09		Ryan Hupfer					
Livestock feed grain	C12PLANT(4)		0.40		Ryan Hupfer					
Meat	C12MEAT_MILK(1)		0.24		Ryan Hupfer	N. Holt	1/13/2020			Spot check
Milk	C12MEAT_MILK(2)		0.07		Ryan Hupfer					
Tritium										
Humidity in air	HUMID	g/m3	8		Ryan Hupfer					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8		Ryan Hupfer					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8		Ryan Hupfer					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8		Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8		Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6		Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer					Not Simulated
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer	J. Davis	1/21/2020			Fish only
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer					Not Simulated
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer					Not Simulated
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer	J. Davis	1/21/2020			
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer					Not Simulated
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer					Not Simulated
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer					Not Simulated
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer					Not Simulated
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					Not Simulated
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					Not Simulated
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer	J. Davis	1/21/2020			
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					Not Simulated
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					Not Simulated
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					Not Simulated
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					Not Simulated
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					Not Simulated
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					Not Simulated
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					Not Simulated
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					Not Simulated
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					Not Simulated
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					Not Simulated
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by	Checked by	Date	Checked by	Date	Notes
	Waste Zone	Saprolite and Bedrock zones						
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/13/2020	J. Davis	1/21/2020	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
H	0	0	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/13/2020	J. Davis	1/21/2020	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nd	158	158	**Ryan Hupfer**					Not Simulated
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	1/13/2020	J. Davis	1/21/2020	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
U	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03	STK							Not simulated
Am-241	5.90E+01	STK							Not simulated
Am-243	2.97E+00	STK							Not simulated
Ba-133	1.60E+00	STK							Not simulated, screened
Be-10	2.53E-05	STK							Not simulated
C-14	5.40E-01	RH							
Ca-41	4.21E-02	STK							Not simulated
Cd-113m	NA	STK							Not simulated, screened
Cf-249	1.09E-06	STK							Not simulated, screened
Cf-250	7.40E-06	STK							Not simulated, screened
Cf-251	2.10E-07	STK							Not simulated, screened
Cf-252	1.31E-07	STK							Not simulated, screened
Cl-36		RH							Not simulated, no inventory value
Cm-243	4.30E-01	STK							Not simulated
Cm-244	1.26E+02	STK							Not simulated
Cm-245	3.83E-02	STK							Not simulated
Cm-246	1.59E-01	STK							Not simulated
Cm-247	1.04E-02	STK							Not simulated
Cm-248	5.59E-04	STK							Not simulated
Co-60	2.00E-02	STK							Not simulated, screened
Cs-134	1.06E-08	STK							Not simulated, screened
Cs-135	NA	STK							Not simulated, no inventory value
Cs-137	1.18E+03	STK							Not simlated, screened
Eu-152	2.87E+01	STK							Not simulated
Eu-154	6.49E+00	STK							Not simulated, screened
Eu-155	6.74E-03	STK							Not simulated, screened
Fe-55	8.95E-07	STK							Not simulated, screened
H-3	4.64E+00	RH							Not simulated
I-129	3.50E-01	RH							
K-40	3.28E+00	STK							Not simulated
Kr-85	3.55E-01	STK							Not simulated, screened
Mo-100	4.20E-06	STK							Not simulated, screened
Mo-93	3.88E-01	STK							Not simulated
Na-22	8.22E-07	STK							Not simulated, screened
Nb-93m	2.33E-01	STK							Not simulated
Nb-94	1.63E-02	STK							Not simulated
Ni-59	3.04E+00	STK							Not simulated
Ni-63	6.73E+02	STK							Not simulated, screened
Np-237	3.25E-01	STK							Not simulated
Pa-231	2.39E-01	STK							Not simulated
Pb-210	3.68E+00	STK							Not simulated
Pd-107	NA	STK							Not simulated, no inventory value
Pm-146	8.84E-05	STK							Not simulated, screened
Pm-147	2.20E-04	STK							Not simulated, screened
Pu-238	9.38E+01	STK							Not simulated
Pu-239	5.83E+01	STK							Not simulated
Pu-240	6.20E+01	STK							Not simulated
Pu-241	2.04E+02	STK							Not simulated
Pu-242	1.73E-01	STK							Not simulated
Pu-244	3.68E-03	STK							Not simulated
Ra-226	8.01E-01	STK							Not simulated
Ra-228	2.21E-02	STK							Not simulated
Re-187	1.71E-06	STK							Not simulated, screened
Sb-125	3.03E-08	STK							Not simulated, screened
Se-79	NA	STK							Not simulated, no inventory value
Sm-151	NA	STK							Not simulated, no inventory value
Sn-121m	NA	STK							Not simulated, no inventory value

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Checked By	Date	Notes
Sn-126	NA	STK							Not simulated, no inventory value
Sr-90	1.92E+02	STK							Not simulated
Tc-99	1.56E+00	RH							
Th-228	2.11E-06	STK							Not simulated
Th-229	5.71E+00	STK							Not simulated
Th-230	1.92E+00	STK							Not simulated
Th-232	3.52E+00	STK							Not simulated
U-232	1.02E+01	STK							Not simulated
U-233	4.16E+01	STK							Not simulated
U-234	6.30E+02	STK							Not simulated
U-235	3.97E+01	STK							Not simulated
U-236	8.98E+00	STK							Not simulated
U-238	3.81E+02	STK							Not simulated
Zr-93	NA	STK							Not simulated, no inventory value

Zone	Parameter	Unit	Distribution	Alpha(P)/ Mean	Beta(Q)/Standard Deviation	Min/Lower Quantile	Max/Upper Quantile	Min	Max	RESRAD Identifier	Relations or Correlations (rcc is rank correlation coefficient)	Input Type	Prepared by	Cheked by	Date	Cheked by	Date	Notes
CZ	Time at which radionuclide first becomes releasable (delay time), C-14	y	Beta (asymmetric)	2	5	100	1000	100	1000	RELTIMEINIT(C-14)	No Correlation	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
CZ	Time at which radionuclide first becomes releasable (delay time), I-129	y	Related Parameter Specification					100	1000	RELTIMEINIT(I-129)	RELTIMEINIT(I-129) = RELTIMEINIT(C-14)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
CZ	Time at which radionuclide first becomes releasable (delay time), Tc-99	y	Related Parameter Specification					100	1000	RELTIMEINIT(Tc-99)	RELTIMEINIT(Tc-99) = RELTIMEINIT(C-14)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
CZ	Time over which transformation to releasable form occurs, C-14	y	Related Parameter Specification					400	1200	RELDUR(C-14)	RELDUR(C-14) = RELDUR(I-129)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
CZ	Time over which transformation to releasable form occurs, I-129	y	Beta (symmetric)	4	4	400	1200	400	1200	RELDUR(I-129)	rcc = -0.9 (negative) for RELDUR(I-129) and RELFRACINIT(I-129) rcc = 0.9 for RELDUR(I-129) and DCACTU1(I-129) rcc = 0.9 for RELDUR(I-129) and DCACTU1(Tc-99)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
CZ	Time over which transformation to releasable form occurs, Tc-99	y	Related Parameter Specification					400	1200	RELDUR(Tc-99)	RELDUR(Tc-99) = RELDUR(I-129)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
CZ	Initial Releaseable Fraction C-14	-	Related Parameter Specification					0.4	0.9	RELFRACINIT(C-14)	RELFRACINIT(C-14) = 0.4 + RELFRACINIT(I-129)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
CZ	Initial Releaseable Fraction I-129	-	Beta (decreasing)	1	3	0	0.5	0	0.5	RELFRACINIT(I-129)	rcc = -0.9 (negative) for RELFRACINIT(I-129) and RELDUR(I-129)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
CZ	Initial Releaseable Fraction Tc-99	-	Related Parameter Specification					0	0.5	RELFRACINIT(Tc-99)	RELFRACINIT(Tc-99) = RELFRACINIT(I-129)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
CZ	Contaminated Zone, I-129 Kd	ml/g	Related Parameter Specification					0	4	DCACTC(I-129)	DCACTC(I-129) = DCACTU1(I-129)/2	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
UZ	Unsaturated Zone 1, I-129 Kd	ml/g	Bounded Normal	Mean = 4	SD = 1.7	0	8	0	8	DCACTU1(I-129)	rcc= 0.9 for DCACTU1(I-129) and RELDUR(I-129) rcc = 0.9 for DCACTU1(I-129) and DCACTS(I-129)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Unsaturated Zone 2, I-129 Kd	ml/g	Related Parameter Specification					0	8	DCACTU2(I-129)	DCACTU2(I-129) = DCACTU1(I-129)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
UZ	Unsaturated Zone 3, I-129 Kd	ml/g	Related Parameter Specification					0	8	DCACTU3(I-129)	DCACTU3(I-129) = DCACTU1(I-129)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
UZ	Unsaturated Zone 4, I-129 Kd	ml/g	Related Parameter Specification					0	8	DCACTU4(I-129)	DCACTU4(I-129) = DCACTU1(I-129)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
UZ	Unsaturated Zone 5, I-129 Kd	ml/g	Related Parameter Specification					0	8	DCACTU5(I-129)	DCACTU5(I-129) = DCACTU1(I-129)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
SZ	Saturated Zone, I-129 Kd	ml/g	Bounded Normal	Mean = 4	SD = 1.7	0	8	0	8	DCACTS(I-129)	rcc = 0.9 for DCACTS(I-129) and DCACTU1(I-129)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
CZ	Contaminated Zone, Tc-99 Kd	ml/g	Related Parameter Specification					0	0.72	DCACTC(Tc-99)	DCACTC(Tc-99) = DCACTU1(Tc-99)/2	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
UZ	Unsaturated Zone 1, Tc-99 Kd	ml/g	Bounded Normal	Mean = 0.72	SD = 0.31	0	1.44	0	1.44	DCACTU1(Tc-99)	rcc = 0.9 for DCACTU1(Tc-99) and RELDUR(I-129) rcc = 0.9 for DCACTU1(Tc-99) and DCACTS(Tc-99)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Unsaturated Zone 2, Tc-99 Kd	ml/g	Related Parameter Specification					0	1.44	DCACTU2(Tc-99)	DCACTU2(Tc-99) = DCACTU1(Tc-99)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
UZ	Unsaturated Zone 3, Tc-99 Kd	ml/g	Related Parameter Specification					0	1.44	DCACTU3(Tc-99)	DCACTU3(Tc-99) = DCACTU1(Tc-99)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
UZ	Unsaturated Zone 4, Tc-99 Kd	ml/g	Related Parameter Specification					0	1.44	DCACTU4(Tc-99)	DCACTU4(Tc-99) = DCACTU1(Tc-99)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
UZ	Unsaturated Zone 5, Tc-99 Kd	ml/g	Related Parameter Specification					0	1.44	DCACTU5(Tc-99)	DCACTU5(Tc-99) = DCACTU1(Tc-99)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
SZ	Saturated Zone, Tc-99 Kd	ml/g	Bounded Normal	Mean = 0.72	SD = 0.31	0	1.44	0	1.44	DCACTS(Tc-99)	rcc = 0.9 for DCACTS(Tc-99) and DCACTU1(Tc-99)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
CZ	Precipitation	m/yr	Beta (symmetric)	4	4	1.037	1.728	1.037	1.73	PRECIP	rcc = 0.9 for PRECIP and RUNOFF rcc = -0.9 (negative) for PRECIP and TLAKE rcc = -0.9 (negative) for PRECIP and H(5) rcc = 0.9 for PRECIP and HGW	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
CZ	Runoff coefficient	-	Beta (increasing)	4.75	1	0.83	0.982	0.830	0.982	RUNOFF	rcc = 0.9 for RUNOFF and PRECIP rcc = 0.9 for RUNOFF and H(5)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
CZ	Bulk Density of Contaminated Zone	g/cc	Beta (symmetric)	4	4	1.80	2.00	1.80	2.00	DENSCZ	No Correlation	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
CZ	Total Porosity of Contaminated Zone	-	Related Parameter Specification					0.39	0.45	TPCZ	TPCZ = 1-DENSCZ/[1.9/(1-0.419)] TPCZ = 1-DENSCZ/3.27	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
CZ	Contaminated Zone Effective Porosity	-	Beta (symmetric)	4	4	0.12	0.35	0.12	0.35	EPCZ	rcc = 0.9 for EPCZ and HCCZ	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
CZ	Hydraulic Conductivity of Contaminated Zone	m/yr	Truncated lognormal-N	Mean = ln(6)	SD = 1	Max = 1.2 LQ = 5%	Min = 30 UQ = 95%	1.20	30.00	HCCZ	rcc = 0.9 for HCCZ and EPCZ	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
CZ	Soil b-parameter		Beta (symmetric)	4	4	4.65	10.85	4.65	10.9	BCZ		P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
CZ	Contaminated Zone Longitudinal Dispersivity	m	Beta (symmetric)	4	4	0.05	3.55	0.05	3.55	ALPHALCZ		P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Bulk Density UZ3	g/cc	Related Parameter Specification					1.41	1.63	DENSUZ(3)	DENSUZ(3) = (1-TPUZ(3))*2.65 DENSUZ(3) = 2.65-2.65*TPUZ(3)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
UZ	Total Porosity of UZ3	-	Beta (symmetric)	4	4	0.384	0.470	0.384	0.470	TPUZ(3)	No Correlation	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Unsaturated Zone Effective Porosity: UZ3 (Clay Liner)	-	Beta (symmetric)	4	4	0.176	0.215	0.176	0.215	EPUZ(3)	No Correlation	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Unsaturated Zone Longitudinal Dispersivity: UZ3 (Clay Liner)	m	Beta (asymmetric)	1.25	3	0.05	0.5	0.05	0.5	ALPHALU(3)	rcc = 0.9 for ALPHALU(3) and ALPHALU(4)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Bulk Density UZ4	g/cc	Related Parameter Specification					1.43	1.65	DENSUZ(4)	DENSUZ(4) = (1-TPUZ(4))*2.65 DENSUZ(4) = 2.65-2.65*TPUZ(4)	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
UZ	Total Porosity of UZ4	-	Beta (symmetric)	4	4	0.377	0.461	0.377	0.461	TPUZ(4)	No Correlation	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Unsaturated Zone Effective Porosity: UZ4 (Geobuffer)	-	Beta (symmetric)	4	4	0.211	0.257	0.211	0.257	EPUZ(4)	No Correlation	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Unsaturated Zone Longitudinal Dispersivity: UZ4 (Geobuffer)	m	Beta (asymmetric)	1.25	3	0.05	0.5	0.05	0.5	ALPHALU(4)	rcc = 0.9 for ALPHALU(4) and ALPHALU(3)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Unsaturated Zone Thickness: UZ5 (In-Situ Material)	m	Beta (asymmetric)	4	2.5	0.1	7.6	0.10	7.6	H(5)	rcc = -0.9 (negative) for H(5) and PRECIP rcc = 0.9 for H(5) and RUNOFF rcc = 0.9 for H(5) and ALPHALU(5)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Bulk Density UZ5	g/cc	Beta (symmetric)	4	4	1.7	1.9	1.7	1.90	DENSUZ(5)	No Correlation	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Total Porosity of UZ5	-	Related Parameter Specification					0.317	0.388	TPUZ(5)	TPUZ(5) = 1-DENSUZ(5)/2.78	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
UZ	Unsaturated Zone Effective Porosity: UZ5 (In-situ Material)	-	Beta (symmetric)	4	4	0.243	0.297	0.243	0.297	EPUZ(5)	rcc = 0.9 for EPUZ(5) and HCUZ(5)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Unsaturated Zone Hydraulic Conductivity: UZ5 (In-situ Material)	m/yr	Truncated lognormal-N	Mean = ln(16.7)	SD = 1	Min = 3.2 LQ = 5%	Max = 86.4 UQ = 95%	3.2	86.4	HCUZ(5)	rcc = 0.9 for HCUZ(5) and EPUZ(5)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
UZ	Unsaturated Zone Longitudinal Dispersivity: UZ5 (In-situ Material)	m	Beta (asymmetric)	1.25	3	0.05	0.5	0.05	0.5	ALPHALU(5)	rcc = 0.9 for ALPHALU(5) and H(5)	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
SZ	Saturated Zone Bulk Density	g/cc	Beta (symmetric)	4	4	1.7	2.5	1.7	2.5	DENSAQ	No Correlation	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
SZ	Saturated Zone Total Porosity	-	Related Parameter Specification					0.10	0.39	TPSZ	TPSZ = 1-DENSAQ/2.78	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
SZ	Saturated Zone Effective Porosity	-	Beta (symmetric)	4	4	0.18	0.22	0.18	0.22	EPSZ	rcc = 0.9 for EPSZ and HCSZ	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
SZ	Saturated Zone Hydraulic Conductivity	m/yr	Truncated lognormal-N	Mean = ln(26.8)	SD = 0.5	Min = 11.8 LQ = 5%	Max = 61 UQ = 95%	11.8	61.0	HCSZ	rcc = 0.9 for HCSZ and EPSZ rcc = -0.9 (negative) for HCSZ and HGW	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
SZ	Depth of Aquifer Contributing to Well	m	Beta (symmetric)	4	4	25.0	55.0	25.0	55.0	DWIBWT	No Correlation	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
SZ	Saturated Zone Hydraulic Gradient to Well	m/m	Beta (symmetric)	4	4	0.027	0.081	0.027	0.081	HGW	rcc = 0.9 between HGW and PRECIP rcc = -0.9 (negative) for HGW and HCSZ	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file

Zone	Parameter	Unit	Distribution	Alpha(P)/ Mean	Beta(Q)/Standard Deviation	Min/Lower Quantile	Max/Upper Quantile	Min	Max	RESRAD Identifier	Relations or Correlations (rcc is rank correlation coefficient)	Input Type	Prepared by	Cheked by	Date	Cheked by	Date	Notes
SZ	Saturated Zone Hydraulic Gradient to Surface Water Body	m/m	Related Parameter Specification					0.018009	0.05403	HGSW	HGSW = (36/54)* HGW HGSW = 0.667*HGW	R	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in rel file
SZ	Saturated Zone Longitudinal Dispersivity to Well	m	Beta (symmetric)	4	4	1	19	1	19	ALPHALOW	No Correlation	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
SZ	Saturated Zone Longitudinal Dispersivity to SW	m	Beta (symmetric)	4	4	1	62	1	62	ALPHALOSW	No Correlation	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file
SW	Mean Residence Time of Water in Surface Water Body	yr	Truncated lognormal-N	Mean = ln(1E-04)	SD = 0.99	Min = 1E-05 LQ = 1%	Max = 1E-03 UQ = 99%	1E-05	1E-03	TLAKE	rcc = -0.9 (negative) for TLAKE and PRECIP	P	Ryan Hupfer	N. Holt	1/10/2020	J. Davis	1/21/2019	Checked in smp file

R = Related Input   CZ = Contzminated Zone (Primary Contamination)   SW = Surface Water
P = Probabilistic Input   UZ = Unsaturated Zone   SZ = Saturated Zone

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer					
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Exposure duration	ED	yr	30		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer					
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer					
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer					
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer					
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer					
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer					
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer					
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer					
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer					
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer					
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer					
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer			J. Davis	2/3/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer					
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer					
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Source					-					
Nuclide concentration	S1	pCi/g	varies		Ryan Hupfer					
Release to groundwater, leach rate		1/yr	varies		Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer					
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	300		Ryan Hupfer					
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	0.75 for C-14, H-3 0 for All Other Nuclides		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Time over which transformation to releasable form occurs	RELDUR	Years	500 for C-14, H-3 800 for All Other Nulides		Ryan Hupfer					
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer					
Release Mechanism	RELOPT		Instantaneous Equilibrium Sorption Desorption, 1		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Initial Leach Rate	RLEACH ALEACH	1/year	0		Ryan Hupfer					
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Distribution Coefficient in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer					
Release to Atmospheric	--		In the same manner as for release to groundwater		Ryan Hupfer					
Distribution Coefficients					-					

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Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Contaminated zone	DCACTC DCNUCC	cm^3/g	varies		Ryan Hupfer					
Unsaturated zone	DCACTU(1-5) DCNUCU(1-5)	cm^3/g	varies		Ryan Hupfer					
Saturated zone	DCACTS DCNUCS	cm^3/g	varies		Ryan Hupfer					
Sediment in surface water body	DCACTSWB DCNUCSWB	cm^3/g	0		Ryan Hupfer					
Fruit, grain, nonleafy fields	DCACTV1 DCNUCOF(1)	cm^3/g	varies		Ryan Hupfer					
Leafy vegetable fields	DCACTV2 DNUCOF(2)	cm^3/g	varies		Ryan Hupfer					
Pasture, silage growing areas	DCACTL1 DNUCOF(3)	cm^3/g	varies		Ryan Hupfer					
Livestock feed grain fields	DCACTL2 DNUCOF(4)	cm^3/g	varies		Ryan Hupfer					
Offsite dwelling site	DCACTDWE DCNUCDWE	cm^3/g	varies		Ryan Hupfer					
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Dose Conversion and Slope Factors					-					
External exposure library	N/A	(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer					
Internal exposure dose library	N/A	mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer					
Slope Factor (Risk) Library	N/A	(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer					
Transfer Factors					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer					
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/ (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg)/ (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/ (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/ (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times					-					
Times at which output is reported	T()	yr	1000, 1500, 2000, 3000, 4250, 5500, 7000, 8500, 10000		Ryan Hupfer			J. Davis	2/3/2020	Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer					
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer					
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer					
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer					
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer					
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer					
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Wind speed	WIND	m/s	3.4342	Calc	Ryan Hupfer					
Primary Contamination					-					
Area of primary contamination	AREA	m^2	95,900	Calc	Ryan Hupfer					
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer					
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer					
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer					
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer					
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Rainfall and Runoff Factor	RAINEROS	--	0		Ryan Hupfer					
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer					
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer					
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer					
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer					

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Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer					
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer					
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer					
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer					
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer					
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer					
Clean Cover					-					
Thickness of clean cover	COVER0	m	3.353		Ryan Hupfer					
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Erosion rate of clean cover	VCV	m/yr	0	Calc	Ryan Hupfer					
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer					
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field	AREAO(1)	m2	1024	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0		Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer					
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer					
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer					
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer			J. Davis	2/3/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer					
Leafy Vegetable Field					-					
Area for leafy vegetable field	AREAO(2)	m^2	1024	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0		Ryan Hupfer					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer					
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer					
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3		Ryan Hupfer					
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer					
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer					
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer					
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer					
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field	AREAO(3)	m^2	10000	Calc	Ryan Hupfer					
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0		Ryan Hupfer					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer					
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3		Ryan Hupfer					

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Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer					
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer					
Grain Field					-					
Area for grain field	AREAO(4)	m^2	10000	Calc	Ryan Hupfer			J. Davis	2/3/2020	Spot check
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0		Ryan Hupfer					
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer					
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer					
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer					
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer					
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer					
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer					
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site	AREAODWELL	m^2	1024	Calc	Ryan Hupfer	N. Holt	2/3/2020			Spot check
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer					
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer					
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer					
Volumetric water content for dwelling site	TMOFDWELL	--	0.3		Ryan Hupfer					
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer					
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer					
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer	N. Holt	2/3/2020			Spot check

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Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer					
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer					
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer					
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer					
Anemometer height	ANH	m	10		Ryan Hupfer					
Ambient temperature	TABK	K	285		Ryan Hupfer					
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	N. Holt	2/3/2020			Spot check
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer					
Dispersion model coefficients	IDISPMOD	--	Pasquill-Gifford		Ryan Hupfer					
Windspeed Terrain	IZONE	--	Rural		Ryan Hupfer					
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer					
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer					
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer					
Dwelling site	DWELLELEV	m	0		Ryan Hupfer					
Surface water body	SWELEV	m	0		Ryan Hupfer					
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer					
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer					
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer					
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer					
	H(2)		0.305		Ryan Hupfer					
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer					
	H(4)		3.048		Ryan Hupfer					
	H(5)		4.846		Ryan Hupfer					
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer					
	DENSUZ(2)		1.6		Ryan Hupfer			J. Davis	2/3/2020	Spot check
	DENSUZ(3)		1.5		Ryan Hupfer					
	DENSUZ(4)		1.5		Ryan Hupfer			J. Davis	2/3/2020	Spot check
	DENSUZ(5)		1.8		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer					
	TPUZ(2)		0.397		Ryan Hupfer					
	TPUZ(3)		0.427		Ryan Hupfer					
	TPUZ(4)		0.419		Ryan Hupfer					
	TPUZ(5)		0.353		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer					
	EPUZ(2)		0.389		Ryan Hupfer					
	EPUZ(3)		0.195		Ryan Hupfer	N. Holt	2/3/2020			Spot check
	EPUZ(4)		0.234		Ryan Hupfer					
	EPUZ(5)		0.27		Ryan Hupfer					

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Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer					
	FCUZ(2)		0.032		Ryan Hupfer					
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer	N. Holt	2/3/2020			Spot check
	FCUZ(5)		0.2471		Ryan Hupfer					
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer					
	HCUZ(2)		94600		Ryan Hupfer			J. Davis	2/3/2020	Spot check
	HCUZ(3)		0.315		Ryan Hupfer					
	HCUZ(4)		3.15		Ryan Hupfer					
	HCUZ(5)		16.7		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer					
	BUZ(2)		4.05		Ryan Hupfer					
	BUZ(3)		11.4		Ryan Hupfer					
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer					
	ALPHALU(2)		0.1		Ryan Hupfer					
	ALPHALU(3)		0.1		Ryan Hupfer	N. Holt	2/3/2020			Spot check
	ALPHALU(4)		0.1		Ryan Hupfer					
	ALPHALU(5)		0.1		Ryan Hupfer					
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer					
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer					
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer					
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer					
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer					
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer					
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer					
Fraction of water from surface body for human consumption	FSWD	--	0		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Fraction of water from well for human consumption	FWWD	--	1		Ryan Hupfer					
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer					
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50		Ryan Hupfer					
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1		Ryan Hupfer					
Fraction of water from well for beef cattle	FWWLV(1)	--	0		Ryan Hupfer					
Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer					
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1		Ryan Hupfer					
Fraction of water from well for dairy cows	FWWLV(2)	--	0		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer					
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer					
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer					
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer					
Area of Plot for leafy vegetables		m^2	1024	Calc	Ryan Hupfer					
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer					
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer					
Area of Plot for pasture and silage		m^2	10000	Calc	Ryan Hupfer					
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer					
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer					
Area of Plot for livestock feed grain		m^2	10000	Calc	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer					
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Area of Plot for offsite dwelling site		m^2	1024	Calc	Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer					
Well pumping rate needed to support specified water use		m^3/yr	331.645	Calc	Ryan Hupfer					
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer					
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Surface area of water in surface water body:	ALAKE	m^2	500	Calc	Ryan Hupfer					
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer					
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer					
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer					
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer					
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer					
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Fish consumption	DFI(1)	kg/yr	2.43		Ryan Hupfer					
Other aquatic food consumption	DFI(2)	kg/yr	0.0		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Leafy vegetables consumption	DVI(2)	kg/yr	17.0		Ryan Hupfer					
Meat consumption	DMI(1)	kg/yr	91.9		Ryan Hupfer					
Milk consumption	DMI(2)	L/yr	110		Ryan Hupfer					
Soil (incidental) ingestion rate	SOIL	g/yr	36.53		Ryan Hupfer					
Drinking water intake from affected area		--	1	Calc	Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.0		Ryan Hupfer					
Other aquatic food consumption from affected area	FFISH(2)	--	0.5		Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5		Ryan Hupfer					
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5		Ryan Hupfer					
Meat consumption from affected area	FMEMI(1)	--	0.25		Ryan Hupfer					
Milk consumption from affected area	FMEMI(2)	--	0.5		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50		Ryan Hupfer					
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0		Ryan Hupfer					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1		Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4		Ryan Hupfer					
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160		Ryan Hupfer					
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0		Ryan Hupfer					
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0		Ryan Hupfer					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4		Ryan Hupfer					
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1		Ryan Hupfer					
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1		Ryan Hupfer					
Duration of growingseason of pasture and silage	GROWTIME(3)	yr	0.08		Ryan Hupfer					
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Root depth of pasture and silage	DROOT(3)	m	0.90		Ryan Hupfer					
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70		Ryan Hupfer					
Duration of growing season of grain	GROWTIME(4)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1		Ryan Hupfer					
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25		Ryan Hupfer					
Root depth of grain	DROOT(4)	m	1.20		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70		Ryan Hupfer					
Duration of growingseason of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17		Ryan Hupfer					
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1		Ryan Hupfer					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25		Ryan Hupfer					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20		Ryan Hupfer					
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50		Ryan Hupfer					
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25		Ryan Hupfer					
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1		Ryan Hupfer					
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0		Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25		Ryan Hupfer					
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25		Ryan Hupfer					
Root depth of leafy vegetables	DROOT(2)	m	0.90		Ryan Hupfer					
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer					
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer			J. Davis	2/3/2020	Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer	N. Holt	2/3/2020			Spot check
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer					
Scale	-	m	598.375		Ryan Hupfer					
Dwelling location coordinate in X-direction	-	m	210	Calc	Ryan Hupfer					
Dwelling location coordinate in y-direction	-	m	547		Ryan Hupfer					
Radius	RAD_SHAPE(1)	m	43.5833		Ryan Hupfer					
	RAD_SHAPE(2)		87.1667		Ryan Hupfer					
	RAD_SHAPE(3)		130.7500		Ryan Hupfer					
	RAD_SHAPE(4)		174.3333		Ryan Hupfer					
	RAD_SHAPE(5)		217.9167		Ryan Hupfer					
	RAD_SHAPE(6)		261.5000		Ryan Hupfer					
	RAD_SHAPE(7)		305.0833		Ryan Hupfer					
	RAD_SHAPE(8)		348.6667		Ryan Hupfer					
	RAD_SHAPE(9)		392.2500		Ryan Hupfer	N. Holt	2/3/2020			Spot check
	RAD_SHAPE(10)		435.8333		Ryan Hupfer					
	RAD_SHAPE(11)		479.4167		Ryan Hupfer					
Radius	RAD_SHAPE(12)	m	523.0000		Ryan Hupfer			J. Davis	2/3/2020	Spot check
Fraction (Onsite)	FRACA(1)	--	0		Ryan Hupfer					
	FRACA(2)		0		Ryan Hupfer					
	FRACA(3)		0.04		Ryan Hupfer					
	FRACA(4)		0.21		Ryan Hupfer					
	FRACA(5)		0.22		Ryan Hupfer					
	FRACA(6)		0.18		Ryan Hupfer					
	FRACA(7)		0.15		Ryan Hupfer					
	FRACA(8)		0.12		Ryan Hupfer					
	FRACA(9)		0.11		Ryan Hupfer					
	FRACA(10)		0.097		Ryan Hupfer					
	FRACA(11)		0.088		Ryan Hupfer					
	FRACA(12)		0.049		Ryan Hupfer					
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer					
Outdoor time fraction on primary contamination	FOTD	--	0.05		Ryan Hupfer					
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05		Ryan Hupfer					
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1		Ryan Hupfer					
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1		Ryan Hupfer					
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1		Ryan Hupfer					
Radon										

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Model Check	Date	Model Check	Date	Notes
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer					
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer					
Vertical dimension of mixing	HMIX	m	2		Ryan Hupfer					
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2.0		Ryan Hupfer					
Vertical dimension of mixing for vegetation	HMIXV	m	1.0		Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer					
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer					
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Fraction of vegetation carbon absorbed from air	CAIR		0.98		Ryan Hupfer					
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer					
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer					
Local water	C12WTR	g/cm3	2.00E-05		Ryan Hupfer					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40		Ryan Hupfer					
Leafy vegetables	C12PLANT(2)		0.09		Ryan Hupfer					
Pasture and Silage	C12PLANT(3)		0.09		Ryan Hupfer					
Livestock feed grain	C12PLANT(4)		0.40		Ryan Hupfer	N. Holt	2/3/2020			Spot check
Meat	C12MEAT_MILK(1)		0.24		Ryan Hupfer					
Milk	C12MEAT_MILK(2)		0.07		Ryan Hupfer					
Tritium										
Humidity in air	HUMID	g/m3	8	Inactive	Ryan Hupfer					
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8	Inactive	Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6	Inactive	Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive	Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	2		Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer					
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer					Not Simulated
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer					
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer					Not Simulated
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					Not Simulated
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					Not Simulated
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer					Not Simulated
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer					
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer					Not Simulated
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer					Not Simulated
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					Not Simulated
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer					Not Simulated
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer					
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer					
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					Not Simulated
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					Not Simulated
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					Not simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					Not Simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer					Not Simulated
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer					
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					Not Simulated
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					Not Simulated
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					Not Simulated
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					Not Simulated
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					Not Simulated
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					Not Simulated
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

A.5-403

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
H	0	0	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Nd	158	158	**Ryan Hupfer**					Not Simulated
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not Simulated

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Ac-227	2.92E-03	STK					Simulated as progeny
Am-241	5.90E+01	STK					Not simulated
Am-243	2.97E+00	STK					Not simulated
Ba-133	1.60E+00	STK					Not simulated, screened
Be-10	2.53E-05	STK					Not simulated
C-14	5.40E-01	RH					
Ca-41	4.21E-02	STK					Not simulated
Cd-113m	NA	STK					Not simulated, screened
Cf-249	1.09E-06	STK					Not simulated, screened
Cf-250	7.40E-06	STK					Not simulated, screened
Cf-251	2.10E-07	STK					Not simulated, screened
Cf-252	1.31E-07	STK					Not simulated, screened
Cl-36		RH					Not simulated, no inventory value
Cm-243	4.30E-01	STK					Not simulated
Cm-244	1.26E+02	STK					Not simulated
Cm-245	3.83E-02	STK					Not simulated
Cm-246	1.59E-01	STK					Not simulated
Cm-247	1.04E-02	STK					Not simulated
Cm-248	5.59E-04	STK					Not simulated
Co-60	2.00E-02	STK					Not simulated, screened
Cs-134	1.06E-08	STK					Not simulated, screened
Cs-135	NA	STK					Not simulated, no inventory value
Cs-137	1.18E+03	STK					Not simlated, screened
Eu-152	2.87E+01	STK					Not simulated
Eu-154	6.49E+00	STK					Not simulated, screened
Eu-155	6.74E-03	STK					Not simulated, screened
Fe-55	8.95E-07	STK					Not simulated, screened
H-3	4.64E+00	RH					Not simulated
I-129	3.50E-01	RH					
K-40	3.28E+00	STK					Not simulated
Kr-85	3.55E-01	STK					Not simulated, screened
Mo-100	4.20E-06	STK					Not simulated, screened
Mo-93	3.88E-01	STK					Not simulated
Na-22	8.22E-07	STK					Not simulated, screened
Nb-93m	2.33E-01	STK					Not simulated
Nb-94	1.63E-02	STK					Not simulated
Ni-59	3.04E+00	STK					Not simulated
Ni-63	6.73E+02	STK					Not simulated, screened
Np-237	3.25E-01	STK					Not simulated
Pa-231	2.39E-01	STK					Simulated as progeny
Pb-210	3.68E+00	STK					Simulated as progeny
Pd-107	NA	STK					Not simulated, no inventory value
Pm-146	8.84E-05	STK					Not simulated, screened
Pm-147	2.20E-04	STK					Not simulated, screened
Pu-238	9.38E+01	STK					Not simulated
Pu-239	5.83E+01	STK					
Pu-240	6.20E+01	STK					Not simulated
Pu-241	2.04E+02	STK					Not simulated
Pu-242	1.73E-01	STK					Not simulated
Pu-244	3.68E-03	STK					Not simulated
Ra-226	8.01E-01	STK					Simulated as progeny
Ra-228	2.21E-02	STK					Not simulated
Re-187	1.71E-06	STK					Not simulated, screened
Sb-125	3.03E-08	STK					Not simulated, screened

Isotope Name	Source (As-Disposed) Concentration (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Se-79	NA	STK					Not simulated, no inventory value
Sm-151	NA	STK					Not simulated, no inventory value
Sn-121m	NA	STK					Not simulated, no inventory value
Sn-126	NA	STK					Not simulated, no inventory value
Sr-90	1.92E+02	STK					Not simulated
Tc-99	1.56E+00	RH					
Th-228	2.11E-06	STK					Not simulated
Th-229	5.71E+00	STK					Not simulated
Th-230	1.92E+00	STK					Simulated as progeny
Th-232	3.52E+00	STK					Not simulated
U-232	1.02E+01	STK					Not simulated
U-233	4.16E+01	STK					Not simulated
U-234	6.30E+02	STK					
U-235	3.97E+01	STK					
U-236	8.98E+00	STK					Not simulated
U-238	3.81E+02	STK					
Zr-93	NA	STK					Not simulated, no inventory value

Zone	Parameter	Unit	Distribution	Alpha(P)/ Mean	Beta(Q)/ Standard Deviation	Min/Lower Quantile	Max/Upper Quantile	RESRAD Identifier	Relations or Correlations (rcc is rank correlation coefficient)	Input Type	Prepared By	Checked By	Checked Date	Checked By	Checked Date	Notes
CZ	Time at which radionuclide first becomes releasable (delay time), C-14	y	Beta (asymmetric)	2	5	100	1000	RELTIMEINIT(C-14)	No Correlation	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Time at which radionuclide first becomes releasable (delay time), I-129	y	Related Parameter Specification			100	1000	RELTIMEINIT(I-129)	RELTIMEINIT(I-129) = RELTIMEINIT(C-14)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Time at which radionuclide first becomes releasable (delay time), Pu-239		Related Parameter Specification			100	1000	RELTIMEINIT(Pu-239)	RELTIMEINIT(Pu-239) = RELTIMEINIT(C-14)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Time at which radionuclide first becomes releasable (delay time), Tc-99	y	Related Parameter Specification			100	1000	RELTIMEINIT(Tc-99)	RELTIMEINIT(Tc-99) = RELTIMEINIT(C-14)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Time at which radionuclide first becomes releasable (delay time), U-234	y	Related Parameter Specification			100	1000	RELTIMEINIT(U-234)	RELTIMEINIT(U-234) = RELTIMEINIT(C-14)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Time at which radionuclide first becomes releasable (delay time), U-235	y	Related Parameter Specification			100	1000	RELTIMEINIT(U-235)	RELTIMEINIT(U-235) = RELTIMEINIT(C-14)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Time at which radionuclide first becomes releasable (delay time), U-238	y	Related Parameter Specification			100	1000	RELTIMEINIT(U-238)	RELTIMEINIT(U-238) = RELTIMEINIT(C-14)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Time over which transformation to releasable form occurs, C-14	y	Related Parameter Specification			400	1200	RELDUR(C-14)	RELDUR(C-14) = RELDUR(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Time over which transformation to releasable form occurs, I-129	y	Beta (symmetric)	4	4	400	1200	RELDUR(I-129)	rcc = -0.9 (negative) for RELDUR(I-129) and RELFRACINIT(I-129) rcc = 0.9 for RELDUR(I-129) and DCACTU1(I-129) rcc = 0.9 for RELDUR(I-129) and DCACTU1(Pu-239) rcc = 0.9 for RELDUR(I-129) and DCACTU1(Tc-99) rcc = 0.9 for RELDUR(I-129) and DCACTU1(U-234)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Time over which transformation to releasable form occurs, Pu-239	y	Related Parameter Specification			400	1200	RELDUR(Pu-239)	RELDUR(Pu-239) = RELDUR(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Time over which transformation to releasable form occurs, Tc-99	y	Related Parameter Specification			400	1200	RELDUR(Tc-99)	RELDUR(Tc-99) = RELDUR(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Time over which transformation to releasable form occurs, U-234	y	Related Parameter Specification			400	1200	RELDUR(U-234)	RELDUR(U-234) = RELDUR(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Time over which transformation to releasable form occurs, U-235	y	Related Parameter Specification			400	1200	RELDUR(U-235)	RELDUR(U-235) = RELDUR(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Time over which transformation to releasable form occurs, U-238	y	Related Parameter Specification			400	1200	RELDUR(U-238)	RELDUR(U-238) = RELDUR(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Initial Releaseable Fraction C-14	-	Related Parameter Specification			0.4	0.9	RELFRACINIT(C-14)	RELFRACINIT(C-14) = 0.4 + RELFRACINIT(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Initial Releaseable Fraction I-129	-	Beta (decreasing)	1	3	0	0.5	RELFRACINIT(I-129)	rcc = -0.9 for RELFRACINIT(I-129) and RELDUR(I-129)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Initial Releasable Fraction Pu-239	-	Related Parameter Specification			0	0.5	RELFRACINIT(Pu-239)	RELFRACINIT(Pu-239) = RELFRACINIT(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Initial Releasable Fraction Tc-99	-	Related Parameter Specification			0	0.5	RELFRACINIT(Tc-99)	RELFRACINIT(Tc-99) = RELFRACINIT(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Initial Releasable Fraction U-234	-	Related Parameter Specification			0	0.5	RELFRACINIT(U-234)	RELFRACINIT(U-234) = RELFRACINIT(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Initial Releasable Fraction U-235	-	Related Parameter Specification			0	0.5	RELFRACINIT(U-235)	RELFRACINIT(U-235) = RELFRACINIT(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Initial Releasable Fraction U-238	-	Related Parameter Specification			0	0.5	RELFRACINIT(U-238)	RELFRACINIT(U-238) = RELFRACINIT(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	
CZ	Contaminated Zone, I-129 Kd	ml/g	Related Parameter Specification			0	4	DCACTC(I-129)	DCACTC(I-129) = DCACTU1(I-129)/2	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 1, I-129 Kd	ml/g	Bounded Normal	Mean = 4	SD = 1.7	0	8	DCACTU1(I-129)	rcc = 0.9 for DCACTU1(I-129) and RELDUR(I-129) rcc = 0.9 for DCACTU1(I-129) and DCACTS(I-129)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Unsaturated Zone 2, I-129 Kd	ml/g	Related Parameter Specification			0	8	DCACTU2(I-129)	DCACTU2(I-129) = DCACTU1(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 3, I-129 Kd	ml/g	Related Parameter Specification			0	8	DCACTU3(I-129)	DCACTU3(I-129) = DCACTU1(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 4, I-129 Kd	ml/g	Related Parameter Specification			0	8	DCACTU4(I-129)	DCACTU4(I-129) = DCACTU1(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 5, I-129 Kd	ml/g	Related Parameter Specification			0	8	DCACTU5(I-129)	DCACTU5(I-129) = DCACTU1(I-129)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
SZ	Saturated Zone, I-129 Kd	ml/g	Bounded Normal	Mean = 4	SD = 1.7	0	8	DCACTS(I-129)	rcc = 0.9 for DCACTS(I-129) and DCACTU1(I-129)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Contaminated Zone, Pu-239 Kd	ml/g	Related Parameter Specification			10	40	DCACTC(Pu-239)	DCACTC(Pu-239) = DCACTU1(Pu-239)/2	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 1, Pu-239 Kd	ml/g	Bounded Normal	Mean = 40	SD = 10	20	80	DCACTU1(Pu-239)	rcc = 0.9 for DCACTU1(Pu-239) and RELDUR(I-129) rcc = 0.9 for DCACTU1(Pu-239) and DCACTS(Pu-239)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Unsaturated Zone 2, Pu-239 Kd	ml/g	Related Parameter Specification			20	80	DCACTU2(Pu-239)	DCACTU2(Pu-239) = DCACTU1(Pu-239)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 3, Pu-239 Kd	ml/g	Related Parameter Specification			20	80	DCACTU3(Pu-239)	DCACTU3(Pu-239) = DCACTU1(Pu-239)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 4, Pu-239 Kd	ml/g	Related Parameter Specification			20	80	DCACTU4(Pu-239)	DCACTU4(Pu-239) = DCACTU1(Pu-239)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 5, Pu-239 Kd	ml/g	Related Parameter Specification			20	80	DCACTU5(Pu-239)	DCACTU5(Pu-239) = DCACTU1(Pu-239)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
SZ	Saturated Zone, Pu-239 Kd	ml/g	Bounded Normal	Mean = 40	SD = 10	20	80	DCACTS(Pu-239)	rcc = 0.9 for DCACTS(Pu-239) and DCACTU1(Pu-239)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Contaminated Zone, Tc-99 Kd	ml/g	Related Parameter Specification			0	0.72	DCACTC(Tc-99)	DCACTC(Tc-99) = DCACTU1(Tc-99)/2	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 1, Tc-99 Kd	ml/g	Bounded Normal	Mean = 0.72	SD = 0.31	0	1.44	DCACTU1(Tc-99)	rcc = 0.9 for DCACTU1(Tc-99) and RELDUR(I-129) rcc = 0.9 for DCACTU1(Tc-99) and DCACTS(Tc-99)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Unsaturated Zone 2, Tc-99 Kd	ml/g	Related Parameter Specification			0	1.44	DCACTU2(Tc-99)	DCACTU2(Tc-99) = DCACTU1(Tc-99)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 3, Tc-99 Kd	ml/g	Related Parameter Specification			0	1.44	DCACTU3(Tc-99)	DCACTU3(Tc-99) = DCACTU1(Tc-99)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 4, Tc-99 Kd	ml/g	Related Parameter Specification			0	1.44	DCACTU4(Tc-99)	DCACTU4(Tc-99) = DCACTU1(Tc-99)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 5, Tc-99 Kd	ml/g	Related Parameter Specification			0	1.44	DCACTU5(Tc-99)	DCACTU5(Tc-99) = DCACTU1(Tc-99)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
SZ	Saturated Zone, Tc-99 Kd	ml/g	Bounded Normal	Mean = 0.72	SD = 0.31	0	1.44	DCACTS(Tc-99)	rcc = 0.9 for DCACTS(Tc-99) and DCACTU1(Tc-99)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Contaminated Zone, U-234 Kd	ml/g	Related Parameter Specification			12.5	50	DCACTC(U-234)	DCACTC(U-234) = DCACTU1(U-234)/2	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 1, U-234 Kd	ml/g	Bounded Normal	Mean = 50	SD = 12.5	25	100	DCACTU1(U-234)	rcc = 0.9 for DCACTU1(U-234) and RELDUR(I-129) rcc = 0.9 for DCACTU1(U-234) and DCACTS(U-234)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Unsaturated Zone 2, U-234 Kd	ml/g	Related Parameter Specification			25	100	DCACTU2(U-234)	DCACTU2(U-234) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 3, U-234 Kd	ml/g	Related Parameter Specification			25	100	DCACTU3(U-234)	DCACTU3(U-234) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 4, U-234 Kd	ml/g	Related Parameter Specification			25	100	DCACTU4(U-234)	DCACTU4(U-234) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 5, U-234 Kd	ml/g	Related Parameter Specification			25	100	DCACTU5(U-234)	DCACTU5(U-234) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
SZ	Saturated Zone, U-234 Kd	ml/g	Bounded Normal	Mean = 50	SD = 12.5	25	100	DCACTS(U-234)	rcc = 0.9 for DCACTS(U-234) and DCACTU1(U-234)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Contaminated Zone, U-235 Kd	ml/g	Related Parameter Specification			12.5	50	DCACTC(U-235)	DCACTC(U-235) = DCACTU1(U-234)/2	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 1, U-235 Kd	ml/g	Related Parameter Specification			25	100	DCACTU1(U-235)	DCACTU1(U-235)= DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 2, U-235 Kd	ml/g	Related Parameter Specification			25	100	DCACTU2(U-235)	DCACTU2(U-235) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 3, U-235 Kd	ml/g	Related Parameter Specification			25	100	DCACTU3(U-235)	DCACTU3(U-235) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 4, U-235 Kd	ml/g	Related Parameter Specification			25	100	DCACTU4(U-235)	DCACTU4(U-235) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file

Zone	Parameter	Unit	Distribution	Alpha(P)/ Mean	Beta(Q)/ Standard Deviation	Min/Lower Quantile	Max/Upper Quantile	RESRAD Identifier	Relations or Correlations (rcc is rank correlation coefficient)	Input Type	Prepared By	Checked By	Checked Date	Checked By	Checked Date	Notes
UZ	Unsaturated Zone 5, U-235 Kd	ml/g	Related Parameter Specification			25	100	DCACTU5(U-235)	DCACTU5(U-235) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
SZ	Saturated Zone, U-235 Kd	ml/g	Related Parameter Specification			25	100	DCACTS(U-235)	DCACTS(U-235) = DCACTS(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Contaminated Zone, U-238 Kd	ml/g	Related Parameter Specification			12.5	50	DCACTC(U-238)	DCACTC(U-238) = DCACTU1(U-234)/2	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 1, U-238 Kd	ml/g	Related Parameter Specification			25	100	DCACTU1(U-238)	DCACTU1(U-238)= DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 2, U-238 Kd	ml/g	Related Parameter Specification			25	100	DCACTU2(U-238)	DCACTU2(U-238) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 3, U-238 Kd	ml/g	Related Parameter Specification			25	100	DCACTU3(U-238)	DCACTU3(U-238) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 4, U-238 Kd	ml/g	Related Parameter Specification			25	100	DCACTU4(U-238)	DCACTU4(U-238) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone 5, U-238 Kd	ml/g	Related Parameter Specification			25	100	DCACTU5(U-238)	DCACTU5(U-238) = DCACTU1(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
SZ	Saturated Zone, U-238 Kd	ml/g	Related Parameter Specification			25	100	DCACTS(U-238)	DCACTS(U-238) = DCACTS(U-234)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Precipitation	m/yr	Beta (symmetric)	4	4	1.037	1.73	PRECIP	rcc = 0.9 for PRECIP and RUNOFF rcc = -0.9 (negative) for PRECIP and TLAKE rcc = -0.9 (negative) for PRECIP and H(5) rcc = 0.9 for PRECIP and HGW	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Runoff coefficient	-	Beta (increasing)	4.75	1	0.830	0.982	RUNOFF	rcc = 0.9 for RUNOFF and PRECIP rcc = 0.9 for RUNOFF and H(5)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Bulk Density of Contaminated Zone	g/cc	Beta (symmetric)	4	4	1.80	2.00	DENSCZ	No Correlation	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Total Porosity of Contaminated Zone	-	Beta (symmetric)			0.377	0.461	TPCZ	TPCZ=1-DENSCZ/[1.9/(1-0.419)] TPCZ=1-DENSCZ/3.27	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
CZ	Contaminated Zone Effective Porosity	-	Beta (symmetric)	4	4	0.12	0.35	EPCZ	rcc = 0.9 for EPCZ and HCCZ	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Hydraulic Conductivity of Contaminated Zone	m/yr	Truncated lognormal-N	mean=ln(6), SD=1	truncated at 5% and 95%	1.20	30.00	HCCZ	rcc = 0.9 for HCCZ and EPCZ	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Soil b-parameter	-	Beta (symmetric)	4	4	4.65	10.9	BCZ		P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
CZ	Contaminated Zone Longitudinal Dispersivity	m	Beta (symmetric)	4	4	0.05	3.55	ALPHALCZ		P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Bulk Density UZ3	g/cc	Related Parameter Specification			1.41	1.63	DENSUZ(3)	DENSUZ(3)=(1-TPUZ(3))*2.65 DENSUZ(3)=2.65-2.65*TPUZ(3)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Total Porosity of UZ3	-	Beta (symmetric)	4	4	0.384	0.470	TPUZ(3)	No Correlation	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Unsaturated Zone Effective Porosity: UZ3 (Clay Liner)	-	Beta (symmetric)	4	4	0.176	0.215	EPUZ(3)	No Correlation	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Unsaturated Zone Longitudinal Dispersivity: UZ3 (Clay Liner)	m	Beta (asymmetric)	1.25	3	0.05	0.5	ALPHALU(3)	rcc = 0.9 for ALPHALU(3) and ALPHALU(4)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Bulk Density UZ4	g/cc	Related Parameter Specification			1.43	1.65	DENSUZ(4)	DENSUZ(4)=(1-TPUZ(4))*2.65 DENSUZ(4)=2.65-2.65*TPUZ(4)	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Total Porosity of UZ4	-	Beta (symmetric)	4	4	0.377	0.461	TPUZ(4)	No Correlation	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Unsaturated Zone Effective Porosity: UZ4 (Geobuffer)	-	Beta (symmetric)	4	4	0.211	0.257	EPUZ(4)	No Correlation	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Unsaturated Zone Longitudinal Dispersivity: UZ4 (Geobuffer)	m	Beta (asymmetric)	1.25	3	0.05	0.5	ALPHALU(4)	rcc = 0.9 for ALPHALU(4) and ALPHALU(3)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Unsaturated Zone Thickness: UZ5 (In-Situ Material)	m	Beta (asymmetric)	4	2.5	0.10	7.6	H(5)	rcc = -0.9 (negative) for H(5) and PRECIP rcc = 0.9 for H(5) and RUNOFF rcc = 0.9 for H(5) and ALPHALU(5)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Bulk Density UZ5	g/cc	Beta (symmetric)	4	4	1.7	1.90	DENSUZ(5)	No Correlation	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Total Porosity of UZ5	-	Related Parameter Specification			0.317	0.388	TPUZ(5)	TPUZ(5)=1-DENSUZ(5)/2.78	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
UZ	Unsaturated Zone Effective Porosity: UZ5 (In-situ Material)	-	Beta (symmetric)	4	4	0.243	0.297	EPUZ(5)	rcc = 0.9 for EPUZ(5) and HCUZ(5)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Unsaturated Zone Hydraulic Conductivity: UZ5 (In-situ Material)	m/yr	Truncated lognormal-N	mean=ln(16.7), SD=1	truncated at 5% and 95%	3.2	86.4	HCUZ(5)	rcc = 0.9 for HCUZ(5) and EPUZ(5)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
UZ	Unsaturated Zone Longitudinal Dispersivity: UZ5 (In-situ Material)	m	Beta (asymmetric)	1.25	3	0.05	0.5	ALPHALU(5)	rcc = 0.9 for ALPHALU(5) and H(5)	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
SZ	Saturated Zone Bulk Density	g/cc	Beta (symmetric)	4	4	1.7	2.5	DENSAQ	No Correlation	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
SZ	Saturated Zone Total Porosity	-	Related Parameter Specification			0.101	0.388	TPSZ	TPSZ=1-DENSAQ/2.78	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
SZ	Saturated Zone Effective Porosity	-	Beta (symmetric)	4	4	0.18	0.22	EPSZ	rcc = 0.9 for EPSZ and HCSZ	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
SZ	Saturated Zone Hydraulic Conductivity	m/yr	Truncated lognormal-N	mean=ln(26.8), SD=0.5	truncated at 5% and 95%	11.8	61.0	HCSZ	rcc = 0.9 for HCSZ and EPSZ rcc = -0.9 (negative) for HGW and HCSZ	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
SZ	Depth of Aquifer Contributing to Well	m	Beta (symmetric)	4	4	25.0	55.0	DWIBWT	No Correlation	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
SZ	Saturated Zone Hydraulic Gradient to Well	m/m	Beta (symmetric)	4	4	0.027	0.081	HGW	rcc = 0.9 for HGW and PRECIP rcc = -0.9 for HGW and HCSZ	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
SZ	Saturated Zone Hydraulic Gradient to Surface Water Body	m/m	Related Parameter Specification			0.018	0.054	HGSW	HGSW =(36/54)* HGW HGSW=0.667*HGW	R	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Cheked in rel file
SZ	Saturated Zone Longitudinal Dispersivity to Well	m	Beta (symmetric)	4	4	1	19	ALPHALOW	No Correlation	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
SZ	Saturated Zone Longitudinal Dispersivity to SW	m	Beta (symmetric)	4	4	1	62	ALPHALOSW	No Correlation	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file
SW	Mean Residence Time of Water in Surface Water Body	yr	Truncated lognormal-N	mean=ln(1E-4), SD=0.99	truncated at 1% and 99%	1E-05	1E-03	TLAKE	rcc = -0.9 (negative) for TLAKE and PRECIP	P	Ryan Hupfer	N. Holt	2/3/2020	J. Davis	2/3/2020	Checked in smp file

R = Related Input CZ = Contzminated Zone (Primary Contamination) SW = Surface Water
P = Probabilistic Input UZ = Unsaturated Zone SZ = Saturated Zone

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Exposure duration	ED	yr	30		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Source					-					
Nuclide concentration	-	pCi/g	varies		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in Soil Concentraion tab

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Release to groundwater, leach rate		1/yr	varies		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer	O.Warren	1/10/2020	J. Davis	1/16/2019	Checked in summary file
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	1.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Time over which transformation to releasable form occurs	RELDUR	Years	800		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Release Mechanism	RELOPT	--	Rate Controlled (Leach Rate)/First Order with Transport, 0		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Checked in summary file
Initial Leach Rate	RLEACH	1/year	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Listed as "ALEACH" in summary document
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in Kd Sheet
Release to Atmospheric	--	--	Beginning at time zero		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Distribution Coefficients					-					
Contaminated zone	DCACTC	cm^3/g	varies		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in Kd Sheet
Unsaturated zone	DCACTU	cm^3/g	varies	Inactive	Ryan Hupfer	Inactive	9/3/2019	J. Davis	9/11/2019	Not used
Saturated zone	DCACTS	cm^3/g	varies	Inactive	Ryan Hupfer	Inactive	9/3/2019	J. Davis	9/11/2019	Not used
Sediment in surface water body	DCACTSWB	cm^3/g	0	Inactive	Ryan Hupfer	Inactive	9/3/2019	J. Davis	9/11/2019	Not used
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies	Inactive	Ryan Hupfer	Inactive	9/3/2019	J. Davis	9/11/2019	Not used
Leafy vegetable fields	DCACTV2	cm^3/g	varies	Inactive	Ryan Hupfer	Inactive	9/3/2019	J. Davis	9/11/2019	Not used
Pasture, silage growing areas	DCACTL1	cm^3/g	varies	Inactive	Ryan Hupfer	Inactive	9/3/2019	J. Davis	9/11/2019	Not used
Livestock feed grain fields	DCACTL2	cm^3/g	varies	Inactive	Ryan Hupfer	Inactive	9/3/2019	J. Davis	9/11/2019	Not used
Offsite dwelling site	DCACTDWE	cm^3/g	varies		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Variable name changed
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Dose Conversion and Slope Factors					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
External exposure library		(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Internal exposure dose library		mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Slope Factor (Risk) Library		(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/(pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in TF Sheet
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/(pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in TF Sheet
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in TF Sheet
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in TF Sheet
Meat transfer factor	I_M(,1)	(pCi/kg)/(pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in TF Sheet
Milk transfer factor	I_M(,2)	(pCi/L)/(pCi/d)	PNNL 2003 Milk		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in TF Sheet
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/(pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in TF Sheet
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/(pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in TF Sheet
Reporting Times					-					
Times at which output is reported	T()	yr	1, 200, 400, 500, 600, 800, 1000, 2000, 10000		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Wind speed		m/s	3.4342	Calculated	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Primary Contamination					-					
Area of primary contamination		m^2	95,900	Calculated	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Listed as 97,000 on model screen; Listed in summary file as 95,900. Hand calculated to be ~95,900 based on waste dimensions
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Depth of soil mixing layer (m)	DM	m	1.00		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Rainfall Erosion Index	RAINEROS	--	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Erosion rate of clean cover		m/yr	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Clean Cover					-					
Thickness of clean cover	COVER0	m	1.82		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Erosion rate of clean cover		m/yr	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field		m2	1024	Calculated	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not Used
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMDF(1)	--	0.3		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Listed as TMOF(1)
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Leafy Vegetable Field					-					
Area for leafy vegetable field		m^2	1024	Calculated	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Volumetric water content for leafy vegetable field	TMDF(2)	--	0.3		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Listed as TMOF(2)
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field		m^2	10000	Calculated	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Volumetric water content for pasture and silage field	TMDF(3)	--	0.3		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Listed as TMOF(3)
Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Listed as "Not Used"/Inactive
Grain Field					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Area for grain field		m^2	10000	Calculated	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Volumetric water content for grain field	TMDF(4)	--	0.3		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Listed as TMOF(4)
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site		m^2	1024	Calculated	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Volumetric water content for dwelling site	TMDFDWELL	--	0.3		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Listed as TMOFDWELL
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Anemometer height	ANH	m	10		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Ambient temperature	TABK	K	285		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Dispersion model coefficients	-	--	Pasquill-Gifford		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Windspeed Terrain	-	--	Rural		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Dwelling site	DWELLELEV	m	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Surface water body	SWELEV	m	0		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check

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Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
	H(2)		0.305		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	H(4)		3.048		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	H(5)		4.846		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	DENSUZ(2)		1.6		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	DENSUZ(3)		1.5		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	DENSUZ(4)		1.5		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	DENSUZ(5)		1.8		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
	TPUS(2)		0.397		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	TPUS(3)		0.427		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
	TPUS(4)		0.419		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
	TPUS(5)		0.353		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	EPUZ(2)		0.389		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	EPUZ(3)		0.195		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	EPUZ(4)		0.234		Ryan Hupfer	O.Warren	1/10/2020	J. Davis	12/30/2019	Checked in summary file
	EPUZ(5)		0.27		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	FCUZ(2)		0.032		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
	FCUZ(3)		0.418		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	FCUZ(4)		0.307		Ryan Hupfer	O.Warren	1/10/2020	J. Davis	12/30/2019	Checked in summary file
	FCUZ(5)		0.2471		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	HCUZ(2)		94600		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	HCUZ(3)		0.315		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	HCUZ(4)		3.15		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
	HCUZ(5)		16.7		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	BUZ(2)		4.05		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
	BUZ(3)		11.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
	BUZ(4)		11.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	BUZ(5)		10.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	ALPHALU(2)		0.1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
	ALPHALU(3)		0.1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
	ALPHALU(4)		0.1		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
	ALPHALU(5)		0.1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file

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Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	12/30/2019	Checked in summary file
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Checked in summary file
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Checked in summary file
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Fraction of water from surface body for human consumption	FSWD	--	0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Fraction of water from well for human consumption	FWWD	--	1	Inactive	Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calclated	Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Area of Plot for leafy vegetables		m^2	1024	Calculated	Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Area of Plot for pasture and silage		m^2	10000	Calculated	Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Area of Plot for livestock feed grain		m^2	10000	Calculated	Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Area of Plot for offsite dwelling site		m^2	1024	Calculated	Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	0.900	Calculated	Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Surface area of water in surface water body:	ALAKE	m^2	500	Calculated	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer	O.Warren	9/5/2019	J. Davis	9/11/2019	Checked in summary file
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Meat consumption	DMI(1)	kg/yr	91.9	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Milk consumption	DMI(2)	L/yr	110	Inactive	Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Soil (incidental) ingestion rate	SOIL	g/yr	36.53	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Drinking water intake from affected area		--	1.00	Calculated	Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Fish consumption from affected area	FFISH(1)	--	1.00	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used

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Other aquatic food consumption from affected area	FFISH(2)	--	0.50	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.50	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Leafy vegetables consumption from affected area	FVEG(2)	--	0.50	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
Milk consumption from affected area	FMEMI(2)	--	0.50	Inactive	Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4	Inactive	Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight crop yield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive	Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Duration of growing season of pasture and silage	GROWTIME(3)	yr	0.08	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Foliage to food transfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive	Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Grain					-					
Wet weight crop yield of grain	YIELD(4)	kg/m^2	0.70	Inactive	Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Duration of growing season of grain	GROWTIME(4)	yr	0.17	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Foliage to food transfer coefficient of grain	FOLI F(4)	--	0.1	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Weathering removal constant of grain	RWEATHER(4)	1/yr	20.0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
Foliar interception factor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Foliar interception factor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Root depth of grain	DROOT(4)	m	1.20	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Duration of growing season of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive	Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used

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Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive	Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
External gamma shielding (penetration) factor	SHF1	--	0.7	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Listed as "not used"
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Verified using site layout coordinates.
Scale	-	m	598.375		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Dwelling location coordinate in X-direction	-	m	270	Inactive	Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Dwelling location coordinate in y-direction	-	m	607		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Radius	RAD_SHAPE(1)	m	43.5833		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	RAD_SHAPE(2)		87.1667		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	RAD_SHAPE(3)		130.7500		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
	RAD_SHAPE(4)		174.3333		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
	RAD_SHAPE(5)		217.9167		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	RAD_SHAPE(6)		261.5000		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	RAD_SHAPE(7)		305.0833		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	RAD_SHAPE(8)		348.6667		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	RAD_SHAPE(9)		392.2500		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
	RAD_SHAPE(10)		435.8333		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	RAD_SHAPE(11)		479.4167		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Radius	RAD_SHAPE(12)	m	523.0000		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Fraction (Onsite)	FRACA(1)	--	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	FRACA(2)		0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	FRACA(3)		0.04		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	FRACA(4)		0.21		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	FRACA(5)		0.22		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	FRACA(6)		0.18		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
	FRACA(7)		0.15		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
	FRACA(8)		0.13		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	FRACA(9)		0.11		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	FRACA(10)		0.099		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	FRACA(11)		0.089		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
	FRACA(12)		0.05		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	O.Warren	9/6/2019	J. Davis	9/11/2019	Not found in summary document/Verified in model

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Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Outdoor time fraction on primary contamination	FOTD	--	0.50		Ryan Hupfer	O.Warren	12/30/2019	J. Davis	9/11/2019	Spot check
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.00		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Checked in summary file
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.0		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Depth of foundation below ground level	DMFL	m	-1.00	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Vertical dimension of mixing	HMIX	m	1.00		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Building indoor are factor	FAI		0.00	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	2.00		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Vertical dimension of mixing for inhalation	HMIX	m	1.00		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Vertical dimension of mixing for vegetation	HMIXV	m	1.00	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
Fraction of vegetation carbon absorbed from air	CAIR		0.98	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	12/30/2019	Not used
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer	O. Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer	O. Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Local water	C12WTR	g/cm3	2.00E-05	Inactive	Ryan Hupfer	O. Warren	9/3/2019	J. Davis	9/11/2019	Not used
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive	Ryan Hupfer	O. Warren	9/3/2019	J. Davis	9/11/2019	Not used
Leafy vegetables	C12PLANT(2)		0.09	Inactive	Ryan Hupfer	O. Warren	9/3/2019	J. Davis	9/11/2019	Not used
Pasture and Silage	C12PLANT(3)		0.09	Inactive	Ryan Hupfer	O. Warren	9/3/2019	J. Davis	9/11/2019	Not used
Livestock feed grain	C12PLANT(4)		0.40	Inactive	Ryan Hupfer	O. Warren	9/3/2019	J. Davis	9/11/2019	Not used
Meat	C12MEAT_MILK(1)		0.24	Inactive	Ryan Hupfer	O. Warren	9/3/2019	J. Davis	9/11/2019	Not used
Milk	C12MEAT_MILK(2)		0.07	Inactive	Ryan Hupfer	O. Warren	9/3/2019	J. Davis	9/11/2019	Not used
Tritium										
Humidity in air	HUMID	g/m3	8.00		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.80	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.80	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.80	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.80	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.60	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive	Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Not used
Vertical dimension of mixing for inhalation	HMIX	m	1.00		Ryan Hupfer	O.Warren	9/3/2019	J. Davis	9/11/2019	Checked in summary file

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer	OW	9/3/2019			Not simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer	OW	9/3/2019			Not Simulated
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	9.81E-03	5.00E+04	9.10E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	Fish Only/Verified in model
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer	OW	9/3/2019			Not simulated
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer	OW	9/3/2019			Not simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer	OW	9/3/2019			Not simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer	OW	9/3/2019			Not simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer	OW	9/3/2019			Not simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer	OW	9/3/2019			Not simulated
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	OW	9/3/2019			Not simulated
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer	OW	9/3/2019			Not simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer	OW	9/3/2019			Not simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	OW	9/3/2019			Not simulated

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer	OW	9/3/2019			Not simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer	OW	9/3/2019			Not simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	OW	9/3/2019	J. Davis	9/11/2019	
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer	OW	9/3/2019			Not simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Nd	158	158	**Ryan Hupfer**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not found in summary file
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	OW	12/30/2019	J. Davis	12/30/2019	Checked in model summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not simulated

Isotope Name	ORNL D&D	MAXIMUM VALUE (pCi/g)	MAXIMUM WASTE STREAM	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	3.88E-02	3.88E-02	ORNL D&D	STK	OW	1/10/2020	J. Davis	12/30/2019	Checked in summary file
Am-241	2.10E+02	6.14E+02	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Am-243	2.73E+00	3.95E+01	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
C-14	8.53E+00	4.18E+01	Y-12 D&D Biology	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cf-249	1.44E-05	1.44E-05	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cf-250	9.82E-05	9.82E-05	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cf-251	2.79E-06	2.79E-06	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cf-252	1.74E-06	1.74E-06	ORNL D&D	STK	OW	9/3/2019			Not simulated
Cm-243	5.18E+00	5.18E+00	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cm-244	1.67E+03	1.67E+03	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cm-245	5.08E-01	5.08E-01	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cm-246	2.11E+00	2.11E+00	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cm-247	1.38E-01	1.38E-01	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cm-248	7.43E-03	7.43E-03	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Co-60	2.18E-01	2.18E-01	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Cs-134	2.79E-08	1.21E-07	ORNL RA	STK	OW	9/3/2019			Not simulated
Cs-137	2.11E+03	1.46E+04	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Eu-152	3.73E+02	3.73E+02	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Eu-154	8.49E+01	8.49E+01	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Eu-155	8.87E-02	8.87E-02	ORNL D&D	STK	OW	9/3/2019			Not simulated
Fe-55		1.28E-05	ORNL RA	STK	OW	9/3/2019			Not simulated
H-3	1.30E+02	1.30E+02	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
I-129	4.92E+00	4.92E+00	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
K-40	5.53E+00	2.23E+01	Y-12 D&D Biology	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Mo-100	5.58E-05	5.58E-05	ORNL D&D	STK	OW	9/3/2019			Not simulated
Na-22	1.08E-05	1.08E-05	ORNL D&D	STK	OW	9/3/2019			Not Simulated
Nb-94	2.16E-01	2.16E-01	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Ni-59	4.04E+01	4.04E+01	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Ni-63	6.02E+02	8.97E+03	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Np-237	4.59E-01	2.81E+00	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Pa-231	3.17E+00	3.17E+00	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Pb-210	4.68E+01	4.68E+01	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Pm-146	1.17E-03	1.17E-03	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Pm-147	2.83E-03	2.83E-03	ORNL D&D	STK	OW	9/3/2019			Not simulated
Pu-238	7.37E+02	7.37E+02	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Pu-239	2.37E+02	5.76E+02	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Pu-240	3.51E+02	5.08E+02	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Pu-241	6.87E+01	2.83E+03	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Pu-242	1.83E-01	2.27E+00	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Pu-244	4.89E-02	4.89E-02	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Ra-226	2.92E+00	3.92E+00	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Ra-228	6.54E-03	1.71E-01	Y-12 D&D Remaining Facili	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Re-187	2.27E-05	2.27E-05	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Sb-125	4.02E-07	4.02E-07	ORNL D&D	STK	OW	9/3/2019			Not simulated
Sr-90	2.16E+03	2.16E+03	ORNL D&D	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Tc-99	1.32E+01	4.06E+01	Y-12 D&D Biology	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Th-228	1.16E-06	1.58E-05	Y-12 D&D Remaining Facili	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Th-229	1.73E+00	7.96E+01	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Th-230	1.70E+00	2.11E+01	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
Th-232	1.19E+00	1.31E+01	Y-12 Remedial Action	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
U-232	8.34E-01	1.45E+02	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
U-233	2.65E+02	2.92E+02	ORNL RA	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
U-234	1.11E+01	5.23E+03	Y-12 D&D Remaining Facili	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
U-235	4.20E-01	3.16E+02	Y-12 D&D Remaining Facili	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
U-236	2.65E-01	7.47E+01	Y-12 D&D Remaining Facili	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file
U-238	6.79E+00	2.91E+03	Y-12 D&D Remaining Facili	STK	OW	9/3/2019	J. Davis	9/11/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Radiological units for activity	-	Ci, Bq, dps,	pCi		Ryan Hupfer					
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer					
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Exposure duration	ED	yr	30		Ryan Hupfer					
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer					
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer					
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer					
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer					
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer					
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer					
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer					
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer					
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer					
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer					
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer					
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer					
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer					
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer					
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer					
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer					
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer					
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer					
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Source					-					
Nuclide concentration	-	pCi/g	varies		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Release to groundwater, leach rate		1/yr	varies		Ryan Hupfer					
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer					
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer					
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	0		Ryan Hupfer					
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	1.0		Ryan Hupfer					
Time over which transformation to releasable form occurs	RELDUR	Years	800		Ryan Hupfer					
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer					
Release Mechanism	RELOPT	--	Rate Controlled (Leach Rate)/First Order with Transport, 0		Ryan Hupfer					
Initial Leach Rate	RLEACH	1/year	0		Ryan Hupfer					
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer					
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer					
Release to Atmospheric	--	--	Beginning at time zero		Ryan Hupfer					
Distribution Coefficients					-					
Contaminated zone	DCACTC	cm^3/g	varies		Ryan Hupfer					
Unsaturated zone	DCACTU	cm^3/g	varies	Inactive	Ryan Hupfer					
Saturated zone	DCACTS	cm^3/g	varies	Inactive	Ryan Hupfer					
Sediment in surface water body	DCACTSWB	cm^3/g	0	Inactive	Ryan Hupfer					
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies	Inactive	Ryan Hupfer					
Leafy vegetable fields	DCACTV2	cm^3/g	varies	Inactive	Ryan Hupfer					
Pasture, silage growing areas	DCACTL1	cm^3/g	varies	Inactive	Ryan Hupfer					
Livestock feed grain fields	DCACTL2	cm^3/g	varies	Inactive	Ryan Hupfer					
Offsite dwelling site	DCACTDWE	cm^3/g	varies		Ryan Hupfer					
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer					
Dose Conversion and Slope Factors					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
External exposure library		(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer					
Internal exposure dose library		mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer					
Slope Factor (Risk) Library		(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer					
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg) / (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer					
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg) / (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer					
Pasture and silage transfer factor	RTF(,3)	(pCi/kg) / (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg) / (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer					
Meat transfer factor	I_M(,1)	(pCi/kg) / (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer					
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer					
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg) / (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer					
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg) / (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer					
Reporting Times					-					
Times at which output is reported	T()	yr	1, 200, 400, 500, 600, 800, 1000, 2000, 10000		Ryan Hupfer					
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer					
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer					
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer					
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer					
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer					
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer					
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer					
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer					
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Wind speed		m/s	3.4342	Calculated	Ryan Hupfer					
Primary Contamination					-					
Area of primary contamination		m^2	95,900	Calculated	Ryan Hupfer					
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Depth of soil mixing layer (m)	DM	m	1.00		Ryan Hupfer					
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer					
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer					
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer					
Rainfall Erosion Index	RAINEROS	--	0		Ryan Hupfer					
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer					
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer					
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer					
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer					
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer					
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer					
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer					
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer					
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer					
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer					
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Clean Cover					-					
Thickness of clean cover	COVER0	m	1.82		Ryan Hupfer					
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer					
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer					
Erosion rate of clean cover		m/yr	0		Ryan Hupfer					
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer					
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer					
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field		m2	1024	Calculated	Ryan Hupfer					
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer					
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer					
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer					
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer					
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer					
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer					
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Leafy Vegetable Field					-					
Area for leafy vegetable field		m^2	1024	Calculated	Ryan Hupfer					
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer					
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer					
Volumetric water content for leafy vegetable field	TMDF(2)	--	0.3		Ryan Hupfer					
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer					
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer					
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer					
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field		m^2	10000	Calculated	Ryan Hupfer					
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer					
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer					
Volumetric water content for pasture and silage field	TMDF(3)	--	0.3		Ryan Hupfer					
Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0		Ryan Hupfer					
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer					
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer					
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer					
Grain Field					-					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Area for grain field		m^2	10000	Calculated	Ryan Hupfer					
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive	Ryan Hupfer					
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer					
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer					
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer					
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Erosion rate	EROSN(4)	m/yr	0.0		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer					
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer					
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer					
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer					
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer					
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site		m^2	1024	Calculated	Ryan Hupfer					
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer					
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer					
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer					
Volumetric water content for dwelling site	TMDFDWELL	--	0.3		Ryan Hupfer					
Erosion rate for dwelling site	EROSNDWELL	m/yr	0		Ryan Hupfer					
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer					
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer					
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer					
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer					
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer					
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer					
Anemometer height	ANH	m	10		Ryan Hupfer					
Ambient temperature	TABK	K	285		Ryan Hupfer			O. Warren	3/3/2020	Spot check
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer					
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Dispersion model coefficients	-	--	Pasquill-Gifford		Ryan Hupfer					
Windspeed Terrain	-	--	Rural		Ryan Hupfer					
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer					
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer					
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer					
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Dwelling site	DWELLELEV	m	0		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Surface water body	SWELEV	m	0		Ryan Hupfer					

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Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer					
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer					
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer					
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer			O. Warren	3/3/2020	Spot check
	H(2)		0.305		Ryan Hupfer					
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer					
	H(4)		3.048		Ryan Hupfer					
	H(5)		4.846		Ryan Hupfer					
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer					
	DENSUZ(2)		1.6		Ryan Hupfer			O. Warren	3/3/2020	Spot check
	DENSUZ(3)		1.5		Ryan Hupfer					
	DENSUZ(4)		1.5		Ryan Hupfer					
	DENSUZ(5)		1.8		Ryan Hupfer					
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer					
	TPUZ(2)		0.397		Ryan Hupfer					
	TPUZ(3)		0.427		Ryan Hupfer	J. Davis	2/12/2020			Spot check
	TPUZ(4)		0.419		Ryan Hupfer					
	TPUZ(5)		0.353		Ryan Hupfer					
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer					
	EPUZ(2)		0.389		Ryan Hupfer			O. Warren	3/3/2020	Spot check
	EPUZ(3)		0.195		Ryan Hupfer					
	EPUZ(4)		0.234		Ryan Hupfer					
	EPUZ(5)		0.27		Ryan Hupfer					
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer					
	FCUZ(2)		0.032		Ryan Hupfer			O. Warren	3/3/2020	Spot check
	FCUZ(3)		0.418		Ryan Hupfer					
	FCUZ(4)		0.307		Ryan Hupfer					
	FCUZ(5)		0.2471		Ryan Hupfer					
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer	J. Davis	2/12/2020			Spot check
	HCUZ(2)		94600		Ryan Hupfer			O. Warren	3/3/2020	Spot check
	HCUZ(3)		0.315		Ryan Hupfer					
	HCUZ(4)		3.15		Ryan Hupfer					
	HCUZ(5)		16.7		Ryan Hupfer					
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer					
	BUZ(2)		4.05		Ryan Hupfer					
	BUZ(3)		11.4		Ryan Hupfer					
	BUZ(4)		11.4		Ryan Hupfer					
	BUZ(5)		10.4		Ryan Hupfer					
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer					
	ALPHALU(2)		0.1		Ryan Hupfer					
	ALPHALU(3)		0.1		Ryan Hupfer					
	ALPHALU(4)		0.1		Ryan Hupfer			O. Warren	3/3/2020	Spot check
	ALPHALU(5)		0.1		Ryan Hupfer					
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer					
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer					
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer					
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer					

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Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer					
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer					
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer					
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer					
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer					
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730	Inactive	Ryan Hupfer					
Fraction of water from surface body for human consumption	FSWD	--	0	Inactive	Ryan Hupfer					
Fraction of water from well for human consumption	FWWD	--	1	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer					
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer					
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer					
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer					
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer					
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer					
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive	Ryan Hupfer					
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive	Ryan Hupfer					
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer					
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer					
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calclated	Ryan Hupfer					
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer					
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Area of Plot for leafy vegetables		m^2	1024	Calculated	Ryan Hupfer					
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer					
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer					
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Area of Plot for pasture and silage		m^2	10000	Calculated	Ryan Hupfer					
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer					
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer					
Area of Plot for livestock feed grain		m^2	10000	Calculated	Ryan Hupfer					
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer	J. Davis	2/12/2020			Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer					
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer					
Area of Plot for offsite dwelling site		m^2	1024	Calculated	Ryan Hupfer					
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	0.900	Calculated	Ryan Hupfer					
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer					
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	J. Davis	2/12/2020			Spot check
Surface area of water in surface water body:	ALAKE	m^2	500	Calculated	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer					
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer					
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer					
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer					
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer					
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer					
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer					
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer					
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer					
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer					
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer					
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer					
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730	Inactive	Ryan Hupfer					
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	Ryan Hupfer					
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive	Ryan Hupfer					
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive	Ryan Hupfer					
Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive	Ryan Hupfer					
Meat consumption	DMI(1)	kg/yr	91.9	Inactive	Ryan Hupfer					
Milk consumption	DMI(2)	L/yr	110	Inactive	Ryan Hupfer					
Soil (incidental) ingestion rate	SOIL	g/yr	36.53	Inactive	Ryan Hupfer					
Drinking water intake from affected area		--	1.00	Calculated	Ryan Hupfer					
Fish consumption from affected area	FFISH(1)	--	1.00	Inactive	Ryan Hupfer					
Other aquatic food consumption from affected area	FFISH(2)	--	0.50	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.50	Inactive	Ryan Hupfer					
Leafy vegetables consumption from affected area	FVEG(2)	--	0.50	Inactive	Ryan Hupfer					
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Milk consumption from affected area	FMEMI(2)	--	0.50	Inactive	Ryan Hupfer					
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer					
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive	Ryan Hupfer					
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive	Ryan Hupfer					
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1	Inactive	Ryan Hupfer					
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4	Inactive	Ryan Hupfer					
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0	Inactive	Ryan Hupfer					
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0	Inactive	Ryan Hupfer					
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4	Inactive	Ryan Hupfer					
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1	Inactive	Ryan Hupfer					
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Duration of growingseason of pasture and silage	GROWTIME(3)	yr	0.08	Inactive	Ryan Hupfer					
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive	Ryan Hupfer					
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive	Ryan Hupfer					
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive	Ryan Hupfer					
Grain					-					
Wet weight cropyield of grain	YIELD(4)	kg/m^2	0.70	Inactive	Ryan Hupfer					
Duration of growingseason of grain	GROWTIME(4)	yr	0.17	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Foliage to foodtransfer coefficient of grain	FOLI F(4)	--	0.1	Inactive	Ryan Hupfer					
Weatheringremoval constant ofgrain	RWEATHER(4)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Foliar interceptionfactor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interceptionfactor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of grain	DROOT(4)	m	1.20	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Duration of growingseason of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Foliage to foodtransfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive	Ryan Hupfer					
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive	Ryan Hupfer					
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive	Ryan Hupfer					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive	Ryan Hupfer					
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0	Inactive	Ryan Hupfer					
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive	Ryan Hupfer					
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive	Ryan Hupfer					
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive	Ryan Hupfer					
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer					
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer					
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer					
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer					
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer	J. Davis	2/12/2020			Spot check
External gamma shielding (penetration) factor	SHF1	--	0.7	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer					
Scale	-	m	598.375		Ryan Hupfer					
Dwelling location coordinate in X-direction	-	m	270		Ryan Hupfer					
Dwelling location coordinate in y-direction	-	m	607		Ryan Hupfer					
	RAD_SHAPE(1)		43.5833		Ryan Hupfer					
	RAD_SHAPE(2)		87.1667		Ryan Hupfer					
	RAD_SHAPE(3)		130.7500		Ryan Hupfer					
	RAD_SHAPE(4)		174.3333		Ryan Hupfer			O. Warren	3/3/2020	Spot check, not used
	RAD_SHAPE(5)		217.9167		Ryan Hupfer					
Radius	RAD_SHAPE(6)	m	261.5000		Ryan Hupfer					
	RAD_SHAPE(7)		305.0833		Ryan Hupfer					
	RAD_SHAPE(8)		348.6667		Ryan Hupfer					
	RAD_SHAPE(9)		392.2500		Ryan Hupfer					
	RAD_SHAPE(10)		435.8333	Inactive	Ryan Hupfer					
	RAD_SHAPE(11)		479.4167		Ryan Hupfer					
Radius	RAD_SHAPE(12)	m	523.0000		Ryan Hupfer					
	FRACA(1)		0		Ryan Hupfer					
	FRACA(2)		0		Ryan Hupfer					
	FRACA(3)		0.04		Ryan Hupfer	J. Davis	2/12/2020			Spot check
	FRACA(4)		0.21		Ryan Hupfer					
	FRACA(5)		0.22		Ryan Hupfer					
	FRACA(6)		0.18		Ryan Hupfer					
Fraction (Onsite)	FRACA(7)	--	0.15		Ryan Hupfer					
	FRACA(8)		0.13		Ryan Hupfer					
	FRACA(9)		0.11		Ryan Hupfer					
	FRACA(10)		0.099		Ryan Hupfer					
	FRACA(11)		0.089		Ryan Hupfer					
	FRACA(12)		0.05		Ryan Hupfer					
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer					
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer					
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer	J. Davis	2/12/2020			Spot check

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Outdoor time fraction on primary contamination	FOTD	--	0.50		Ryan Hupfer					
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.0		Ryan Hupfer					
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.00		Ryan Hupfer					
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.0		Ryan Hupfer					
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.0		Ryan Hupfer					
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.0		Ryan Hupfer					
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.0		Ryan Hupfer					
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer					
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer					
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer					
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer					
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer					
Depth of foundation below ground level	DMFL	m	-1.00	Inactive	Ryan Hupfer					
Vertical dimension of mixing	HMIX	m	1.00		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer					
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer					
Building indoor are factor	FAI		0.00	Inactive	Ryan Hupfer					
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer					
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer					
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	2/12/2020			Spot check
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	2.00		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Vertical dimension of mixing for inhalation	HMIX	m	1.00		Ryan Hupfer					
Vertical dimension of mixing for vegetation	HMIXV	m	1.00	Inactive	Ryan Hupfer					
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer					
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer					
Fraction of vegetation carbon absorbed from soil	CSOIL		0.02	Inactive	Ryan Hupfer					
Fraction of vegetation carbon absorbed from air	CAIR		0.98	Inactive	Ryan Hupfer					
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer					
Local water	C12WTR	g/cm3	2.00E-05	Inactive	Ryan Hupfer					
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive	Ryan Hupfer					
Leafy vegetables	C12PLANT(2)		0.09	Inactive	Ryan Hupfer					
Pasture and Silage	C12PLANT(3)		0.09	Inactive	Ryan Hupfer					
Livestock feed grain	C12PLANT(4)		0.40	Inactive	Ryan Hupfer					
Meat	C12MEAT_MILK(1)		0.24	Inactive	Ryan Hupfer					
Milk	C12MEAT_MILK(2)		0.07	Inactive	Ryan Hupfer					
Tritium										
Humidity in air	HUMID	g/m3	8.00		Ryan Hupfer			O. Warren	3/3/2020	Spot check
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.80	Inactive	Ryan Hupfer					
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.80	Inactive	Ryan Hupfer					
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.80	Inactive	Ryan Hupfer					
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.80	Inactive	Ryan Hupfer					
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.60	Inactive	Ryan Hupfer					
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive	Ryan Hupfer					
Vertical dimension of mixing for inhalation	HMIX	m	1.00		Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer					
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer					
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer					
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer					
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	9.81E-03	5.00E+04	9.10E+03	Ryan Hupfer					
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer					
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer					
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer					
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer					
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer					
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer					
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer					
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer					
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer					
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer					
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer					
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer					
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer					
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer					
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer					
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer					
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer					
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer					
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer					
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer					
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer					

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer					
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer					
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer					
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer					
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer					
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer					

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock zones		Checked by	Date	Checked by	Date	Notes
Ac	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Am	2000	4100[a]	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Ba	28	55	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Be	400	800	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
C	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Ca	15	30	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Cd	100	200	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Cf	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Cl	N/A[c]	N/A[c]	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Cm	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Co	400	800	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Cs	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Eu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Fe	450	890	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Gd	410	820	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
H	0	0	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
I	2	4	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
K	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Mo	45	90	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Na	5	10	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Nb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Nd	158	158	**Ryan Hupfer**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Ni	1000	2000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Np	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Pa	200	400	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Pb	50	100	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Pd	1000	2000	**Information/Data Transfer Transmittal 001 rev1**					Not found in summary file
Pm	410	820	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Pu	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Ra	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Re	20	40	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Sb	75	150	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Se	250	500	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Sm	500	1000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Sn	50	100	**Information/Data Transfer Transmittal 001 rev1**					Not simulated
Sr	15	30	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Tc	0.36	0.72	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Th	1500	3000	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
U	25	50	**Information/Data Transfer Transmittal 001 rev1**	J. Davis	2/12/2020	O. Warren	3/3/2020	Checked in summary file
Zr	25	50	**Information/Data Transfer Transmittal 001 rev1**					Not simulated

Isotope Name	ORNL D&D	MAXIMUM VALUE (pCi/g)	MAXIMUM WASTE STREAM	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	3.88E-02	3.88E-02	ORNL D&D	STK					
Am-241	2.10E+02	6.14E+02	ORNL RA	STK					
Am-243	2.73E+00	3.95E+01	ORNL RA	STK					
C-14	8.53E+00	4.18E+01	Y-12 D&D Biology	STK					
Cf-249	1.44E-05	1.44E-05	ORNL D&D	STK					
Cf-250	9.82E-05	9.82E-05	ORNL D&D	STK					
Cf-251	2.79E-06	2.79E-06	ORNL D&D	STK					
Cf-252	1.74E-06	1.74E-06	ORNL D&D	STK					Not simulated
Cm-243	5.18E+00	5.18E+00	ORNL D&D	STK					
Cm-244	1.67E+03	1.67E+03	ORNL D&D	STK					
Cm-245	5.08E-01	5.08E-01	ORNL D&D	STK					
Cm-246	2.11E+00	2.11E+00	ORNL D&D	STK					
Cm-247	1.38E-01	1.38E-01	ORNL D&D	STK					
Cm-248	7.43E-03	7.43E-03	ORNL D&D	STK					
Co-60	2.18E-01	2.18E-01	ORNL D&D	STK					
Cs-134	2.79E-08	1.21E-07	ORNL RA	STK					Not simulated
Cs-137	2.11E+03	1.46E+04	ORNL RA	STK					
Eu-152	3.73E+02	3.73E+02	ORNL D&D	STK					
Eu-154	8.49E+01	8.49E+01	ORNL D&D	STK					
Eu-155	8.87E-02	8.87E-02	ORNL D&D	STK					Not simulated
Fe-55		1.28E-05	ORNL RA	STK					Not simulated
H-3	1.30E+02	1.30E+02	ORNL D&D	STK					
I-129	4.92E+00	4.92E+00	ORNL D&D	STK					
K-40	5.53E+00	2.23E+01	Y-12 D&D Biology	STK					
Mo-100	5.58E-05	5.58E-05	ORNL D&D	STK					Not simulated
Na-22	1.08E-05	1.08E-05	ORNL D&D	STK					Not Simulated
Nb-94	2.16E-01	2.16E-01	ORNL D&D	STK					
Ni-59	4.04E+01	4.04E+01	ORNL D&D	STK					
Ni-63	6.02E+02	8.97E+03	ORNL RA	STK					
Np-237	4.59E-01	2.81E+00	ORNL RA	STK					
Pa-231	3.17E+00	3.17E+00	ORNL D&D	STK					
Pb-210	4.68E+01	4.68E+01	ORNL D&D	STK					
Pm-146	1.17E-03	1.17E-03	ORNL D&D	STK					
Pm-147	2.83E-03	2.83E-03	ORNL D&D	STK					Not simulated
Pu-238	7.37E+02	7.37E+02	ORNL D&D	STK					
Pu-239	2.37E+02	5.76E+02	ORNL RA	STK					
Pu-240	3.51E+02	5.08E+02	ORNL RA	STK					
Pu-241	6.87E+01	2.83E+03	ORNL RA	STK					
Pu-242	1.83E-01	2.27E+00	ORNL RA	STK					
Pu-244	4.89E-02	4.89E-02	ORNL D&D	STK					
Ra-226	2.92E+00	3.92E+00	ORNL RA	STK					
Ra-228	6.54E-03	1.71E-01	Y-12 D&D Remaining Facil	STK					
Re-187	2.27E-05	2.27E-05	ORNL D&D	STK					
Sb-125	4.02E-07	4.02E-07	ORNL D&D	STK					Not simulated
Sr-90	2.16E+03	2.16E+03	ORNL D&D	STK					
Tc-99	1.32E+01	4.06E+01	Y-12 D&D Biology	STK					
Th-228	1.16E-06	1.58E-05	Y-12 D&D Remaining Facil	STK					
Th-229	1.73E+00	7.96E+01	ORNL RA	STK					
Th-230	1.70E+00	2.11E+01	ORNL RA	STK					
Th-232	1.19E+00	1.31E+01	Y-12 Remedial Action	STK					
U-232	8.34E-01	1.45E+02	ORNL RA	STK					
U-233	2.65E+02	2.92E+02	ORNL RA	STK					
U-234	1.11E+01	5.23E+03	Y-12 D&D Remaining Facil	STK					
U-235	4.20E-01	3.16E+02	Y-12 D&D Remaining Facil	STK					
U-236	2.65E-01	7.47E+01	Y-12 D&D Remaining Facil	STK					
U-238	6.79E+00	2.91E+03	Y-12 D&D Remaining Facil	STK					

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Radiological units for activity	-	Ci, Bq, dps,	pCi		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Basic radiation dose limit	BRDL	mrem/yr	25		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Exposure duration	ED	yr	30		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	12/19/2019	Checked in summary file
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	12/19/2019	Checked in summary file
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	12/19/2019	Checked in summary file
Source					-					
Nuclide concentration	-	pCi/g	varies		Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in Soil Conc sheet
Release to groundwater, leach rate		1/yr	varies	Inactive	Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file. Checked in summary file that ALEACH = 0 for all
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	varies	Inactive	Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file. Checked in summary file that Version 2 is not used by verifying variables defined for Radionuclide Release
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Radionuclide bearing material becomes releasable		N/A	Linear		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	1.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Time over which transformation to releasable form occurs	RELDUR	Years	800		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1.0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Release Mechanism	RELOPT	--	Rate Controlled (Leach Rate)/First Order with Transport, 0		Ryan Hupfer	N. Holt	11/7/2019	J. Davis	11/15/2019	Checked in summary file
Initial Leach Rate	ALEACH	1/year	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	Waste Zone Kd		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in Kd sheet
Release to atmospheric			Beginning at time zero			N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Distribution Coefficients					-					
Contaminated zone	DCACTC	cm^3/g	varies		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in Kd sheet
Unsaturated zone	DCACTU	cm^3/g	varies		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in Kd sheet
Saturated zone	DCACTS	cm^3/g	varies		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in Kd sheet
Sediment in surface water body	DCACTSWB	cm^3/g	0		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in Kd sheet
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in Kd sheet
Leafy vegetable fields	DCACTV2	cm^3/g	varies		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in Kd sheet
Pasture, silage growing areas	DCACTL1	cm^3/g	varies		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in Kd sheet

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Livestock feed grain fields	DCACTL2	cm^3/g	varies		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in Kd sheet
Offsite dwelling site	DCACTDWE	cm^3/g	varies		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in Kd sheet
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (I-129)		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (I-129)		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Dose Conversion and Slope Factors					-					
External exposure library		(mrem/yr) per (pCi/g)	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Internal exposure dose library		mrem/pCi	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Slope Factor (Risk) Library		(risk/yr) per (pCi/g)	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg) / (pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in Transfer Factors sheet
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg) / (pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in Transfer Factors sheet
Pasture and silage transfer factor	RTF(,3)	(pCi/kg) / (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in Transfer Factors sheet
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg) / (pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in Transfer Factors sheet
Meat transfer factor	I_M(,1)	(pCi/kg) / (pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in Transfer Factors sheet
Milk transfer factor	I_M(,2)	(pCi/L)/ (pCi/d)	PNNL 2003 Milk		Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in Transfer Factors sheet
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg) / (pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in Transfer Factors sheet
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg) / (pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in Transfer Factors sheet
Reporting Times					-					
Times at which output is reported	T()	yr	1, 200, 400, 500, 600, 800, 1000, 2000, 10000		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Wind speed	WIND	m/s	3.4342	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Primary Contamination					-					
Area of primary contamination	AREA	m^2	95,900	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Depth of soil mixing layer (m)	DM	m	1.00		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Runoff coefficient	RUNOFF	--	0.963		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Rainfall Erosion Index	RAINEROS	--	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Erosion rate of contaminated zone	VCZ	m/yr	0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0.000		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Depth of primary contamination below water table	SUBMERGEDDEPTH	--	0.000	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Clean Cover					-					
Thickness of clean cover	COVER0	m	0.97		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file

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Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file. Not Used
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Erosion rate of clean cover	VCV	m/yr	0	Inactive	Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field	AREA0(1)	m2	1024	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMOF(1)	--	0.3		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Erosion rate for fruit, grain, and nonleafy vegetable field	EROSN(1)	m/yr	0.0	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file. Not Used
Leafy Vegetable Field					-					
Area for leafy vegetable field	AREA0(2)	m^2	1024	Calculated	Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Volumetric water content for leafy vegetable field	TMOF(2)	--	0.3		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Erosion rate for leafy vegetable field	EROSN(2)	m/yr	0.0	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file

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Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field	AREA0(3)	m^2	10000	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Volumetric water content for pasture and silage field	TMOF(3)	--	0.3		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Erosion rate for pasture and silage field	EROSN(3)	m/yr	0.0	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Grain Field					-					
Area for grain field	AREA0(4)	m^2	10000	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568		Ryan Hupfer			J. Davis	11/15/2019	Checked in summary file
Runoff coefficient for grain field	RUNOF(4)	--	0.734		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Volumetric water content for grain field	TMOF(4)	--	0.3		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Erosion rate	EROSN(4)	m/yr	0.0	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Cover and management factor for grain field	CRPMANG(4)	--	0.003		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Support practice factor for grain field	CONVPRAC(4)	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site	AREAODWELL	m^2	1024	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer			J. Davis	11/15/2019	
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Volumetric water content for dwelling site	TMOFDWELL	--	0.3		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Erosion rate for dwelling site	EROSNDWELL	m/yr	0	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file

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Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Support practice factor for dwelling site	CONVPRACDWELL	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file. Not Used
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Anemometer height	ANH	m	10		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Ambient temperature	TABK	K	285		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Dispersion model coefficients	-	--	Pasquill-Gifford		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Windspeed Terrain	-	--	Rural		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Leafy vegetable plot	AGRIELEV(2)	m	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Pasture, silage growing area	AGRIELEV(3)	m	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Grain fields	AGRIELEV(4)	m	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Dwelling site	DWELLELEV	m	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Surface water body	SWELEV	m	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	H(2)		0.305		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	H(4)		3.048		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	H(5)		4.846		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	DENSUZ(2)		1.6		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	DENSUZ(3)		1.5		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	DENSUZ(4)		1.5		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	DENSUZ(5)		1.8		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	TPUZ(2)		0.397		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	TPUZ(3)		0.427		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
	TPUZ(4)		0.419		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	TPUZ(5)		0.353		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	EPUZ(2)		0.389		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	EPUZ(3)		0.195		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
	EPUZ(4)		0.234		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
	EPUZ(5)		0.27		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file

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Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FCUZ(2)		0.032		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FCUZ(3)		0.418		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FCUZ(4)		0.307		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
	FCUZ(5)		0.2471		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	HCUZ(2)		94600		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	HCUZ(3)		0.315		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	HCUZ(4)		3.15		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	HCUZ(5)		16.7		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	BUZ(2)		4.05		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	BUZ(3)		11.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	BUZ(4)		11.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	BUZ(5)		10.4		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	ALPHALU(2)		0.1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	ALPHALU(3)		0.1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	ALPHALU(4)		0.1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	ALPHALU(5)		0.1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	60.96		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Depth of aquifer contributing to well	DWIBWT	m	40		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to surface water b	ALPHATSW	m	3.15		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file, not used
Fraction of water from surface body for human consumption	FSWD	--	0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file, not used
Fraction of water from well for human consumption	FWWD	--	1	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file, not used
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file, not used
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file, not used
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file, not used

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Number of cattle for beef cattle	NLWI(1)	--	2		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file, not used
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file, not used
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file, not used
Number of cows for dairy cows	NLWI(2)	--	2		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Calclated	Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Area of Plot for leafy vegetables		m^2	1024	Calculated	Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of water from well for pasture and silage	FWWIR(3)	--	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Area of Plot for pasture and silage		m^2	10000	Calculated	Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Area of Plot for livestock feed grain		m^2	10000	Calculated	Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Area of Plot for offsite dwelling site		m^2	1024	Calculated	Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	0.900	Calculated	Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Surface area of water in surface water body:	ALAKE	m^2	500	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file

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Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file, not used
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file, not used
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/17/2019	Checked in summary file, not used
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive	Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/18/2019	Checked in summary file, not used
Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/19/2019	Checked in summary file, not used
Meat consumption	DMI(1)	kg/yr	91.9	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/20/2019	Checked in summary file, not used
Milk consumption	DMI(2)	L/yr	110	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file, not used
Soil (incidental) ingestion rate	SOIL	g/yr	36.53	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/22/2019	Checked in summary file, not used
Drinking water intake from affected area		--	1	Calculated	Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/21/2019	Checked in model
Fish consumption from affected area	FFISH(1)	--	1.0	Inactive	Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/22/2019	Checked in summary file, not used
Other aquatic food consumption from affected area	FFISH(2)	--	0.5	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/23/2019	Checked in summary file, not used
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/24/2019	Checked in summary file, not used
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/25/2019	Checked in summary file, not used
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/26/2019	Checked in summary file, not used
Milk consumption from affected area	FMEMI(2)	--	0.5	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/27/2019	Checked in summary file, not used
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/26/2019	Checked in summary file, not used
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/27/2019	Checked in summary file, not used
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/28/2019	Checked in summary file, not used
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/29/2019	Checked in summary file, not used
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/30/2019	Checked in summary file, not used
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/26/2019	Checked in summary file, not used

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Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	44.0	Inactive	Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/27/2019	Checked in summary file, not used
Grain intake for dairy cows	LFI(2,2)	kg/d	11.0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/28/2019	Checked in summary file, not used
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/29/2019	Checked in summary file, not used
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/30/2019	Checked in summary file, not used
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/29/2019	Checked in summary file, not used
Duration of growingseason of pasture and silage	GROWTIME(3)	yr	0.08	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/30/2019	Checked in summary file, not used
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/1/2019	Checked in summary file, not used
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/2/2019	Checked in summary file, not used
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file, not used
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/4/2019	Checked in summary file, not used
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/5/2019	Checked in summary file, not used
Grain					-					
Wet weight cropyield of grain	YIELD(4)	kg/m^2	0.70	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/29/2019	Checked in summary file, not used
Duration of growingseason of grain	GROWTIME(4)	yr	0.17	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/30/2019	Checked in summary file, not used
Foliage to foodtransfer coefficient of grain	FOLI F(4)	--	0.1	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/1/2019	Checked in summary file, not used
Weatheringremoval constant ofgrain	RWEATHER(4)	1/yr	20.0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/2/2019	Checked in summary file, not used
Foliar interceptionfactor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file, not used
Foliar interceptionfactor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/4/2019	Checked in summary file, not used
Root depth of grain	DROOT(4)	m	1.20	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/5/2019	Checked in summary file, not used
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/29/2019	Checked in summary file, not used
Duration of growing season of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/30/2019	Checked in summary file, not used
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/1/2019	Checked in summary file, not used
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/2/2019	Checked in summary file, not used
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/3/2019	Checked in summary file, not used
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/4/2019	Checked in summary file, not used
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/5/2019	Checked in summary file, not used
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/29/2019	Checked in summary file, not used
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive	Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/30/2019	Checked in summary file, not used
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/1/2019	Checked in summary file, not used
Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	20.0	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/2/2019	Checked in summary file, not used
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/3/2019	Checked in summary file, not used
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/4/2019	Checked in summary file, not used
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/5/2019	Checked in summary file, not used
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
External gamma shielding (penetration) factor	SHF1	--	0.7		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Scale	-	m	598.375		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Dwelling location coordinate in X-direction	-	m	270		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Dwelling location coordinate in y-direction	-	m	607		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
	RAD_SHAPE(1)		43.5833		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
	RAD_SHAPE(2)		87.1667		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
	RAD_SHAPE(3)		130.7500		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
	RAD_SHAPE(4)		174.3333		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	RAD_SHAPE(5)		217.9167		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Radius	RAD_SHAPE(6)	m	261.5000		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	RAD_SHAPE(7)		305.0833		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	RAD_SHAPE(8)		348.6667		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
	RAD_SHAPE(9)		392.2500		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	RAD_SHAPE(10)		435.8333	Calculated	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	RAD_SHAPE(11)		479.4167		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Radius	RAD_SHAPE(12)	m	523.0000		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FRACA(1)		0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FRACA(2)		0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FRACA(3)		0.04		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FRACA(4)		0.21		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FRACA(5)		0.22		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FRACA(6)		0.18		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction (Onsite)	FRACA(7)	--	0.15		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FRACA(8)		0.13		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FRACA(9)		0.11		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FRACA(10)		0.099		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FRACA(11)		0.089		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
	FRACA(12)		0.05		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Outdoor time fraction on primary contamination	FOTD	--	0.50		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.0		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.00		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.0		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.0		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/16/2019	Checked in summary file
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/17/2019	Checked in summary file
Thickness of floor and foundation	FLOOR1	m	0.15	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/18/2019	Checked in summary file
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/19/2019	Checked in summary file
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/20/2019	Checked in summary file
Volumetric water content of floor and foundation	PH20FL		0.03	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/21/2019	Checked in summary file
Depth of foundation below ground level	DMFL	m	-1.00	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/22/2019	Checked in summary file
Vertical dimension of mixing	HMIX	m	1.00		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Building indoor are factor	FAI		0.00	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/16/2019	Checked in summary file
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/18/2019	Checked in summary file
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/20/2019	Checked in summary file
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/21/2019	Checked in summary file
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/22/2019	Checked in summary file
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	1.00		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Vertical dimension of mixing for inhalation	HMIX	m	1.00		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Vertical dimension of mixing for vegetation	HMIXV	m	1.00	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of vegetation carbon absorbed from soil	CAIR		0.02	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fraction of vegetation carbon absorbed from air	CSOIL		0.98	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	12/19/2019	Checked in summary file
Contaminated soil	C12CZ	g/g	0.03		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Local water	C12WTR	g/cm3	2.00E-05	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Leafy vegetables	C12PLANT(2)		0.09	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Pasture and Silage	C12PLANT(3)		0.09	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Livestock feed grain	C12PLANT(4)		0.40	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Meat	C12MEAT_MILK(1)		0.24	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Milk	C12MEAT_MILK(2)		0.07	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Tritium										
Humidity in air	HUMID	g/m3	8.00		Ryan Hupfer	N. Holt	12/23/2019	J. Davis	11/15/2019	Checked in summary file
Mass fraction of water in fruit, grain, non-leafy vegetables	H20PLANT(1)		0.80	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Mass fraction of water in leafy vegetables	H20PLANT(2)		0.80	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Mass fraction of water in pasture and silage	H20PLANT(3)		0.80	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Mass fraction of water in livestock feed grain	H20PLANT(4)		0.80	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Mass fraction of water in meat	H20_MEAT_MILK(1)		0.60	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Mass fraction of water in milk	H20_MEAT_MILK(2)		0.88	Inactive	Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file
Vertical dimension of mixing for inhalation	HMIX	m	1.00		Ryan Hupfer	N. Holt	11/8/2019	J. Davis	11/15/2019	Checked in summary file

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	8.37E-03	5.00E+04	9.10E+03	Ryan Hupfer	N. Holt	11/13/2019	J. Davis	11/15/2019	Checked in model
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.31E-03	1.00E+00	1.00E+00	Ryan Hupfer	N.Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Partition Coefficient values for EMDF Performance Analysis - Technical Review Documentation - April 12 2019

Element	K_d, EMDF base case model (ml/g)		Prepared by					
	Waste Zone	Saprolite and Bedrock		Checked by	Date	Checked by	Date	Notes
Ac	20	40	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Am	2000	4100[a]	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Ba	28	55	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Be	400	800	Information/Data Transfer Transmittal 001 rev1					Not Simulated
C	0	0	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Ca	15	30	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Cd	100	200	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Cf	20	40	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Cl	N/A[c]	N/A[c]	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Cm	20	40	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Co	400	800	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Cs	1500	3000	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Eu	20	40	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Fe	450	890	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Gd	410	820	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
H	0	0	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
I	2	4	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
K	15	30	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Mo	45	90	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Na	5	10	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Nb	50	100	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Nd	158	158	Ryan Hupfer	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Ni	1000	2000	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Np	20	40	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Pa	200	400	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Pb	50	100	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Pd	1000	2000	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Pm	410	820	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Pu	20	40	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Ra	1500	3000	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Re	20	40	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Sb	75	150	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Se	250	500	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Sm	500	1000	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Sn	50	100	Information/Data Transfer Transmittal 001 rev1					Not Simulated
Sr	15	30	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Tc	0.36	0.72	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Th	1500	3000	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
U	25	50	Information/Data Transfer Transmittal 001 rev1	N. Holt	12/23/2019	J. Davis	12/19/2019	Checked in summary file
Zr	25	50	Information/Data Transfer Transmittal 001 rev1					Not Simulated

Isotope Name	MAXIMUM VALUE	MAXIMUM WASTE	Prepared	Checked by	Date	Checked by	Date	Notes
Ac-227	3.88E-02	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Am-241	6.14E+02	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Am-243	3.95E+01	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
C-14	4.18E+01	Y-12 D&D Biology	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cf-249	1.44E-05	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cf-250	9.82E-05	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cf-251	2.79E-06	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cf-252	1.74E-06	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Cm-243	5.18E+00	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cm-244	1.67E+03	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cm-245	5.08E-01	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cm-246	2.11E+00	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cm-247	1.38E-01	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cm-248	7.43E-03	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Co-60	2.18E-01	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Cs-134	1.21E-07	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Cs-137	1.46E+04	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Eu-152	3.73E+02	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Eu-154	8.49E+01	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Eu-155	8.87E-02	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Fe-55	1.28E-05	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
H-3	1.30E+02	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
I-129	4.92E+00	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
K-40	2.23E+01	Y-12 D&D Biology	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Mo-100	5.58E-05	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Na-22	1.08E-05	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Nb-94	2.16E-01	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Ni-59	4.04E+01	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Ni-63	8.97E+03	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Np-237	2.81E+00	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pa-231	3.17E+00	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pb-210	4.68E+01	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pm-146	1.17E-03	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pm-147	2.83E-03	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Pu-238	7.37E+02	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pu-239	5.76E+02	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pu-240	5.08E+02	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pu-241	2.83E+03	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pu-242	2.27E+00	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Pu-244	4.89E-02	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Ra-226	3.92E+00	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Ra-228	1.71E-01	Y-12 D&D Remaining Facilities	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Re-187	2.27E-05	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Sb-125	4.02E-07	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Not Simulated
Sr-90	2.16E+03	ORNL D&D	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Tc-99	4.06E+01	Y-12 D&D Biology	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Th-228	1.58E-05	Y-12 D&D Remaining Facilities	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Th-229	7.96E+01	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Th-230	2.11E+01	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
Th-232	1.31E+01	Y-12 Remedial Action	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-232	1.45E+02	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-233	2.92E+02	ORNL RA	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-234	5.23E+03	Y-12 D&D Remaining Facilities	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-235	3.16E+02	Y-12 D&D Remaining Facilities	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-236	7.47E+01	Y-12 D&D Remaining Facilities	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file
U-238	2.91E+03	Y-12 D&D Remaining Facilities	STK	N. Holt	11/14/2019	J. Davis	11/15/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Radiological units for activity	-	Ci, Bq, dps, dpm	pCi		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Radiological units for dose	-	rem and Sv	mrem		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Basic radiation dose limit	BRDL	mrem/yr	0.4		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Exposure duration	ED	yr	30		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Number of unsaturated zone(s)	NS	--	5		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Submerged fraction of Primary Contamination	SUBMERGEDF	unitless	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Default Release Mechanism	-		Version 2 Release Methodology		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Bearing of X axis	NXBEARING	degrees	90		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
X dimension of Primary contamination	SOURCEXY(1)	m	250.6		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Y dimension of Primary contamination	SOURCEXY(2)	m	382.7		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Smaller x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(1,1)	m	0.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Larger x coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(2,1)	m	32.00	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Smaller y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(3,1)	m	-132.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Larger y coordinate of the fruit, grain, nonleafy vegetables plot	AGRIXY(4,1)	m	-100.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Smaller x coordinate of the leafy vegetables plot	AGRIXY(1,2)	m	40.0	Inactive	Ryan Hupfer	J. Davis	9/26/2019	O. Warren	9/24/2019	Not used
Larger x coordinate of the leafy vegetables plot	AGRIXY(2,2)	m	72.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Smaller y coordinate of the leafy vegetables plot	AGRIXY(3,2)	m	-132.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Larger y coordinate of the leafy vegetables plot	AGRIXY(4,2)	m	-100.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Smaller x coordinate of the pasture, silage growing area	AGRIXY(1,3)	m	120.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Larger x coordinate of the pasture, silage growing area	AGRIXY(2,3)	m	220.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Smaller y coordinate of the pasture, silage growing area	AGRIXY(3,3)	m	-200.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Larger y coordinate of the pasture, silage growing area	AGRIXY(4,3)	m	-100.00	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Smaller x coordinate of the grain fields	AGRIXY(1,4)	m	230.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Larger x coordinate of the grain fields	AGRIXY(2,4)	m	330.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Smaller y coordinate of the grain fields	AGRIXY(3,4)	m	-200.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Larger y coordinate of the grain fields	AGRIXY(4,4)	m	-100.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Smaller x coordinate of the dwelling site	DWELLXY(1)	m	80.00	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Larger x coordinate of the dwelling site	DWELLXY(2)	m	112.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Smaller y coordinate of the dwelling site	DWELLXY(3)	m	-132.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Larger y coordinate of the dwelling site	DWELLXY(4)	m	-100.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Smaller x coordinate of the surface-water body	SWXY(1)	m	-575.4		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Larger x coordinate of the surface-water body	SWXY(2)	m	-475.4		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Smaller y coordinate of the surface-water body	SWXY(3)	m	-337.4		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Larger y coordinate of the surface-water body	SWXY(4)	m	-332.4		Ryan Hupfer	J. Davis	9/26/2019	O. Warren	9/24/2019	Checked in summary file
Source					-					
Nuclide concentration	-	pCi/g	varies		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in Soil Conc Sheet

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Release to groundwater, leach rate		1/yr	0	Inactive	Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in summary file
Use Distribution Coefficient to Estimate First Order Leach Rate	-	cc/g	0	Inactive	Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in summary file
Deposition velocity	DEPVEL DEPVELT	m/s	0.001 0.01 (Cl-36, I-129)		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Radionuclide bearing material becomes releasable	RELTIMEOPT	N/A	Linear		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Time at which radionuclide first becomes releasable (delay time)	RELTIMEINIT	Year	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Fraction of radionuclide bearing material that is initially releasable	RELFRACINIT	unitless	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Time over which transformation to releasable form occurs	RELDUR	Years	800		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Total fraction of radionuclide bearing material that is releasable	RELFRACFINAL	unitless	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Release mechanism	RELOPT		1.0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Initial Leach Rate	RLEACH	1/year	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	ALEACH
Final Leach Rate	RLEACHF	1/year	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Distribution Coefficients in the contaminated zone	DCACTC	cc/g	varies		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/29/2019	Checked in summary file
Release to Atmospheric			in the same manner as for release to groundwater		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Distribution Coefficients					-					
Contaminated zone	DCACTC	cm^3/g	varies		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in Kd Sheet
Unsaturated zone	DCACTU	cm^3/g	varies		Ryan Hupfer	J. Davis	10/1/2019			Checked in Kd Sheet
Saturated zone	DCACTS	cm^3/g	varies		Ryan Hupfer	J. Davis	10/1/2019			Checked in Kd Sheet
Sediment in surface water body	DCACTSWB	cm^3/g	0		Ryan Hupfer	J. Davis	10/1/2019			Checked in Kd Sheet
Fruit, grain, nonleafy fields	DCACTV1	cm^3/g	varies	Inactive	Ryan Hupfer	J. Davis	3/11/2020			Not used. Checked in summary file
Leafy vegetable fields	DCACTV2	cm^3/g	varies	Inactive	Ryan Hupfer	J. Davis	3/11/2020			Not used. Checked in summary file
Pasture, silage growing areas	DCACTL1	cm^3/g	varies	Inactive	Ryan Hupfer	J. Davis	3/11/2020			Not used. Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Livestock feed grain fields	DCACTL2	cm^3/g	varies	Inactive	Ryan Hupfer	J. Davis	3/11/2020			Not used. Checked in summary file
Offsite dwelling site	DCACTDWE	cm^3/g	varies	Inactive	Ryan Hupfer	J. Davis	3/11/2020			Not used. Checked in summary file
Deposition Velocities					-					
Deposition velocity of respirable particulates	DEPVEL	m/s	0.001 0.01 (Cl-36, I-129)		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Deposition velocity of all particulates	DEPVELT	m/s	0.001 0.01 (Cl-36, I-129)		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Dose Conversion and Slope Factors					-					
External exposure library	N/A	N/A	DCFPAK3.02 Database, DOE STD-5002-2017		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Internal exposure dose library	N/A	N/A	DOE STD-1196-2011 (Reference Person)		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Slope factor (Risk) library	N/A	N/A	DCFPAK3.02 Morbidity - DOE STD-5002-2017		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Transfer Factors					-					
Fruit, grain, nonleafy vegetables transfer factor	RTF(,1)	(pCi/kg)/(pCi/kg)	PNNL 2003, Mean of Fruits, Grains, Root Vegetables Transfer Factors (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in Transfer Factors Sheet
Leafy vegetables transfer factor	RTF(,2)	(pCi/kg)/(pCi/kg)	PNNL 2003, Leafy Vegetables (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in Transfer Factors Sheet
Pasture and silage transfer factor	RTF(,3)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in Transfer Factors Sheet
Livestock feed grain transfer factor	RTF(,4)	(pCi/kg)/(pCi/kg)	PNNL 2003, Grains (C-14, H-3 Calculated)		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in Transfer Factors Sheet
Meat transfer factor	I_M(,1)	(pCi/kg)/(pCi/d)	PNNL 2003, Consumption Adjusted Transfer Factors, Red Meat, Poultry, Egg		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in Transfer Factors Sheet
Milk transfer factor	I_M(,2)	(pCi/L)/(pCi/d)	PNNL 2003 Milk		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in Transfer Factors Sheet
Bioaccumulation factor for fish	BIOFAC(,1)	(pCi/kg)/(pCi/L)	PNNL 2003 Fresh Water Fish (RESRAD default for H-3)		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in Transfer Factors Sheet
Bioaccumulation factor for crustacea and mollusks	BIOFAC(,2)	(pCi/kg)/(pCi/L)	RESRAD default values for all isotopes		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in Transfer Factors Sheet
Reporting Times					-					
Times at which output is reported	T()	yr	1, 200, 400, 500, 600, 800, 1000, 2000, 10000		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Storage Times					-					
Storage time for surface water	STOR_T(1)	d	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Storage time for well water	STOR_T(2)	d	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Storage time for fruits, grain, and nonleafy vegetables	STOR_T(3)	d	14		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Storage time for leafy vegetables	STOR_T(4)	d	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Storage time for pasture and silage	STOR_T(5)	d	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Storage time for livestock feed grain	STOR_T(6)	d	45		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Storage time for meat	STOR_T(7)	d	20		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Storage time for milk	STOR_T(8)	d	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Storage time for fish	STOR_T(9)	d	7		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Storage time for crustacea and mollusks	STOR_T(10)	d	7		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Physical and Hydrological					-					
Precipitation	PRECIP	m/yr	1.382		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Wind speed		m/s	3.4342	Calculated	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Primary Contamination					-					
Area of primary contamination		m^2	95,900	Calculated	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Length of contamination parallel to aquifer flow	LCZPAQ	m	398.9		Ryan Hupfer	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Depth of soil mixing layer (m)	DM	m	0.15		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Mass loading of all particulates	MLFD	g/m^3	0.0001		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Deposition velocity of dust (m/s)	DEPVEL DUSTT	m/s	0.001		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Deposition Velocity of respirable particulates	DEPVEL_DUST	m/s	0.001	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Irrigation applied per year (m/yr)	RI	m/yr	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Evapotranspiration coefficient	EVAPTR	--	0.568		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Runoff coefficient	RUNOFF	--	0.625		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/8/2019	Checked in summary file, Spot Checked 10/8/2019
Rainfall Erosion Index	RAINEROS	--	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Slope-length-steepness factor	SLPLENSTPPC	--	0.4		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cover and management factor	CRPMANGPC	--	0.003		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Support practice factor	CONVPRACPC	--	0.0		Ryan Hupfer	J. Davis	9/26/2019	O. Warren	9/24/2019	Checked in summary file
Fraction of primary contamination that is submerged	SUBMERGEDF	--	0.0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Contaminated Zone					-					
Thickness of contaminated zone	THICK0	m	17.5		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Total porosity of contaminated zone	TPCZ	--	0.419		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Dry bulk density of contaminated zone	DENSCZ	g/cm^3	1.9		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Erosion rate of contaminated zone		m/yr	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Soil erodibility factor of contaminated zone	ERODIBILITYCZ	tons/acre	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Field capacity of contaminated zone	FCCZ	--	0.307		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Soil b parameter of contaminated zone	BCZ	--	7.75		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Longitudinal Dispersivity	ALPHALCZ	m	1.80		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Hydraulic conductivity of contaminated zone (above)	HCCZ	m/yr	5.99		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/8/2019	Checked in summary file, Spot Checked 10/8/2019
Hydraulic conductivity of contaminated zone (below)	HCSZ	m/yr	26.8		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
CZ effective porosity	EPCZ	--	0.234		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Depth of primary contamination below water table	SUBMERGEDEPTH	--	0	Calculated	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Clean Cover					-					
Thickness of clean cover	COVER0	m	3.353		Ryan Hupfer	J. Davis	9/26/2019	O. Warren	9/24/2019	Checked in summary file
Total porosity of clean cover	TPCV	--	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Dry bulk density of clean cover	DENSCV	g/cm^3	1.5		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Erosion rate of clean cover	VCV	m/yr	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/8/2019	Checked in summary file, Spot Checked 10/8/2019
Soil erodibility factor of clean cover	ERODIBILITYCV	tons/acre	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file

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Volumetric water content of clean cover	PH2OCV	--	0.05	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Agriculture Area Parameters					-					
Fruit, Grain, and Non-leafy Vegetables Field					-					
Area for fruit, grain, and non-leafy vegetables field		m2	1024	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of area directly over primary contamination for fruit, grain, and nonleafy vegetables field	FAREA_PLANT(1)	--	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Irrigation applied per year for fruit, grain, and nonleafy vegetables field	RIRRIG(1)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Evapotranspiration coefficient for fruit, grain, and nonleafy vegetables field	EVAPTRN(1)	--	0.568	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Runoff coefficient for fruit, grain, and nonleafy vegetables field	RUNOF(1)	--	0.734	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Depth of soil mixing layer or plow layer for fruit, grain, and nonleafy vegetables field	DPTHMIXG(1)	m	0.1500	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Volumetric water content for fruit, grain, and nonleafy vegetables field	TMDF(1)	--	0.3	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Erosion rate for fruit, grain, and nonleafy vegetable field		m/yr	0.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Dry bulk density of soil for fruit, grain, and nonleafy vegetables field	RHOB(1)	g/cm^3	1.50	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Soil erodibility factor for fruit, grain, and nonleafy vegetables field	ERODIBILITY(1)	tons/acre	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Slope-length- steepness factor for fruit, grain, and nonleafy vegetables field	SLPLENSTP(1)	--	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Cover and management factor for fruit, grain, and nonleafy vegetables field	CRPMANG(1)	--	0.003	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Support practice factor for fruit, grain, and nonleafy vegetables field	CONVPRAC(1)	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Total Porosity for fruit, grain, and nonleafy vegetable field	TPOF(1)	--	0.40	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Leafy Vegetable Field					-					
Area for leafy vegetable field		m^2	1024	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of area directly over primary contamination for leafy vegetable field	FAREA_PLANT(2)	--	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Irrigation applied per year for leafy vegetable field	RIRRIG(2)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Evapotranspiration coefficient for leafy vegetable field	EVAPTRN(2)	--	0.568	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Runoff coefficient for leafy vegetable field	RUNOF(2)	--	0.734	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Depth of soil mixing layer or plow layer for leafy vegetable field	DPTHMIXG(2)	m	0.1500	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Volumetric water content for leafy vegetable field	TMDF(2)	--	0.3	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Erosion rate for leafy vegetable field		m/yr	0.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Dry bulk density of soil for leafy vegetable field	RHOB(2)	g/cm^3	1.50	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Soil erodibility factor for leafy vegetable field	ERODIBILITY(2)	tons/acre	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Slope-length-steepness factor for leafy vegetable field	SLPLENSTP(2)	--	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Cover and management factor for leafy vegetable field	CRPMANG(2)	--	0.003	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Support practice factor for leafy vegetable field	CONVPRAC(2)	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Total Porosity for leafy vegetable field	TPOF(2)	--	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Livestock Feed Growing Area Parameters Pasture					-					
Silage Field					-					
Area for pasture and silage field		m^2	10000	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of area directly over primary contamination for pasture and silage field	FAREA_PLANT(3)	--	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Irrigation applied per year for pasture and silage field	RIRRIG(3)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Evapotranspiration coefficient for pasture and silage field	EVAPTRN(3)	--	0.568	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Runoff coefficient for pasture and silage field	RUNOF(3)	--	0.734	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Depth of soil mixing layer or plow layer for pasture and silage field	DPTHMIXG(3)	m	0.15	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Volumetric water content for pasture and silage field	TMDF(3)	--	0.3	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Erosion rate for pasture and silage field		m/yr	0.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Dry bulk density of soil for pasture and silage field	RHOB(3)	g/cm^3	1.50	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Soil erodibility factor for pasture and silage field	ERODIBILITY(3)	tons/acre	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Slope-length- steepness factor for pasture and silage field	SLPLENSTP(3)	--	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Cover and management factor for pasture and silage field	CRPMANG(3)	--	0.003	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Support practice factor for pasture and silage field	CONVPRAC(3)	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Total porosity for pasture and silage field	TPOF(3)	--	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Grain Field					-					
Area for grain field		m^2	10000	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of area directly over primary contamination for grain field	FAREA_PLANT(4)	--	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Irrigation applied per year for grain field	RIRRIG(4)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Evapotranspiration coefficient for grain field	EVAPTRN(4)	--	0.568	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Runoff coefficient for grain field	RUNOF(4)	--	0.734	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Depth of soil mixing layer or plow layer for grain field	DPTHMIXG(4)	m	0.1500	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Volumetric water content for grain field	TMDF(4)	--	0.3	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Erosion rate		m/yr	0.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Dry bulk density of soil for grain field	RHOB(4)	g/cm^3	1.50	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Soil erodibility factor for grain field	ERODIBILITY(4)	tons/acre	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Slope-length-steepness factor for grain field	SLPLENSTP(4)	--	0.4	Inactive	Ryan Hupfer	J. Davis	9/26/2019	O. Warren	9/24/2019	Not used
Cover and management factor for grain field	CRPMANG(4)	--	0.003	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Support practice factor for grain field	CONVPRAC(4)	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Total Porosity for grain field	TPOF(4)	--	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Offsite Dwelling Area Parameters					-					
Area of offsite dwelling site		m^2	1024	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Irrigation applied per year to home garden or lawn	RIRRIGDWELL	m/yr	0.015	Inactive	Ryan Hupfer	J. Davis	9/26/2019	O. Warren	9/24/2019	Not used
Evapotranspiration coefficient for dwelling site	EVAPTRNDWELL	--	0.568	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Runoff coefficient for dwelling site	RUNOFDWELL	--	0.636	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Depth of soil mixing layer for dwelling site	DPTHMIXGDWELL	m	0.15	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Volumetric water content for dwelling site	TMDFDWELL	--	0.3	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Erosion rate for dwelling site		m/yr	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Dry bulk density of soil for dwelling site	RHOBDWELL	g/cm^3	1.5	Inactive	Ryan Hupfer	J. Davis	9/26/2019	O. Warren	9/24/2019	Not used
Soil erodibility factor for dwelling site	ERODIBILITYDWELL	tons/acre	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Slope-length- steepness factor for dwelling site	SLPLENSTPDWELL	--	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Cover and management factor for dwelling site	CRPMANGDWELL	--	0.003	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Support practice factor for dwelling site	CONVPRACDWELL	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Total porosity for dwelling site	TPOFDWELL	--	0.4	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Atmospheric Transport					-					
Release height	AIRRELHT	m	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Release heat flux	HEATFLX	cal/s	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Anemometer height	ANH	m	10		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/8/2019	Checked in summary file, Spot Checked 10/8/2019
Ambient temperature	TABK	K	285		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
AM atmospheric mixing height	AMIX	m	400		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
PM atmospheric mixing height	PMIX	m	1,600		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/8/2019	Checked in summary file, Spot Checked 10/8/2019
Dispersion model coefficients	-	--	Pasquill-Gifford		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Windspeed Terrain	-	--	Rural		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Fruit, grain, nonleafy vegetable plot	AGRIELEV(1)	m	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Leafy vegetable plot	AGRIELEV(2)	m	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Pasture, silage growing area	AGRIELEV(3)	m	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Grain fields	AGRIELEV(4)	m	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Dwelling site	DWELLELEV	m	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Surface water body	SWELEV	m	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Grid spacing for areal integration	ATGRID	m	10		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Joint frequency of wind speed and stability class for a 16 sector wind rose	DFREQ	--	1 (S to N)		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Wind speed	WINDSPEED	m/s	0.89, 2.46, 4.47, 6.93, 9.61, 12.52		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Unsaturated Zone Parameters					-					
Unsaturated zone thickness	H(1)	m	0.305		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	H(2)		0.305		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Unsaturated zone thickness	H(3)	m	0.9144		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	H(4)		3.048		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	H(5)		3.328		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Unsaturated zone dry bulk density	DENSUZ(1)	g/cm^3	1.4		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	DENSUZ(2)		1.6		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	DENSUZ(3)		1.5		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	DENSUZ(4)		1.5		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	DENSUZ(5)		1.8		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Unsaturated zone total porosity	TPUZ(1)	--	0.463		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	TPUS(2)		0.397		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	TPUS(3)		0.427		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	TPUS(4)		0.419		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	TPUS(5)		0.353		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Unsaturated zone effective porosity	EPUZ(1)	--	0.294		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	EPUZ(2)		0.389		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	EPUZ(3)		0.195		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	EPUZ(4)		0.234		Ryan Hupfer	J. Davis	9/26/2019	O. Warren	9/24/2019	Checked in summary file
	EPUZ(5)		0.27		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Unsaturated zone field capacity	FCUZ(1)	--	0.232		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	FCUZ(2)		0.032		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	FCUZ(3)		0.418		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	FCUZ(4)		0.307		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	FCUZ(5)		0.2471		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Unsaturated zone hydraulic conductivity	HCUZ(1)	m/yr	117		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	HCUZ(2)		94600		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	HCUZ(3)		0.315		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	HCUZ(4)		3.15		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	HCUZ(5)		16.7		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Unsaturated zone soil b parameter	BUZ(1)	--	5.4		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	BUZ(2)		4.05		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	BUZ(3)		11.4		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	BUZ(4)		11.4		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	BUZ(5)		10.4		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Unsaturated zone longitudinal dispersivity	ALPHALU(1)	m	0.1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	ALPHALU(2)		0.1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	ALPHALU(3)		0.1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	ALPHALU(4)		0.1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
	ALPHALU(5)		0.1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Saturated Zone Hydrological Data					-					
Thickness of saturated zone	DPTHAQ	m	62		Ryan Hupfer	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Dry bulk density of saturated zone	DENSAQ	g/cm^3	2.1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Saturated zone total porosity	TPSZ	--	0.24		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Saturated zone effective porosity	EPSZ	--	0.20		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Saturated zone hydraulic conductivity	HCSZ	m/yr	26.8		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Saturated zone hydraulic gradient to well	HGW	--	0.054		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/8/2019	Checked in summary file, Spot Checked 10/8/2019
Saturated zone longitudinal dispersivity to well	ALPHALOW	m	10		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file

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Saturated zone horizontal lateral dispersivity to well	ALPHATW	m	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to well	ALPHAVW	m	0.1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Depth of aquifer contributing to well	DWIBWT	m	40.00		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Saturated zone hydraulic gradient to surface water body	HGSW	--	0.036		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Saturated zone longitudinal dispersivity to surface water body	ALPHALOSW	m	31.5		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Saturated zone horizontal lateral dispersivity to surface water body	ALPHATSW	m	3.15		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Saturated zone vertical lateral dispersivity to surface water body	ALPHAVSW	m	0.315		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Depth of aquifer contributing to surface water body	DPTHAQSW	m	30.48		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Water Use					-					
Quantity of water consumed by an individual	DWI	L/yr	730		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/8/2019	Checked in summary file, Spot Checked 10/8/2019
Fraction of water from surface body for human consumption	FSWD	--	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Fraction of water from well for human consumption	FWWD	--	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/8/2019	Checked in summary file, Spot Checked 10/8/2019
Number of household individuals consuming and using water	NDWI	--	4		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Quantity of water for use indoors of dwelling per individual	HHW	L/d	225		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Fraction of water from surface body for use indoors of dwelling	FSWHH	--	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Fraction of water from well for use indoors of dwelling	FWWHH	--	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Beef Cattle					-					
Quantity of water for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from surface body for beef cattle	FSWLV(1)	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from well for beef cattle	FWWLV(1)	--	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Number of cattle for beef cattle	NLWI(1)	--	2	Inactive	Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Dairy Cows					-					
Quantity of water for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from surface body for dairy cows	FSWLV(2)	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from well for dairy cows	FWWLV(2)	--	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Number of cows for dairy cows	NLWI(2)	--	2	Inactive	Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Fruit, grain, non-leafy vegetables					-					
Irrigation rate for fruit, grain, and nonleafy vegetables	RIRRIG(1)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from surface body for fruit, grain, and nonleafy vegetables	FSWIR(1)	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Fraction of water from well for fruit, grain, and nonleafy vegetables	FWWIR(1)	--	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Area of Plot for fruit, grain, and nonleafy vegetables		m^2	1024	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Leafy Vegetables					-					
Irrigation rate for leafy vegetables	RIRRIG(2)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from surface body for leafy vegetables	FSWIR(2)	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from well for leafy vegetables	FWWIR(2)	--	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Area of Plot for leafy vegetables		m^2	1024	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Pasture and Silage					-					
Irrigation rate for pasture and silage	RIRRIG(3)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from surface body for pasture and silage	FSWIR(3)	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from well for pasture and silage	FWWIR(3)	--	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Area of Plot for pasture and silage		m^2	10000	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Livestock Feed Grain					-					
Irrigation rate for feed grain	RIRRIG(4)	m/yr	0.15	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from surface body for livestock feed grain	FSWIR(4)	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from well for livestock feed grain	FWWIR(4)	--	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Area of Plot for livestock feed grain		m^2	10000	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Offsite Dwelling Site					-					
Irrigation rate for dwelling area	RIRRIGDWELL	m/yr	0.015	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from surface body for offsite dwelling site	FSWIRDWELL	--	1	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fraction of water from well for offsite dwelling site	FWWIRDWELL	--	0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Area of Plot for offsite dwelling site		m^2	1024	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Well pumping rate	UW	m^3/yr	332		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Well pumping rate needed to specified water use for livestock feed grain		m^3/yr	331.645	Calculated	Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Surface Water Body Parameters					-					
Sediment delivery ratio	SDR	--	1		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Volume of surface water body	VLAKE	m^3	250		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/8/2019	Checked in summary file, Spot Checked 10/8/2019
Mean residence time of water in surface water body	TLAKE	yr	0.0001		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Surface area of water in surface water body:	ALAKE	m^2	500	Calculated	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Groundwater Transport Parameters										
Distance from Downgradient Edge of Contamination to:										
Well in the direction parallel to aquifer flow	OFFLPAQW	m	100		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Surface water body in the direction parallel to aquifer flow	OFFLPAQS	m	315.468		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Well in the direction perpendicular to aquifer flow	OFFLNAQW	m	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file

Input Screen Title and Parameter Name	RESRAD ID	Units	PA Modeling Proposed Value (EMDF)	Inactive	Prepared By	Reviewed By	Date	Reviewed By	Date	Notes
Near edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSN	m	-50		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Far edge of surface water body in the direction perpendicular to aquifer flow	OFFLNAQSF	m	50		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Convergence criterion (fractional accuracy desired)	EPS	--	0		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/8/2019	Checked in summary file, Spot Checked 10/8/2019
Main sub zones in primary contamination	NPCZ	--	5		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Main sub zones in submerged primary contamination	NSPCZ	--	5		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Main sub zones in saturated zone	NPSS	--	5		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Main sub zones in each partially saturated zone	NAQS	--	5		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Nuclide-specific retardation in all subzones, longitudinal dispersion in all but the subzone of transformation?	-	--	Yes		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, parent retardation in zone of transformation?	-	--	No		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Longitudinal dispersion in all subzones, nuclide- specific retardation in all but the subzone of transformation, progeny retardation in zone of transformation?	-	--	No		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Anticlockwise angle from x axis to direction of aquifer flow	AQFLOWDIR	degrees	253.6		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Ingestion Rates					-					
Consumption Rate					-					
Drinking water intake	DWI	L/yr	730		Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fish consumption	DFI(1)	kg/yr	2.43	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Other aquatic food consumption	DFI(2)	kg/yr	0.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Fruit, grain, nonleafy vegetables consumption	DVI(1)	kg/yr	176.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Leafy vegetables consumption	DVI(2)	kg/yr	17.0	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Meat consumption	DMI(1)	kg/yr	91.9	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Milk consumption	DMI(2)	L/yr	110	Inactive	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Not used
Soil (incidental) ingestion rate	SOIL	g/yr	36.53	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Drinking water intake from affected area		--	1	Calculated	Ryan Hupfer	J. Davis	10/1/2019	O. Warren	9/24/2019	Checked in summary file
Fish consumption from affected area	FFISH(1)	--	1.0	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Other aquatic food consumption from affected area	FFISH(2)	--	0.5	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Fruit, grain, nonleafy vegetables consumption from affected area	FVEG(1)	--	0.5	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Leafy vegetables consumption from affected area	FVEG(2)	--	0.5	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Meat consumption from affected area	FMEMI(1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Milk consumption from affected area	FMEMI(2)	--	0.5	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Livestock Intakes					-					
Beef Cattle					-					
Water intake for beef cattle	LWI(1)	L/d	50	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Pasture and silage intake for beef cattle	LFI(1,1)	kg/d	14.0	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Grain intake for beef cattle	LFI(1,2)	kg/d	54.0	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Soil from pasture and silage intake for beef cattle	LSI(1,1)	kg/d	0.1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Soil from grain intake for beef cattle	LSI(1,2)	kg/d	0.4	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Dairy Cows					-					
Water intake for dairy cows	LWI(2)	L/d	160	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used

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Pasture and silage intake for dairy cows	LFI(2,1)	kg/d	41.5	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Grain intake for dairy cows	LFI(2,2)	kg/d	8.5	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Soil from pasture and silage intake for dairy cows	LSI(2,1)	kg/d	0.4	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Soil from grain intake for dairy cows	LSI(2,2)	kg/d	0.1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Livestock Feed Factors					-					
Pasture and Silage					-					
Wet weight cropyield of pasture and silage	YIELD(3)	kg/m^2	1.1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Duration of growingseason of pasture and silage	GROWTIME(3)	yr	0.08	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliage to foodtransfer coefficient of pasture and silage	FOLI F(3)	--	1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Weathering removal constant of pasture and silage	RWEATHER(3)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliar interception factor for irrigation of pasture and silage	FINTCEPT(3,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliar interception factor for dust of pasture and silage	FINTCEPT(3,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Root depth of pasture and silage	DROOT(3)	m	0.90	Inactive	Ryan Hupfer	J. Davis	9/26/2019	O. Warren	9/24/2019	Not used
Grain					-					
Wet weight cropyield of grain	YIELD(4)	kg/m^2	0.70	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Duration of growingseason of grain	GROWTIME(4)	yr	0.17	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliage to foodtransfer coefficient of grain	FOLI F(4)	--	1.0	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Weatheringremoval constant ofgrain	RWEATHER(4)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliar interceptionfactor for irrigation of grain	FINTCEPT(4,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliar interceptionfactor for dust of grain	FINTCEPT(4,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Root depth of grain	DROOT(4)	m	1.20	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Plant Factors					-					
Wet weight crop yield of fruit, grain, and nonleafy vegetables	YIELD(1)	kg/m^2	0.70	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Duration of growing season of fruit, grain, and nonleafy vegetables	GROWTIME(1)	yr	0.17	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliage to food transfer coefficient of fruit, grain, and nonleafy vegetables	FOLI F(1)	--	0.1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Weathering removal constant of fruit, grain, and nonleafy vegetables	RWEATHER(1)	1/yr	20.0	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliar interception factor for irrigation of fruit, grain, and nonleafy vegetables	FINTCEPT(1,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliar interception factor for dust of fruit, grain, and nonleafy vegetables	FINTCEPT(1,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Root depth of fruit, grain, and nonleafy vegetables	DROOT(1)	m	1.20	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Leafy Vegetables					-					
Wet weight crop yield of leafy vegetables	YIELD(2)	kg/m^2	1.50	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Duration of growing season of leafy vegetables	GROWTIME(2)	yr	0.25	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliage to food transfer coefficient of leafy vegetables	FOLI F(2)	--	1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used

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Weathering removal constant of leafy vegetables	RWEATHER(2)	1/yr	18.4	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliar interception factor for irrigation of leafy vegetables	FINTCEPT(2,2)	--	0.25	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Foliar interception factor for dust of leafy vegetables	FINTCEPT(2,1)	--	0.25	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Root depth of leafy vegetables	DROOT(2)	m	0.90	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Inhalation and External Gamma Data					-					
Inhalation rate	INHALR	m^3/yr	8,400	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Mass loading for inhalation	MLFD	g/m^3	0.0001		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Checked in summary file
Respirable particulates as a fraction of total particulates	RESPFRACPC	--	1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Use same values as for primary contamination mass loading and respirable fraction at offsite locations	-		Y	Inactive	Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Input different values for primary contamination mass loading and respirable fraction at offsite locations	-		N	Inactive	Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Indoor dust filtration factor (indoor to outdoor dust concentration)	SHF3	--	0.4	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
External gamma shielding (penetration) factor	SHF1	--	0.7	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
External Radiation Shape and Area Factors					-					
Dwelling location	-		Offsite		Ryan Hupfer	J. Davis	9/24/2019	O. Warren		Checked in summary file
Scale	-	m	598.375		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Dwelling location coordinate in X-direction	-	m	210	Inactive	Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Dwelling location coordinate in y-direction	-	m	547		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Radius	RAD_SHAPE(1)	m	43.5833		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	RAD_SHAPE(2)		87.1667		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	RAD_SHAPE(3)		130.7500		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	RAD_SHAPE(4)		174.3333		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	RAD_SHAPE(5)		217.9167		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	RAD_SHAPE(6)		261.5000		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	RAD_SHAPE(7)		305.0833		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	RAD_SHAPE(8)		348.6667		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	RAD_SHAPE(9)		392.2500		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	RAD_SHAPE(10)		435.8333		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	RAD_SHAPE(11)		479.4167		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Radius	RAD_SHAPE(12)	m	523.0000	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Fraction (Onsite)	FRACA(1)	--	0		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	FRACA(2)		0		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	FRACA(3)		0.04		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	FRACA(4)		0.21		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	FRACA(5)		0.22		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	FRACA(6)		0.18		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	FRACA(7)		0.15		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	FRACA(8)		0.12		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	FRACA(9)		0.11		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	FRACA(10)		0.097		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
	FRACA(11)		0.088		Ryan Hupfer	J. Davis	9/26/2019	O. Warren	9/24/2019	Not used
	FRACA(12)		0.049		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Shape of the primary contamination	-	--	Polygonal		Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
X coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Y coordinate of the vertices of polygon of the primary contamination	-	m	none	Inactive	Ryan Hupfer	J. Davis	10/1/2019	O. Warren	10/29/2019	Checked in model
Occupancy Factors					-					
Indoor time fraction on primary contamination	FIND	--	0	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Outdoor time fraction on primary contamination	FOTD	--	0.05	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Indoor time fraction on offsite dwelling site	FINDDWELL	--	0.5	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Outdoor time fraction on offsite dwelling site	FOTDDWELL	--	0.05	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Time fraction in fruit, grain, and nonleafy vegetable fields	OCCUPANCY(1)	--	0.1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Time fraction in leafy vegetable fields	OCCUPANCY(2)	--	0.1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used

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Time fraction in pasture and silage fields	OCCUPANCY(3)	--	0.1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Time fraction in livestock grain fields	OCCUPANCY(4)	--	0.1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Radon										
Effective radon diffusion coefficient of Cover	DIFCV	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Effective radon diffusion coefficient of Contaminated Zone	DIFCZ	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Effective radon diffusion coefficient of Floor	DIFFL	m2/s	3.00E-07	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Thickness of floor and foundation	FLOOR1	m2/s	0.15	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Density of floor and foundation	DENSFL	g/cm3	2.40	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Total porosity of floor and foundation	TPFL		0.10	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Volumetric water content of floor and foundation	PH2OFL		0.03	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Depth of foundation below ground level	DMFL	m	-1	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Vertical dimension of mixing	HMIX	m	2	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Building room height	HRM	m	2.50	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Building air exchange rate	REXG	/hr	0.50	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Building indoor area factor	FAI		0	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Rn-222 emanation coefficient	EMANA(1)		0.25	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Rn-220 emanation coefficient	EMANA(2)		0.15	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Effective radon diffusion coefficient of nonleafy veg field	DIFOS(1)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Effective radon diffusion coefficient of leafy vegetable	DIFOS(2)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Effective radon diffusion coefficient of pasture	DIFOS(3)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Effective radon diffusion coefficient of livestock grain	DIFOS(4)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Effective radon diffusion coefficient of offsite dwelling site	DIFOS(5)	m2/s	2.00E-06	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Carbon-14										
Thickness of evasion layer for C-14 in soil	DMC	m	0.3		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Checked in summary file
Vertical dimension of mixing for inhalation	HMIX	m	2.0	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Vertical dimension of mixing for vegetation	HMIXV	m	1.0	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
C-14 evasion flux rate from soil	C14EVSN	/sec	7.00E-07		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Checked in summary file
C-12 evasion flux rate from soil	C12EVSN	/sec	1.00E-10		Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Checked in summary file
Fraction of vegetation carbon absorbed from soil	CAIR		0.02	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Fraction of vegetation carbon absorbed from air	CSOIL		0.98	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Mass Fractions of Carbon-12										
Atmosphere	C12AIR	g/m3	0.18	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Contaminated soil	C12CZ	g/g	0.03	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Local water	C12WTR	g/cm3	2.00E-05	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Fruit, grain, non-leafy vegetables	C12PLANT(1)		0.40	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Leafy vegetables	C12PLANT(2)		0.09	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Pasture and Silage	C12PLANT(3)		0.09	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Livestock feed grain	C12PLANT(4)		0.40	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Meat	C12MEAT_MILK(1)		0.24	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Milk	C12MEAT_MILK(2)		0.07	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Tritium										
Humidity in air	HUMID	g/m3	8	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/24/2019	Not used
Mass fraction of water in fruit, grain, non-leafy vegetables	H2OPLANT(1)		0.8	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/25/2019	Not used
Mass fraction of water in leafy vegetables	H2OPLANT(2)		0.8	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/26/2019	Not used
Mass fraction of water in pasture and silage	H2OPLANT(3)		0.8	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/27/2019	Not used
Mass fraction of water in livestock feed grain	H2OPLANT(4)		0.8	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/28/2019	Not used
Mass fraction of water in meat	H2OMEAT_MILK(1)		0.6	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/29/2019	Not used
Mass fraction of water in milk	H2OMEAT_MILK(2)		0.88	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	9/30/2019	Not used
Vertical dimension of mixing for inhalation	HMIX	m	2	Inactive	Ryan Hupfer	J. Davis	9/24/2019	O. Warren	10/1/2019	Not used

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac-227	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.29E-03	2.00E-05	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Am-241	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Am-243	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Ba-133	6.83E-03	3.00E-02	1.40E-02	1.40E-02	1.51E-01	4.80E-04	4.00E+00	2.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Be-10	8.17E-04	2.00E-03	1.80E-03	1.80E-03	9.66E-02	9.00E-07	1.00E+02	1.00E+01	Ryan Hupfer	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
C-14	2.67E-01	6.00E-02	6.00E-02	2.67E-01	1.05E-02	9.81E-03	5.00E+04	9.10E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	10/29/2019	Checked in model/summary file
Ca-41	1.57E-01	7.00E-01	3.20E-01	3.20E-01	7.66E-02	3.00E-03	4.00E+01	3.30E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cd-113	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cd-113m	6.83E-02	1.10E-01	1.40E-01	1.40E-01	2.02E-01	1.00E-03	2.00E+02	2.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cf-249	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cf-250	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cf-251	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	1.50E-06	2.50E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cl-36	3.17E+01	1.40E+01	6.40E+01	6.40E+01	4.66E-01	1.70E-02	5.00E+01	1.90E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-243	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-244	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-245	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-246	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-247	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-248	4.39E-05	1.50E-04	1.90E-05	1.90E-05	2.08E-03	2.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Co-60	7.23E-03	4.60E-02	3.40E-03	3.40E-03	4.86E-01	3.00E-04	3.00E+02	2.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cs-135	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cs-137	3.23E-02	9.20E-02	2.40E-02	2.40E-02	7.92E-01	7.90E-03	2.00E+03	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Eu-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Eu-154	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Gd-152	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
H-3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	5.74E-03	4.40E-03	1.00E+00	1.00E+00	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
I-129	2.00E-02	2.00E-02	2.00E-02	2.00E-02	7.63E-01	9.00E-03	4.00E+01	5.00E+00	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
K-40	2.46E-01	2.00E-01	5.00E-01	5.00E-01	2.70E-01	7.20E-03	1.00E+03	2.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Mo-93	3.13E-01	1.60E-01	7.30E-01	7.30E-01	1.91E-01	1.70E-03	1.00E+01	1.00E+01	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Nb-93m	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Nb-94	1.13E-02	5.00E-03	2.30E-02	2.30E-02	2.35E-04	4.10E-07	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Nd-144	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Ni-59	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Ni-63	1.77E-02	5.60E-02	2.70E-02	2.70E-02	1.98E-02	1.60E-02	1.00E+02	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Np-237	2.53E-03	6.40E-03	2.50E-03	2.50E-03	2.66E-03	5.00E-06	2.10E+01	4.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pa-231	5.10E-05	9.40E-05	2.00E-05	2.00E-05	2.08E-03	5.00E-06	1.00E+01	1.10E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pb-210	2.53E-03	2.00E-03	4.30E-03	4.30E-03	3.51E-01	2.60E-04	3.00E+02	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pd-107	1.77E-02	3.00E-02	3.60E-02	3.60E-02	3.14E-03	1.00E-02	1.00E+01	3.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pu-238	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pu-239	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pu-240	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pu-241	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pu-242	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pu-244	9.86E-05	1.20E-05	7.80E-06	7.80E-06	7.84E-04	1.10E-06	3.00E+01	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Ra-226	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Ra-228	9.00E-04	9.80E-03	1.10E-03	1.10E-03	5.88E-02	1.30E-03	5.00E+01	2.50E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Re-187	1.57E-01	3.00E-01	3.20E-01	3.20E-01	8.36E-02	1.50E-03	1.20E+02	1.00E+00	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Se-79	8.40E-02	5.00E-02	2.30E-01	2.30E-01	3.58E+00	4.00E-03	1.70E+02	1.70E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Sm-146	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Sm-148	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Sm-151	8.87E-03	4.00E-03	1.80E-02	1.80E-02	4.82E-04	3.00E-05	3.00E+01	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file

Radionuclide	Fruit, Grain, Nonleafy Vegetables	Leafy Vegetables (Fresh Weight)	Pasture Silage (Grains)	Livestock Feed Grain (Grains)	PNNL 2003 - Adjusted Meat	Milk	Fish	Crustacea	Prepared by	Checked by	Date	Checked by	Date	Notes
Sn-121m	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Sn-126	2.70E-03	6.00E-03	5.50E-03	5.50E-03	3.99E-01	1.00E-03	3.00E+03	1.00E+03	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Sr-90	1.19E-01	6.00E-01	1.90E-01	1.90E-01	5.64E-02	2.80E-03	6.00E+01	1.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Tc-99	3.30E-01	4.20E+01	6.60E-01	6.60E-01	5.03E-01	1.40E-04	2.00E+01	5.00E+00	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Th-228	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Th-229	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Th-230	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Th-232	5.30E-05	3.60E-04	3.10E-05	3.10E-05	2.08E-03	5.00E-06	1.00E+02	5.00E+02	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-232	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-233	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-234	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-235	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-236	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-238	1.64E-03	1.70E-03	1.20E-03	1.20E-03	3.97E-01	4.00E-04	1.00E+01	6.00E+01	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Zr-93	4.47E-04	2.00E-04	9.10E-04	9.10E-04	4.76E-05	5.50E-07	3.00E+02	6.70E+00	Ryan Hupfer	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file

Indicates RESRAD-OFFSITE Default Value
Indicates transfer factor could not be specified due to RESRAD-OFFSITE submodule
Indicates default value not available, value of 1 used in model

Element	K_d, EMDF screening model (ml/g)	Prepared by	Checked by	Date	Checked by	Date	Notes
Ac	2	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Am	20[b]	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Ba	3	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Be	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
C	0	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Ca	2	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Cd	10	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Cf	2	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Cl	0	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Cm	2	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Co	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Cs	150	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Eu	2	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Fe	45	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Not Simulated
Gd	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
H	0	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
I	0.2	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
K	2	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Mo	5	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Na	1	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Not Simulated
Nb	5	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Nd	158	Ryan Hupfer	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Ni	100	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Np	2	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Pa	20	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Pb	5	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Pd	100	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Pm	40	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Pu	2	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Ra	150	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Re	2	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Sb	8	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Not Simulated
Se	25	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Sm	50	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Sn	5	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Sr	2	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Tc	0.04	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Th	150	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
U	3	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file
Zr	3	Information/Data Transfer Transmittal 001 rev1	J. Davis	9/26/2019	O. Warren	10/8/2019	Checked in summary file

Isotope Name	Screening Value (pCi/g)	Prepared By	Checked By	Date	Checked By	Date	Notes
Ac-227	4.89E+04	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Am-241	2.30E+03	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Am-243	2.29E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Ba-133	2.71E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Be-10	7.16E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
C-14	6.27E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Ca-41	4.11E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cd-113m	1.11E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cf-249	3.92E-04	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cf-250	1.70E-02	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cf-251	7.36E-05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cf-252	1.25E+03	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Not Simulated
Cl-36	1.00E+00	RH	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-243	4.37E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-244	5.26E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-245	9.80E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-246	1.97E+00	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-247	2.35E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cm-248	2.29E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Co-60	1.93E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cs-134	1.39E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Not Simulated
Cs-135	2.46E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Cs-137	3.82E+08	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Eu-152	5.84E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Eu-154	7.85E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Eu-155	9.98E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Not Simulated
Fe-55	4.71E+07	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Not Simulated
H-3	4.84E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
I-129	4.86E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
K-40	5.65E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Kr-85	1.16E+08	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Not Simulated
Mo-100	2.55E-03	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Not Simulated
Mo-93	4.99E+03	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Na-22	5.96E-01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Not Simulated
Nb-93m	3.00E+03	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Nb-94	1.90E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Ni-59	1.55E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Ni-63	1.03E+07	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Np-237	5.63E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pa-231	3.17E+00	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pb-210	4.48E+02	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pd-107	3.34E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pm-146	1.24E-01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pm-147	2.67E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Not Simulated

Pu-238	7.15E+03	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pu-239	1.85E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pu-240	8.44E+03	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pu-241	2.83E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pu-242	4.98E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Pu-244	1.11E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Ra-226	1.35E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Ra-228	3.46E+00	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Re-187	1.94E-03	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Sb-125	1.37E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Not Simulated
Se-79	2.47E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Sm-151	5.75E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Sn-121m	6.41E+01	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Sn-126	1.89E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Sr-90	3.93E+08	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Tc-99	1.35E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Th-228	1.14E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Th-229	3.48E+03	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Th-230	1.48E+02	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Th-232	2.67E+06	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-232	8.43E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-233	5.49E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-234	1.67E+03	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-235	2.57E+03	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-236	4.87E+02	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
U-238	2.07E+09	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file
Zr-93	5.56E+05	STK	J. Davis	9/23/2019	O. Warren	9/24/2019	Checked in summary file

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APPENDIX B.
MODEL SIMULATION/MODEL RESULT TRANSFER DOCUMENTATION

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ATTACHMENT B.1. HELP MODEL

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Table xx. Model Files – HELP-OFFSITE

Model Simulation Title and Number	Model Input File Name	Modeling Case	Preparer	Verifier
Example RCRA Landfill	PRECIPITATION DATA FILE: \RCRA.D4 TEMPERATURE DATA FILE: \RCRA.D7 SOLAR RADIATION DATA FILE: \RCRA.D13 EVAPOTRANSPIRATION DATA: \RCRA.D11 SOIL AND DESIGN DATA FILE: RCRA.D10	Help Model V&V	Lu	Fox
PD-1	PRECIPITATION DATA FILE: \WMER-2.D4 TEMPERATURE DATA FILE: \WMER-2.D7 SOLAR RADIATION DATA FILE: \WMER-2.D13 EVAPOTRANSPIRATION DATA: \WMER-2.D11 SOIL AND DESIGN DATA FILE: \PD-1.D10	**Base Case Simulation – 0 to 200 years** Modeling run was performed to simulate the 17 components of the EMDF disposal design performing, (as designed), for 200 years after closure of the landfill.	Lu	Fox
PD-2	SOIL AND DESIGN DATA FILE: \PD-2.D10 **Note:** The same precipitation, temperature, solar radiation, and evapotranspiration data files used for the Model run PD-1 were used for PD-2.	**Base Case Simulation – (200 to 1,000 years)** Simulated the following assumed changed conditions for the **cover layer**: **1)** the HDPE liner is no longer performing as designed and therefore, this model layer (Layer 5) has been removed from the 200 to 1,000 year base case condition, and **2)** the amended clay layer is assumed to a higher conductivity of 3.5E-8 due to degradation. **Liner System Below the Waste** - Simulated that the liners, and the associated liner drainage system below the waste, are not performing as designed. **1)** Therefore, these layers (Layers 12 through 15), have also been removed from the PD-2 model simulation and the subsequent modeling runs.	Lu	Fox
PD-3	SOIL AND DESIGN DATA FILE: \PD-3.D10 **Note:** The same precipitation, temperature, solar radiation, and evapotranspiration data files used for the Model run PD-1 were used for PD-3.	**Base Case Simulation – (greater than 1,000 years)** This modeling run simulated the following assumed changed conditions for the **cover layer**: **1)** the HDPE liner is no longer performing as designed and therefore this model, layer **(Layer 5 in Model PD-1)**, has been removed from the greater than 1,000 year model simulation,	Lu	Fox

		2) the amended clay layer has a higher conductivity (formerly Layer 6 in Model PD-1 and now Layer 5 in Model PD-3), which has increased from 3.5E-8, (as modeled in PD-2), to 7.0E-8; and **3)** the conductively of the Cover drainage layer (**<u>Layer 4</u>**), has degraded (0.33 xK) from 3.0E-01 to 1.0E-01. **Liner System Below the Waste** – As with Model simulation PD-2, Model PD-3 also simulated that the liners and the associated liner drainage system will is not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-3 model simulation.		
PD-4	SOIL AND DESIGN DATA FILE: \PD-4.D10 **<u>Note:</u>** <u>The same precipitation, temperature, solar radiation, and evapotranspiration data files used for the Model run PD-1 were used for PD-4.</u>	**Simulation greater than 1,000 years –** Simulated the following assumed changed conditions for the **cover layer**: **1)** the conductively of the Cover drainage layer (**<u>Layer 4</u>**), as modeled in simulation PD-3, remains at 1.0E-01 in simulation PD-4; **2)** As simulated in model simulations PD-2 and PD-3, the HDPE liner is no longer performing as designed. Therefore, for simulation PD-4, model, layer **(<u>Layer 5 in Model simulation PD-1</u>)**, and has been removed from the greater than 1,000 year model simulation; and **3)** the amended clay layer and underlying compacted clay layer, (Layers 5 and 6 in simulations PD-1, PD-2, and PD3), are now simulated as one layer, (**Layer 5 for Simulation PD-4**). This combined Layer 5 has an assumed degraded combined hydraulic conductivity of 1.56 E-07. **Liner System Below the Waste** – As with Model simulations PD-2 and PD-3, this simulation also assumes that the liners and the associated liner drainage system will not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-4 model simulation.	Lu	Fox
PD-5	SOIL AND DESIGN DATA FILE: \PD-5.D10	**Simulation greater than 1,000 years -** Simulation following assumed changed conditions for the **cover layer** with a higher combined hydraulic conductivity for the combined layer 5, as discussed below:	Lu	Fox

	Note: The same precipitation, temperature, solar radiation, and evapotranspiration data files used for the Model run PD-1 were used for PD-5.	**1)** the conductively of the Cover drainage layer (**Layer 4**), as modeled in simulation PD-3, remains at 1.0E-01 in simulation PD-4; **2)** As simulated in model simulations PD-2, PD-3, and PD-4, the HDPE liner is no longer performing as designed. Therefore, for simulation PD-4, model, layer **(Layer 5 in Model simulation PD-1)**, and has been removed from the greater than 1,000 year model simulation; and **3)** the amended clay layer and underlying compacted clay layer, (Layers 5 and 6 in simulations PD-1, PD-2, PD-3, and PD-4), are now simulated as one layer, (**Layer 5 for Simulation PD-5**). This combined Layer 5 has an assumed degraded combined hydraulic conductivity that has increased from of 1.56 E-07 for simulation PD-4 to 3.5 E-07 for this simulation (**PD-5**). **Liner System Below the Waste** – As with simulations PD-2, PD-3 and PD-4, PD-5 also simulated that the liners, and associated liner drainage system will not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-5 model simulation.		
Sensitivity Analysis				
PD-1B	SOIL AND DESIGN DATA FILE: \PD-1B.D10 **Note:** The same precipitation, temperature, solar radiation, and evapotranspiration data files used for the Model run PD-1 were used for PD-1B.	**0-200 year time frame** with infiltration through the maximum cover drainage length of 543.75 feet and the minimum angle of 18.41 degrees.	Lu	Fox
PD – 1p25	PRECIPITATION DATA FILE: \EMDF-p25.D4 TEMPERATURE DATA FILE: \WMER-2.D7 SOLAR RADIATION DATA FILE: \WMER-2.D13 EVAPOTRANSPIRATION DATA: \WMER-2.D11 SOIL AND DESIGN DATA FILE: \WM-1p25.D4	**0-200 year time frame** to simulate 25 percent more precipitation on an annual basis, with no corresponding evapotranspiration considered.	Lu	Fox
PD-2B	SOIL AND DESIGN DATA FILE: \PD-2B.D10	**200-1,000 years** with infiltration through the cover system with the additional input of the maximum cover drain length of 543.75 feet and associated minimum angle of 18.41 degrees.	Lu	Fox

		The following assumptions presented for base condition PD-2 are also still valid		
PD-2p25	PRECIPITATION DATA FILE: \WM-1p25.D4 TEMPERATURE DATA FILE: \WMER-2.D7 SOLAR RADIATION DATA FILE: \WMER-2.D13 EVAPOTRANSPIRATION DATA: \WMER-2.D11 SOIL AND DESIGN DATA FILE: \PD-2.D10	**200-1,000 years** with infiltration through the cover system with the model input of the additional of 25 percent annual precipitation without an increase in evaporation. The following assumptions presented for base condition PD-2 are also still valid	Lu	Fox
PD-3B	SOIL AND DESIGN DATA FILE: \PD-3.D10 **Note:** The same precipitation, temperature, solar radiation, and evapotranspiration data files used for the Model run PD-1 were used for PD-3B.	**>1,000 Years** with infiltration through the cover system with the additional input of the maximum cover drain length and cover and associated minimum angle. The following presented for base condition PD-3 are also still valid	Lu	Fox
PD-3D	SOIL AND DESIGN DATA FILE: \PD-3D.10 **Note:** The same precipitation, temperature, solar radiation, and evapotranspiration data files used for the Model run PD-1 were used for PD-3D.	**>1,000 Years** with infiltration through the cover system with the cover drainage layer degraded (0.1xK) to 3.0E-2. In addition, the assumptions from the model simulation PD-3 are still valid and incorporated into the assumptions for the cover layer and liner system below the waste:	Lu	Fox
PD-3p25	PRECIPITATION DATA FILE: \W WM-1p25.D4 TEMPERATURE DATA FILE: \WMER-2.D7 SOLAR RADIATION DATA FILE: \WMER-2.D13 EVAPOTRANSPIRATION DATA: \WMER-2.D11 SOIL AND DESIGN DATA FILE: \ PD-3D.10	**>1,000 Years** with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The assumptions presented for base condition PD-3 are also still valid	Lu	Fox
PD-4D	SOIL AND DESIGN DATA FILE: \PD-4D.D10 **Note:** The same precipitation, temperature, solar radiation, and evapotranspiration data files used for the Model run PD-1 were used for PD-4D.	**>1,000 Years** with infiltration through the cover system with the cover drainage layer (Layer 4), degraded (0.1xK) to 3.0E-2. In addition, the additional parameter changes were simulated in the PD-4D model, as with the PD-4 model simulation.	Lu	Fox
PD-4p25	PRECIPITATION DATA FILE: \WM-1p25.D4 TEMPERATURE DATA FILE: \WMER-2.D7 SOLAR RADIATION DATA FILE: \WMER-2.D13 EVAPOTRANSPIRATION DATA: \WMER-2.D11 SOIL AND DESIGN DATA FILE: \PD-4.D10	**>1,000 Years** with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The assumptions presented for base condition PD-4 are also still valid.	Lu	Fox

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date: 3/24/2019**
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)
Project Title and No.: UCOR – EMDF PA	
Simulation Title and No.: Example RCRA Landfill	
Purpose of Simulation: Model V&V Testing Run performed to verify that the operating system used by Changsheng Lu, (with the same input files as provided by the software manufacturer), will duplicate the output file results that were also provided by the HELP model manufacturer.	
Model Code Used/Version No.: HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL VERSION 3.07 (1 NOVEMBER 1997)	
Configuration Control (Computer Hardware/OS): Dell Precision 7720 / Window 10 Enterprise	
Names of Input Files: PRECIPITATION DATA FILE: \RCRA.D4 TEMPERATURE DATA FILE: \RCRA.D7 SOLAR RADIATION DATA FILE: \RCRA.D13 EVAPOTRANSPIRATION DATA: \RCRA.D11 SOIL AND DESIGN DATA FILE: \RCRA.D10	
Comments on Input Data: Original example testing file from HELP Manual were used for the model V&V model testing run.	
Names of Output Files: OUTPUT DATA FILE: \RCRA-VV.OUT	
Comments on Model Outputs/Results: Identical results produced from the run compared to original output file from HELP.	
General Comments Computer able to run program correct as designed.	
Checked By & Date: Steve Fox, Jacobs Engineering, 3/28/2019	Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:22:08 -04'00'

Model Check Form - – HELP

New Model ID (or filename): Example RCRA Landfill	Source Model ID (or filename): Example RCRA Landfill
New Model File Date: **3/24/2019**	**Source Model File Date:** **11/1/97**
Objective: Model V&V Testing Run.	

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
		No changes	Y			
If checker has no comments, check here. ☒				Add additional rows above, as needed.		

New Model ID (or filename): Example RCRA Landfill	**Source Model ID (or filename):** Example RCRA Landfill
New Model File Date: **3/24/2019**	**Source Model File Date:** **11/1/97**
Objective: Model V&V Testing Run.	

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Analyst Name (print): Changsheng Lu, 3/24/19 Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)
Checker Name (print): Steve Fox, Jacobs Engineering, 3/28/19	**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:22:49 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date: 3/27/2019**
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)
Project Title and No.: UCOR – EMDF PA	
Simulation Title and No.: PD-1	
Purpose of Simulation: Base Condition – 0-200 Years. This modeling run was performed to simulate the 17 components of the EMDG disposal design performing, as designed for 200 years after closure of the landfill.	
Model Code Used/Version No.: HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL VERSION 3.07 (1 NOVEMBER 1997)	
Configuration Control (Computer Hardware/OS): Dell Precision 7720 / Window 10 Enterprise	
Names of Input Files:PD-1 PRECIPITATION DATA FILE: \WMER-2.D4 TEMPERATURE DATA FILE: \WMER-2.D7 SOLAR RADIATION DATA FILE: \WMER-2.D13 EVAPOTRANSPIRATION DATA: \WMER-2.D11 SOIL AND DESIGN DATA FILE: \PD-1.D10	
Comments on Input Data: Area-specific weather data design/assumption-specific data	
Names of Output Files: OUTPUT DATA FILE: \PD-1.OUT	
Comments on Model Outputs/Results: The model outputs are consistent with anticipated as-designed full-performance results.	
General Comments Results seems to be reasonable and logical.	
Checked By & Date: Steve Fox, Jacobs Engineering, 3/28/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:23:24 -04'00'	

Model Check Form - – HELP

Model ID (or filename): PD-1	**Source Model ID (or filename):** See Model Input Verification form for source
Model File Date: **3/27/2019**	**Source Model File Date:** Not Applicable

Objective: Review model Base Condition – 0-200 Years.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
		No Changes	Y			

If checker has no comments, check here. ☒ Add additional rows above, as needed.

Analyst Name (print): Changsheng Lu, Jacobs Engineering 3/27/19	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)

Model ID (or filename): PD-1				**Source Model ID (or filename):** See Model Input Verification form for source		
Model File Date: **3/27/2019**				**Source Model File Date:** Not Applicable		
Objective: Review model Base Condition – 0-200 Years.						
Parameter or Element	**Location**	**Change Description**	**Correct ? Y,N**	**Checker Comment**	**Analyst Response**	**Checker Concur?** **Y,N**
Checker Name (print): Steve Fox, Jacobs Engineering, 3/28/19,				**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:23:57 -04'00'		

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date: 3/27/2019**
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD-2

Purpose of Simulation:
Base Condition – 200-1,000 years. The purpose of this modeling run was to simulate the following assumed changed conditions for the **cover layer**: **1)** the HDPE liner is no longer performing as designed and therefore, this model layer (Layer 5) has been removed from the 200 to 1,000 year base case condition, and **2)** the amended clay layer is assumed to a higher conductivity of 3.5E-8 due to degradation.

Liner System Below the Waste - In addition, this model (PD-2), simulated that the liners, and the associated liner drainage system below the waste, are not performing as designed. Therefore, these layers (Layers 12 through 15), have also been removed from the PD-2 model simulation and the subsequent modeling runs.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL VERSION 3.07 (1 NOVEMBER 1997).

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise.

Names of Input Files:
PRECIPITATION DATA FILE: \WMER-2.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \PD-2.D10

Comments on Input Data:
Area-specific weather data
design/assumption-specific data

Names of Output Files:

OUTPUT DATA FILE: \PD-2.OUT

Comments on Model Outputs/Results:

The degraded partial-performance and associated infiltration rate increases are consistent with the expected results.

General Comments

Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 4/4/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:24:35 -04'00'

Model Check Form - – HELP

New Model ID (or filename): PD-2	**Source Model ID (or filename):** **PD-1**
New Model File Date: **3/27/19**	**Source Model File Date:** **3/27/19**

Objective: Review model Base Condition – 200-1,000 years.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Flexible membrane liner (Cover)	Formerly **Layer 5** in Model PD-1	Assume the Flexible membrane liner is not performing as designed, therefore not included in simulation.	Y			
Amended Clay Layer (Cover)	Formerly **Layer 6** in Model PD-1, (0 to 200 year model), now **Layer 5** in Model PD-2	Hydraulic conductivity degraded from 2.5 E-8 to 3.5 E-8 cm/sec.	Y			
Primary Geomembrane Liner	Formerly **Layer 12** in Model PD-1	Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Y			
Geosynthetic Clay Liner	Formerly **Layer 13** in Model PD-1	Assume the geosynthetic clay liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-2	**Source Model ID (or filename):** **PD-1**
New Model File Date: **3/27/19**	**Source Model File Date:** **3/27/19**

Objective: Review model Base Condition – 200-1,000 years.

Parameter or Element	**Location**	**Change Description**	**Correct? Y,N**	**Checker Comment**	**Analyst Response**	**Checker Concur? Y,N**
Geo-composite Drainage/Leak detection System	Formerly **Layer 14** in Model PD-1	Assume the Geo-composite Drainage/Leak detection System is not performing as designed, therefore not included in simulation.	Y			
Secondary Geomembrane Liner	Formerly **Layer 15** in Model PD-1	Assume the Secondary Geomembrane Liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-2	**Source Model ID (or filename):** **PD-1**
New Model File Date: **3/27/19**	**Source Model File Date:** **3/27/19**

Objective: Review model Base Condition – 200-1,000 years.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☒ Add additional rows above, as needed.

Analyst Name (print): Changsheng Lu	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)
Checker Name (print): Steve Fox, Jacobs Engineering, 4/4/19	**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:25:19 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date: 3/27/2019**
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD-3

Purpose of Simulation:
Base Condition – greater than 1,000 years. The purpose of this modeling run was to simulate the following assumed changed conditions for the **cover layer**:

4) the HDPE liner is no longer performing as designed and therefore this model, layer **(Layer 5 in Model PD-1)**, has been removed from the greater than 1,000 year model simulation,

5) the amended clay layer has a higher conductivity (formerly Layer 6 in Model PD-1 and now Layer 5 in Model PD-3), which has increased from 3.5E-8, (as modeled in PD-2), to 7.0E-8; and

6) the conductively of the Cover drainage layer (**Layer 4**), has degraded (0.33 xK) from 3.0E-01 to 1.0E-01.

Liner System Below the Waste – As with Model simulation PD-2, this simulation also simulates that the liners and the associated liner drainage system is not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-3 model simulation.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL
VERSION 3.07 (1 NOVEMBER 1997)

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise

Names of Input Files:
PRECIPITATION DATA FILE: \WMER-2.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \PD-3.D10

Comments on Input Data:
Area-specific weather data
design/assumption-specific data

Names of Output Files:

OUTPUT DATA FILE: \PD-3.OUT

Comments on Model Outputs/Results: The degraded partial-performance and associated infiltration rate increases are consistent with the expected results.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 4/4/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:26:01 -04'00'

Model Check Form - – HELP

New Model ID (or filename): PD-3	Source Model ID (or filename): **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19
Objective: Base Condition – >1000 Years.	

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Objective:						
Drainage layer	**Layer 4**	Assume the conductivity of the cover drainage layer (Layer 4) has degraded (0.33 xK) from 3.0E-01 to 1.0E-01	Y			
Flexible membrane liner (Cover)	Formerly **Layer 5** in Model PD-1	Assume the Flexible membrane liner is not performing as designed, therefore not included in simulation.	Y			
Amended Clay Layer (Cover)	Formerly **Layer 6** in PD-1, (0 to 200 year model), now **Layer 5** in Model PD-3	Degraded from 3.5 E-8 to 7.0 E-8 cm/sec hydraulic conductivity.	Y			

New Model ID (or filename): PD-3	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19
Objective: Base Condition – >1000 Years.	

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Primary Geomembrane Liner	Formerly **Layer 12** in Model PD-1	Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Y			
Geosynthetic Clay Liner	Formerly **Layer 13** in Model PD-1	Assume the geosynthetic clay liner is not performing as designed, therefore not included in simulation.	Y			
Geo-composite Drainage/Leak detection System	Formerly **Layer 14** in Model PD-1	Assume the Geo-composite Drainage/Leak detection System is not performing as designed, therefore not included in simulation.	Y			
Secondary Geomembrane Liner	Formerly **Layer 15** in Model PD-1	Assume the Secondary Geomembrane Liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-3	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☒ Add additional rows above, as needed.

Analyst Name (print): Changsheng Lu, Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)
Checker Name (print): Steve Fox, Jacobs Engineering, 4/4/19	**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:26:40 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date: 3/27/2019**
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD-4

Purpose of Simulation:

Simulation greater than 1,000 years - The purpose of this modeling run was to simulate the following assumed changed conditions for the **cover layer**:

4) the conductively of the Cover drainage layer (**<u>Layer 4</u>**), as modeled in simulation PD-3, remains at 1.0E-01 in simulation PD-4;
5) As simulated in model simulations PD-2 and PD-3, the HDPE liner is no longer performing as designed. Therefore, for simulation PD-4, model, layer **(<u>Layer 5 in Model simulation PD-1</u>)**, and has been removed from the greater than 1,000 year model simulation; and
6) the amended clay layer and underlying compacted clay layer, (Layers 5 and 6 in simulations PD-1, PD-2, and PD3), are now simulated as one layer, (**Layer 5 for Simulation PD-4**). This combined Layer 5 has an assumed degraded combined hydraulic conductivity of 1.56 E-07.

Liner System Below the Waste – As with Model simulations PD-2 and PD-3, this simulation also assumes that the liners and the associated liner drainage system will not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-4 model simulation.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL
VERSION 3.07 (1 NOVEMBER 1997)

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise

Names of Input Files:
PRECIPITATION DATA FILE: \WMER-2.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \PD-4.D10

Comments on Input Data:
Area-specific weather data
design/assumption-specific data

Names of Output Files:

OUTPUT DATA FILE: \PD-4.OUT
Comments on Model Outputs/Results: The degraded partial-performance and associated infiltration rate increases are consistent with the expected results.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 4/4/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:27:22 -04'00'

Model Check Form - – HELP

New Model ID (or filename):	Source Model ID (or filename):
PD-4	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: For a time frame of greater than 1,000 years following closure, the Amended Clay Layer (**Layer 5 in PD-1**), and underlying Compacted Clay Layer, (**Layer 6**) are simulated as a single degraded clay layer, (**Layer 5 in this model simulation**). The hydraulic conductivity of this combined model layer has further degraded to 1.56E-7.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Drainage layer (Cover)	Layer 4	Assume the conductivity of the cover drainage layer (Layer 4) remains degraded as simulated in model simulation PD-3 at 1.0E-01	Y			
Flexible membrane liner (Cover)	Formerly **Layer 5** in Model PD-1	Assume the Flexible membrane liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-4	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: For a time frame of greater than 1,000 years following closure, the Amended Clay Layer (**Layer 5 in PD-1**), and underlying Compacted Clay Layer, (**Layer 6**) are simulated as a single degraded clay layer, (**Layer 5 in this model simulation**). The hydraulic conductivity of this combined model layer has further degraded to 1.56E-7.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Amended Clay Layer and underlying Compacted Clay layers are now modeled as one model layer (Cover)	Layer 5 in PD-4 model	In simulation PD-4, model layers 5 and 6, (**in simulations PD-1, PD-2 and PD-3**), are now modeled in simulation PD-4 as a single model layer (**Layer 5**). The combined Layer 5 has a hydraulic conductivity of 1.56 E-07	Y			
Primary Geomembrane Liner	Formerly **Layer 12** in Model PD-1	Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-4	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: For a time frame of greater than 1,000 years following closure, the Amended Clay Layer (**Layer 5 in PD-1**), and underlying Compacted Clay Layer, (**Layer 6**) are simulated as a single degraded clay layer, (**Layer 5 in this model simulation**). The hydraulic conductivity of this combined model layer has further degraded to 1.56E-7.

Parameter or Element	**Location**	**Change Description**	**Correct? Y,N**	**Checker Comment**	**Analyst Response**	**Checker Concur? Y,N**
Geosynthetic Clay Liner	Formerly **Layer 13** in Model PD-1	Assume the geosynthetic clay liner is not performing as designed, therefore not included in simulation.	Y			
Geo-composite Drainage/Leak detection System	Formerly **Layer 14** in Model PD-1	Assume the Geo-composite Drainage/Leak detection System is not performing as designed, therefore not included in simulation.	Y			
Secondary Geomembrane Liner	Formerly **Layer 15** in Model PD-1	Assume the Secondary Geomembrane Liner is not performing as designed, therefore not included in simulation.	Y			

If checker has no comments, check here. ☒ Add additional rows above, as needed.

New Model ID (or filename): PD-4	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: For a time frame of greater than 1,000 years following closure, the Amended Clay Layer (**Layer 5 in PD-1**), and underlying Compacted Clay Layer, (**Layer 6**) are simulated as a single degraded clay layer, (**Layer 5 in this model simulation**). The hydraulic conductivity of this combined model layer has further degraded to 1.56E-7.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Analyst Name (print): Changsheng Lu, Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)
Checker Name (print): Steve Fox, Jacobs Engineering, 4/4/2019	**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:28:18 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date: 3/27/2019**
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMPF PA

Simulation Title and No.:
PD-5

Simulation greater than 1,000 years - Simulation of the conditions at the EMDF disposal facility greater than 1,000 years after the closure of the cell. The purpose of this modeling run was to simulate the following assumed changed conditions for the **cover layer** with a higher combined hydraulic conductivity for the combined layer 5, as discussed below:

4) the conductively of the Cover drainage layer (**<u>Layer 4</u>**), as modeled in simulations PD-3, and PD-4, remains at 1.0E-01 in simulation PD-5;
5) As simulated in model simulations PD-2, PD-3, and PD-4, the HDPE liner is no longer performing as designed. Therefore, for simulation PD-4, model, layer **(<u>Layer 5 in Model simulation PD-1</u>)**, and has been removed from the greater than 1,000 year model simulation; and
6) the amended clay layer and underlying compacted clay layer, (Layers 5 and 6 in simulations PD-1, PD-2, PD-3, and PD-4), are now simulated as one layer, (**Layer 5 for Simulation PD-5**). This combined Layer 5 has an assumed degraded combined hydraulic conductivity that has increased from of 1.56 E-07 for simulation PD-4 to 3.5 E-07 for this simulation (**PD-5**).

Liner System Below the Waste – As with Model simulations PD-2, PD-3 and PD-4, this simulation also simulates that the liners and the associated liner drainage system is not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-5 model simulation.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL
VERSION 3.07 (1 NOVEMBER 1997)

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise

Names of Input Files:
PRECIPITATION DATA FILE: \WMER-2.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \PD-5.D10

Comments on Input Data:
Area-specific weather data
design/assumption-specific data

model simulation parameters verified Assumed degraded long-term performance results, as well as the degradation of the Cover Clay Layer.
Names of Output Files: OUTPUT DATA FILE: \PD-5.OUT
Comments on Model Outputs/Results: The degraded partial-performance and associated infiltration rate increases are consistent with the expected results.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 4/4/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:29:06 -04'00'

Model Check Form - – HELP

New Model ID (or filename):	Source Model ID (or filename):
PD-5	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: Simulation of the conditions at the EMDF disposal facility greater than 1,000 years after the closure of the cell. Simulation PD-5 only differs from simulation PD-4 in that the degradation of the Amended clay layer **(Layer 5 in Simulations PD-1, PD-2, and PD-3)**, and the underlying Compacted Clay layer**, (Layer 6 in Simulations PD-1, PD-2, and PD-3)** is simulated in the HELP model as having a higher hydraulic conductivity of 3.5 E-07.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Drainage layer (Cover)	Layer 4	Assume the conductivity of the cover drainage layer (Layer 4) remains degraded as simulated in model simulation PD-3 at 1.0E-01	Y			
Flexible membrane liner (Cover)	Formerly **Layer 5** in Model PD-1	Assume the Flexible membrane liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-5	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Simulation of the conditions at the EMDF disposal facility greater than 1,000 years after the closure of the cell. Simulation PD-5 only differs from simulation PD-4 in that the degradation of the Amended clay layer **(Layer 5 in Simulations PD-1, PD-2, and PD-3)**, and the underlying Compacted Clay layer**, (Layer 6 in Simulations PD-1, PD-2, and PD-3)** is simulated in the HELP model as having a higher hydraulic conductivity of 3.5 E-07.

Parameter or Element	**Location**	**Change Description**	**Correct? Y,N**	**Checker Comment**	**Analyst Response**	**Checker Concur? Y,N**
Amended Clay Layer and underlying Compacted Clay layers are now modeled as one model layer (Cover)	Layer 5 in PD-5 model	In simulation PD-5, model layers 5 and 6, (**in simulations PD-1, PD-2 and PD-3**), are now modeled in simulation PD-4 as a single model layer (**Layer 5**). The combined Layer 5 has a higher hydraulic conductivity of 3.5 x E-07.	Y			
Primary Geomembrane Liner	Formerly **Layer 12** in Model PD-1	Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-5	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Simulation of the conditions at the EMDF disposal facility greater than 1,000 years after the closure of the cell. Simulation PD-5 only differs from simulation PD-4 in that the degradation of the Amended clay layer **(Layer 5 in Simulations PD-1, PD-2, and PD-3)**, and the underlying Compacted Clay layer**, (Layer 6 in Simulations PD-1, PD-2, and PD-3)** is simulated in the HELP model as having a higher hydraulic conductivity of 3.5 E-07.

Parameter or Element	**Location**	**Change Description**	**Correct ? Y,N**	**Checker Comment**	**Analyst Response**	**Checker Concur? Y,N**
Geosynthetic Clay Liner	Formerly **Layer 13** in Model PD-1	Assume the geosynthetic clay liner is not performing as designed, therefore not included in simulation.	Y			
Geo-composite Drainage/Leak detection System	Formerly **Layer 14** in Model PD-1	Assume the Geo-composite Drainage/Leak detection System is not performing as designed, therefore not included in simulation.	Y			
Secondary Geomembrane Liner	Formerly **Layer 15** in Model PD-1	Assume the Secondary Geomembrane Liner is not performing as designed, therefore not included in simulation.	Y			

If checker has no comments, check here. ☒ Add additional rows above, as needed.

New Model ID (or filename): PD-5	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Simulation of the conditions at the EMDF disposal facility greater than 1,000 years after the closure of the cell. Simulation PD-5 only differs from simulation PD-4 in that the degradation of the Amended clay layer **(Layer 5 in Simulations PD-1, PD-2, and PD-3)**, and the underlying Compacted Clay layer**, (Layer 6 in Simulations PD-1, PD-2, and PD-3)** is simulated in the HELP model as having a higher hydraulic conductivity of 3.5 E-07.

Parameter or Element	**Location**	**Change Description**	**Correct? Y,N**	**Checker Comment**	**Analyst Response**	**Checker Concur?** **Y,N**

Analyst Name (print): Changsheng Lu, Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)
Checker Name (print): Steve Fox, Jacobs Engineering, 4/4/19	**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:29:51 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date:3/27/19**
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD-1B

Purpose of Simulation:
To simulate the Base Condition – 0-200 year time frame with infiltration through the maximum cover drainage length of 543.75 feet and the minimum angle of 18.41 degrees.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL
VERSION 3.07 (1 NOVEMBER 1997)

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise

Names of Input Files:
PRECIPITATION DATA FILE: \WMER-2.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \PD-1B.D10

Comments on Input Data:
Area-specific weather data
Design/assumption-specific data
Additional input of the maximum cover drain length and cover of 543.75 feet and associated minimum angle of 18.41 degrees confirmed in model input.

Names of Output Files:
OUTPUT DATA FILE: \PD-1B.OUT

Comments on Model Outputs/Results:
The model results are consistent with the anticipated increase infiltration rate with maximum drainage length and the minimum angle.

General Comments

Results seems to be reasonable and logical.

Checked By & Date:
Steve Fox, Jacobs Engineering, 4/4/19

Steve Fox Digitally signed by Steve Fox
DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US
Date: 2019.05.09 10:30:29 -04'00'

Model Check Form - – HELP

New Model ID (or filename): PD-1B	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: To simulate the Base Condition – 0-200 year time frame with infiltration through the maximum cover drain and length.

Parameter or Element	**Location**	**Change Description**	**Correct? Y,N**	**Checker Comment**	**Analyst Response**	**Checker Concur? Y,N**
Drainage layer - Maximum cover drain and length for the simulation	Layer 4	Maximum length and angle of the cover drainage and angle.	Y	Changsheng, how is it that Layer 1 (erosion control) and Layer 4 (lateral drainage layer), have different maximum length and angle in the soil and design data file?		

If checker has no comments, check here. ☒ Add additional rows above, as needed.

Analyst Name (print): Changsheng Lu, Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)

New Model ID (or filename):	Source Model ID (or filename):
PD-1B	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: To simulate the Base Condition – 0-200 year time frame with infiltration through the maximum cover drain and length.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Checker Name (print):	E-Signature (or sign/date/scan hardcopy):
Steve Fox, Jacobs Engineering, 4/4/19	Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:31:05 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date:** 3/27/19
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD – 1p25

Purpose of Simulation:
To simulate 25 percent more precipitation on an annual basis, with no corresponding evapotranspiration considered. This was simulated for the Base, 1 to 200 year, timeframe.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL VERSION 3.07 (1 NOVEMBER 1997).

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise

Names of Input Files:
PRECIPITATION DATA FILE: \EMDF-p25.D4
TEMPERATURE DATA FILE: WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \WM-1p25.D4

Comments on Input Data:
Area-specific weather data
design/assumption-specific data
Additional input of an additional annual precipitation without an increase in evaporation.

Names of Output Files:
OUTPUT DATA FILE: \PD-1P25.OUT

Comments on Model Outputs/Results:
The results are consistent with the continued performance of the layer 4 cover drainage and a minimal increase in infiltration rate.

General Comments
Results seems to be reasonable and logical.

Checked By & Date:
Steve Fox, Jacobs Engineering, 4/7/19

Steve Fox
Digitally signed by Steve Fox
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Date: 2019.05.09 10:31:45 -04'00'

Model Check Form - – HELP

New Model ID (or filename):	Source Model ID (or filename):
PD – 1p25	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: To simulate 25 percent more precipitation on an annual basis, with no corresponding evapotranspiration considered. This was simulated for the Base, 1 to 200 year timeframe.

Parameter or Element	**Location**	**Change Description**	**Correct ? Y,N**	**Checker Comment**	**Analyst Response**	**Checker Concur? Y,N**
Precipitation	Input file WM-1p25.D4	25% additional precipitation with no change in evaporation	Y			

If checker has no comments, check here. ☒ Add additional rows above, as needed.

New Model ID (or filename):	Source Model ID (or filename):
PD – 1p25	**PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: To simulate 25 percent more precipitation on an annual basis, with no corresponding evapotranspiration considered. This was simulated for the Base, 1 to 200 year timeframe.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Analyst Name (print): Changsheng Lu, Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)
Checker Name (print): Steve Fox, Jacobs Engineering, 4/7/19	**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:32:26 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date:** 3/27/19
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD-2B

Purpose of Simulation:
Base Condition – 200-1000 years with infiltration through the cover system with the additional input of the maximum cover drain length of 543.75 feet and associated minimum angle of 18.41 degrees. The following assumptions presented for base condition PD-2 are also still valid:

The changed conditions for the **cover layer** were still simulated:

1) the HDPE liner is no longer performing as designed and therefore, this model layer (Layer 5) has been removed from the 200 to 1,000 year base case condition, and
2) the amended clay layer is assumed to a higher conductivity of 3.5E-8 due to degradation.

Liner System Below the Waste - In addition, this model (PD-2B), simulated that the liners, and the associated liner drainage system below the waste, are not performing as designed. Therefore, these layers (Layers 12 through 15), have also been removed from the PD-2B model simulation and the subsequent modeling runs.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL
VERSION 3.07 (1 NOVEMBER 1997).

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise.

Names of Input Files:
PRECIPITATION DATA FILE: \WMER-2.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \PD-2B.D10

Comments on Input Data:
Area-specific weather data
design/assumption-specific data
additional input of the maximum cover drain length and cover of 543.75 feet and associated minimum angle of 18.41 degrees confirmed in model input

Names of Output Files:
OUTPUT DATA FILE: \PD-2B.OUT

Comments on Model Outputs/Results: The model results are consistent with the anticipated increase infiltration rate with maximum drainage length and the minimum angle.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 4/5/19 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:33:25 -04'00'

Model Check Form - – HELP

New Model ID (or filename):	Source Model ID (or filename):
PD-2B	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: Review model base condition – 200 – 1,000 years, with the additional input of the maximum cover drain length of 543.75 feet and associated minimum angle of 18.41 degrees. The assumptions presented for base condition PD-2 are also still valid.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Drainage layer - Maximum cover drain and length for the simulation	**Layer 4**	Maximum length and angle of the cover drainage and angle.	Y			
Flexible membrane liner (Cover)	Flexible membrane liner (**Cover Layer 5 in Model Simulation PD-1**)	Assume the Flexible membrane liner is not performing as designed, therefore not included in simulation.	Y			
Amended Clay Layer (Cover)	Formerly **Layer 6** in Model PD-1, (0 to 200 year model), now **Layer 5** in Model PD-2	Hydraulic conductivity degraded from 2.5 E-8 to 3.5 E-8 cm/sec.	Y			

New Model ID (or filename): PD-2B	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Review model base condition – 200 – 1,000 years, with the additional input of the maximum cover drain length of 543.75 feet and associated minimum angle of 18.41 degrees. The assumptions presented for base condition PD-2 are also still valid.

Parameter or Element	**Location**	**Change Description**	**Correct ? Y,N**	**Checker Comment**	**Analyst Response**	**Checker Concur?** **Y,N**
Primary Geomembrane Liner	Formerly **Layer 12** in Model PD-1	Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Y			
Geosynthetic Clay Liner	Formerly **Layer 13** in Model PD-1	Assume the geosynthetic clay liner is not performing as designed, therefore not included in simulation.	Y			
Geo-composite Drainage/Leak detection System	Formerly **Layer 14** in Model PD-1	Assume the Geo-composite Drainage/Leak detection System is not performing as designed, therefore not included in simulation.	Y			
Secondary Geomembrane Liner	Formerly **Layer 15** in Model PD-1	Assume the Secondary Geomembrane Liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-2B	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Review model base condition – 200 – 1,000 years, with the additional input of the maximum cover drain length of 543.75 feet and associated minimum angle of 18.41 degrees. The assumptions presented for base condition PD-2 are also still valid.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☒ Add additional rows above, as needed.

Analyst Name (print): Changsheng Lu, Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)
Checker Name (print): Steve Fox, Jacobs Engineering, 4/5/19	**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:34:13 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date:** 3/27/19
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD-2p25

Purpose of Simulation:
Base Condition – 200-1,000 years with infiltration through the cover system with the model input of the additional of 25 percent annual precipitation without an increase in evaporation. The following assumptions presented for base condition PD-2 are also still valid:

The changed conditions for the **cover layer** were still simulated:

1) the HDPE liner is no longer performing as designed and therefore, this model layer (Layer 5) has been removed from the 200 to 1,000 year base case condition, and
2) the amended clay layer is assumed to a higher conductivity of 3.5E-8 cm/sec due to degradation.

Liner System Below the Waste - In addition, this model (PD-2p25), simulated that the liners, and the associated liner drainage system below the waste, are not performing as designed. Therefore, these layers (Layers 12 through 15), have also been removed from the PD-2p25 model simulation and the subsequent modeling runs.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL
VERSION 3.07 (1 NOVEMBER 1997).

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise.

Names of Input Files:
PRECIPITATION DATA FILE: \WM-1p25.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \PD-3.D10

Comments on Input Data:
Area-specific weather data
design/assumption-specific data
Input of an additional annual precipitation without an increase in evaporation.

Names of Output Files:
OUTPUT DATA FILE: \PD-2p25.OUT

Comments on Model Outputs/Results:
The results are consistent with the performance changed conditions of the cover layers above the waste, the changed conditions of the liner system below the waste, and the additional of 25 percent annual precipitation without an increase in evaporation.

General Comments
Results seems to be reasonable and logical.

Checked By & Date:
Steve Fox, Jacobs Engineering, 4/8/19

Steve Fox
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Date: 2019.05.09 10:34:50 -04'00'

Model Check Form - – HELP

New Model ID (or filename): PD-2p25	Source Model ID (or filename): **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – 200-1000 years with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The assumptions presented for base condition Model PD-2 are also still valid.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Annual precipitation	Input file WM-1p25.D4	25% additional precipitation with no change in evaporation	Y			
Drainage layer - Maximum cover drain and length for the simulation	**Layer 4**	Maximum length and angle of the cover drainage and angle.	Y			
Flexible membrane liner (Cover)	Flexible membrane liner (**Layer 5** Cover in base case model PD-1)	Assume the Flexible membrane liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-2p25	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – 200-1000 years with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The assumptions presented for base condition Model PD-2 are also still valid.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Amended Clay Layer (Cover)	Formerly **Layer 6** in Model PD-1, (0 to 200 year model), now **Layer 5** in Model PD-2p25	Hydraulic conductivity degraded from 2.5 E-8 to 3.5 E-8 cm/sec.	Y			
Primary Geomembrane Liner	Formerly **Layer 12** in Model PD-1	Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Y			
Geosynthetic Clay Liner	Formerly **Layer 13** in Model PD-1	Assume the geosynthetic clay liner is not performing as designed, therefore not included in simulation.	Y			
Geo-composite Drainage/Leak detection System	Formerly **Layer 14** in Model PD-1	Assume the Geo-composite Drainage/Leak detection System is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename):	Source Model ID (or filename):
PD-2p25	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: Base Condition – 200-1000 years with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The assumptions presented for base condition Model PD-2 are also still valid.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Secondary Geomembrane Liner	Formerly **Layer 15** in Model PD-1	Assume the Secondary Geomembrane Liner is not performing as designed, therefore not included in simulation.	Y			

If checker has no comments, check here. ☒ Add additional rows above, as needed.

Analyst Name (print):	E-Signature (or sign/date/scan hardcopy): (Not required if no comments)
Changsheng Lu, Jacobs Engineering	
Checker Name (print):	**E-Signature (or sign/date/scan hardcopy):**
Steve Fox, Jacobs Engineering, 4/8/19	Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:35:37 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date:** 3/27/19
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD-3B

Purpose of Simulation:
Base Condition – >1000 Years with infiltration through the cover system with the additional input of the maximum cover drain length and cover and associated minimum angle. The following assumptions presented for base condition PD-3 are also still valid:

1) the HDPE liner is no longer performing as designed and therefore this model, layer **(<u>Layer 5 in Model PD-1</u>)**, has been removed from the greater than 1,000 year model simulation,

2) the amended clay layer has a higher conductivity (formerly Layer 6 in Model PD-1 and now Layer 5 in Model PD-3), which has increased from 3.5E-8, (as modeled in PD-3), to 7.0E-8; and

3) the conductively of the Cover drainage layer (**<u>Layer 4</u>**), has degraded (0.33 xK) from 3.0E-01 to 1.0E-01.

Liner System Below the Waste – As with Model simulation PD-2, this simulation also simulates that the liners and the associated liner drainage system will is not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-3B model simulation.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL
VERSION 3.07 (1 NOVEMBER 1997).

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise.

Names of Input Files:
PRECIPITATION DATA FILE: \WMER-2.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \PD-3.D10

Comments on Input Data: Area-specific weather data design/assumption-specific data maximum cover drain length and cover and associated minimum angle
Names of Output Files: OUTPUT DATA FILE: \PD-3B.OUT
Comments on Model Outputs/Results: The degraded partial-performance, with the additional input of the maximum cover drain length, and cover associated infiltration rate increases are consistent with the expected results.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 4/4/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:36:19 -04'00'

Model Check Form - – HELP

New Model ID (or filename): PD-3B	Source Model ID (or filename): **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the additional input of the maximum cover drain length and cover and associated minimum angle. The assumptions of the degradation of the portions of the cover and liner system above and below the waste that were outlined in Base Case model simulation PD-3 are still valid.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Drainage layer - Maximum cover drain and length for the simulation	**Layer 4**	Maximum length of the cover drainage and the associated angle of the cover drainage.	Y			
Drainage layer	**Layer 4**	Assume the conductivity of the cover drainage layer (Layer 4) has degraded (0.33 xK) from 3.0E-01 to 1.0E-01	Y			
Flexible membrane liner (Cover)	Formerly **Layer 5** in Model PD-1	Assume the Flexible membrane liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename):	Source Model ID (or filename):
PD-3B	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the additional input of the maximum cover drain length and cover and associated minimum angle. The assumptions of the degradation of the portions of the cover and liner system above and below the waste that were outlined in Base Case model simulation PD-3 are still valid.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Amended Clay Layer (Cover)	Formerly **Layer 6** in PD-1, (0 to 200 year model), now **Layer 5** in Model PD-3	Degraded from 3.5 E-8 to 7.0 E-8 cm/sec hydraulic conductivity.	Y			
Primary Geomembrane Liner	Formerly **Layer 12** in Model PD-1	Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Y			
Geosynthetic Clay Liner	Formerly **Layer 13** in Model PD-1	Assume the geosynthetic clay liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-3B	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the additional input of the maximum cover drain length and cover and associated minimum angle. The assumptions of the degradation of the portions of the cover and liner system above and below the waste that were outlined in Base Case model simulation PD-3 are still valid.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Geo-composite Drainage/Leak detection System	Formerly **Layer 14** in Model PD-1	Assume the Geo-composite Drainage/Leak detection System is not performing as designed, therefore not included in simulation.	Y			
Secondary Geomembrane Liner	Formerly **Layer 15** in Model PD-1	Assume the Secondary Geomembrane Liner is not performing as designed, therefore not included in simulation.	Y			

If checker has no comments, check here. ☒ Add additional rows above, as needed.

Analyst Name (print): Changsheng Lu, Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)

New Model ID (or filename):	Source Model ID (or filename):
PD-3B	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the additional input of the maximum cover drain length and cover and associated minimum angle. The assumptions of the degradation of the portions of the cover and liner system above and below the waste that were outlined in Base Case model simulation PD-3 are still valid.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Checker Name (print):	E-Signature (or sign/date/scan hardcopy):
Steve Fox, Jacobs Engineering, 4/4/2019	Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:37:08 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date:** 3/27/19
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD-3D

Purpose of Simulation:
Base Condition – >1000 Years with infiltration through the cover system with the cover drainage layer degraded (0.1xK) to 3.0E-2. In addition, the following assumptions from the model simulation PD-3 are still valid and incorporated into the assumptions for the cover layer and liner system below the waste:

1) the HDPE liner is no longer performing as designed and therefore this model, layer **(Layer 5 in Model PD-1)**, has been removed from the greater than 1,000 year model simulation,

2) the amended clay layer has a higher conductivity (formerly Layer 6 in Model PD-1 and now Layer 5 in Model PD-3D), which has increased from 3.5E-8, (as modeled in PD-2), to 7.0E-8; and

Liner System Below the Waste – As with Model simulation PD-3, this simulation also simulates that the liners and the associated liner drainage system will is not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-3D model simulation.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL
VERSION 3.07 (1 NOVEMBER 1997).

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise.

Names of Input Files:
PRECIPITATION DATA FILE: \WMER-2.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \PD-3D.10

Comments on Input Data:
Area-specific weather data
design/assumption-specific data

Names of Output Files:
OUTPUT DATA FILE: \PD-3D.OUT

Comments on Model Outputs/Results: The degraded partial-performance and associated infiltration rate increase, as well as the degraded state of the lateral drainage layer are consistent with the expected results.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 4/4/19 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:37:51 -04'00'

Model Check Form - – HELP

New Model ID (or filename): PD-3D	Source Model ID (or filename): **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the cover drainage layer degraded (0.1xK). In addition, as with simulation model PD-3, the following are also true: **1)** the HDPE liner is no longer performing as designed and therefore this model, layer **(Layer 5)**, has been removed from the greater than 1,000 year model simulation, and **2)** the amended clay layer has a higher conductivity, which has increased from 3.5E-8 (as modeled in PD-2) to 7.0E-8.

Liner System Below the Waste – As with Model simulation PD-2, this simulation also simulates that the liners and the associated liner drainage system will is not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-2 model simulation.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Drainage layer	Layer 4	Assume the conductivity of the cover drainage later has degraded 0.1 xK from 3.0E-1 to 3.0E-2	Y			
Flexible membrane liner (Cover)	Formerly **Layer 5** in Model PD-1	Formerly **Layer 5** in Model PD-1	Y			
Amended Clay Layer (Cover)	Formerly **Layer 6** in PD-1, (0 to 200 year model), now **Layer 5** in Model PD-3	Degraded from 3.5 E-8 to 7.0 E-8 cm/sec hydraulic conductivity.	Y			

New Model ID (or filename): PD-3D	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the cover drainage layer degraded (0.1xK). In addition, as with simulation model PD-3, the following are also true: **1)** the HDPE liner is no longer performing as designed and therefore this model, layer **(Layer 5)**, has been removed from the greater than 1,000 year model simulation, and **2)** the amended clay layer has a higher conductivity, which has increased from 3.5E-8 (as modeled in PD-2) to 7.0E-8.

Liner System Below the Waste – As with Model simulation PD-2, this simulation also simulates that the liners and the associated liner drainage system will is not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-2 model simulation.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Primary Geomembrane Liner	Formerly **Layer 12** in Model PD-1	Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Y			
Geosynthetic Clay Liner	Formerly **Layer 13** in Model PD-1	Assume the geosynthetic clay liner is not performing as designed, therefore not included in simulation.	Y			
Geo-composite Drainage/Leak detection System	Formerly **Layer 14** in Model PD-1	Assume the Geo-composite Drainage/Leak detection System is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-3D	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the cover drainage layer degraded (0.1xK). In addition, as with simulation model PD-3, the following are also true: **1)** the HDPE liner is no longer performing as designed and therefore this model, layer **(Layer 5)**, has been removed from the greater than 1,000 year model simulation, and **2)** the amended clay layer has a higher conductivity, which has increased from 3.5E-8 (as modeled in PD-2) to 7.0E-8.

Liner System Below the Waste – As with Model simulation PD-2, this simulation also simulates that the liners and the associated liner drainage system will is not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-2 model simulation.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Secondary Geomembrane Liner	Formerly **Layer 15** in Model PD-1	Assume the Secondary Geomembrane Liner is not performing as designed, therefore not included in simulation.	Y			

If checker has no comments, check here. ☒ Add additional rows above, as needed.

Analyst Name (print): Changsheng Lu, Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)

New Model ID (or filename): PD-3D	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the cover drainage layer degraded (0.1xK). In addition, as with simulation model PD-3, the following are also true: **1)** the HDPE liner is no longer performing as designed and therefore this model, layer **(Layer 5)**, has been removed from the greater than 1,000 year model simulation, and **2)** the amended clay layer has a higher conductivity, which has increased from 3.5E-8 (as modeled in PD-2) to 7.0E-8.

Liner System Below the Waste – As with Model simulation PD-2, this simulation also simulates that the liners and the associated liner drainage system will is not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-2 model simulation.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Checker Name (print): Steve Fox, Jacobs Engineering, 4/4/19	**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:38:52 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date:** 3/27/19
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD-3p25

Purpose of Simulation:
Base Condition – >1000 Years with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The following assumptions presented for base condition PD-3 are also still valid:

1) the HDPE liner is no longer performing as designed and therefore this model, layer **(Layer 5 in Model PD-1)**, has been removed from the greater than 1,000 year model simulation,

2) the amended clay layer has a higher conductivity (formerly Layer 6 in Model PD-1 and now Layer 5 in Model PD-3), which has increased from 3.5E-8, (as modeled in PD-3), to 7.0E-8; and

3) the conductively of the Cover drainage layer (**Layer 4**), has degraded (0.33 xK) from 3.0E-01 to 1.0E-01.

Liner System Below the Waste – As with Model simulation PD-3, this simulation also simulates that the liners and the associated liner drainage system will is not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-3B model simulation.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL
VERSION 3.07 (1 NOVEMBER 1997).

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise.

Names of Input Files:
PRECIPITATION DATA FILE: \W WM-1p25.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \ PD-3D.10

Comments on Input Data:
Area-specific weather data
design/assumption-specific data
Additional input of an additional annual precipitation without an increase in evaporation.

Names of Output Files: OUTPUT DATA FILE: \PD-3p25.OUT
Comments on Model Outputs/Results: The degraded partial-performance, with the additional input of the additional 25% precipitation, and no corresponding evapotranspiration, the predicted infiltration rate increases are consistent with the expected results.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 4/8/19 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:39:36 -04'00'

Model Check Form - – HELP

New Model ID (or filename):	Source Model ID (or filename):
PD-3p25	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The assumptions presented for base condition PD-3 are also still valid:

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Precipitation	Input file WM-1p25.D4	25% additional precipitation with no change in evaporation	Y			
Drainage layer	**Layer 4**	Assume the conductivity of the cover drainage layer (Layer 4) has degraded (0.33 xK) from 3.0E-01 to 1.0E-01	Y			
Flexible membrane liner (Cover)	Formerly **Layer 5** in Model PD-1	Assume the Flexible membrane liner is not performing as designed, therefore not included in simulation.	Y			
Amended Clay Layer (Cover)	Formerly **Layer 6** in PD-1, (0 to 200 year model), now **Layer 5** in Model PD-3	Degraded from 3.5 E-8 to 7.0 E-8 cm/sec hydraulic conductivity.	Y			

New Model ID (or filename):	Source Model ID (or filename):
PD-3p25	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The assumptions presented for base condition PD-3 are also still valid:

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Primary Geomembrane Liner	Formerly **Layer 12** in Model PD-1	Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Y			
Geosynthetic Clay Liner	Formerly **Layer 13** in Model PD-1	Assume the geosynthetic clay liner is not performing as designed, therefore not included in simulation.	Y			
Geo-composite Drainage/Leak detection System	Formerly **Layer 14** in Model PD-1	Assume the Geo-composite Drainage/Leak detection System is not performing as designed, therefore not included in simulation.	Y			
Secondary Geomembrane Liner	Formerly **Layer 15** in Model PD-1	Assume the Secondary Geomembrane Liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-3p25	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The assumptions presented for base condition PD-3 are also still valid:

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☒ Add additional rows above, as needed.

Analyst Name (print): Changsheng Lu, Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)
Checker Name (print): Steve Fox, Jacobs Engineering, 4/8/19	**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:40:27 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date:** 3/27/19
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD-4D

Purpose of Simulation:
Base Condition – >1000 Years with infiltration through the cover system with the cover drainage layer (Layer 4), degraded (0.1xK) to 3.0E-2. In addition, the following parameter changes were simulated in the PD-4D model, as with the PD-4 model simulation:

1. As simulated in model simulations PD-2 and PD-3, the HDPE liner is no longer performing as designed. Therefore, for simulation PD-4D, model, layer **(Layer 5 in Model simulation PD-1)**, and has been removed from the greater than 1,000 year model simulation; and
2. the amended clay layer and underlying compacted clay layer, (Layers 5 and 6 in simulations PD-1, PD-2, and PD-3), are now simulated as one layer, (**Layer 5 for Simulation PD-4D**). This combined Layer 5 has an assumed degraded combined hydraulic conductivity of 1.56 E-07.

Liner System Below the Waste – As with Model simulations PD-2 and PD-3, this simulation also simulates that the liners and the associated liner drainage system will is not performing as designed beyond 1,000 years. Thus, these layers, (Layers 12 through 15), have also been removed from the PD-4D model simulation.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL
VERSION 3.07 (1 NOVEMBER 1997).

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise.

Names of Input Files:
PRECIPITATION DATA FILE: \WMER-2.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \PD-4D.D10

Comments on Input Data:
Area-specific weather data
design/assumption-specific data

Names of Output Files: OUTPUT DATA FILE: \PD-4D.OUT
Comments on Model Outputs/Results: The degraded partial-performance, including the degradation of the cover drainage layer (Layer 4), and associated infiltration rate increases are consistent with the expected results.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 4/8/19 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:41:23 -04'00'

Model Check Form - – HELP

New Model ID (or filename): PD-4D	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the cover drainage layer (Layer 4), degraded (0.1xK) to 3.0E-2. In addition, as outline in the model simulation log, the same other parameter changes were simulated in the PD-4D model, as with the PD-4 model simulation.

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Drainage layer	Layer 4	Assume the conductivity of the cover drainage later has degraded 0.1 xK from 3.0E-1 to 3.0E-2	Y			
Flexible membrane liner (Cover)	Formerly **Layer 5** in Model PD-1	Assume the Flexible membrane liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-4D	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the cover drainage layer (Layer 4), degraded (0.1xK) to 3.0E-2. In addition, as outline in the model simulation log, the same other parameter changes were simulated in the PD-4D model, as with the PD-4 model simulation.

Parameter or Element	**Location**	**Change Description**	**Correct ? Y,N**	**Checker Comment**	**Analyst Response**	**Checker Concur?** **Y,N**
Amended Clay Layer and underlying Compacted Clay layers are now modeled as one model layer (Cover)	Layer 5 in PD-4 model	In simulation PD-4D, model layers 5 and 6, (**in simulations PD-1, PD-2 and PD-3**), are now modeled in simulation PD-4 as a single model layer (**Layer 5**). The combined Layer 5 has a hydraulic conductivity of 1.56 E-07.	Y			
Primary Geomembrane Liner	Formerly **Layer 12** in Model PD-1	Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Y			

New Model ID (or filename): PD-4D	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the cover drainage layer (Layer 4), degraded (0.1xK) to 3.0E-2. In addition, as outline in the model simulation log, the same other parameter changes were simulated in the PD-4D model, as with the PD-4 model simulation.

Parameter or Element	**Location**	**Change Description**	**Correct? Y,N**	**Checker Comment**	**Analyst Response**	**Checker Concur? Y,N**
Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Formerly **Layer 13** in Model PD-1	Assume the geosynthetic clay liner is not performing as designed, therefore not included in simulation.	Y			
Geo-composite Drainage/Leak detection System	Formerly **Layer 14** in Model PD-1	Assume the Geo-composite Drainage/Leak detection System is not performing as designed, therefore not included in simulation.	Y			
Secondary Geomembrane Liner	Formerly **Layer 15** in Model PD-1	Assume the Secondary Geomembrane Liner is not performing as designed, therefore not included in simulation.	Y			

If checker has no comments, check here. ☒ Add additional rows above, as needed.

New Model ID (or filename): PD-4D	**Source Model ID (or filename):** **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the cover drainage layer (Layer 4), degraded (0.1xK) to 3.0E-2. In addition, as outline in the model simulation log, the same other parameter changes were simulated in the PD-4D model, as with the PD-4 model simulation.

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Analyst Name (print): Changsheng Lu, Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)
Checker Name (print): Steve Fox, Jacobs Engineering, 4/8/19	**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:42:20 -04'00'

Model Simulation Log – HELP

Performed By: Changsheng Lu	**Date:** 3/27/19
Office Location/Company Jacobs Engineering	**Contact Info:** 865-220-6162 (work) and 865-705-8981 (cell)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
PD-4p25

Purpose of Simulation:
Base Condition – >1000 Years with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The following assumptions presented for base condition PD-4 are also still valid:

1. As simulated in model simulation PD-4D, there is infiltration through the cover system with the cover drainage layer (Layer 4), degraded (0.1xK) to 3.0E-2
2. As simulated in model simulations PD-2 and PD-3, the HDPE liner is no longer performing as designed. Therefore, for simulation PD-4D, model, layer **(Layer 5 in Model simulation PD-1)**, and has been removed from the greater than 1,000 year model simulation; and
3. the amended clay layer and underlying compacted clay layer, (Layers 5 and 6 in simulations PD-1, PD-2, and PD3), are now simulated as one layer, (**Layer 5 for Simulation PD-4D**). This combined Layer 5 has an assumed degraded combined hydraulic conductivity of 1.56 E-07.

Liner System Below the Waste – As with Model simulations PD-2 and PD-3, this simulation also simulates that the liners and the associated liner drainage system will is not performing as designed beyond 1,000 years. Thus, these layers (Layers 12 through 15), have also been removed from the PD-4 model simulation.

Model Code Used/Version No.:
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE (HELP) MODEL
VERSION 3.07 (1 NOVEMBER 1997).

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise.

Names of Input Files:
PRECIPITATION DATA FILE: \WM-1p25.D4
TEMPERATURE DATA FILE: \WMER-2.D7
SOLAR RADIATION DATA FILE: \WMER-2.D13
EVAPOTRANSPIRATION DATA: \WMER-2.D11
SOIL AND DESIGN DATA FILE: \PD-4.D10

Comments on Input Data: Area-specific weather data design/assumption-specific data
Names of Output Files: OUTPUT DATA FILE: \PD-4p25.OUT
Comments on Model Outputs/Results: The additional 25 percent precipitation, and associated degraded partial-performance, and corresponding infiltration rate increases are consistent with the expected infiltration results.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 4/8/19 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:43:08 -04'00'

Model Check Form - – HELP

New Model ID (or filename): PD-4p25	Source Model ID (or filename): **PD-1**
New Model File Date: 3/27/19	**Source Model File Date:** 3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The following assumptions presented for base condition PD-4 are also still valid:

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Precipitation	Input file \WM-1p25.D4	25% additional precipitation with no change in evaporation	Y			
Drainage layer	Layer 4	Assume the conductivity of the cover drainage later has degraded 0.1 xK from 3.0E-1 to 3.0E-2	Y			
Flexible membrane liner (Cover)	Formerly **Layer 5** in Model PD-1	Formerly **Layer 5** in Model PD-1	Y			
Amended Clay Layer (Cover)	Formerly **Layer 6** in PD-1, (0 to 200 year model), now **Layer 5** in Model PD-3	Degraded from 3.5 E-8 to 7.0 E-8 cm/sec hydraulic conductivity.	Y			

New Model ID (or filename):	Source Model ID (or filename):
PD-4p25	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The following assumptions presented for base condition PD-4 are also still valid:

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Primary Geomembrane Liner	Formerly **Layer 12** in Model PD-1	Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Y			
Assume the primary Geomembrane liner is not performing as designed, therefore not included in simulation.	Formerly **Layer 13** in Model PD-1	Assume the geosynthetic clay liner is not performing as designed, therefore not included in simulation.	Y			

If checker has no comments, check here. ☒ Add additional rows above, as needed.

New Model ID (or filename):	Source Model ID (or filename):
PD-4p25	**PD-1**
New Model File Date:	**Source Model File Date:**
3/27/19	3/27/19

Objective: Base Condition – >1000 Years with infiltration through the cover system with the model input of the an additional of 25 percent annual precipitation without an increase in evaporation. The following assumptions presented for base condition PD-4 are also still valid:

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Analyst Name (print): Changsheng Lu, Jacobs Engineering	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments)
Checker Name (print): Steve Fox, Jacobs Engineering, 4/8/19	**E-Signature (or sign/date/scan hardcopy):** Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2019.05.09 10:44:00 -04'00'

Additional Files Associated with HELP Simulations

Filename	Description	Calculation Package	Preparer	Reviewer

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ATTACHMENT B.2. STOMP MODEL

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Model Scenarios – STOMP

Model Simulation Title and Number	Modeling Case	Preparer	Verifier
STOMP Tutorial Problem 3, Classic test problem for 1D Transport problem, Water mode (STOMP1) with transport,	STOMP Model V&V	Lu	Fox
X-A Base	**Base Condition Model for Cross-section A-A' (NW-SE)** Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A' (NW-SE) for the base case parameter and assumptions.	Lu	Fox
X-B-Base	**Base Condition Model for Cross-section B-B' (NE-SW)** Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section B-B' (NE-SW) for the base case parameter and assumptions.	Lu	Fox
Sensitivity Analysis			
X-A S1 same-kd High	**Future Condition Model** Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A' (NW-SE) for the base case parameter and assumptions except for the higher Kd values for the waste zone (same as values used in the other zones).	Lu	Fox
X-A S2 same-kd low	**Future Condition Model** Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A' (NW-SE) for the base case parameter and assumptions except for the higher Kd values for the other zones (same as values used in the waste zone).	Lu	Fox

X-A S3 high recharge	**Future Condition Model** Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A' (NW-SE) for the base case parameter and assumptions except for the higher water recharge rate (the rates are 0-1.76 inch/yr from 200 to 1000 years in a linear increase function and being constant beyond 1000 years).	Lu	Fox

Model Simulation Log – STOMP

Performed By: Changsheng Lu	**Date:** 09/03/19
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** 865-220-6182 (work)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
VV-testing

Purpose of Simulation:
Model V&V Testing Run performed to verify that the operating system used by Changsheng Lu, (with the same input files as provided by the software), will duplicate the output file results that were also provided by the STOMP model developer.

Model Code Used/Version No.:
STOMP Model - stomp1.F, v 1.4.2.1 2011/12/02

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:
Input

Comments on Input Data:
STOMP Tutorial Problem 3

Classic test problem for 1D Transport problem,
Water mode (STOMP1) with transport,

Names of Output Files:

Output-VV
Plot.100

Comments on Model Outputs/Results:

Identical results produced from the V&V run as compared to the original output file from STOMP. For both the original run and the V-V' run, the same date was presented in the cover sheet. However, I was able to discern the original example output file from the V&V output file. The V&V' produced for this STOMP modeling run since the project output was run without the "Surface Flux Card"

General Comments The computer was able to run program correct as designed with identical output file as the example file provided by the designers of the STOMP model.
Checked By & Date: Steve Fox, Jacobs Engineering, 10/29/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 17:45:56 -05'00'

Model Simulation Log – STOMP

Performed By: Changsheng Lu	Date: 08/06/19
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** 865-220-6182 (work)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
X-A Base

Purpose of Simulation:
Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A' (NW-SE) for the base case parameter and assumptions. The A-A' Section is oriented parallel to the slope of the four disposal cell floors.

Model Code Used/Version No.:
STOMP Model - stomp1.F, v 1.4.2.1 2011/12/02

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:
Control and parameter file:
Input

Supporting grid and boundary files:

X-A-SE-NW-Zone.csv
X-A-BC-FA.csv
X-A-BC-recharge-berm.csv
X-A-BC-recharge-cover.csv
X-A-BC-recharge-maryville.csv
X-A-BC-recharge-Maynardville.csv
X-A-BC-recharge-nolichucky.csv
X-A-BC-recharge-PV.csv
X-A-BC-SE-HG.csv
X-A-BC-NW-HG.csv

Comments on Input Data:
Base case parameter and assumptions:

- Different Kds for the waste and other zones for each radionuclide modeled. (Tc-99, H-3, U-234, Pu-239, U-238, C-14, I-129)
- Water recharge rates – Linear increasing from 0 – 0.88 "/yr starting year 200 to 1000, constant 0.88"/yr after 1000 year
- Modeled time length (0--1,000,000 year)

Names of Output Files:

Model summary and node output file:
output

Plot files for selected time steps:

plot.0
plot.1019
plot.1122
plot.1272
plot.1360
plot.1858
plot.2568
plot.2820
plot.2988
plot.3115
plot.3158
plot.3181
plot.3233
plot.3236
plot.3243
plot.3247
plot.3250
plot.3252
plot.3254
plot.3256
plot.3258
plot.3260
plot.3262
plot.3264
plot.3266
plot.3268
plot.3270
plot.3272
plot.3274
plot.3277
plot.3280
plot.3282
plot.3284
plot.3286
plot.3288
plot.3290
plot.3292
plot.3294
plot.3296

plot.3306
plot.3311
plot.3316
plot.3321
plot.3329
plot.3343
plot.3349
plot.3354
plot.3359
plot.3384
plot.3409
plot.3434
plot.3459
plot.3484
plot.3509
plot.3534
plot.3559
plot.3584
plot.3609
plot.3634
plot.3659
plot.3684
plot.3709
plot.3734
plot.3759
plot.3784
plot.3809

Comments on Model Outputs/Results:

Model execution was run correctly. Output file and plot files are generated as expected.

General Comments

Base Condition Run.

Checked By & Date:

Steve Fox, Jacobs Engineering, 10/30/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 17:46:45 -05'00'

Model Simulation Log – STOMP

Performed By: Changsheng Lu	**Date:** 08/06/19
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** 865-220-6182 (work)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
X-B Base

Purpose of Simulation:
Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section B-B' (NE-SW) for the base case parameter and assumptions. The B-B is orientated along the axis of the maximum waste thickness within the four waste cells.

Model Code Used/Version No.:
STOMP Model - stomp1.F, v 1.4.2.1 2011/12/02

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:
Control and parameter file:
Input

Supporting grid and boundary files:

X-B-NE-SW-Zone.csv
X-B-BC-FA.csv
X-B-BC-recharge-berm.csv
X-B-BC-recharge-cover.csv
X-B-BC-recharge-maryville.csv
X-B-BC-recharge-Maynardville.csv
X-B-BC-recharge-nolichucky.csv
X-B-BC-recharge-PV.csv
X-B-BC-NE-HG.csv
X-B-BC-SW-HG.csv

Comments on Input Data:

Base case parameter and assumptions:

- Different Kds for the waste and other zones for each radionuclide modeled. (Tc-99, H-3, U-234, Pu-239, U-238, C-14, I-129)
- Water recharge rates – Linear increasing from 0 – 0.88 "/yr starting year 200 to 1000, constant 0.88"/yr after 1000 year
- Modeled time length (0--1,000,000 year)

Names of Output Files:

Model summary and node output file:
output

Plot files for selected time steps:

plot.0
plot.1227
plot.1293
plot.1338
plot.1408
plot.1899
plot.2740
plot.2974
plot.3164
plot.3323
plot.3507
plot.3669
plot.3810
plot.3813
plot.3820
plot.3824
plot.3827
plot.3829
plot.3831
plot.3833
plot.3835
plot.3837
plot.3839
plot.3841
plot.3843
plot.3845
plot.3847
plot.3849
plot.3851
plot.3854
plot.3857
plot.3859
plot.3869
plot.3875
plot.3879
plot.3882
plot.3884
plot.3886
plot.3888
plot.3898
plot.3903

plot.3908 plot.3917 plot.3923 plot.3928 plot.3933 plot.3938 plot.3943 plot.3968 plot.3993 plot.4023 plot.4059 plot.4089 plot.4135 plot.4165 plot.4194 plot.4221 plot.4260 plot.4290 plot.4320 plot.4345 plot.4370 plot.4395 plot.4420 plot.4445 plot.4470
Comments on Model Outputs/Results: Model execution was run correctly. Output file and plot files are generated as expected.
General Comments Base Condition Run.
Checked By & Date: Steve Fox, Jacobs Engineering, 10/30/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 17:47:33 -05'00'

Model Simulation Log – STOMP

Performed By: Changsheng Lu	**Date:** 08/09/19
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** 865-220-6182 (work)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
X-A S1 same Kd High

Purpose of Simulation:
Sensitivity analysis Modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A' (NW-SE) for the base case parameter and assumptions, except for the higher Kd values for the waste zone (same as values used in the other zones for the radionuclides modeled).

Model Code Used/Version No.:
STOMP Model - stomp1.F, v 1.4.2.1 2011/12/02

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:
Control and parameter file:
Input

Supporting grid and boundary files:

X-A-SE-NW-Zone.csv
X-A-BC-FA.csv
X-A-BC-recharge-berm.csv
X-A-BC-recharge-cover.csv
X-A-BC-recharge-maryville.csv
X-A-BC-recharge-Maynardville.csv
X-A-BC-recharge-nolichucky.csv
X-A-BC-recharge-PV.csv
X-A-BC-SE-HG.csv
X-A-BC-NW-HG.csv

Comments on Input Data:
Same as X-A base run except for:

- Same Kds for the waste zone as other zones (Tc-99, H-3, U-234, Pu-239, U-238, C-14, I-129)
- Modeled time length (0--500,000 year)

Names of Output Files:

Model summary and node output file:
output

Plot files for selected time steps:

plot.0
plot.1019
plot.1122
plot.1272
plot.1360
plot.1858
plot.2568
plot.2820
plot.2988
plot.3115
plot.3158
plot.3181
plot.3233
plot.3236
plot.3243
plot.3247
plot.3250
plot.3252
plot.3254
plot.3256
plot.3258
plot.3260
plot.3262
plot.3264
plot.3266
plot.3268
plot.3270
plot.3272
plot.3274
plot.3277
plot.3280
plot.3282
plot.3284
plot.3286
plot.3288
plot.3290
plot.3292
plot.3294
plot.3296
plot.3306
plot.3311
plot.3316
plot.3321
plot.3329
plot.3343
plot.3349

plot.3354 plot.3359 plot.3384 plot.3409 plot.3434 plot.3459 plot.3484 plot.3509 plot.3534 plot.3559
Comments on Model Outputs/Results: Model execution was run correctly. Output file and plot files are generated as expected.
General Comments Sensitivity Run.
Checked By & Date: Steve Fox, Jacobs Engineering, 10/30/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 17:48:17 -05'00'

Model Simulation Log – STOMP

Performed By: Changsheng Lu	**Date:** 08/09/19
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** 865-220-6182 (work)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
X-A S2 same Kd Low

Purpose of Simulation:
Sensitivity analysis modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A' (NW-SE) for the base case parameter and assumptions, except for the Lower Kd values for the other zone (same as values used in the waste zones for the radionuclides).

Model Code Used/Version No.:
STOMP Model - stomp1.F, v 1.4.2.1 2011/12/02

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:
Control and parameter file:
Input

Supporting grid and boundary files:

X-A-SE-NW-Zone.csv
X-A-BC-FA.csv
X-A-BC-recharge-berm.csv
X-A-BC-recharge-cover.csv
X-A-BC-recharge-maryville.csv
X-A-BC-recharge-Maynardville.csv
X-A-BC-recharge-nolichucky.csv
X-A-BC-recharge-PV.csv
X-A-BC-SE-HG.csv
X-A-BC-NW-HG.csv

Comments on Input Data:
Same as X-A base run except for:

- Same Kds for the other zones as in the waste zone (Tc-99, H-3, U-234, Pu-239, U-238, C-14, I-129)
- Modeled time length (0--500,000 year)

Names of Output Files:

Model summary and node output file:
output

Plot files for selected time steps:

plot.0
plot.1019
plot.1122
plot.1272
plot.1360
plot.1858
plot.2568
plot.2820
plot.2988
plot.3115
plot.3158
plot.3181
plot.3233
plot.3236
plot.3243
plot.3247
plot.3250
plot.3252
plot.3254
plot.3256
plot.3258
plot.3260
plot.3262
plot.3264
plot.3266
plot.3268
plot.3270
plot.3272
plot.3274
plot.3277
plot.3280
plot.3282
plot.3284
plot.3286
plot.3288
plot.3290
plot.3292
plot.3294
plot.3296
plot.3306
plot.3311

plot.3316 plot.3321 plot.3329 plot.3343 plot.3349 plot.3354 plot.3359 plot.3384 plot.3409 plot.3434 plot.3459 plot.3484 plot.3509 plot.3534 plot.3559
Comments on Model Outputs/Results: Model execution was run correctly. Output file and plot files are generated as expected.
General Comments Sensitivity Run for lower Kd values for both the waste zones and the other zones.
Checked By & Date: Steve Fox, Jacobs Engineering, 10/30/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 17:49:28 -05'00'

Model Simulation Log – STOMP

Performed By: Changsheng Lu	**Date:** 08/09/19
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** 865-220-6182 (work)

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
X-A S3 Higher recharge

Purpose of Simulation:
Sensitivity analysis modeling run to simulate the water movement and radionuclide transport in the vadose zone in cross-section A-A' (NW-SE) for the same base case parameters and assumptions except for the higher (2X) water recharge rate. The rates are 0-1.76 inch/yr from 200 to 1000 years in a linear increase function and being constant beyond 1000 years.

Model Code Used/Version No.:
STOMP Model - stomp1.F, v 1.4.2.1 2011/12/02

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:
<u>Control and parameter file:</u>
Input

<u>Supporting grid and boundary files:</u>

X-A-SE-NW-Zone.csv
X-A-BC-FA.csv
X-A-BC-recharge-berm.csv
X-A-BC-recharge-cover.csv
X-A-BC-recharge-maryville.csv
X-A-BC-recharge-Maynardville.csv
X-A-BC-recharge-nolichucky.csv
X-A-BC-recharge-PV.csv
X-A-BC-SE-HG.csv
X-A-BC-NW-HG.csv

Comments on Input Data:
Same as X-A base run except for:

- higher (2X) water recharge rate (the rates are 0-1.76 inch/yr from 200 to 1000 years in a linear increase function and being constant beyond 1000 years).
- Modeled time length (0--500,000 year)

Names of Output Files:

Model summary and node output file:
output

Plot files for selected time steps:

plot.0
plot.1019
plot.1122
plot.1272
plot.1421
plot.2470
plot.2833
plot.3053
plot.3102
plot.3162
plot.3228
plot.3259
plot.3299
plot.3302
plot.3308
plot.3312
plot.3315
plot.3317
plot.3319
plot.3321
plot.3323
plot.3325
plot.3327
plot.3329
plot.3331
plot.3333
plot.3335
plot.3337
plot.3339
plot.3342
plot.3345
plot.3347
plot.3349
plot.3351
plot.3353
plot.3355

plot.3357 plot.3359 plot.3361 plot.3372 plot.3377 plot.3382 plot.3387 plot.3392 plot.3397 plot.3402 plot.3407 plot.3412 plot.3442 plot.3472 plot.3497 plot.3527 plot.3552 plot.3577 plot.3602 plot.3627
Comments on Model Outputs/Results: Model execution was run correctly. Output file and plot files are generated as expected.
General Comments Sensitivity Run for higher recharge rates.
Checked By & Date: Steve Fox, Jacobs Engineering, 10/30/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 17:50:23 -05'00'

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ATTACHMENT B.3. MODFLOW MODEL

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Model Scenarios – MODFLOW

Model Simulation Title and Number	Modeling Case	Preparer	Verifier
TWRI	MODFLOW 2005 Model V&V	Lu	Fox
EMDF-CC	**Calibrated Current Condition Model** Model run to simulate the current condition long-term steady-state groundwater condition at the site.	Lu	Fox
EMDF-DC	**Design Condition Model** Model run to simulate the design condition steady-state groundwater condition at the site.	Lu	Fox
EMDF-FC	**Future Condition Model** Model run to simulate the future condition steady-state groundwater condition at the site with recharge rate of 0.88”/yr applied to the lined cell area.	Lu	Fox
EMDF-FC-p1	**Future Condition Model – phase 1** Model run to simulate the future condition steady-state groundwater condition at the site with recharge rate of 0.43”/yr applied to the lined cell area to represent the condition during the partial-performance period (200-1000 years).	Lu	Fox
Sensitivity Analysis			
EMDF-FC-R-1p5	**Future Condition Model** Model run to simulate the future condition steady-state groundwater condition at the site under wet condition with 1.5X of the base recharge rates for the whole model domain (1.32”/yr applied to the lined cell area).	Lu	Fox
EMDF-FC-K1	**Future Condition Model** Model run to simulate the future condition steady-state groundwater condition with different of anisotropy ratios (3/5 X base anisotropy) – lower anisotropy ratio.	Lu	Fox
EMDF-FC-K2	**Future Condition Model** Model run to simulate the future condition steady-state groundwater condition with different of anisotropy ratios (2 X base anisotropy) – higher anisotropy ratio.	Lu	Fox

Model Simulation Log – MODFLOW

Performed By: Changsheng Lu	**Date:** **3/12/2019**
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
TWRI

Purpose of Simulation:
Model V&V Testing Run performed to verify that the operating system used by Changsheng Lu, (with the same input files as provided by the software manufacturer), will duplicate the output file results that were also provided by the MODFLOW model manufacturer.

Model Code Used/Version No.:
MODFLOW-2005, VERSION 1.12.00 2/3/2017

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:
twri.bas
twri.bcf
twri.dis
twri.drn
twri.lst
twri.nam
twri.oc
twri.rch
twri.sip
twri.wel

Comments on Input Data:
Original example testing file from MODFLOW Manual was used for the model V&V model testing run.

Names of Output Files:

twri.ddn
twri.hds
twri.lst

Comments on Model Outputs/Results:

Identical results produced from the run compared to original output file from MODFLOW.

General Comments Computer able to run program correct as designed.
Checked By & Date: Steve Fox, Jacobs Engineering, 10/1/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:11:37 -05'00'

Model Simulation Log – MODFLOW

Performed By: Changsheng Lu	**Date: 4/3/2019**
Office Location/Company Jacobs Engineering	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-CC

Purpose of Simulation:
Current Condition Model Run. This modeling run represent the calibrated groundwater construction model for long-term average condition for the current (2018-2019) site condition.

Model Code Used/Version No.:
MODFLOW-2005, VERSION 1.12.00 2/3/2017

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

EMDF-CC.bas
EMDF-CC.chd
EMDF-CC.dis
EMDF-CC.drn
EMDF-CC.lmt
EMDF-CC.lpf
EMDF-CC.nam
EMDF-CC.oc
EMDF-CC.pcg
EMDF-CC.rch
EMDF-CC.riv
EMDF-CC.zone

Comments on Input Data:
Calibrated model run for the current condition of the groundwater, steady state conditions at the site prior to installation of the proposed EMDF disposal system.

Names of Output Files:
EMDF-CC.cbb
EMDF-CC.hds
EMDF-CC.lst

Comments on Model Outputs/Results: The model outputs are consistent with site-specific data.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/1/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:12:22 -05'00'

Model Simulation Log – MODFLOW

Performed By: Changsheng Lu	**Date: 4/29/2019**
Office Location/Company Jacobs Engineering	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-DC (Design Condition)

Purpose of Simulation:
Design Condition Model Run. This modeling run represent the design condition model for long-term average condition for the fully functional condition for the EMDF.

Model Code Used/Version No.:
MODFLOW-2005, VERSION 1.12.00 2/3/2017

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

EMDF-DC.bas
EMDF-DC.chd
EMDF-DC.dis
EMDF-DC.drn
EMDF-DC.lmt
EMDF-DC.lpf
EMDF-DC.nam
EMDF-DC.oc
EMDF-DC.pcg
EMDF-DC.rch
EMDF-DC.riv
EMDF-DC.zone

Comments on Input Data:
Design condition model run with 0.0 inches/year of recharge for the lined area.

Names of Output Files:
EMDF-DC.cbb
EMDF-DC.hds
EMDF-DC.lst

Comments on Model Outputs/Results: The model outputs are consistent with assumptions.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 10/01/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:13:34 -05'00'

Model Simulation Log – MODFLOW

Performed By: Changsheng Lu	**Date: 5/2/2019**
Office Location/Company Jacobs Engineering	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-FC

Purpose of Simulation:
Future Condition Model Run. This modeling run represent the future long-term (>1000 year) run with a recharge rate of of 0.88 in/yr applied to the line cell area.

Model Code Used/Version No.:
MODFLOW-2005, VERSION 1.12.00 2/3/2017

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

EMDF-FC.bas
EMDF-FC.chd
EMDF-FC.dis
EMDF-FC.drn
EMDF-FC.lmt
EMDF-FC.lpf
EMDF-FC.nam
EMDF-FC.oc
EMDF-FC.pcg
EMDF-FC.rch
EMDF-FC.riv
EMDF-FC.zone

Comments on Input Data:
Design condition with long-term performance run (0.88 inches/yr).

Names of Output Files:
EMDF-FC.cbb
EMDF-FC.hds
EMDF-FC.lst

Comments on Model Outputs/Results: The model outputs are consistent with assumptions.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 10/01/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:15:28 -05'00'

Model Simulation Log – MODFLOW

Performed By: Changsheng Lu	**Date:** 4/30/2019
Office Location/Company Jacobs Engineering	**Contact Info:** Changsheng.lu@jacobs.com
Project Title and No.: UCOR – EMDF PA	
Simulation Title and No.: EMDF-FC-p1	
Purpose of Simulation: Future Condition Model Run. This modeling run represent the future long-term (200-1000 year) run with recharge rate of 0.43 in/yr applied to the lined cell area. This simulation represents partial performance of the liner system.	
Model Code Used/Version No.: MODFLOW-2005, VERSION 1.12.00 2/3/2017	
Configuration Control (Computer Hardware/OS): Dell Precision 7720 / Window 10 Enterprise 1709	
Names of Input Files: EMDF-FC.bas EMDF-FC.chd EMDF-FC.dis EMDF-FC.drn EMDF-FC.lmt EMDF-FC.lpf EMDF-FC.nam EMDF-FC.oc EMDF-FC.pcg EMDF-FC-p1.rch EMDF-FC.riv EMDF-FC.zone	
Comments on Input Data: All input data files are same as EMDF-FC run except the recharge (RCH) file that represents the different recharge rate applied for the lined area in the model compared to base run (EMDF-FC).	
Names of Output Files: EMDF-FC-p1.cbb EMDF-FC-p1.hds EMDF-FC-p1.lst	

Comments on Model Outputs/Results: The model outputs are consistent with assumptions.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 10/1/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:16:19 -05'00'

Model Simulation Log – MODFLOW

Performed By: Changsheng Lu	**Date: 5/1/2019**
Office Location/Company Jacobs Engineering	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-FC-R-1p5X

Purpose of Simulation:
Sensitivity analysis, Future Condition Model Run. This modeling run represent the future long-term (>1000 year) run with 1.5X recharge rates applied for the whole model domain.

Model Code Used/Version No.:
MODFLOW-2005, VERSION 1.12.00 2/3/2017

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

EMDF-FC.bas
EMDF-FC.chd
EMDF-FC.dis
EMDF-FC.drn
EMDF-FC.lmt
EMDF-FC.lpf
EMDF-FC.nam
EMDF-FC.oc
EMDF-FC.pcg
EMDF-FC-R-1p5X.rch
EMDF-FC.riv
EMDF-FC.zone

Comments on Input Data and Parameter Changes:

All input data files are same as EMDF-FC run except the recharge (RCH) file that represents the higher recharge rates (1.5X base) applied in the model domain compared to base run (EMDF-FC).

Names of Output Files:
EMDF-FC-R-1p5X.cbb
EMDF-FC-R-1p5X.hds
EMDF-FC-R-1p5X.lst

Comments on Model Outputs/Results: The model outputs are consistent with expected impact (predicted higher water levels with increased groundwater recharge).
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/1/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:17:08 -05'00'

Model Simulation Log – MODFLOW

Performed By: Changsheng Lu	**Date: 5/1/2019**
Office Location/Company Jacobs Engineering	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-FC-K1

Purpose of Simulation:
Sensitivity analysis, Future Condition Model Run. This modeling run represents the future condition with the steady-state groundwater condition at the site with the different anisotropy ratio (3/5 X base ratio).

Model Code Used/Version No.:
MODFLOW-2005, VERSION 1.12.00 2/3/2017

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

EMDF-FC-K1.bas
EMDF-FC-K1.chd
EMDF-FC-K1.dis
EMDF-FC-K1.drn
EMDF-FC-K1.lmt
EMDF-FC-K1.lpf
EMDF-FC-K1.nam
EMDF-FC-K1.oc
EMDF-FC-K1.pcg
EMDF-FC-K1.rch
EMDF-FC-K1.riv
EMDF-FC-K1.zone

Comments on Input Data and Parameter Changes:

New model input and property files were generated due to the complex K changes within the model layers.

Names of Output Files:
EMDF-FC-K1.cbb
EMDF-FC-K1.hds
EMDF-FC-K1.lst

Comments on Model Outputs/Results: The model outputs are consistent with expected impact for lower anisotropy.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/1/19   Steve Fox   Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:17:53 -05'00'

Model Simulation Log – MODFLOW

Performed By: Changsheng Lu	**Date: 5/2/2019**
Office Location/Company Jacobs Engineering	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-FC-K2

Purpose of Simulation:
Sensitivity analysis, Future Condition Model Run. This modeling run represent the different anisotropy ratio (2 X base ratio) for these units with a higher anisotropy ratio.

Model Code Used/Version No.:
MODFLOW-2005, VERSION 1.12.00 2/3/2017

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

EMDF-FC-K2.bas
EMDF-FC-K2.chd
EMDF-FC-K2.dis
EMDF-FC-K2.drn
EMDF-FC-K2.lmt
EMDF-FC-K2.lpf
EMDF-FC-K2.nam
EMDF-FC-K2.oc
EMDF-FC-K2.pcg
EMDF-FC-K2.rch
EMDF-FC-K2.riv
EMDF-FC-K2.zone

Comments on Input Data and Parameter Changes:

New model input and property files were generated due to the complex K changes within the model layers.

Names of Output Files:
EMDF-FC-K2.cbb
EMDF-FC-K2.hds
EMDF-FC-K2.lst

Comments on Model Outputs/Results: The model outputs are consistent with expected impact.
General Comments Results seems to be reasonable and logical.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/1/19 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:18:42 -05'00'

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ATTACHMENT B.4. MT3D MODEL

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Model Scenarios – MT3D

Model Simulation Title and Number	Modeling Case	Preparer	Verifier
MT3D Benchmark Problem 7, 3D TRANSPORT IN UNIFORM FLOW FIELD WITH CONTINUOUS POINT SOURCE (REFER TO SECTION 7.7 OF MT3DMS MANUAL)	MT3D Model V&V Model run to document the applicability and reliability of the model for the hardware and system use for the project.	Lu	Fox
MT3D General Application Model Runs			
EMDF-FC-T	**Uniform and constant source model run** Model run to predict the maximum plume development, delineate the plume discharge to the surface streams, and determine the applicable location and vertical profile for the 100-m well.	Lu	Fox
EMDF-FC-HC-T	**Non-uniform and constant source model run** Model run to evaluate the impact of non-uniform source release.	Lu	Fox
EMDF-FC-disp-T	**Uniform and constant source model run with dispersivity applied** Model run to evaluate the impact of dispersivity.		
COC-Specific Model Runs			
EMDF-FC-20sp-T-TC99-2	**Tc-99 Base Condition Run** Model run to simulate the Tc-99 fate and transport in the groundwater zone with uniform release.	Lu	Fox
EMDF-FC-20sp-T-TC99-hk-L2-2	**Tc-99 Sensitivity Run for Higher K in Model Layer 2** Model run to simulate the Tc-99 fate and transport in the groundwater zone for the higher K in Layer 2.	Lu	Fox

EMDF-FC-20sp-T-TC99-nu-2	**Tc-99 Sensitivity Run for non-uniform release for the waste zone** Model run to simulate the Tc-99 fate and transport in the groundwater zone for non-uniform release for the waste zone.	Lu	Fox
EMDF-FC-20sp-T-I129-2	**I-129 Base Condition Run** Model run to simulate the I-129 fate and transport in the groundwater zone.		
EMDF-FC-20sp-T-C14-2	**C-14 Base Condition Run** Model run to simulate the C-14 fate and transport in the groundwater zone.		

Model Simulation Log – MT3D

Performed By: Changsheng Lu	**Date:** **09/03/2019**
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
VV-testing

Purpose of Simulation:
Model V&V Testing Run performed to verify that the operating system used for the project duplicated the output file results that were also provided by the MT3D model developer. The title of the document is *MT3DMS, A Modular Three-Dimensional Multispecies Transport Model*, by Zheng and Wang, November 1999, Contract Report SERDP-99-1, U. S. Army Engineer Research and Development Center, Vicksburg, MS

Model Code Used/Version No.:
MT3D Model - MT3DMS Version 5, 2006

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:
MT3DMS v5 Name file for test case P7
p7mt.nam

Transport package input files
BTN p7.btn
ADV p7.adv
DSP p7.dsp
SSM p7.ssm
GCG p7.gcg

Flow-Transport Link input file
FTL p7.ftl

Comments on Input Data:
MT3D Benchmark Problem 7.7,

3D TRANSPORT IN UNIFORM FLOW FIELD WITH CONTINUOUS POINT SOURCE
(Refer to Section 7.7 of MT3DMS Manual, Zheng and Wang, November 1999)

Names of Output Files:

Standard output file
p7-testing.out

optional MT3DMS output files
mt3d001.ucn,

mt3d001s.ucn, mt3d001.obs, mt3d001.mas, mt3d.cnf.
Comments on Model Outputs/Results: Identical results produced from the run compared to original output file from MT3D.
General Comments The computer was able to run the program correctly as designed.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/13/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:52:08 -05'00'

Model Simulation Log – MT3D

Performed By: Changsheng Lu	**Date:** **06/01/2019**
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-FC-T – Uniform and constant source model run.

Purpose of Simulation: Uniform and constant source model run

Model run to predict the maximum plume development, delineate the plume discharge to the surface streams, and determine the applicable location and vertical profile for the 100 meter well.

Model Code Used/Version No.:
MT3D Model - MT3DMS Version 5, 2006

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

MT3DMS v5 Name file:
EMDF-FC-T.nam

Transport package input files
EMDF-FC-T.btn
EMDF-FC-T.adv
EMDF-FC-T.dsp
EMDF-FC-T.ssm
EMDF-FC-T.rct
EMDF-FC-T.gcg

Flow-Transport Link input file
FTL   EMDF-FC.ftl

Comments on Input Data:

- Uniform and constant (non-depleting) source.
- Unit leachate source concentration is applied in the SSM package (=1).
- Advection only - No dispersion and chemical reaction processes modeled.
- Steady-state flow field (from MODFLOW)

.

Names of Output Files: EMDF-FC-T.out EMDF-FC-T1.ucn, EMDF-FC-T1.obs, EMDF-FC-T1.mas, EMDF-FC-T.cnf
Comments on Model Outputs/Results: Model execution was run correctly. Output file and associated files were generated as expected.
General Comments Result is expected.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/13/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:53:23 -05'00'

Model Simulation Log – MT3D

Performed By: Changsheng Lu	**Date:** **06/01/2019**
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** Changsheng.lu@jacobs.com
Project Title and No.: UCOR – EMDF PA	
Simulation Title and No.: **EMDF-FC-HC-T** – Non uniform and constant source model run.	
Purpose of Simulation: Model run to evaluate the impact of non-uniform source release.	
Model Code Used/Version No.: MT3D Model - MT3DMS Version 5, 2006	
Configuration Control (Computer Hardware/OS): Dell Precision 7720 / Window 10 Enterprise 1709	
Names of Input Files: # MT3DMS v5 Name file: EMDF-FC-HC-T.nam # Transport package input files EMDF-FC-HC-T.btn EMDF-FC-HC-T.adv EMDF-FC-HC-T.dsp EMDF-FC-HC-T.ssm EMDF-FC-HC-T.rct EMDF-FC-HC-T.gcg # Flow-Transport Link input file FTL EMDF-FC.ftl	
Comments on Input Data: • Non-uniform and constant (non-depleting) source • Unit leachate source concentration is applied in the SSM package (1 and 10, respectively) • Advection only - No dispersion and chemical reaction processes modeled. • Steady-state flow field (from MODFLOW)	

Names of Output Files: EMDF-FC-HC-T.out EMDF-FC-HC-T1.ucn, EMDF-FC-HC-T1.obs, EMDF-FC-HC-T1.mas, EMDF-FC-HC-T.cnf
Comments on Model Outputs/Results: Model execution was run correctly. Output file and associated files are generated as expected.
General Comments Result is expected.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/13/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:54:00 -05'00'

Model Simulation Log – MT3D

Performed By: Changsheng Lu	**Date:** **06/04/2019**
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-FC-disp-T – Uniform and constant source model run with dispersivity applied.

Purpose of Simulation:

Model run to evaluate the impact of dispersivity.

Model Code Used/Version No.:
MT3D Model - MT3DMS Version 5, 2006

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

MT3DMS v5 Name file:
EMDF-FC-DISP-T.nam

Transport package input files
EMDF-FC-DISP-T.btn
EMDF-FC-DISP-T.adv
EMDF-FC-DISP-T.dsp
EMDF-FC-DISP-T.ssm
EMDF-FC-DISP-T.rct
EMDF-FC-DISP-T.gcg

Flow-Transport Link input file
FTL   EMDF-FC.ftl

Comments on Input Data:

- Uniform and constant (non-depleting) source
- Unit leachate source concentration is applied in the SSM package (=1)
- Advection and Dispersion are applied
- No chemical reaction process modeled.
- Steady-state flow field (from MODFLOW)

Names of Output Files: EMDF-FC-DISP-T.out EMDF-FC-DISP-T1.ucn, EMDF-FC-DISP-T1.obs, EMDF-FC-DISP-T1.mas, EMDF-FC-DISP-T.cnf
Comments on Model Outputs/Results: Model execution was run correctly. Output file and associated files are generated as expected.
General Comments Result is expected.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/13/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:54:59 -05'00'

Model Simulation Log – MT3D

Performed By: Changsheng Lu	**Date:** **08/31/2019**
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-FC-20sp-T-TC99-2 – Tc-99 Base Condition Run

Purpose of Simulation:

Model run to simulate the Tc-99 fate and transport in the groundwater zone with uniform release.

Model Code Used/Version No.:
MT3D Model - MT3DMS Version 5, 2006

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

Transport package input files
EMDF-FC-20SP-T-TC99.btn
EMDF-FC-20SP-T.adv
EMDF-FC-20SP-T.dsp
EMDF-FC-20SP-T-TC99.ssm
EMDF-FC-20SP-T-TC99-2.rct
EMDF-FC-20SP-T.gcg

Flow-Transport Link input file
FTL EMDF-FC-20sp.ftl

Comments on Input Data:

- Uniform and depleting source.
- True concentration based on source inventory in the SSM package.
- Advection, dispersion, and chemical reaction processes are modeled.
- Steady-state flow field (from MODFLOW) utilized 20 stress periods.

Names of Output Files:

EMDF-FC-20SP-T-TC99-2.out

EMDF-FC-20SP-T-TC99-2.ucn,
EMDF-FC-20SP-T-TC99-2.obs,
EMDF-FC-20SP-T-TC99-2.mas,
EMDF-FC-20SP-T-TC99-2.cnf

Comments on Model Outputs/Results: Model execution was run correctly. Output file and associated files are generated as expected.
General Comments Result is expected.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/13/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:57:16 -05'00'

Model Simulation Log – MT3D

Performed By: Changsheng Lu	**Date:** **09/01/2019**
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** Changsheng.lu@jacobs.com
Project Title and No.: UCOR – EMDF PA	
Simulation Title and No.: EMDF-FC-20sp-T-C14-2 – C-14 Base condition run.	
Purpose of Simulation: Model run to simulate the C-14 fate and transport in the groundwater zone with uniform release.	
Model Code Used/Version No.: MT3D Model - MT3DMS Version 5, 2006	
Configuration Control (Computer Hardware/OS): Dell Precision 7720 / Window 10 Enterprise 1709	
Names of Input Files: # Transport package input files EMDF-FC-20SP-T-C14.btn EMDF-FC-20SP-T.adv EMDF-FC-20SP-T.dsp EMDF-FC-20SP-T-C14.ssm EMDF-FC-20SP-T-C14-2.rct EMDF-FC-20SP-T.gcg # Flow-Transport Link input file FTL EMDF-FC-20sp.ftl	
Comments on Input Data: • Uniform and depleting source • True concentration based on source inventory in the SSM package • Advection, dispersion, and chemical reaction processes (Kd=0) are modeled. • Steady-state flow field (from MODFLOW) utilized 20 stress periods	

Names of Output Files: EMDF-FC-20SP-T-C14-2.out EMDF-FC-20SP-T-C14-2.ucn, EMDF-FC-20SP-T-C14-2.obs, EMDF-FC-20SP-T-C14-2.mas, EMDF-FC-20SP-T-C14-2.cnf
Comments on Model Outputs/Results: Model execution was run correctly. Output file and associated files are generated as expected.
General Comments Result is expected.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/13/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:58:01 -05'00'

Model Simulation Log – MT3D

Performed By: Changsheng Lu	**Date:** **09/01/2019**
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-FC-20sp-T-I129-2 – I-1129 Base condition run.

Purpose of Simulation:

Model run to simulate the I-129 fate and transport in the groundwater zone with uniform release.

Model Code Used/Version No.:
MT3D Model - MT3DMS Version 5, 2006

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

Transport package input files
EMDF-FC-20SP-T-I-129.btn
EMDF-FC-20SP-T.adv
EMDF-FC-20SP-T.dsp
EMDF-FC-20SP-T-I-129.ssm
EMDF-FC-20SP-T-I-129-2.rct
EMDF-FC-20SP-T.gcg

Flow-Transport Link input file
FTL   EMDF-FC-20sp.ftl

Comments on Input Data:

- Uniform and depleting source
- True concentration based on source inventory in the SSM package
- Advection, dispersion, and chemical reaction processes are modeled.
- Steady-state flow field (from MODFLOW) utilized 20 stress periods

Names of Output Files: EMDF-FC-20SP-T-I-129-2.out EMDF-FC-20SP-T-I-129-2.ucn, EMDF-FC-20SP-T-I-129-2.obs, EMDF-FC-20SP-T-I-129-2.mas, EMDF-FC-20SP-T-I-129-2.cnf
Comments on Model Outputs/Results: Model execution was run correctly. Output file and associated files are generated as expected.
General Comments Result is expected.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/13/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:59:01 -05'00'

Model Simulation Log – MT3D

Performed By: Changsheng Lu	**Date:** **09/02/2019**
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-FC-20sp-T-TC99-hk-L2-2 – Tc-99 Sensitivity run for higher K in Model Layer 2.

Purpose of Simulation:

Sensitivity run to simulate the Tc-99 fate and transport in the groundwater zone with uniform release for higher K value in Model Layer 2.

Model Code Used/Version No.:
MT3D Model - MT3DMS Version 5, 2006

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

Transport package input files
EMDF-FC-20SP-T-TC99.btn
EMDF-FC-20SP-T.adv
EMDF-FC-20SP-T.dsp
EMDF-FC-20SP-T-TC99.ssm
EMDF-FC-20SP-T-TC99-2.rct
EMDF-FC-20SP-T.gcg

Flow-Transport Link input file
FTL EMDF-FC-20sp-HK-L2.ftl

Comments on Input Data:

- Kx values in Model layer 2 are same as the Kx in model layer 1 and Ky and Kz inlayer 2 is 1/10 of the new Kx (keeping the 1/10 anisotropy ratio for the layer 2).
- New flow model run with new flow field.
- Uniform and depleting source.
- True concentration based on source inventory in the SSM package.
- Advection, dispersion, and chemical reaction processes are modeled.
- Steady-state flow field (from MODFLOW) utilized 20 stress periods.

Names of Output Files:

EMDF-FC-20SP-T-TC99-HK-L2-2.out

EMDF-FC-20SP-T-TC99-HK-L2-2.ucn,

EMDF-FC-20SP-T-TC99-HK-L2-2.obs, EMDF-FC-20SP-T-TC99-HK-L2-2.mas, EMDF-FC-20SP-T-TC99-HK-L2-2.cnf
Comments on Model Outputs/Results: Model execution was run correctly. Output file and associated files are generated as expected.
General Comments Result is expected.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/13/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 16:59:46 -05'00'

Model Simulation Log – MT3D

Performed By: Changsheng Lu	**Date:** **09/02/2019**
Office Location/Company Jacobs Engineering, Oak Ridge, TN	**Contact Info:** Changsheng.lu@jacobs.com

Project Title and No.:
UCOR – EMDF PA

Simulation Title and No.:
EMDF-FC-20sp-T-TC99-NU-2 – Tc-99 Sensitivity run for non-uniform release for the waste zone.

Purpose of Simulation:

Sensitivity run to simulate the Tc-99 fate and transport in the groundwater zone with non-uniform and depleting release with variable recharge rates for the different cell footprint areas..

Model Code Used/Version No.:
MT3D Model - MT3DMS Version 5, 2006

Configuration Control (Computer Hardware/OS):
Dell Precision 7720 / Window 10 Enterprise 1709

Names of Input Files:

Transport package input files
EMDF-FC-20SP-T-TC99.btn
EMDF-FC-20SP-T.adv
EMDF-FC-20SP-T.dsp
EMDF-FC-20SP-T-TC99.ssm
EMDF-FC-20SP-T-TC99-2.rct
EMDF-FC-20SP-T.gcg

Flow-Transport Link input file
FTL EMDF-FC-20sp-NU.ftl

Comments on Input Data:

- New flow model run with variable recharge rates for the different cell footprint areas.
- Non-uniform and depleting source.
- True concentration based on source inventory in the SSM package.
- Advection, dispersion, and chemical reaction processes are modeled.
- Steady-state flow field (from MODFLOW) utilized 20 stress periods.

Names of Output Files: EMDF-FC-20SP-T-TC99-NU-2.out EMDF-FC-20SP-T-TC99-NU-2.ucn, EMDF-FC-20SP-T-TC99-NU-2.obs, EMDF-FC-20SP-T-TC99-NU-2.mas, EMDF-FC-20SP-T-TC99-NU-2.cnf
Comments on Model Outputs/Results: Model execution was run correctly. Output file and associated files are generated as expected.
General Comments Result is expected.
Checked By & Date: Steve Fox, Jacobs Engineering, 11/13/2019 Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.05 17:00:30 -05'00'

ATTACHMENT B.5. RESRAD-OFFSITE MODEL

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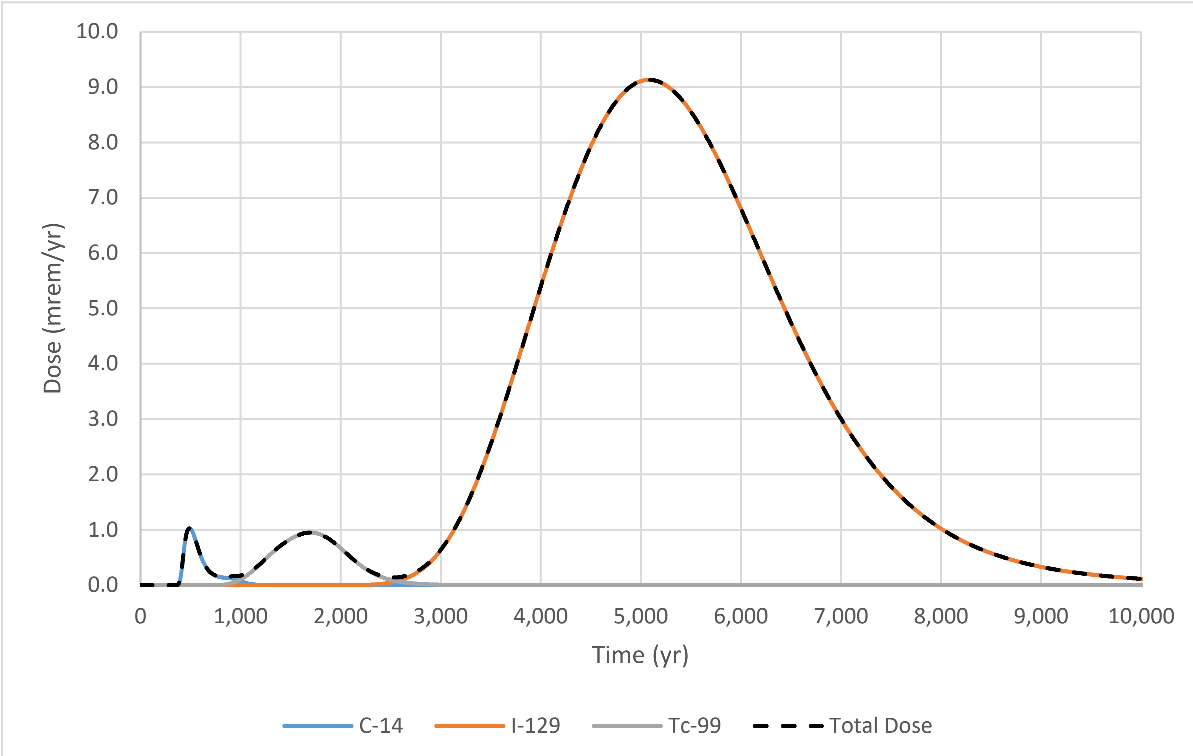
Model Simulation Log

ID: BC_V01.ROF	
Performed By: R. Hupfer	Date: 10/25/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: BC_V01	
Purpose of Simulation: To provide deterministic dose predictions for the base case scenario for a 10,000-year simulation period	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01\BC_V01.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01\BC_V01_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01\BC_V01.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01\BC_V01.par OD\Projects\0011-D3\Sims\BC\BC_V01\BC_V01_RES.xlsx	
Comments on Model Outputs/Results: Peak dose (all radionuclides, all pathway summed) for the compliance period is approximately of 1.03 mrem/yr and occurs at approximately 500 yr. Peak dose for the 10,000-year simulation is 9.13 mrem/yr and occurs at approximately 5,100 yr. C-14 contributes the most to the total dose during the compliance period (peak dose = 1.03 mrem/yr) and I-129 contributes the most during the 10,000-year simulation period (peak dose = 9.13 mrem/yr) to total dose. The highest contributing pathways (in descending order) are: water ingestion (primarily C-14 during compliance period, I-129 during the 10,000-year simulation period), fish ingestion (C-14 during compliance period), meat ingestion (waterborne) (primarily Tc-99 from 1,000-2,000 yr and I-129 during the 10,000-year simulation period), and milk ingestion (waterborne) (primarily C-14 during compliance and I-129 during the 10,000-year simulation period.).	



Temporal plot of top contributing radionuclide (all pathways summed) and total dose (all pathways summed) for the 10,000-year simulation period.

Radionuclide	C-14	I-129	Tc-99	Total
Peak Dose Compliance Period (mrem/yr)	1.03	1.44E-24	0.11	1.03
Time of Peak Dose (yr)	490	1,004	1,004	490
Peak Dose 10,000-year (mrem/yr)	1.03	9.13	0.95	9.13
Time of Peak Dose (yr)	490	5,084	1,699	5,084

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:
J. Davis 12/30/19

Signed: 4/9/2020

O. Warren 12/30/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 9/20/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter inputs in the base case model						
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01\BC_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\QA\BC\BC_V01\BC_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	N	Parameters in BC_V01_QA.xlsx were found to be identical to those in the BC_V01.par with the exceptions of LFI(2,2) (8.5 instead of 11) and RWEATHER(2). O. Warren 10/9/2019	The following revisions were made to on 10/28/19 BC_V01.ROF to satisfy reviewer comments: • Grain intake for dairy cows [LFI(2,2)] changed to 11 kg/d • Weathering removal constant of leafy vegetables [RWEATHER(2)] changed to 20 /yr The following changes were also made on 10/28/19: • Food to foliage transfer coefficient of grain [FOLIF(4)] changed to 0.1 • Pasture and silage intake for dairy cows [LFI(2,1)] changed to 44 kg/d	Y, O. Warren 10/31/19

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01.ROF	
New Model File Date: 9/20/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01\BC_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\QA\BC\BC_V01\BC_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	Y	Values were found to be correct. J. Davis 10/30/2019		
BC_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01\BC_V01_QA.xlsx	All comments in BC_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 9/20/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 9/20/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 9/20/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

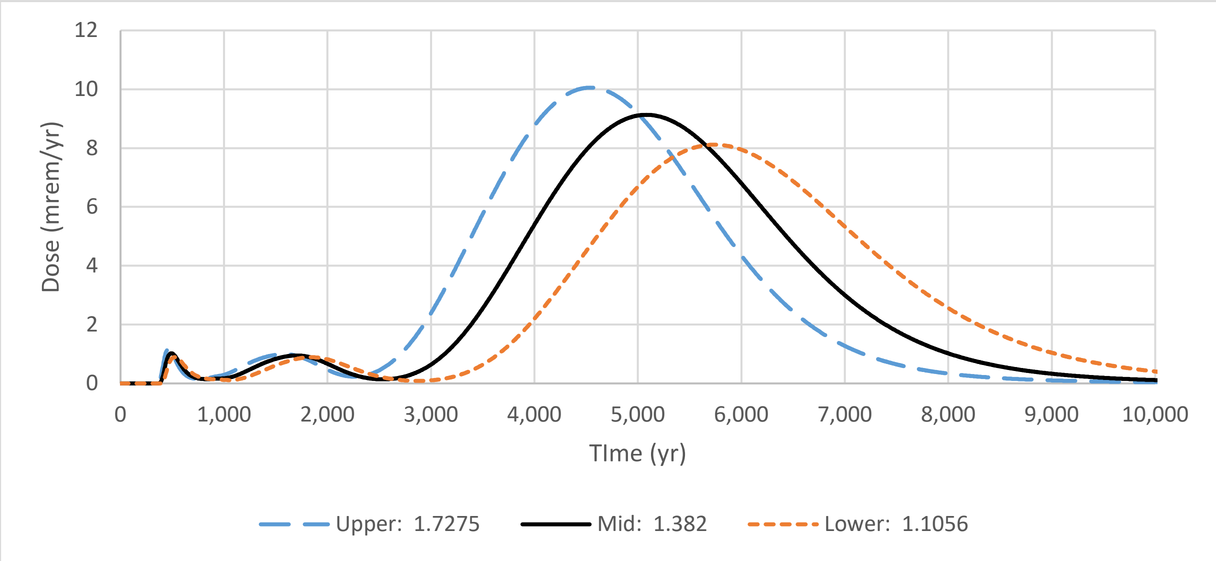
Model Simulation Log

<table>
<tr><td colspan="2">ID: BC_V01_SA1.ROF</td></tr>
<tr><td>Performed By: R. Hupfer</td><td>Date: 12/16/2019</td></tr>
<tr><td>Office Location/Company
Drummond Carpenter, PLLC Orlando, FL</td><td>Contact Info:
rhupfer@drummondcarpenter.com</td></tr>
<tr><td colspan="2">Project Title and No.: Environmental Management Disposal Facility Performance Assessment</td></tr>
<tr><td colspan="2">Simulation Title and No.: Site 7 Base Case Model SA1</td></tr>
<tr><td colspan="2">Purpose of Simulation: To determine the sensitivity of the base case deterministic results to precipitation</td></tr>
<tr><td colspan="2">Model Code Used/Version No.: RESRAD OFFSITE Version 3.2</td></tr>
<tr><td colspan="2">Configuration Control (Computer Hardware/OS):
Computer: Dell Precision 7520 DESKTOP-MDFIMDA
Operating System: Windows 10 Professional</td></tr>
<tr><td colspan="2">Names of Input Files:
Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA1\
BC_V01_SA1.ROF</td></tr>
<tr><td colspan="2">Comments on Input Data:
Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA1\BC_V01_SA1_QA.xlsx</td></tr>
<tr><td colspan="2">Names of Output Files:
OD\Projects\0011-D3\QA\BC\BC_V01_SA1\BC_V01_SA1.par
Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA1\
BC_V01_SA1.par
OD\Projects\0011-D3\QA\BC\BC_V01_SA1\BC_V01_SA1_GraphData.DAT
OD\Projects\0011-D3\Sims\BC\BC_V01_SA1\Out\BC_V01_SA1_GraphData.DAT
OD\Projects\0011-D3\Sims\BC\BC_V01_SA1\BC_V01_SA1_RES.xlsx</td></tr>
</table>

Comments on Model Outputs/Results:
Sensitivity analysis performed on precipitation rate [PRECIP], which was multiplied and divided by a factor of 1.25

Peak total dose and timing of the peak dose for the 1,000-year compliance period is sensitive to precipitation. Peak total dose and timing of the peak dose for the 10,000-year compliance period is sensitive to precipitation.

1.25x SA on precipitation



PRECIP Value (m/yr)	Upper: 1.7275	Mid: 1.382	Lower: 1.1056
Peak Dose 1k (mrem/yr)	1.17	1.03	0.89
Time of Peak Dose (yr)	465	490	524
Peak Dose 10k (mrem/yr)	10.05	9.13	8.12
Time of Peak Dose (yr)	4,540	5,084	5,740

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 1/15/2020
Signed: 4/9/2020

J. Davis 1/17/2020
Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA1.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 1						
Sensitivity analysis factor applied to cover thickness	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA1\BC_V01_SA1.ROF	Applied a sensitivity analysis factor of 1.5 to precipitation [PRECIP] to simulate the Base Case scenario precipitation rates of 0.9213 m/yr (lower), 1.382 m/yr (base case) and 2.073 m/yr (upper)	Y	O. Warren 12/5/2019 J. Davis 12/6/19		
Sensitivity analysis factor applied to cover thickness	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA1\BC_V01_SA1.ROF	Applied a sensitivity analysis factor of 1.25 to precipitation [PRECIP] to simulate the Base Case scenario precipitation rates of 1.1056 m/yr (lower), 1.382 m/yr (base case) and 1.7275 m/yr (upper)	Y	O. Warren 1/15/2020 J. Davis 1/17/20		
BC_V01_SA1_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA1\BC_V01_SA1_QA.xlsx	All comments in BC_V01_SA1_QA.xlsx have been addressed	Y	All comments were addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA1.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA1.ROF	BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA1.ROF	BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA1.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

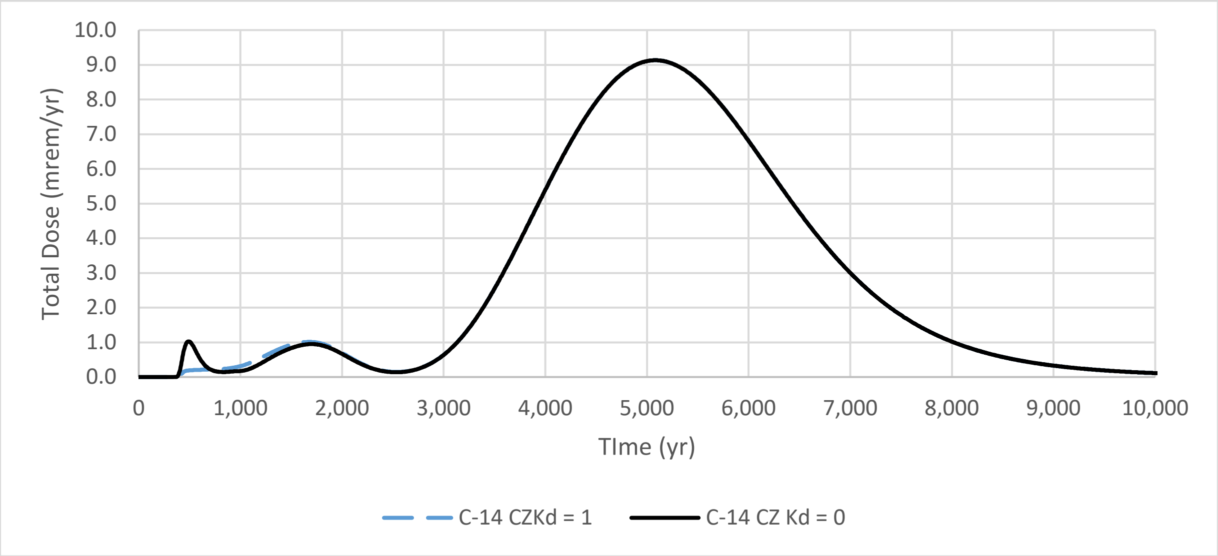
Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed 4/9/2020

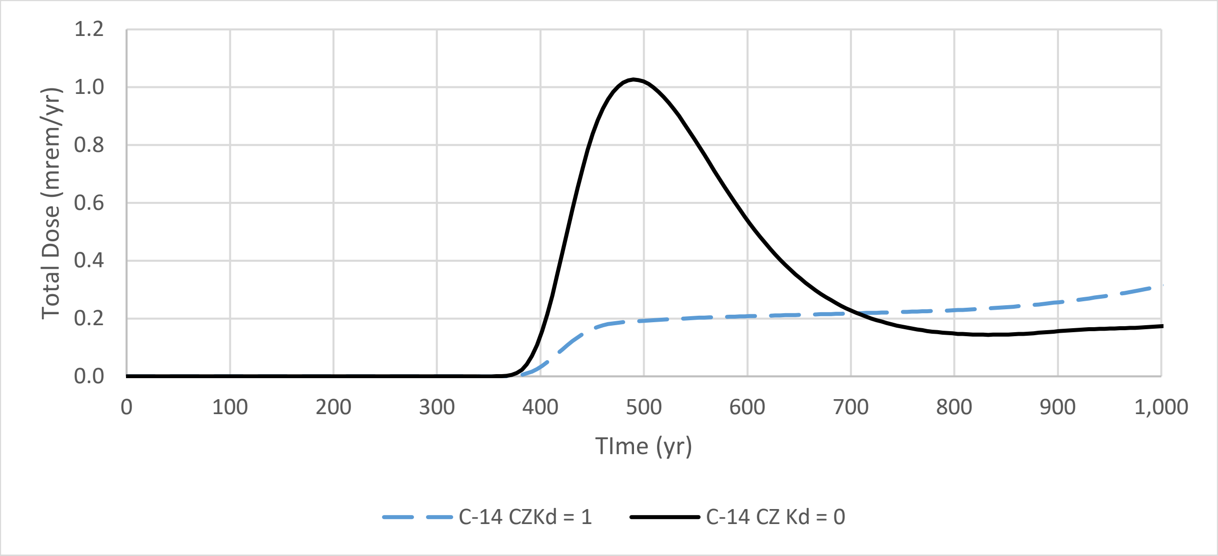
Model Simulation Log

ID: BC_V01_SA2.ROF	
Performed By: R. Hupfer	Date: 11/19/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA2	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to C-14 contaminated zone distribution coefficient	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA2\BC_V01_SA2.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA2\BC_V01_SA2_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA2\BC_V01_SA2.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA2\BC_V01_SA2.par OD\Projects\0011-D3\QA\BC\BC_V01_SA2\BC_V01_SA2_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA2\Out\BC_V01_SA2_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA2\BC_V01_SA2_RES.xlsx	

Comments on Model Outputs/Results:
Base case model simulated with C-14 contaminated zone Kd equal to 1 cm^3/g to determine base case model sensitivity to C-14 contaminated zone Kd.

Peak total dose and timing of peak dose for the 1,000-year compliance period is sensitive to C-14 contaminated zone Kd. Peak total dose and timing of peak dose for the 10,000-year simulation period is not sensitive to C-14 contaminated zone Kd.





C-14 CZ Kd Value (cm^3/g)	1	0
Peak Dose 1k (mrem/yr)	0.32	1.03
Time of Peak Dose (yr)	1,004	490
Peak Dose 10k (mrem/yr)	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/5/2019

Signed: 4/9/2020

J. Davis 12/9/19

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA2.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 2						
C-14 contaminated zone distribution coefficient	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA2\ BC_V01_SA2.ROF	Changed C-14 contaminated zone distribution coefficient (K_d) to 1 cm^3/g	Y	O.Warren 12/5/2019 J. Davis 12/9/19		
BC_V01_SA2_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_SA2\ BC_V01_SA2_QA.xlsx	All comments in BC_V01_SA2_QA.xlsx have been addressed	Y	All comments were addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA2.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA2.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA2.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA2.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed 4/9/2020

Model Simulation Log

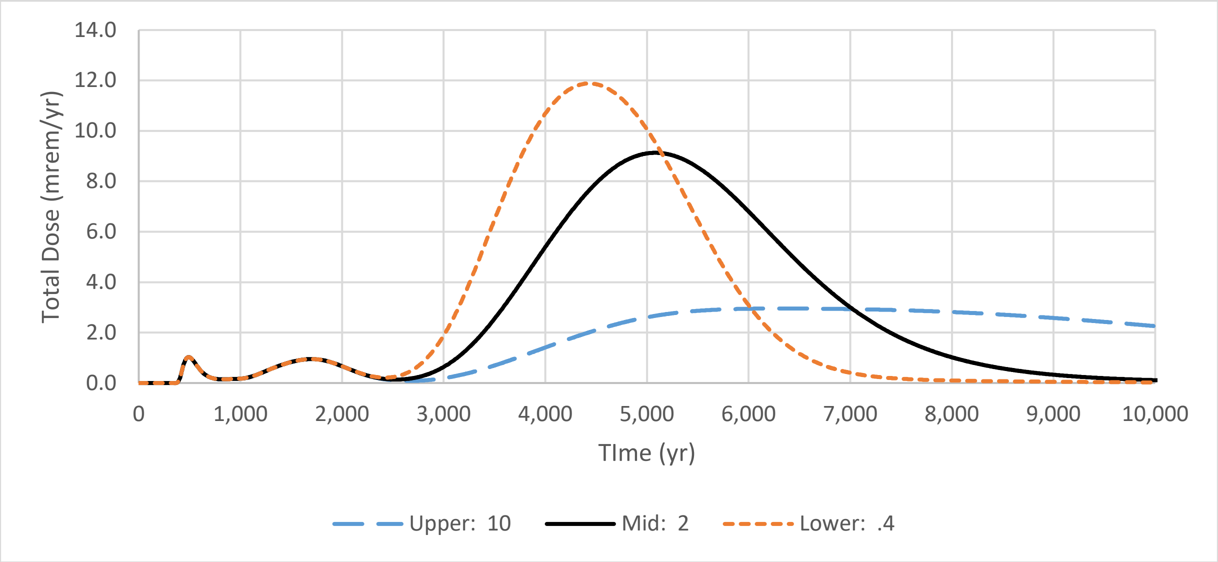
ID: BC_V01_SA3.ROF	
Performed By: R. Hupfer	Date: 11/19/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA3	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to I-129 contaminated zone distribution coefficient and Tc-99 contaminated zone distribution coefficient	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA3\ BC_V01_SA3.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA3\BC_V01_SA3_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA3\BC_V01_SA3.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA3\ BC_V01_SA3.par OD\Projects\0011-D3\QA\BC\BC_V01_SA3\BC_V01_SA3_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA3\Out\BC_V01_SA3_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA3\BC_V01_SA3_RES.xlsx	

Comments on Model Outputs/Results:
Sensitivity analyses performed on I-129 contaminated zone K_d, which was multiplied and divided by a factor of 5, and Tc-99 contaminated zone K_d, which was multiplied and divided by a factor of five.

I-129 Contaminated Zone K_d

Peak total dose and time of peak dose for the 1,000-year compliance period are not sensitive to I-129 contaminated zone K_d. Peak total dose and timing of peak dose for the 10,000-year simulation period is sensitive to I-129 contaminated zone K_d.

5x SA on I-129 Contaminated Zone Kd

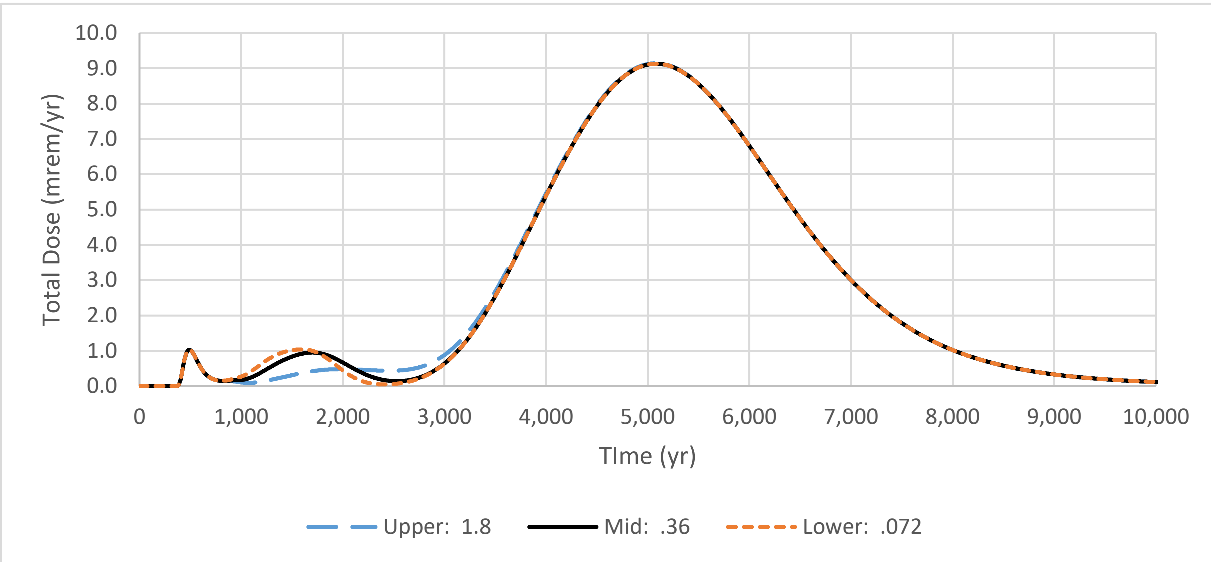


I-129 CZ K_d Value (cm^3/g)	Upper: 10	Mid: 2	Lower: .4
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	2.95	9.13	11.88
Time of Peak Dose (yr)	6,323	5,084	4,432

Tc-99 Contaminated Zone K_d

Peak total dose and time of peak dose are sensitive for the 1,000-year compliance period are not sensitive to Tc-99 contaminated zone K_d. Peak total dose and timing of peak dose for the 10,000-year simulation period is mildly sensitive to Tc-99 contaminated zone K_d.

5x SA on Tc-99 contaminated zone Kd



Tc-99 CZ K_d Value (cm^3/g)	Upper: 1.8	Mid: .36	Lower: .072
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.15	9.13	9.13
Time of Peak Dose (yr)	5,079	5,084	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/5/2019

Signed: 4/9/2020

J. Davis 12/9/19

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA3.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 3						
Sensitivity analysis factor applied to I-129 contaminated zone Kd [DCACTC(I-129)]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA3\ BC_V01_SA3.ROF	Applied a sensitivity analysis factor of 5 to the I-129 contaminated zone distribution coefficient [DCACTC(I-129)]	Y	O. Warren 12/5/2019 J. Davis 12/9/19		
Sensitivity analysis factor applied to Tc-99 contaminated zone Kd [DCACTC(Tc-99)]		Applied a sensitivity analysis factor of 5 to the Tc-99 contaminated zone distribution coefficient [DCACTC(Tc-99)]	Y	O. Warren 12/5/2019 J. Davis 12/9/19		
BC_V01_SA3_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_SA3\ BC_V01_SA3_QA.xlsx	All comments in BC_V01_SA3_QA.xlsx have been addressed	Y	All comments were addressed. J. Davis 3/10/2020 O. Warren 3/11/20		

Model Check Form

New Model ID (or filename): BC_V01_SA3.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA3.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA3.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA3.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

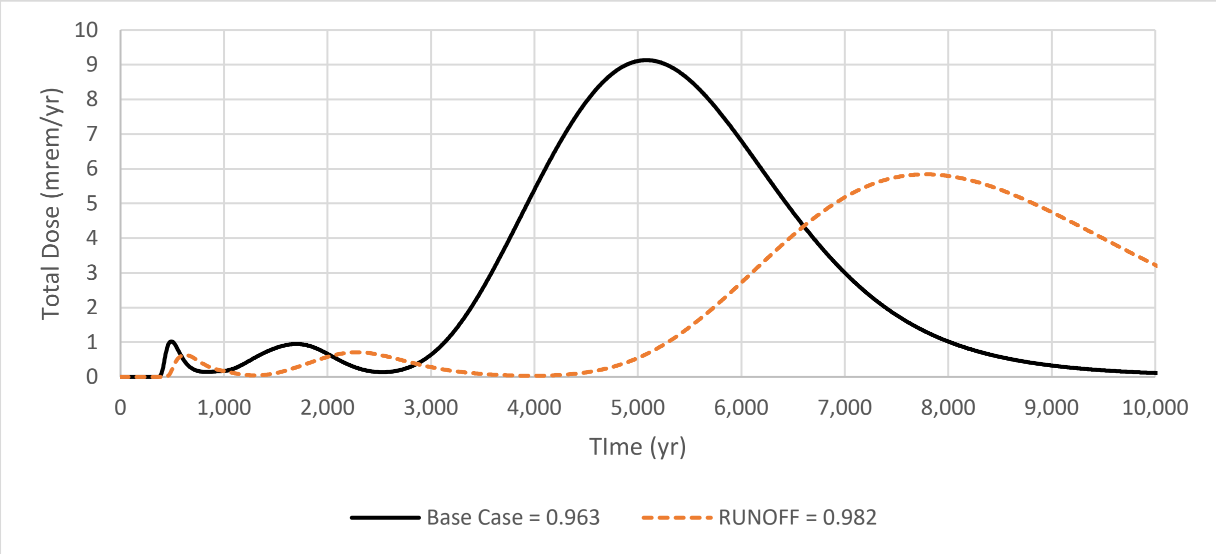
Model Simulation Log

ID: BC_V01_SA4.ROF	
Performed By: R. Hupfer	Date: 11/19/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA4	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to a runoff coefficient in the primary contamination that results in 0.43 in/yr infiltration	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA4\BC_V01_SA4.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA2\BC_V01_SA2_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA4\BC_V01_SA4.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA4\BC_V01_SA4.par OD\Projects\0011-D3\QA\BC\BC_V01_SA4\BC_V01_SA4_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA4\Out\BC_V01_SA4_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA4\BC_V01_SA4_RES.xlsx	

Comments on Model Outputs/Results:
Base case model simulated with runoff coefficient in the primary contamination equal to 0.982 to evaluate the impact of 0.43 in/yr infiltration on deterministic dose.

Runoff Coefficient in Primary Contamination
Peak total dose and timing of peak dose within the 1,000-year compliance period is sensitive a higher runoff coefficient in the primary contamination compared to the base case. Peak total dose and timing of peak dose for the 10,000-year simulation period is also sensitive to a higher runoff coefficient in the primary contamination.

Sensitivity Analysis on runoff coefficient in primary contamination



SA Value	Base Case = 0.963	RUNOFF = 0.982
Peak Dose 1k (mrem/yr)	1.03	0.63
Time of Peak Dose (yr)	490	627
Peak Dose 10k (mrem/yr)	9.13	5.84
Time of Peak Dose (yr)	5,084	7,777

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/5/2019

Signed 4/9/2020

J. Davis 12/9/19

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA4.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 4						
Runoff coefficient in primary contamination [RUNOFF]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA4\BC_V01_SA4.ROF	Changed runoff coefficient in primary contamination [RUNOFF] to 0.982	Y	O. Warren 12/5/2019 J. Davis 12/9/19		
BC_V01_SA4_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA4\BC_V01_SA4_QA.xlsx	All comments in BC_V01_SA4_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/20 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA4.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA4.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA4.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA4.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed 4/9/2020

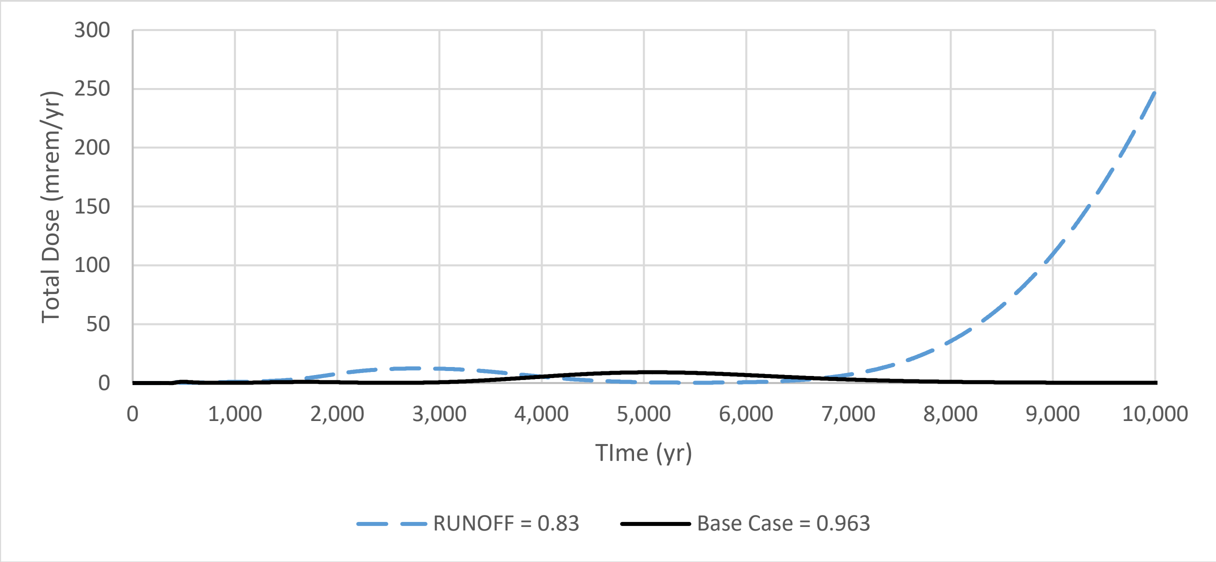
Model Simulation Log

ID: BC_V01_SA5.ROF	
Performed By: R. Hupfer	Date: 11/19/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA5	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to a runoff coefficient in the primary contamination that results in 4 in/yr infiltration	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA5\ BC_V01_SA5.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA5\BC_V01_SA5_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA5\BC_V01_SA5.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA5\ BC_V01_SA5.par OD\Projects\0011-D3\QA\BC\BC_V01_SA5\BC_V01_SA5_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA5\Out\BC_V01_SA5_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA5\BC_V01_SA5_RES.xlsx	

Comments on Model Outputs/Results:
Base case model simulated with runoff coefficient in the primary contamination equal to 0.830 to evaluate the impact of 4 in/yr infiltration on deterministic dose.

Runoff Coefficient in Primary Contamination
Peak total dose and timing of peak dose within the 1,000-year compliance period is sensitive a lower runoff coefficient in the primary contamination compared to the base case. Peak total dose and timing of peak dose for the 10,000-year simulation period is also sensitive to a lower runoff coefficient in the primary contamination.

Sensitivity Analysis on runoff coefficient in primary contamination



SA Value	RUNOFF = 0.83	Base Case = 0.963
Peak Dose 1k (mrem/yr)	1.61	1.03
Time of Peak Dose (yr)	382	490
Peak Dose 10k (mrem/yr)	248.03	9.13
Time of Peak Dose (yr)	10,001	5,084

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/5/2019


Signed: 4/9/2020

J. Davis 12/9/19


Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA5.ROF	BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)?
- If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.

Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 5

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Runoff coefficient in primary contamination [RUNOFF]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA5\ BC_V01_SA5.ROF	Changed runoff coefficient in primary contamination [RUNOFF] to 0.830	Y	O. Warren 12/5/2019 J. Davis 12/9/19		
BC_V01_SA5_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_ SA5\ BC_V01_SA5_QA .xlsx	All comments in BC_V01_SA5_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA5.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA5.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA5.ROF	BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA5.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

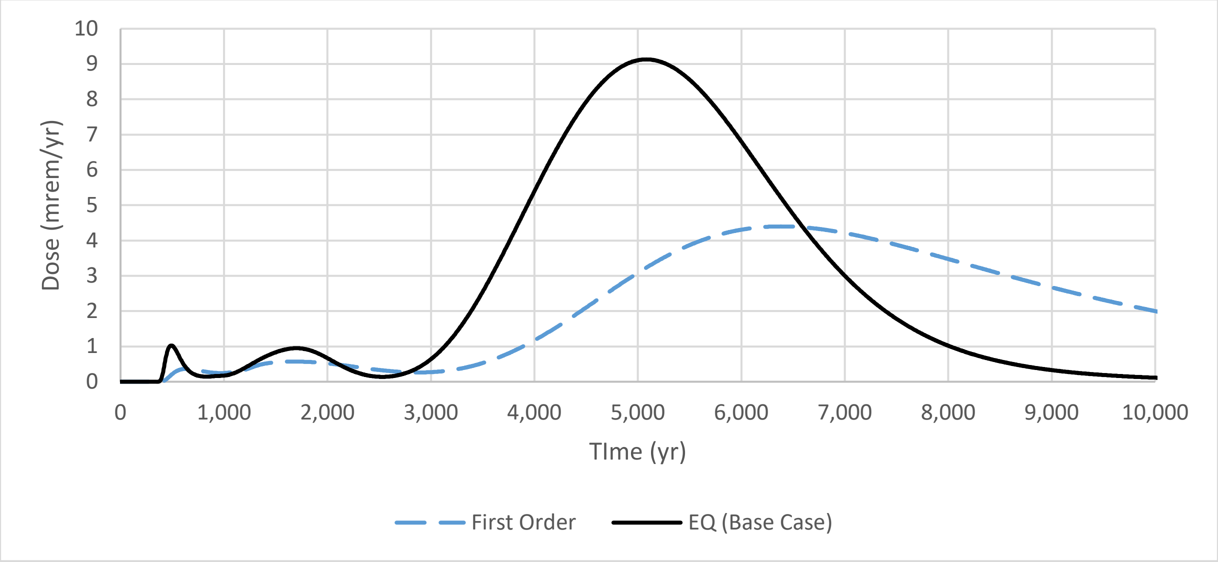
Model Simulation Log

ID: BC_V01_SA6.ROF	
Performed By: R. Hupfer	Date: 11/19/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA6	
Purpose of Simulation: Simulated the base case model with the first order with transport release mechanism to determine the sensitivity of the base case deterministic results to the release model assumption	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA6\BC_V01_SA6.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA6\BC_V01_SA6_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA6\BC_V01_SA6.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA6\BC_V01_SA6.par OD\Projects\0011-D3\Sims\BC\BC_V01_SA6\BC_V01_SA6_RES.xlsx	

Comments on Model Outputs/Results:
Base case model simulated with the first order with transport release mechanism.

First Order with Transport Release Mechanism
Peak total dose and timing of peak dose within the 1,000-year compliance period is sensitive to the release mechanism when first order with transport is used. Peak total dose and timing of peak dose for the 10,000-year simulation period is also sensitive to release mechanism when first order with transport is used.

Sensitivity Analysis on release mechanism – first order with transport



SA Value	First Order	EQ Desorption (Base Case)
Peak Dose 1k (mrem/yr)	0.36	1.03
Time of Peak Dose (yr)	632	490
Peak Dose 10k (mrem/yr)	4.40	9.13
Time of Peak Dose (yr)	6,381	5,084

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/5/2019

Signed: 4/9/2020

J. Davis 12/9/19

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA6.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 6						
Release Mechanism	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA6\BC_V01_SA6.ROF	Changed release mechanism to first order with transport for all radionuclides	Y	O. Warren 12/5/2019 J. Davis 12/9/19		
Initial leach rate [RLEACH]		Changed initial leach rate to calculated value based on 0.43 in/yr infiltration	Y	O. Warren 12/5/2019 J. Davis 12/9/19		
Final leach rate [RLEACHF]		Changed final leach rate to calculated value based on 0.88 in/yr infiltration	Y	O. Warren 12/5/2019 J. Davis 12/9/19		
Initial releasable fraction [RELFRACINIT]		Changed initial releasable fraction to 1.0 for all radionuclides	Y	O. Warren 12/5/2019 J. Davis 12/9/19		
Release duration [RELDUR]		Changed release duration to 800 yr for C-14, H-3	Y	O. Warren 12/5/2019 J. Davis 12/9/19		
BC_V01_SA6_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA6\BC_V01_SA6_QA.xlsx	All comments in BC_V01_SA6_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA6.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA6.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA6.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA6.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

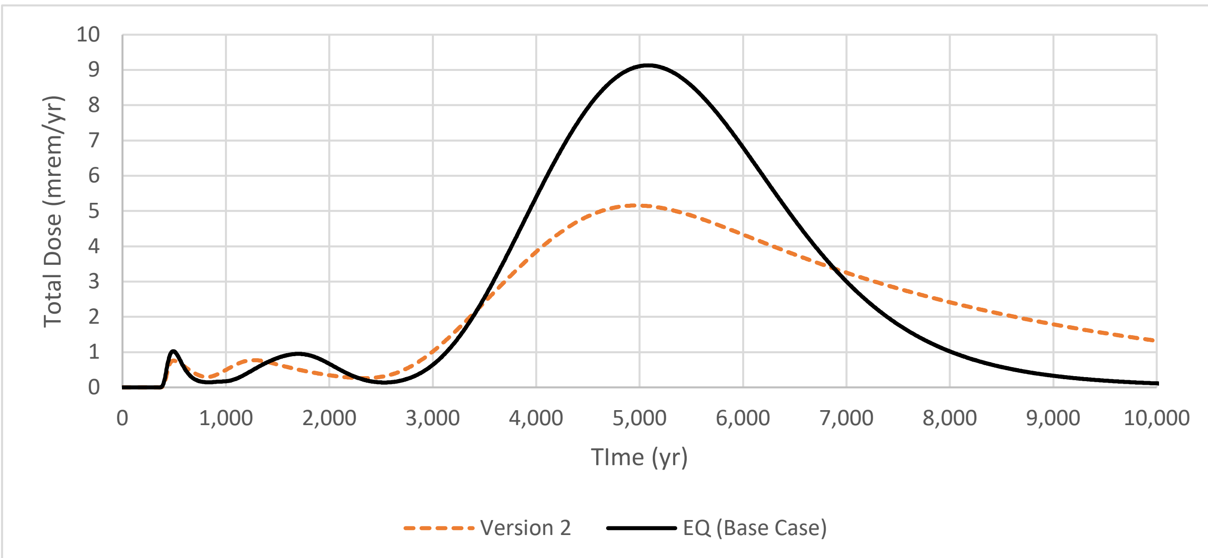
Model Simulation Log

ID: BC_V01_SA7.ROF	
Performed By: R. Hupfer	Date: 11/19/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA7	
Purpose of Simulation: Simulated the base case model with the version 2 release mechanism to determine the sensitivity of the base case deterministic results to the release model assumption	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA7\ BC_V01_SA7.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA7\BC_V01_SA7_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA7\BC_V01_SA7.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA7\ BC_V01_SA7.par OD\Projects\0011-D3\Sims\BC\BC_V01_SA7\BC_V01_SA7_RES.xlsx	

Comments on Model Outputs/Results:
Base case model simulated with the version 2 release mechanism.

Version 2 Release Mechanism
Peak total dose and timing of peak dose within the 1,000-year compliance period is sensitive to the release mechanism when version 2 is used. Peak total dose and timing of peak dose for the 10,000-year simulation period is also sensitive to release mechanism when version 2 is used.

Sensitivity Analysis on release mechanism – version 2



SA Value	Version 2	EQ Desorption (Base Case)
Peak Dose 1k (mrem/yr)	0.76	1.03
Time of Peak Dose (yr)	495	490
Peak Dose 10k (mrem/yr)	5.16	9.13
Time of Peak Dose (yr)	4,966	5,084

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/5/2019

Signed: 4/9/2020

J. Davis 12/9/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA7.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 7						
Release Mechanism	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA7\BC_V01_SA7.ROF	Changed release mechanism to version 2 for all radionuclides	Y	O. Warren 12/5/2019 J. Davis 12/9/2019		
BC_V01_SA7_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA7\BC_V01_SA7_QA.xlsx	All comments in BC_V01_SA7_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA7.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA7.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA7.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA7.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

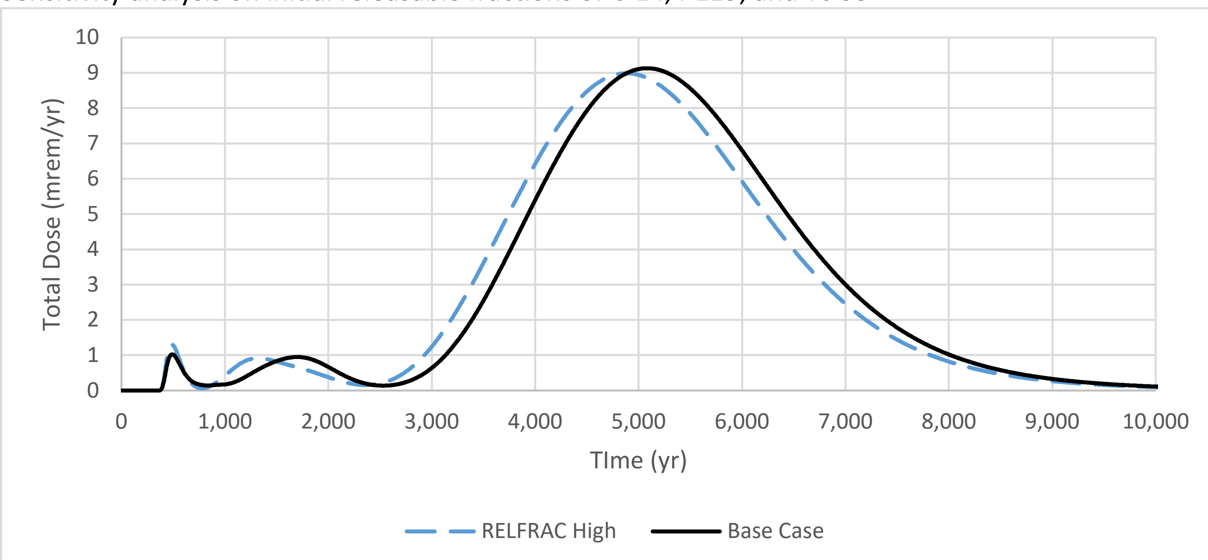
Model Simulation Log

ID: BC_V01_SA8.ROF	
Performed By: R. Hupfer	Date: 11/19/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA8	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to the initial releasable fractions of C-14, I-129, and Tc-99	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA8\ BC_V01_SA8.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA8\BC_V01_SA8_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA8\BC_V01_SA8.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA8\ BC_V01_SA8.par OD\Projects\0011-D3\Sims\BC\BC_V01_SA8\BC_V01_SA8_RES.xlsx	

Comments on Model Outputs/Results:
Base case model simulated with high initial releasable fractions relative to the base case. Initial releasable fractions for C-14, I-129, and Tc-99 were set equal to 0.998, 0.5, and 0.5, respectively, to evaluate the impact of initial releasable fractions of mobile radionuclides on deterministic dose.

High Initial Releasable Fractions
Peak total dose and timing of the peak dose within the 1,000-year compliance period are sensitive to an increase in the initial releasable fractions for C-14, I-129, and Tc-99. Peak total dose and timing of peak dose for the 10,000-year simulation period are also sensitive to initial releasable fractions of C-14, I-129, and Tc-99.

Sensitivity analysis on initial releasable fractions of C-14, I-129, and Tc-99



Note: RELFRACINIT for C-14, I-129, Tc-99 equal to 0.998, 0.5, 0.5 for RELFRAC High
RELFRACINIT for C-14, I-129, Tc-99 equal to 0.75, 0, 0 for Base Case

SA Value	RELFRAC High	RELFRAC Low	Base Case
Peak Dose 1k (mrem/yr)	1.30	0.82	1.03
Time of Peak Dose (yr)	485	495	490
Peak Dose 10k (mrem/yr)	8.99	9.13	9.13
Time of Peak Dose (yr)	4,883	5,084	5,084

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:
O. Warren 12/6/2019
Signed: 4/9/2020
J. Davis 12/9/2019
Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA8.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 8						
Initial releasable fraction of C-14	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA8\ BC_V01_SA8.ROF	Changed initial releasable fraction of C-14 [RELFRACINIT(C-14)] to 0.998	Y	O. Warren 12/6/2019 J. Davis 12/9/2019		
Initial releasable fraction of I-129		Changed initial releasable fraction of I-129 [RELFRACINIT(I-129)] to 0.5	Y	O. Warren 12/6/2019 J. Davis 12/9/2019		
Initial releasable fraction of Tc-99		Changed initial releasable fraction of Tc-99 [RELFRACINIT(Tc-99)] to 0.5	Y	O. Warren 12/6/2019 J. Davis 12/9/2019		
BC_V01_SA8_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_SA8\ BC_V01_SA8_QA.xlsx	All comments in BC_V01_SA8_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA8.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA8.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA8.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA8.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

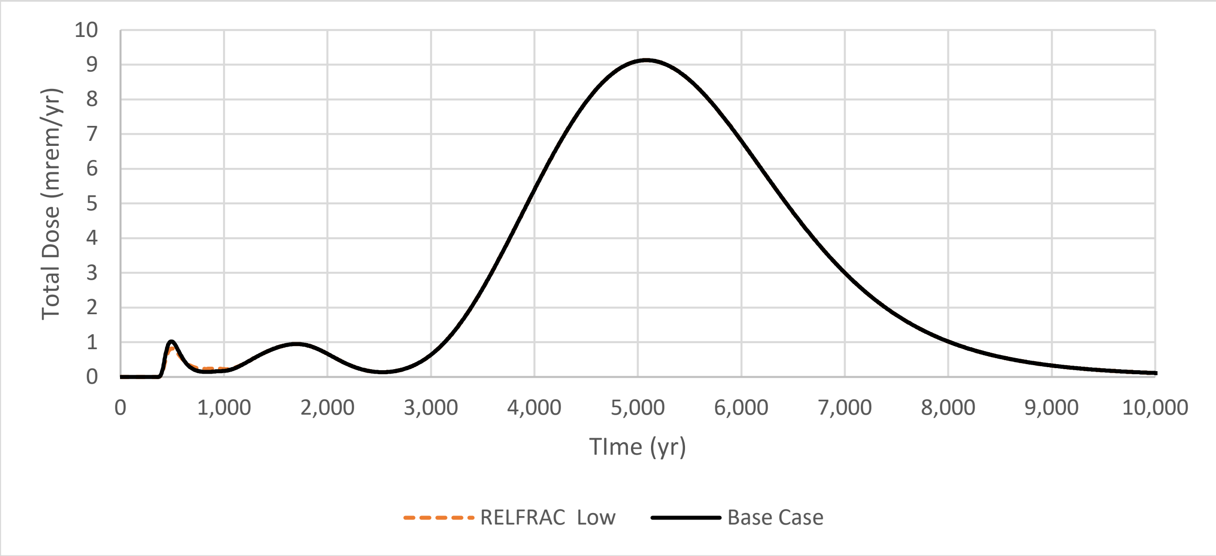
Model Simulation Log

ID: BC_V01_SA9.ROF	
Performed By: R. Hupfer	Date: 11/19/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA9	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to the initial releasable fraction of C-14	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA9\BC_V01_SA9.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA9\BC_V01_SA9_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA9\BC_V01_SA9.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA9\BC_V01_SA9.par OD\Projects\0011-D3\Sims\BC\BC_V01_SA9\BC_V01_SA9_RES.xlsx	

Comments on Model Outputs/Results:
Base case model simulated with a low initial releasable fraction of C-14 relative to the base case. Initial releasable fraction of C-14 was set equal to 0.564 to evaluate the impact of initial releasable fraction of C-14 on deterministic dose.

Low Initial Releasable Fraction
Peak total dose and timing of the peak dose within the 1,000-year compliance period are sensitive to a decrease in the initial releasable fraction for C-14. Peak total dose and timing of peak dose for the 10,000-year simulation period are not sensitive to the initial releasable fraction of C-14.

Sensitivity analysis on initial releasable fraction of C-14



Note: RELFRACINIT for C-14 equal to 0.564 for RELFRAC Low
RELFRACINIT for C-14 equal to 0.75 for Base Case

SA Value	RELFRAC Low	Base Case
Peak Dose 1k (mrem/yr)	0.82	1.03
Time of Peak Dose (yr)	495	490
Peak Dose 10k (mrem/yr)	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/6/2019


Signed: 4/9/2020

J. Davis 12/10/2019


Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA9.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 9						
Initial releasable fraction of C-14	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA9\BC_V01_SA9.ROF	Changed initial releasable fraction of C-14 [RELFRACINIT(C-14)] to 0.564	Y	O. Warren 12/6/2019 J. Davis 12/10/2019		
BC_V01_SA9_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA9\BC_V01_SA9_QA.xlsx	All comments in BC_V01_SA9_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA9.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA9.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA9.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA9.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

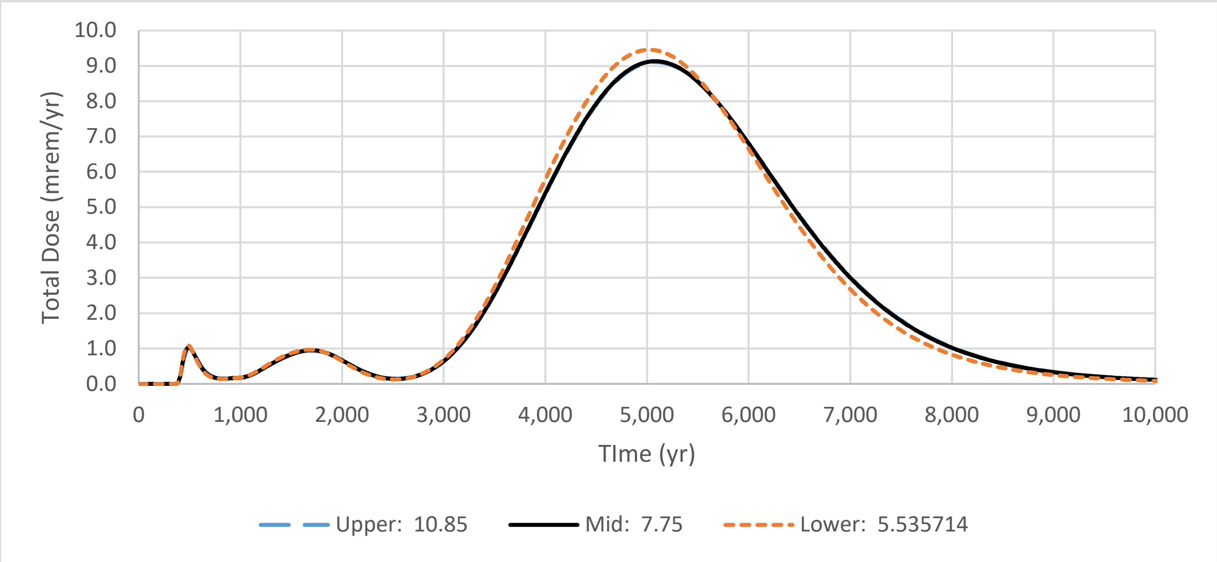
Model Simulation Log

ID: BC_V01_SA10.ROF	
Performed By: R. Hupfer	Date: 11/20/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA10	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to contaminated zone b parameter [BCZ], hydraulic conductivity of contaminated zone [HCCZ], and longitudinal dispersivity of contaminated zone [ALPHALCZ]	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA10\BC_V01_SA10.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA10\BC_V01_SA10_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA10\BC_V01_SA10.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA10\BC_V01_SA10.par OD\Projects\0011-D3\QA\BC\BC_V01_SA10\BC_V01_SA10_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA10\Out\BC_V01_SA10_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA10\BC_V01_SA10_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on contaminated zone b parameter [BCZ], hydraulic conductivity of contaminated zone [HCCZ], and longitudinal dispersivity of contaminated zone [ALPHALCZ].	

Contaminated Zone b Parameter

Peak dose and timing of peak dose for the 1,000-year compliance period is mildly sensitive to contaminated zone b parameter. Peak dose and timing of peak dose for the 10,000-year simulation period is also mildly sensitive to the contaminated zone b parameter.

1.4x SA on contaminated zone b parameter

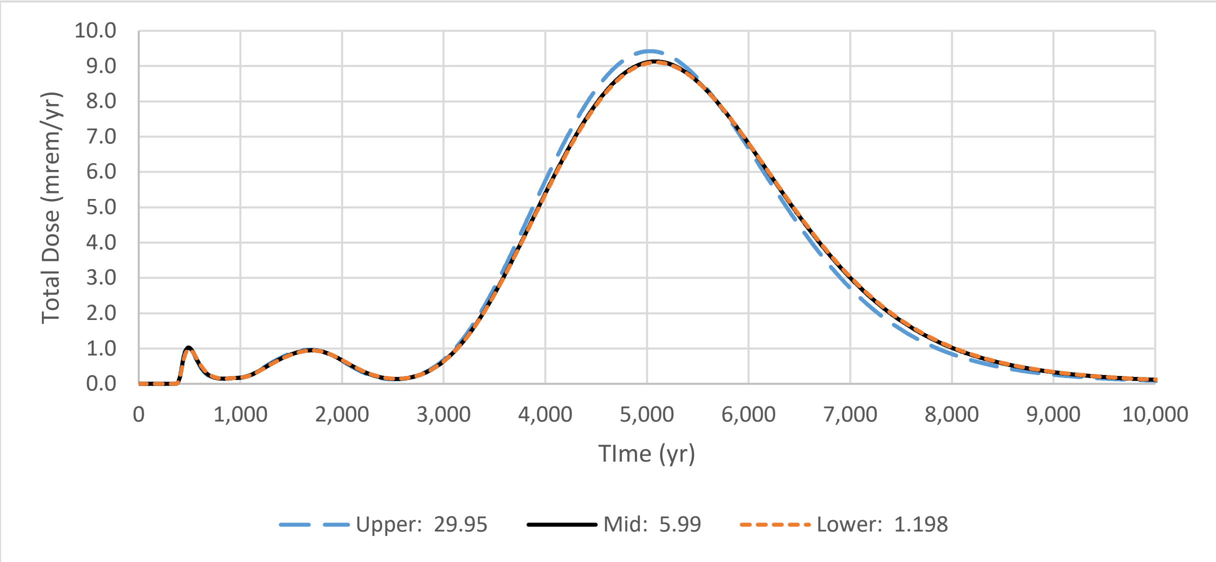


CZ b Parameter Value	Upper: 10.85	Mid: 7.75	Lower: 5.536
Peak Dose 1k (mrem/yr)	0.98	1.03	1.09
Time of Peak Dose (yr)	495	490	485
Peak Dose 10k (mrem/yr)	9.11	9.13	9.45
Time of Peak Dose (yr)	5,084	5,084	5,025

Contaminated Zone Hydraulic Conductivity

Peak dose and timing of peak dose for the 1,000-year compliance period is mildly sensitive to the contaminated zone hydraulic conductivity. Peak total dose and timing of peak dose for the10,000-year simulation period is also mildly sensitive to contaminated zone hydraulic conductivity.

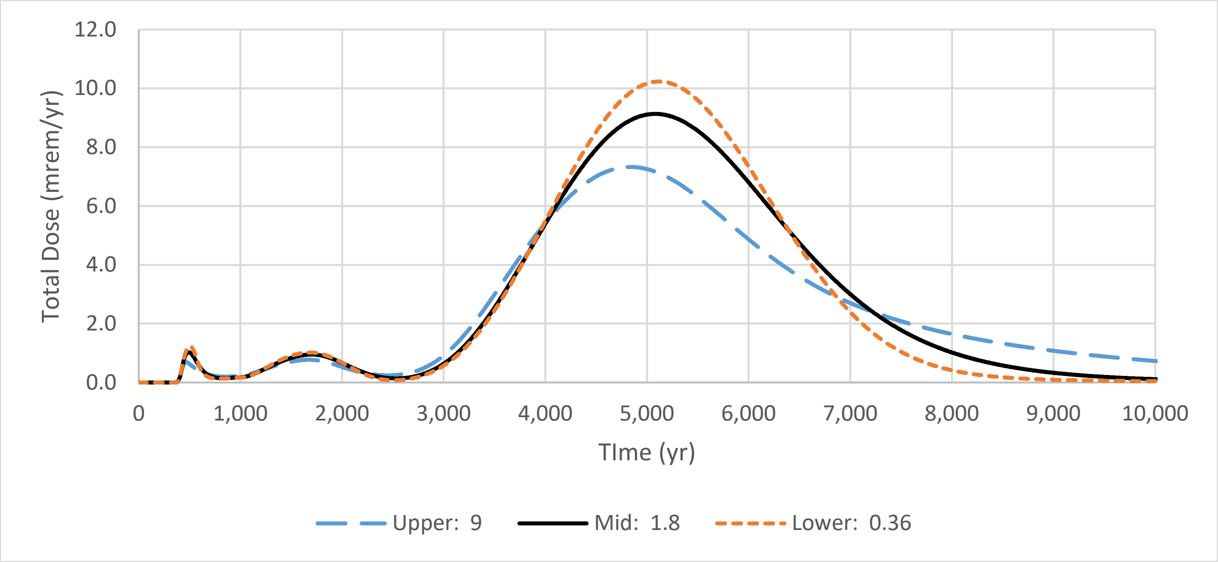
5x SA on contaminated zone hydraulic conductivity



CZ Hydraulic Conductivity Value (m)	Upper: 29.95	Mid: 5.99	Lower: 1.198
Peak Dose 1k (mrem/yr)	1.08	1.03	0.97
Time of Peak Dose (yr)	485	490	495
Peak Dose 10k (mrem/yr)	9.42	9.13	9.11
Time of Peak Dose (yr)	5,030	5,084	5,088

Contaminated Zone Longitudinal Dispersivity
Peak dose and timing of peak dose for the 1,000-year compliance period is sensitive to the contaminated zone longitudinal dispersivity. Peak total dose and timing of peak dose for the10,000-year simulation period is also sensitive to contaminated zone longitudinal dispersivity.

5x SA on longitudinal dispersivity of contaminated zone



CZ Longitudinal Dispersivity Value (m)	Upper: 9	Mid: 1.8	Lower: 0.36
Peak Dose 1k (mrem/yr)	0.69	1.03	1.23
Time of Peak Dose (yr)	465	490	504
Peak Dose 10k (mrem/yr)	7.33	9.13	10.23
Time of Peak Dose (yr)	4,839	5,084	5,118

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/6/2019
Signed: 4/9/2020
J. Davis 12/10/2019
Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA10.ROF	BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 10						
Longitudinal dispersivity of contaminated zone [ALPHALCZ]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA10\ BC_V01_SA10.ROF	Applied a sensitivity analysis factor of 5 to longitudinal dispersivity of contaminated zone [ALPHALCZ]	Y	O. Warren 12/6/2019 J. Davis 12/10/2019		
Contaminated zone b parameter [BCZ]		Applied a sensitivity analysis factor of 1.4 to contaminated zone b parameter [BCZ]	Y	O. Warren 12/6/2019 J. Davis 12/10/2019		
Hydraulic conductivity of contaminated zone [HCCZ]		Applied a sensitivity analysis factor of 5 to hydraulic conductivity of contaminated zone [HCCZ]	Y	O. Warren 12/6/2019 J. Davis 12/10/2019		
BC_V01_SA10_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_SA10\ BC_V01_SA10_QA.xlsx	All comments in BC_V01_SA10_QA.xlsx have been addressed	Y	All comments were addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA10.ROF	BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA10.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA10.ROF	BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA10.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/19/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

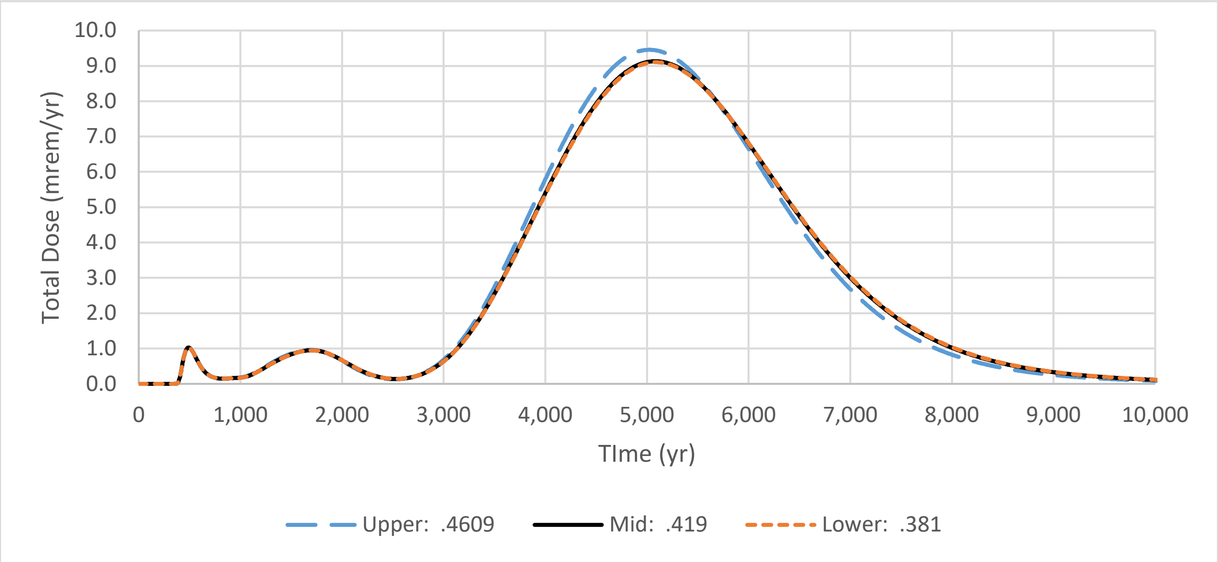
Model Simulation Log

ID: BC_V01_SA11.ROF	
Performed By: R. Hupfer	Date: 11/20/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA11	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to total porosity of the contaminated zone [TPCZ] and effective porosity of the contaminated zone [EPCZ]	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA11\ BC_V01_SA11.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA11\BC_V01_SA11_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA11\BC_V01_SA11.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA11\ BC_V01_SA11.par OD\Projects\0011-D3\QA\BC\BC_V01_SA11\BC_V01_SA11_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA11\Out\BC_V01_SA11_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA11\BC_V01_SA11_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on total porosity of the contaminated zone [TPCZ], which was multiplied and divided by a factor of 1.1, and effective porosity of contaminated zone [EPCZ], which was multiplied and divided by a factor of 1.5.	

Total Porosity of Contaminated Zone

Peak total dose and timing of peak dose for the 1,000-year compliance period is sensitive to the total porosity. Peak total dose and timing of the peak dose for the 10,000-year simulation period is mildly sensitive to the total porosity of the contaminated zone.

1.1x SA on total porosity of contaminated zone

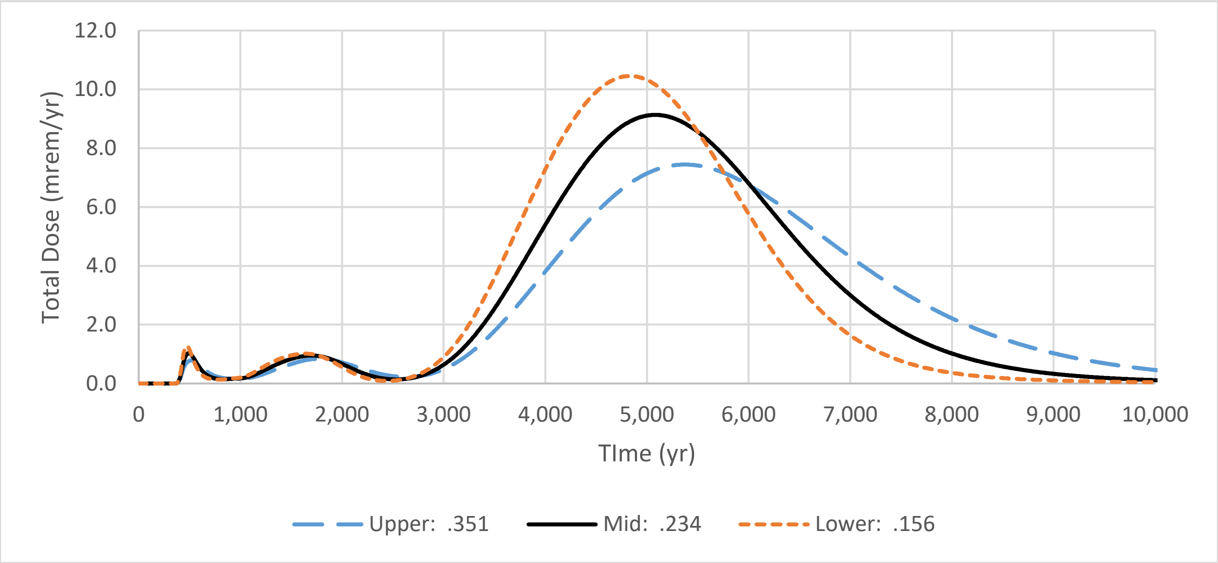


SA Value	Upper: .4609	Mid: .419	Lower: .381
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.45	9.13	9.10
Time of Peak Dose (yr)	5,025	5,084	5,088

Effective Porosity of Contaminated Zone

Peak total dose and timing of peak dose for the 1,000-year compliance period is sensitive to the effective porosity of the contaminated zone. Peak total dose and timing of the peak dose for the 10,000-year simulation period is sensitive to the effective porosity of the contaminated zone

1.5x SA on effective porosity of contaminated zone



SA Value	Upper: .351	Mid: .234	Lower: .156
Peak Dose 1k (mrem/yr)	0.79	1.03	1.27
Time of Peak Dose (yr)	519	490	470
Peak Dose 10k (mrem/yr)	7.44	9.13	10.45
Time of Peak Dose (yr)	5,373	5,084	4,829

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/6/2019

Signed: 4/9/2020

J. Davis 12/10/19

Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA11.ROF	BC_V01.ROF
New Model File Date: 11/20/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 11						
Sensitivity analysis factor applied to total porosity of contaminated zone [TPCZ]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA11\BC_V01_SA11.ROF	Applied a sensitivity analysis factor of 1.1 to total porosity of contaminated zone	Y	O. Warren 12/6/2019 J. Davis 12/10/19		
Sensitivity analysis factor applied to effective porosity of contaminated zone [EPCZ]		Applied a sensitivity analysis factor of 1.5 to effective porosity of contaminated zone	Y	O. Warren 12/6/2019 J. Davis 12/10/19		
BC_V01_SA11_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA11\BC_V01_SA11_QA.xlsx	All comments in BC_V01_SA11_QA.xlsx have been addressed	Y	All comments were addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA11.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/20/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA11.ROF	BC_V01.ROF
New Model File Date: 11/20/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA11.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/20/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA11.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/20/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

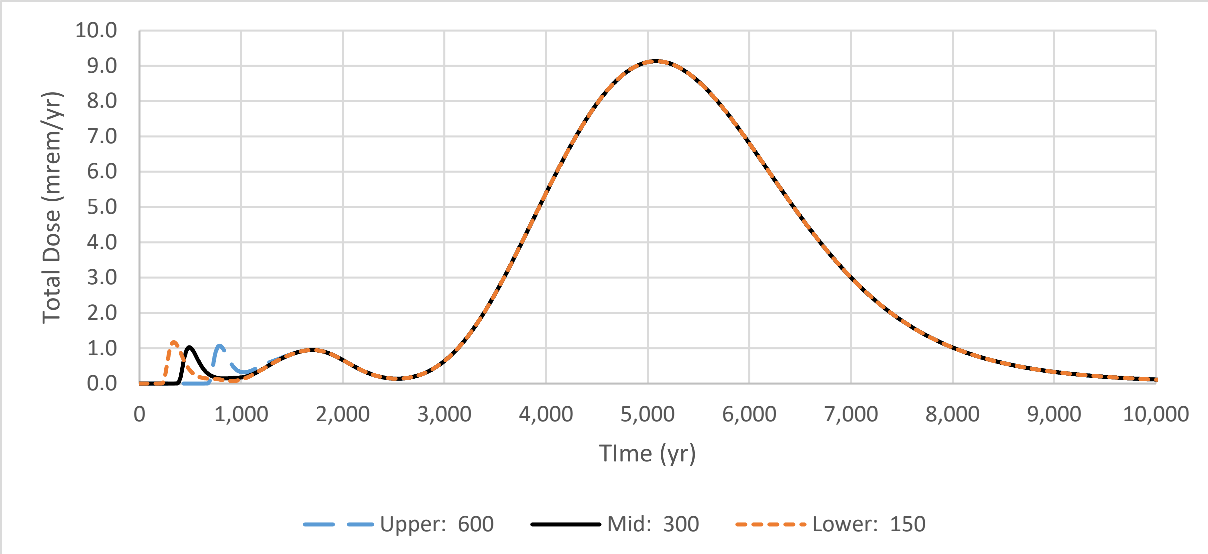
Model Simulation Log

ID: BC_V01_SA12.ROF	
Performed By: R. Hupfer	Date: 11/21/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA12	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to initial release time of C-14 [RELTIMEINIT(C-14])], [I-129 RELTIMEINIT(I-129)], and Tc-99 [RELTIMEINIT(Tc-99)]	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA12\ BC_V01_SA12.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA12\BC_V01_SA12_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA12\BC_V01_SA12.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA12\ BC_V01_SA12.par OD\Projects\0011-D3\QA\BC\BC_V01_SA12\BC_V01_SA12_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA12\Out\BC_V01_SA12_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA12\BC_V01_SA12_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on initial releasable time of C-14 [RELTIMEINIT(C-14)], I-129 [RELTIMEINIT(I-129)], and Tc-99 [RELTIMEINIT(Tc-99)], all of which were multiplied and divided by a factor of 2.	

Initial Release Time of C-14

Peak total dose for the 1,000-year compliance period is mildly sensitive to RELTIMEINIT(C-14) while and timing of peak dose for the compliance period is sensitive to RELTIMENIT(C-14). Peak total dose and timing of the peak dose for the 10,000-year simulation period are not sensitive to RELTIMEINIT(C-14).

2x SA on initial release time of C-14

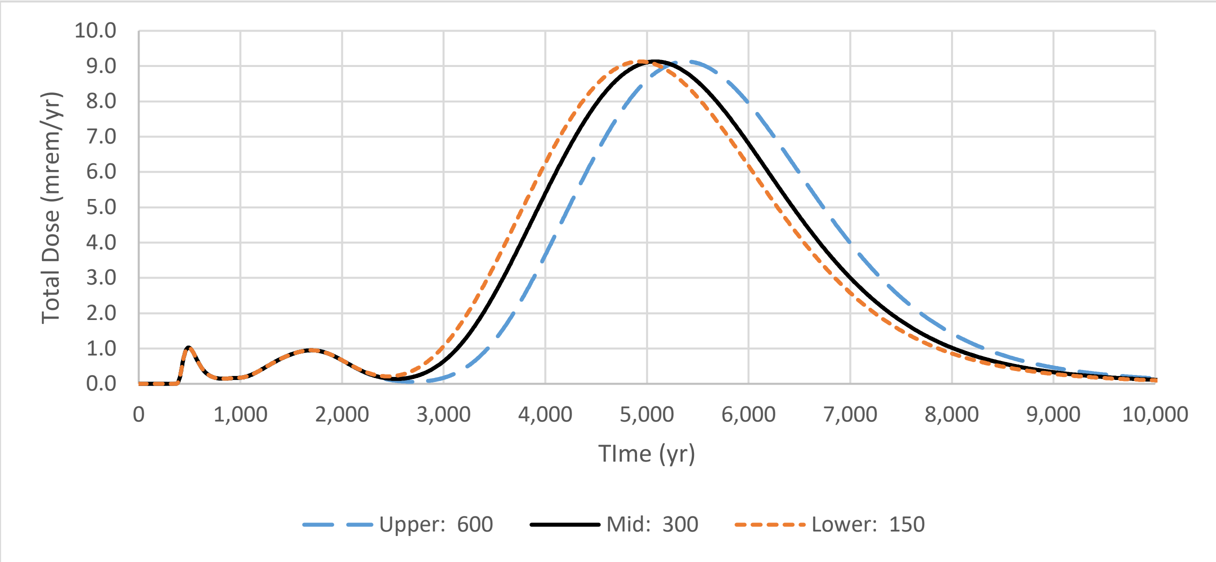


RELTIMEINIT(C-14) Value (yr)	Upper: 600	Mid: 300	Lower: 150
Peak Dose 1k (mrem/yr)	1.07	1.03	1.17
Time of Peak Dose (yr)	788	490	338
Peak Dose 10k (mrem/yr)	9.13	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084	5,084

Initial Release Time of I-129

Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to RELTIMEINIT(I-129). Peak total dose for the 10,000-year simulation period is not sensitive to RELTIMEINIT(I-129) while timing of the peak dose for the 10,000-year simulation period is sensitive to RELTIMEINIT(I-129).

2x SA on initial release time of I-129

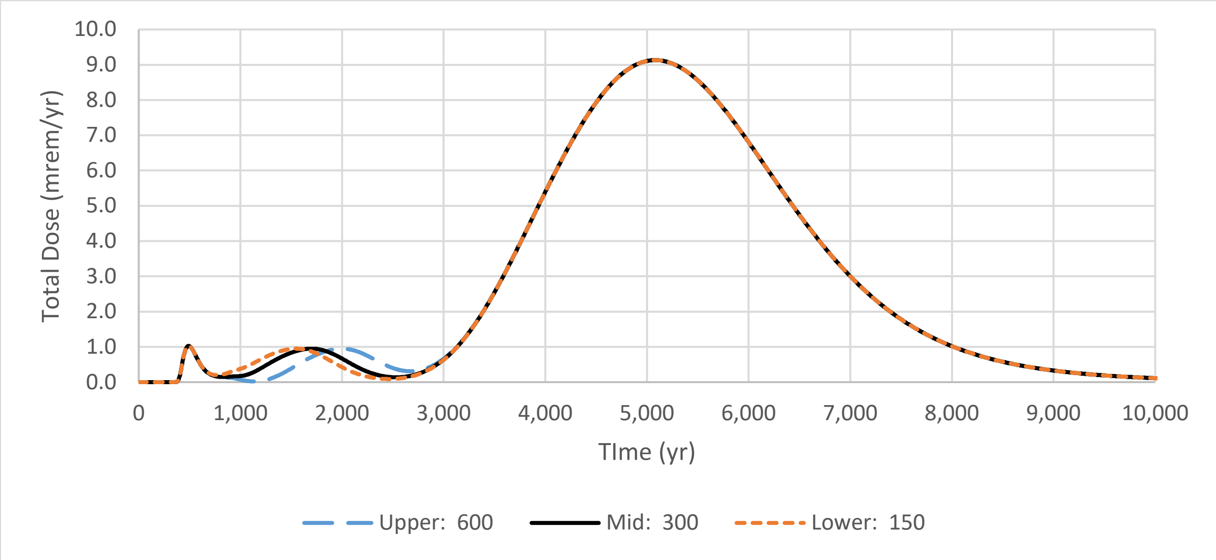


RELTIMEINIT(I-129) Value (yr)	Upper: 600	Mid: 300	Lower: 150
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.13	9.13	9.13
Time of Peak Dose (yr)	5,382	5,084	4,932

Initial Release Time of Tc-99

Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to RELTIMEINIT(Tc-99). Peak total dose and timing of the peak dose for the 10,000-year simulation are not sensitive to RELTIMEINIT(Tc-99).

2x SA on initial release time of Tc-99



RELTIMEINIT(Tc-99) Value (yr)	Upper: 600	Mid: 300	Lower: 150
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.13	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/6/2019

Signed: 4/9/2020

J. Davis 12/11/19

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA12.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/20/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 12						
Sensitivity analysis factor initial release time of C-14 [RELTIMEINIT(C-14)]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA12\BC_V01_SA12.ROF	Applied a sensitivity analysis factor of 2 to initial release time of C-14	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
Sensitivity analysis factor initial release time of I-129 [RELTIMEINIT(I-129)]		Applied a sensitivity analysis factor of 2 to initial release time of I-129	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
Sensitivity analysis factor initial release time of Tc-99 [RELTIMEINIT(Tc-99)]		Applied a sensitivity analysis factor of 2 to initial release time of Tc-99	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
BC_V01_SA12_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA12\BC_V01_SA12_QA.xlsx	All comments in BC_V01_SA12_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA12.ROF	BC_V01.ROF
New Model File Date:	**Source Model File Date:**
11/20/2019	10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA12.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/20/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA12.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/20/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA12.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 11/20/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

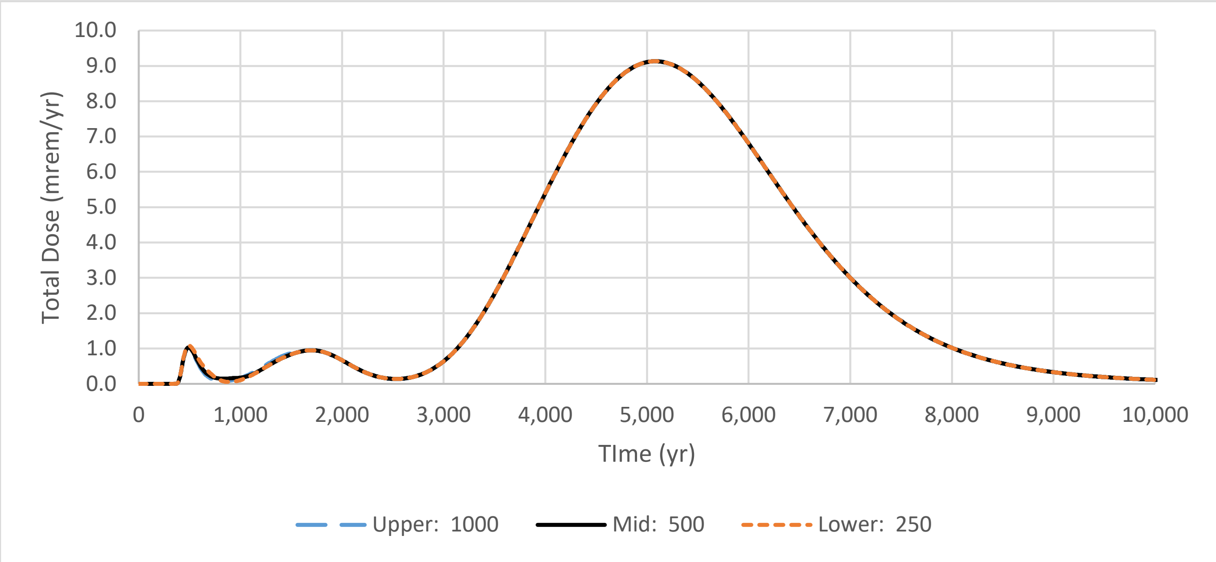
Model Simulation Log

ID: BC_V01_SA13.ROF	
Performed By: R. Hupfer	Date: 11/22/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA13	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to release duration of C-14 [RELDUR(C-14)], release duration of I-129 [RELDUR(I-129)], and release duration of Tc-99 [RELDUR(Tc-99)].	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA13\ BC_V01_SA13.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA13\BC_V01_SA13_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA13\BC_V01_SA13.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA13\ BC_V01_SA13.par OD\Projects\0011-D3\QA\BC\BC_V01_SA13\BC_V01_SA13_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA13\Out\BC_V01_SA13_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA13\BC_V01_SA13_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on initial releasable time of release duration of C-14 [RELDUR(C-14)], release duration of I-129 [RELDUR(I-129)], and release duration of Tc-99 [RELDUR(Tc-99)]	

Release Duration of C-14

Peak total dose and timing of peak dose for the 1,000-year compliance period are mildly sensitive to RELDUR(C-14). Peak total dose and timing of the peak dose for the 10,000-year simulation period are not sensitive to RELDUR(C-14).

2x SA on release duration of C-14

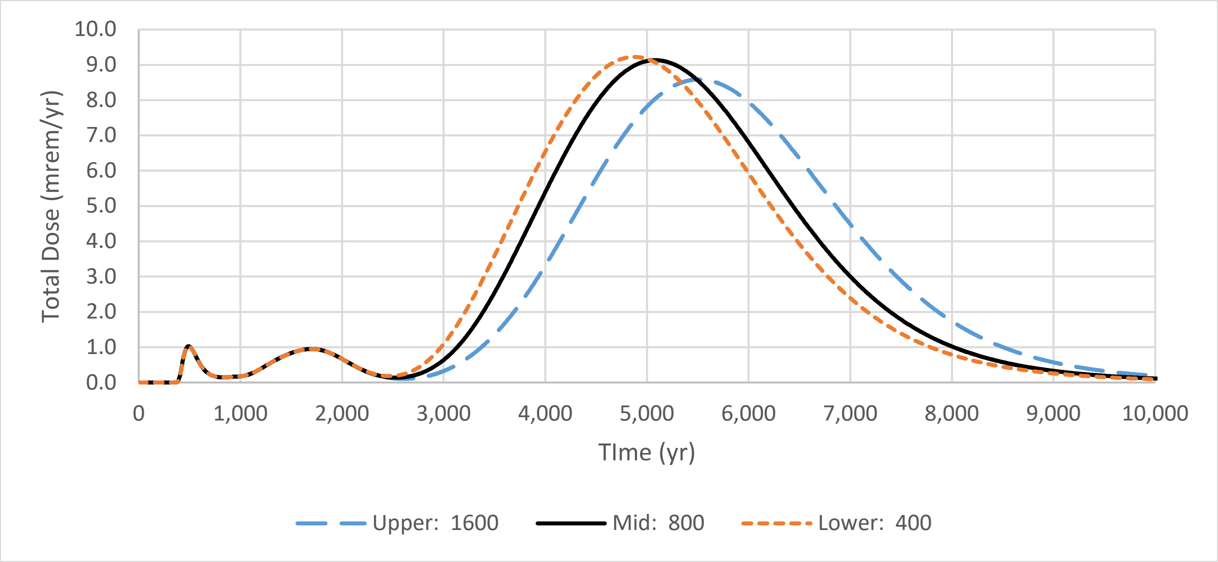


RELDUR(C-14) Value (yr)	Upper: 1000	Mid: 500	Lower: 250
Peak Dose 1k (mrem/yr)	1.00	1.03	1.08
Time of Peak Dose (yr)	490	490	495
Peak Dose 10k (mrem/yr)	9.13	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084	5,084

Release Duration of I-129

Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to RELDUR(I-129). Peak total dose and timing of peak dose for the 10,000-year simulation period is sensitive to RELDUR(I-129).

2x SA on release duration of I-129

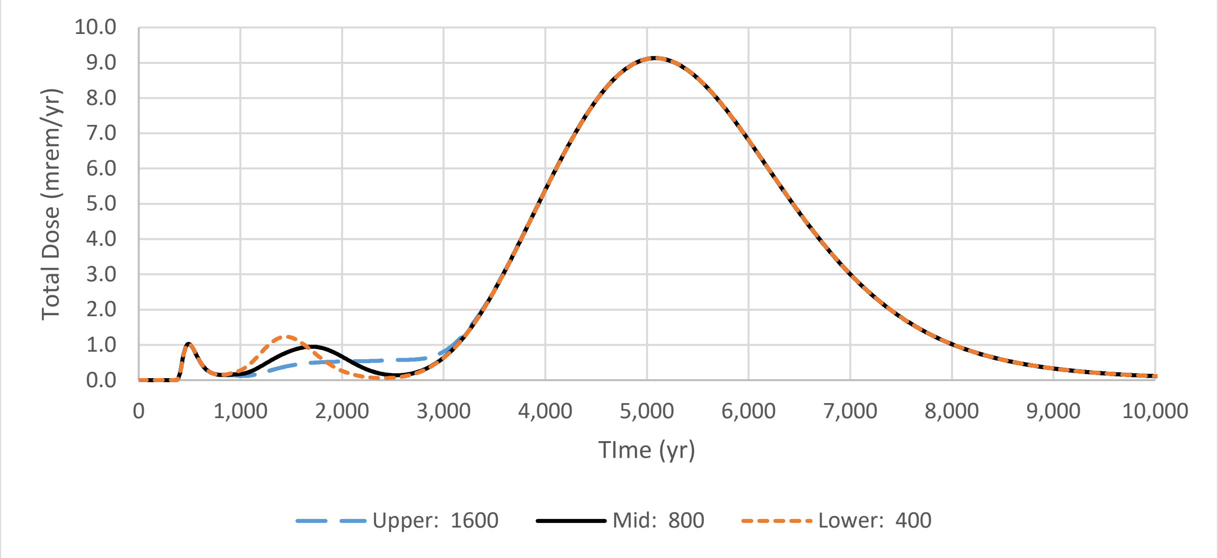


RELDUR (I-129) Value (yr)	Upper: 1600	Mid: 800	Lower: 400
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	8.58	9.13	9.22
Time of Peak Dose (yr)	5,510	5,084	4,873

Release Duration of Tc-99

Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to RELDUR(Tc-99). Peak total dose and timing of the peak dose for the 10,000-year simulation are not sensitive to RELDUR(Tc-99).

2x SA on release duration of Tc-99



RELDUR(Tc-99) Value (yr)	Upper: 1600	Mid: 800	Lower: 400
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.13	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/6/2019

Olivia Warren Signed: 4/9/2020

J. Davis 12/11/19

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA13.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 13						
Sensitivity analysis factor applied to release duration of C-14 [RELDUR(C-14)]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA13\BC_V01_SA13.ROF	Applied a sensitivity analysis factor of 2 to release duration of C-14	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
Sensitivity analysis factor applied to release duration of I-129 [RELDUR(I-129)]		Applied a sensitivity analysis factor of 2 to release duration of I-129	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
Sensitivity analysis factor applied to release duration of Tc-99 [RELDUR(Tc-99)]		Applied a sensitivity analysis factor of 2 to release duration of Tc-99	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
BC_V01_SA13_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA13\BC_V01_SA13_QA.xlsx	All comments in BC_V01_SA13_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA13.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA13.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 11/22/2019	Source Model File Date: 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA13.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA13.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

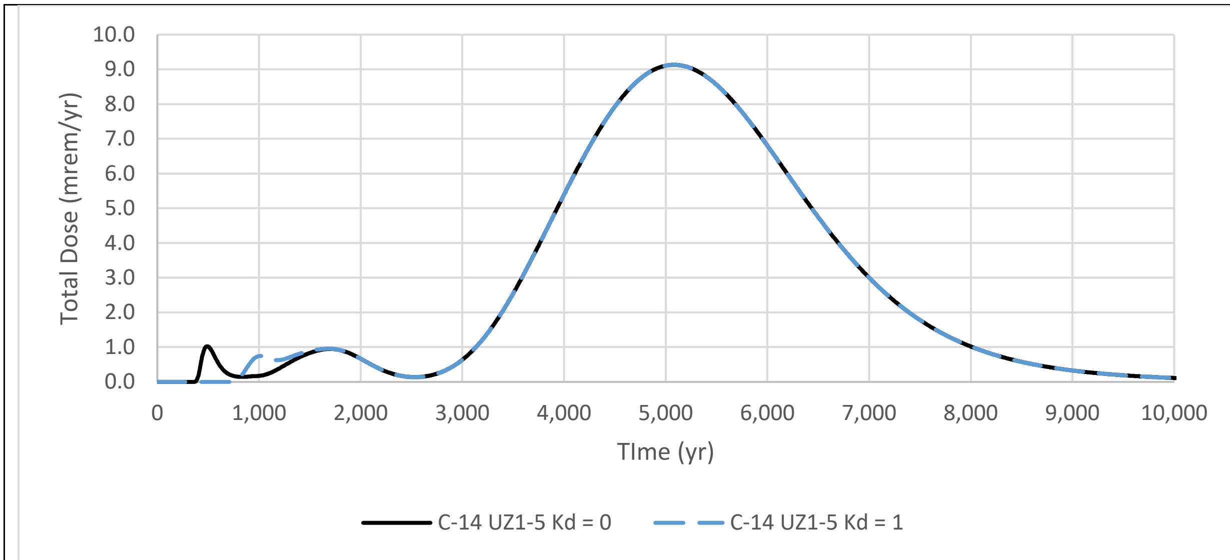
Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

ID: BC_V01_SA14.ROF	
Performed By: R. Hupfer	Date: 11/22/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA14	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to changing the C-14 unsaturated zone 1-5 distribution coefficients to 1 cm^3/g	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA14\BC_V01_SA14.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA14\BC_V01_SA14_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA14\BC_V01_SA14.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA14\BC_V01_SA14.par OD\Projects\0011-D3\Sims\BC\BC_V01_SA14\BC_V01_SA14_RES.xlsx	
Comments on Model Outputs/Results: Base case model simulated with C-14 unsaturated zone 1-5 Kds equal to 1 cm^3/g to determine base case model sensitivity to higher C-14 unsaturated zone Kds compared to the base case. **C-14 Unsaturated Zone K_d Values** Peak total dose and timing of peak dose for the 1,000-year compliance period is sensitive to C-14 unsaturated zone Kds. Peak total dose and timing of peak dose for the 10,000-year simulation period is not sensitive to C-14 unsaturated zone Kds.	



C-14 UZ Kd Values (cm^3/g)	1	0
Peak Dose 1k (mrem/yr)	0.74	1.03
Time of Peak Dose (yr)	1,004	490
Peak Dose 10k (mrem/yr)	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/6/2019

Signed: 4/9/2020

J. Davis 12/11/19

Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA14.ROF	BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 14						
C-14 unsaturated zone 1 distribution coefficient	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA14\BC_V01_SA14.ROF	Changed C-14 unsaturated zone 1 distribution coefficient (K_d) to 1 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/2019		
C-14 unsaturated zone 2 distribution coefficient		Changed C-14 unsaturated zone 2 distribution coefficient (K_d) to 1 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
C-14 unsaturated zone 3 distribution coefficient		Changed C-14 unsaturated zone 3 distribution coefficient (K_d) to 1 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
C-14 unsaturated zone 4 distribution coefficient		Changed C-14 unsaturated zone 4 distribution coefficient (K_d) to 1 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
C-14 unsaturated zone 5 distribution coefficient		Changed C-14 unsaturated zone 5 distribution coefficient (K_d) to 1 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
BC_V01_SA14_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA14\BC_V01_SA14_QA.xlsx	All comments in BC_V01_SA14_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA14.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA14.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA14.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA14.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

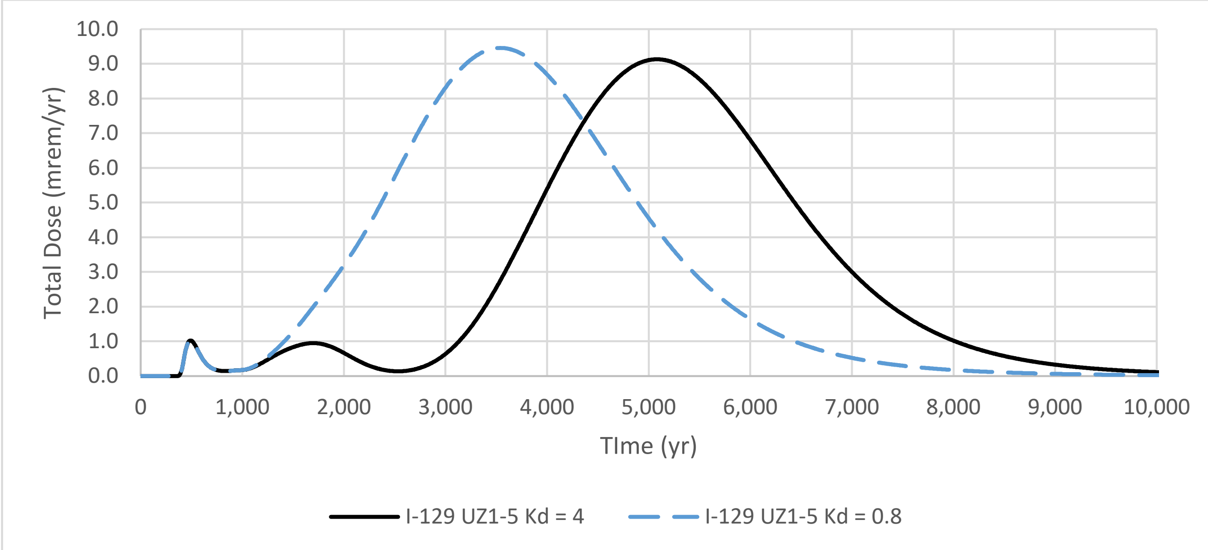
Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

Model Simulation Log

ID: BC_V01_SA15.ROF	
Performed By: R. Hupfer	Date: 11/22/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA15	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to changing the I-129 unsaturated zone 1-5 distribution coefficients to 0.8 cm^3/g	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA15\ BC_V01_SA15.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA15\BC_V01_SA15_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA15\BC_V01_SA15.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA15\ BC_V01_SA15.par OD\Projects\0011-D3\Sims\BC\BC_V01_SA15\BC_V01_SA15_RES.xlsx	
Comments on Model Outputs/Results: Base case model simulated with I-129 unsaturated zone 1-5 Kds equal to 0.8 cm^3/g to determine base case model sensitivity to low I-129 unsaturated zone Kds compared to the base case. **I-129 Unsaturated Zone K_d Values** Peak total dose and timing of peak dose for the 1,000-year compliance period is not sensitive to I-129 unsaturated zone Kds. Peak total dose and timing of peak dose for the 10,000-year simulation period is sensitive to I-129 unsaturated zone Kds.	



I-129 UZ Kd Values (cm^3/g)	0.8	4
Peak Dose 1k (mrem/yr)	1.03	1.03
Time of Peak Dose (yr)	490	490
Peak Dose 10k (mrem/yr)	9.46	9.13
Time of Peak Dose (yr)	3,541	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/6/2019

Signed 4/9/2020

J. Davis 12/11/19

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA15.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 15						
I-129 unsaturated zone 1 distribution coefficient	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA15\ BC_V01_SA15.ROF	Changed I-129 unsaturated zone 1 distribution coefficient (K_d) to 0.8 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
I-129 unsaturated zone 2 distribution coefficient		Changed I-129 unsaturated zone 2 distribution coefficient (K_d) to 0.8 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
I-129 unsaturated zone 3 distribution coefficient		Changed I-129 unsaturated zone 3 distribution coefficient (K_d) to 0.8 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
I-129 unsaturated zone 4 distribution coefficient		Changed I-129 unsaturated zone 4 distribution coefficient (K_d) to 0.8 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
I-129 unsaturated zone 5 distribution coefficient		Changed I-129 unsaturated zone 5 distribution coefficient (K_d) to 0.8 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/19		
BC_V01_SA15_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_SA15\ BC_V01_SA15_QA.xlsx	All comments in BC_V01_SA15_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA15.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA15.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA15.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA15.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

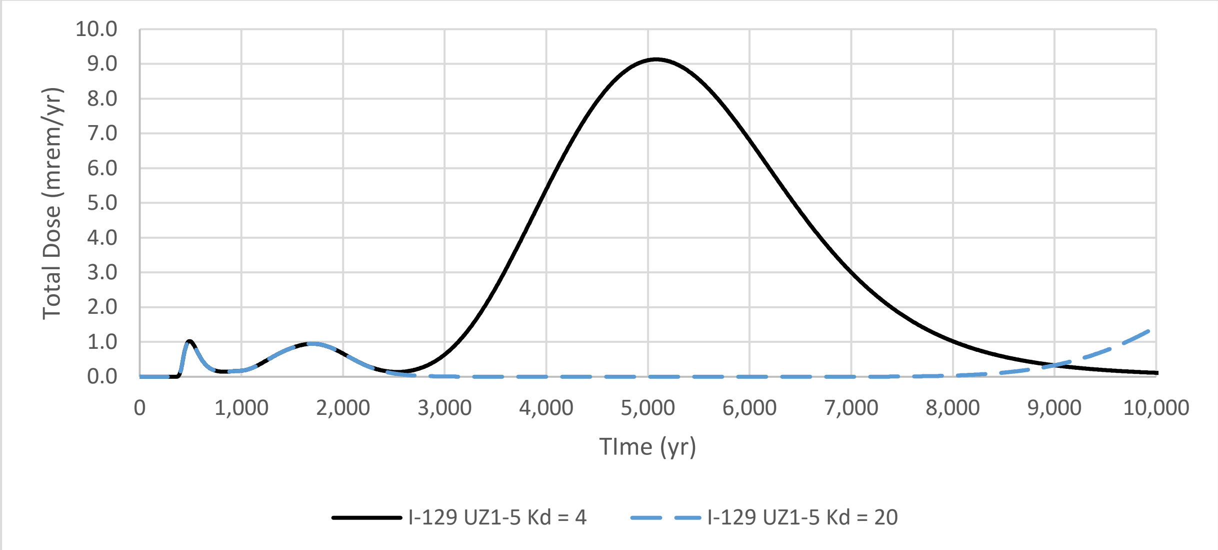
Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	E-Signature (or sign/date/scan hardcopy): (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

ID: BC_V01_SA16.ROF	
Performed By: R. Hupfer	Date: 11/22/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA16	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to changing the I-129 unsaturated zone 1-5 distribution coefficients to 20 cm^3/g	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA16\BC_V01_SA16.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA16\BC_V01_SA16_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA16\BC_V01_SA16.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA16\BC_V01_SA16.par OD\Projects\0011-D3\Sims\BC\BC_V01_SA16\BC_V01_SA16_RES.xlsx	
Comments on Model Outputs/Results: Base case model simulated with I-129 unsaturated zone 1-5 Kds equal to 20 cm^3/g to determine base case model sensitivity to high I-129 unsaturated zone Kds compared to the base case. **I-129 Unsaturated Zone K_d Values** Peak total dose and timing of peak dose for the 1,000-year compliance period is not sensitive to I-129 unsaturated zone Kds. Peak total dose and timing of peak dose for the 10,000-year simulation period is sensitive to I-129 unsaturated zone Kds.	



I-129 UZ Kd Values (cm^3/g)	20	4
Peak Dose 1k (mrem/yr)	1.03	1.03
Time of Peak Dose (yr)	490	490
Peak Dose 10k (mrem/yr)	1.49	9.13
Time of Peak Dose (yr)	10,030	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/6/2019

Olivia Warren Signed: 4/9/2020

J. Davis 12/11/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA16.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 16						
I-129 unsaturated zone 1 distribution coefficient	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA16\ BC_V01_SA16.ROF	Changed I-129 unsaturated zone 1 distribution coefficient (K_d) to 20 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/2019		
I-129 unsaturated zone 2 distribution coefficient		Changed I-129 unsaturated zone 2 distribution coefficient (K_d) to 20 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/2019		
I-129 unsaturated zone 3 distribution coefficient		Changed I-129 unsaturated zone 3 distribution coefficient (K_d) to 20 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/2019		
I-129 unsaturated zone 4 distribution coefficient		Changed I-129 unsaturated zone 4 distribution coefficient (K_d) to 20 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/2019		
I-129 unsaturated zone 5 distribution coefficient		Changed I-129 unsaturated zone 5 distribution coefficient (K_d) to 20 cm^3/g	Y	O. Warren 12/6/2019 J. Davis 12/11/2019		
BC_V01_SA16_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_SA16\ BC_V01_SA16_QA.xlsx	All comments in BC_V01_SA16_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA16.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA16.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA16.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA16.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

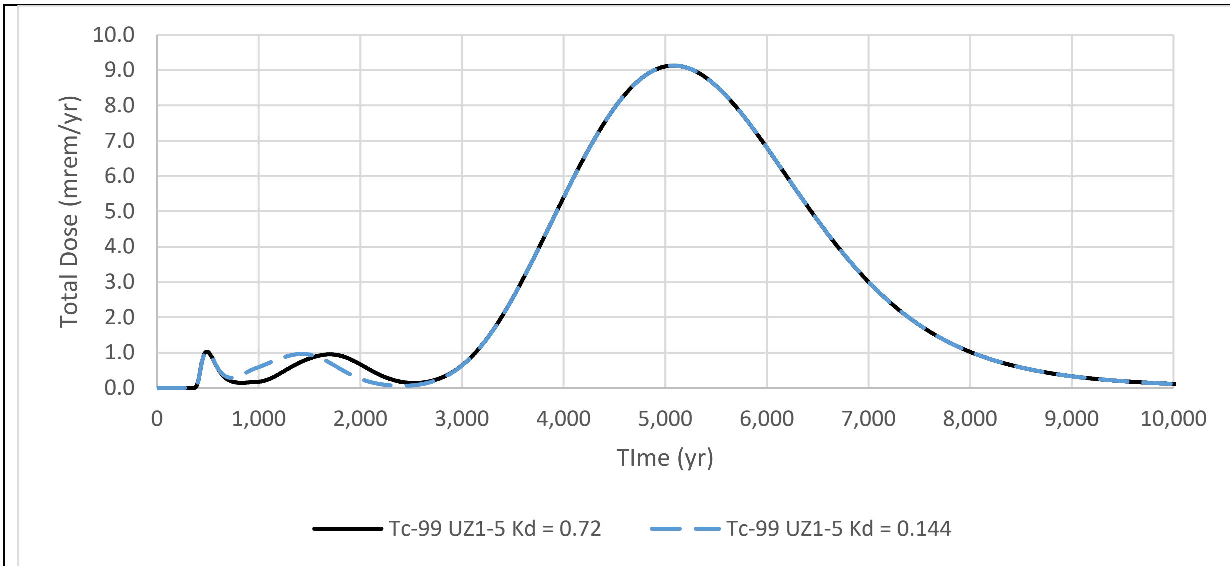
Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

Model Simulation Log

ID: BC_V01_SA17.ROF	
Performed By: R. Hupfer	Date: 11/22/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA17	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to changing the Tc-99 unsaturated zone 1-5 distribution coefficients to 0.144 cm^3/g	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA17\BC_V01_SA17.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA17\BC_V01_SA17_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA17\BC_V01_SA17.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA17\BC_V01_SA17.par OD\Projects\0011-D3\Sims\BC\BC_V01_SA17\BC_V01_SA17_RES.xlsx	
Comments on Model Outputs/Results: Base case model simulated with Tc-99 unsaturated zone 1-5 Kds equal to 0.144 cm^3/g to determine base case model sensitivity to low Tc-99 unsaturated zone Kds compared to the base case. **Tc-99 Unsaturated Zone K_d Values** Peak total dose and timing of peak dose for the 1,000-year compliance period is not sensitive to Tc-99 unsaturated zone Kds. Peak total dose and timing of peak dose for the 10,000-year simulation period is not sensitive to Tc-99 unsaturated zone Kds.	



Tc-99 UZ Kd Values (cm^3/g)	0.144	0.72
Peak Dose 1k (mrem/yr)	1.03	1.03
Time of Peak Dose (yr)	490	490
Peak Dose 10k (mrem/yr)	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/9/2019

Signed: 4/9/2020

J. Davis 12/11/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA17.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 17						
Tc-99 unsaturated zone 1 distribution coefficient	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA17\ BC_V01_SA17.ROF	Changed Tc-99 unsaturated zone 1 distribution coefficient (K_d) to 0.144 cm^3/g	Y	O. Warren 12/9/2019 J. Davis 12/11/2019		
Tc-99 unsaturated zone 2 distribution coefficient		Changed Tc-99 unsaturated zone 2 distribution coefficient (K_d) to 0.144 cm^3/g	Y	O. Warren 12/9/2019 J. Davis 12/11/2019		
Tc-99 unsaturated zone 3 distribution coefficient		Changed Tc-99 unsaturated zone 3 distribution coefficient (K_d) to 0.144 cm^3/g	Y	O. Warren 12/9/2019 J. Davis 12/11/2019		
Tc-99 unsaturated zone 4 distribution coefficient		Changed Tc-99 unsaturated zone 4 distribution coefficient (K_d) to 0.144 cm^3/g	Y	O. Warren 12/9/2019 J. Davis 12/11/2019		
Tc-99 unsaturated zone 5 distribution coefficient		Changed Tc-99 unsaturated zone 5 distribution coefficient (K_d) to 0.144 cm^3/g	Y	O. Warren 12/9/2019 J. Davis 12/11/2019		
BC_V01_SA17_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_SA17\ BC_V01_SA17_QA.xlsx	All comments in BC_V01_SA17_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA17.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA17.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA17.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA17.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

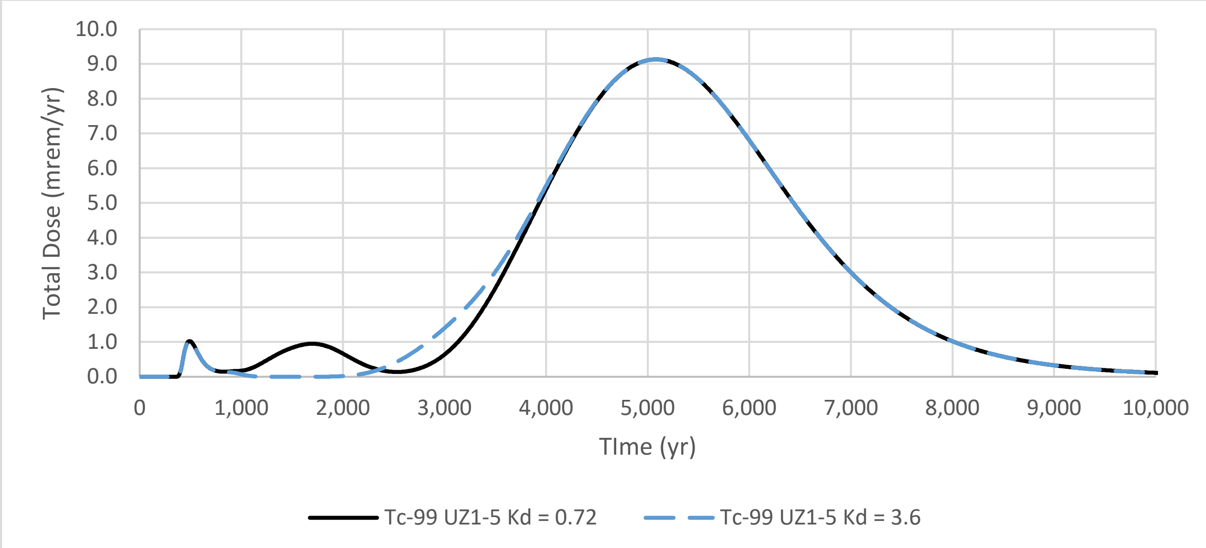
Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

Model Simulation Log

ID: BC_V01_SA18.ROF	
Performed By: R. Hupfer	Date: 11/22/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA18	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to changing the Tc-99 unsaturated zone 1-5 distribution coefficients to 3.6 cm^3/g	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA18\BC_V01_SA18.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA18\BC_V01_SA18_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA18\BC_V01_SA18.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA18\BC_V01_SA18.par OD\Projects\0011-D3\Sims\BC\BC_V01_SA18\BC_V01_SA18_RES.xlsx	
Comments on Model Outputs/Results: Base case model simulated with Tc-99 unsaturated zone 1-5 Kds equal to 3.6 cm^3/g to determine base case model sensitivity to high Tc-99 unsaturated zone Kds compared to the base case. **Tc-99 Unsaturated Zone K_d Values** Peak total dose and timing of peak dose for the 1,000-year compliance period is not sensitive to Tc-99 unsaturated zone Kds. Peak total dose and timing of peak dose for the 10,000-year simulation period is also not sensitive to Tc-99 unsaturated zone Kds.	



Tc-99 UZ Kd Values (cm^3/g)	3.6	0.72
Peak Dose 1k (mrem/yr)	1.03	1.03
Time of Peak Dose (yr)	490	490
Peak Dose 10k (mrem/yr)	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084

General Comments

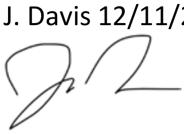
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

O. Warren 12/9/2019


Signed: 4/9/2020

J. Davis 12/11/2019


Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA18.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 18						
Tc-99 unsaturated zone 1 distribution coefficient	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA16\ BC_V01_SA16.ROF	Changed Tc-99 unsaturated zone 1 distribution coefficient (K_d) to 3.6 cm^3/g	Y	O. Warren 12/9/2019 J. Davis 12/11/19		
Tc-99 unsaturated zone 2 distribution coefficient		Changed Tc-99 unsaturated zone 2 distribution coefficient (K_d) to 3.6 cm^3/g	Y	O. Warren 12/9/2019 J. Davis 12/11/19		
Tc-99 unsaturated zone 3 distribution coefficient		Changed Tc-99 unsaturated zone 3 distribution coefficient (K_d) to 3.6 cm^3/g	Y	O. Warren 12/9/2019 J. Davis 12/11/19		
Tc-99 unsaturated zone 4 distribution coefficient		Changed Tc-99 unsaturated zone 4 distribution coefficient (K_d) to 3.6 cm^3/g	Y	O. Warren 12/9/2019 J. Davis 12/11/19		
Tc-99 unsaturated zone 5 distribution coefficient		Changed Tc-99 unsaturated zone 5 distribution coefficient (K_d) to 3.6 cm^3/g	Y	O. Warren 12/9/2019 J. Davis 12/11/19		
BC_V01_SA18_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_SA18\ BC_V01_SA18_QA.xlsx	All comments in BC_V01_SA18_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA18.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA18.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA18.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA18.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/22/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

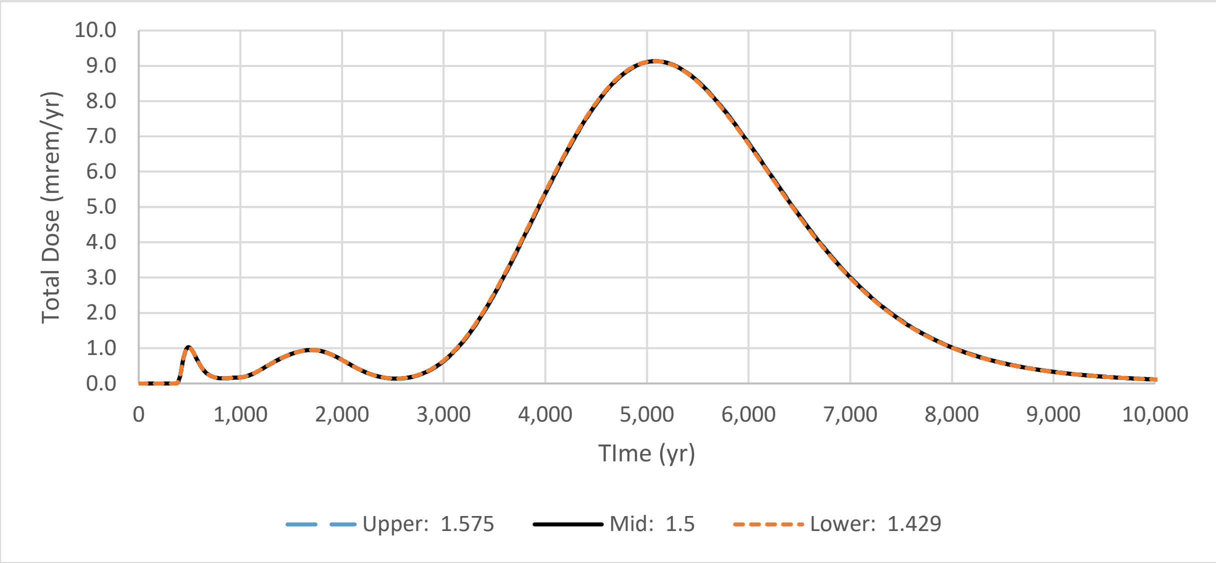
Model Simulation Log

ID: BC_V01_SA19.ROF	
Performed By: R. Hupfer	Date: 11/25/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA19	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to dry bulk density of unsaturated zone 3 [DENSUZ(3)], total porosity of unsaturated zone 3 [TPUZ(3)], effective porosity of unsaturated zone 3 [EPUZ(3)]	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA19\ BC_V01_SA19.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA19\BC_V01_SA19_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA19\BC_V01_SA19.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA19\ BC_V01_SA19.par OD\Projects\0011-D3\QA\BC\BC_V01_SA19\BC_V01_SA19_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA19\Out\BC_V01_SA19_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA19\BC_V01_SA19_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on dry bulk density of unsaturated zone 3 [DENSUZ(3)], total porosity of unsaturated zone 3 [TPUZ(3)], effective porosity of unsaturated zone 3 [EPUZ(3)]	

Dry Bulk Density of Unsaturated Zone 3 [DENSUZ(3)]

Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to dry bulk density of unsaturated zone 3. Peak total dose and timing of the peak dose for the 10,000-year simulation period are not sensitive to dry bulk density of unsaturated zone 3.

1.05x SA on Dry Bulk Density of Unsaturated Zone 3

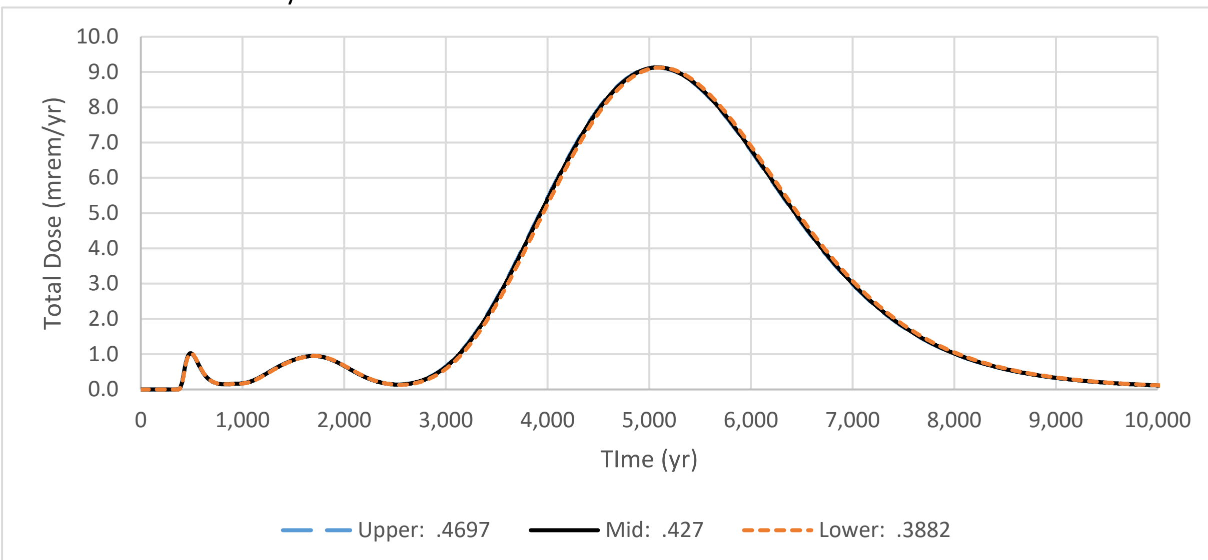


DENSUZ(3) Value (g/cm^3)	Upper: 1.575	Mid: 1.5	Lower: 1.429
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.13	9.13	9.13
Time of Peak Dose (yr)	5,088	5,084	5,079

Total Porosity of Unsaturated Zone 3 [TPUZ(3)]

Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to total porosity of unsaturated zone 3. Peak total dose for the 10,000-year simulation period is not sensitive to total porosity of unsaturated zone 3 while timing of peak dose is mildly sensitive to total porosity of unsaturated zone 3.

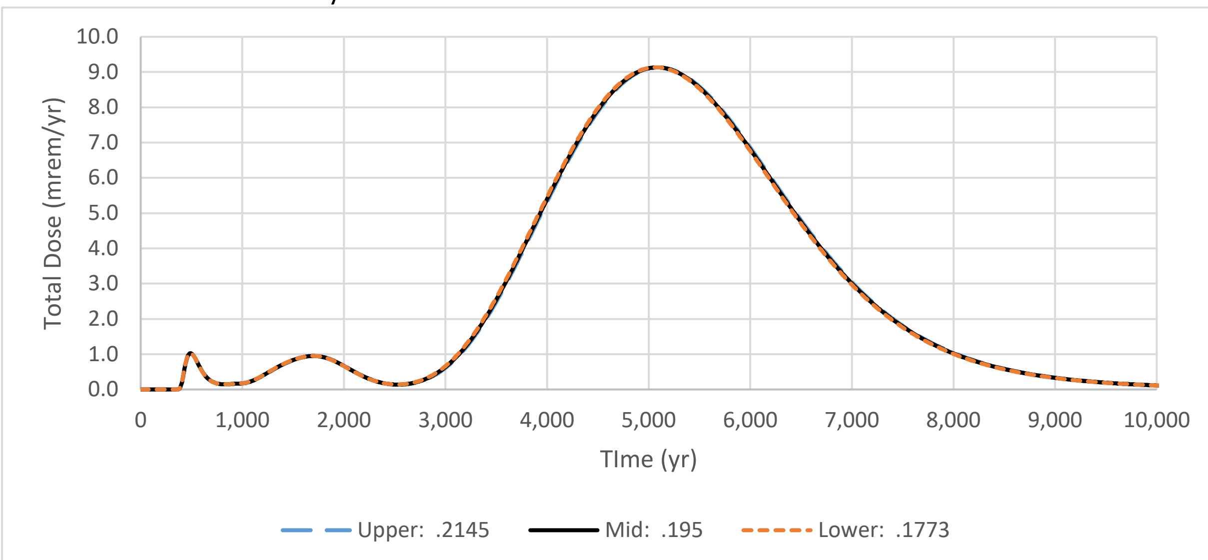
1.1x SA on Total Porosity of Unsaturated Zone 3



TPUZ(3) Value	Upper: .4697	Mid: .427	Lower: .3882
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	495
Peak Dose 10k (mrem/yr)	9.13	9.13	9.13
Time of Peak Dose (yr)	5,074	5,084	5,108

Effective Porosity of Unsaturated Zone 3 [EPUZ(3)]
Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to effective porosity of unsaturated zone 3. Peak total dose for the 10,000-year simulation period is not sensitive to effective porosity of unsaturated zone 3 while timing of peak dose is mildly sensitive to effective porosity of unsaturated zone 3.

1.1x SA on Effective Porosity of Unsaturated Zone 3



EPUZ(3) Value	Upper: .2145	Mid: .195	Lower: .1773
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.13	9.13	9.13
Time of Peak Dose (yr)	5,093	5,084	5,069

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 12/11/2019

Signed: 4/9/2020

O. Warren 12/13/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA19.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/25/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 19						
Sensitivity analysis factor applied to dry bulk density of unsaturated zone 3 [DENSUZ(3)]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA19\BC_V01_SA19.ROF	Applied a sensitivity analysis factor of 1.05 to dry bulk density of unsaturated zone 3	Y	J. Davis 12/11/2019 O. Warren 12/13/2019		
Sensitivity analysis factor applied to total porosity of unsaturated zone 3 [TPUZ(3)]		Applied a sensitivity analysis factor of 1.1 to total porosity of unsaturated zone 3	Y	J. Davis 12/11/2019 O. Warren 12/13/2019		
Sensitivity analysis factor applied to effective porosity of unsaturated zone 3 [EPUZ(3)]		Applied a sensitivity analysis factor of 1.1 to effective porosity of unsaturated zone 3	Y	J. Davis 12/11/2019 O. Warren 12/13/2019		
BC_V01_SA19_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA19\BC_V01_SA19_QA.xlsx	All comments in BC_V01_SA19_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA19.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/25/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA19.ROF	BC_V01.ROF
New Model File Date: 11/25/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA19.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/25/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA19.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/25/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

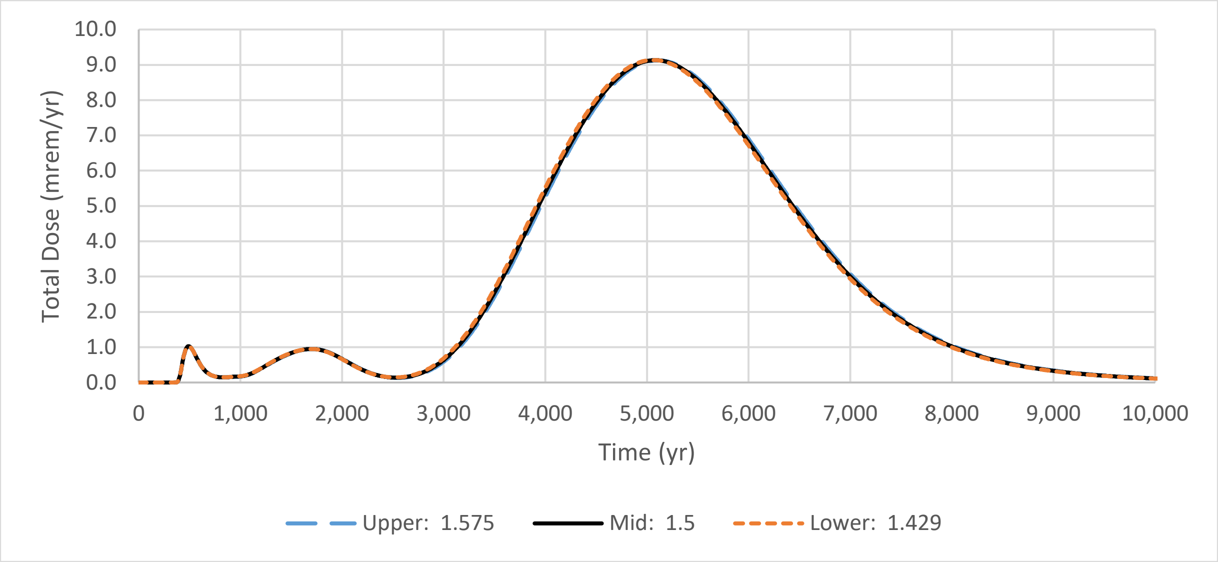
Model Simulation Log

ID: BC_V01_SA20.ROF	
Performed By: R. Hupfer	Date: 11/26/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA20	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to dry bulk density of unsaturated zone 4 [DENSUZ(4)], total porosity of unsaturated zone 4 [TPUZ(4)], effective porosity of unsaturated zone 4 [EPUZ(4)]	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA20\ BC_V01_SA20.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA20\BC_V01_SA20_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA20\BC_V01_SA20.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA20\ BC_V01_SA20.par OD\Projects\0011-D3\QA\BC\BC_V01_SA20\BC_V01_SA20_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA20\Out\BC_V01_SA20_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA20\BC_V01_SA20_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on dry bulk density of unsaturated zone 4 [DENSUZ(4)], total porosity of unsaturated zone 4 [TPUZ(4)], effective porosity of unsaturated zone 4 [EPUZ(4)]	

Dry Bulk Density of Unsaturated Zone 4 [DENSUZ(4)]

Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to dry bulk density of unsaturated zone 4. Peak total dose and timing of the peak dose for the 10,000-year simulation period are mildly sensitive to dry bulk density of unsaturated zone 4.

1.05x SA on Dry Bulk Density of Unsaturated Zone 4

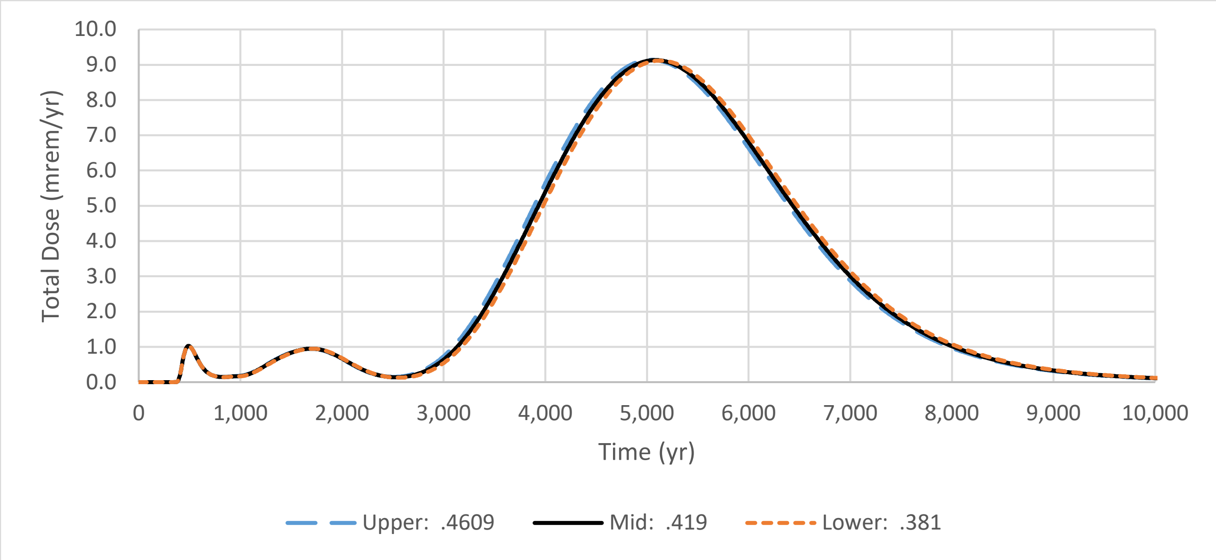


DENSUZ(4) Value (g/cm3)	Upper: 1.575	Mid: 1.5	Lower: 1.429
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.13	9.13	9.14
Time of Peak Dose (yr)	5,103	5,084	5,059

Total Porosity of Unsaturated Zone 4 [TPUZ(4)]

Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to total porosity of unsaturated zone 4. Peak total dose and timing of peak dose for the 10,000-year simulation period are mildly sensitive to total porosity of unsaturated zone 4.

1.1x SA on Total Porosity of Unsaturated Zone 4

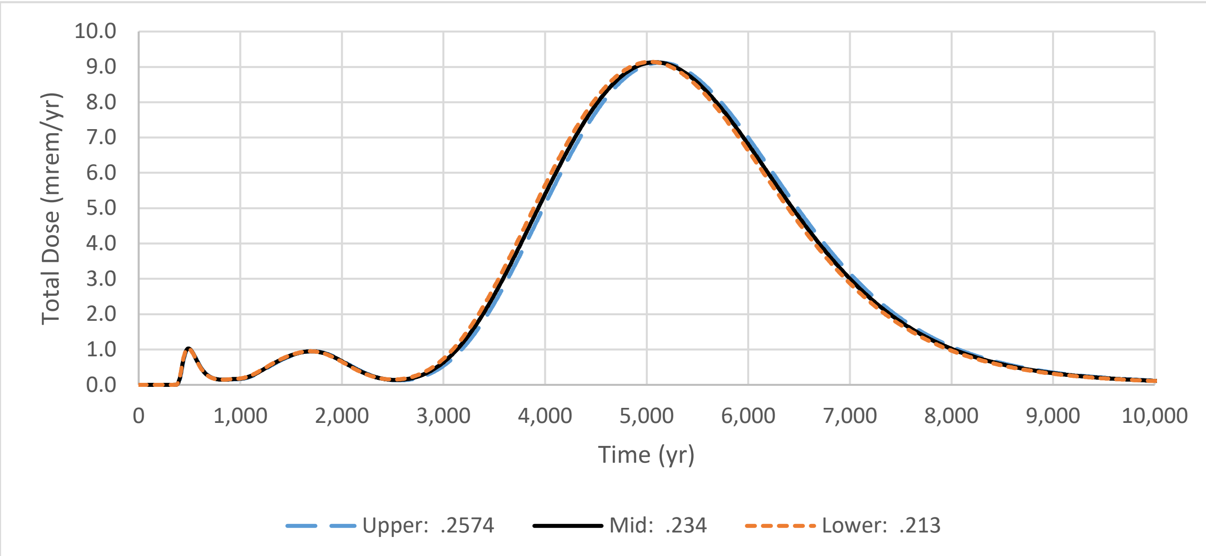


TPUZ(4) Value (--)	Upper: .4609	Mid: .419	Lower: .381
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.14	9.13	9.12
Time of Peak Dose (yr)	5,039	5,084	5,128

Effective Porosity of Unsaturated Zone 4 [EPUZ(4)]

Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to effective porosity of unsaturated zone 4. Peak total dose and timing of peak dose for the 10,000-year simulation period are mildly sensitive to effective porosity of unsaturated zone 4.

1.1x SA on Effective Porosity of Unsaturated Zone 4



EPUZ(4) Value (--)	Upper: .2574	Mid: .234	Lower: .213
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	495	490	490
Peak Dose 10k (mrem/yr)	9.12	9.13	9.14
Time of Peak Dose (yr)	5,133	5,084	5,035

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 12/11/19

Signed: 4/9/2020

O. Warren 12/13/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA20.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/27/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 20						
Sensitivity analysis factor applied to dry bulk density of unsaturated zone 4 [DENSUZ(4)]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA20\ BC_V01_SA20.ROF	Applied a sensitivity analysis factor of 1.05 to dry bulk density of unsaturated zone 4	Y	J. Davis 12/11/19 O. Warren 12/13/2019		
Sensitivity analysis factor applied to total porosity of unsaturated zone 4 [TPUZ(4)]		Applied a sensitivity analysis factor of 1.1 to total porosity of unsaturated zone 4	Y	J. Davis 12/11/19 O. Warren 12/13/2019		
Sensitivity analysis factor applied to effective porosity of unsaturated zone 4 [EPUZ(4)]		Applied a sensitivity analysis factor of 1.1 to effective porosity of unsaturated zone 4	Y	J. Davis 12/11/19 O. Warren 12/13/2019		
BC_V01_SA20_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_SA20\ BC_V01_SA20_QA.xlsx	All comments in BC_V01_SA20_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA20.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/27/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA20.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/27/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA20.ROF	BC_V01.ROF
New Model File Date: 11/27/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA20.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/27/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

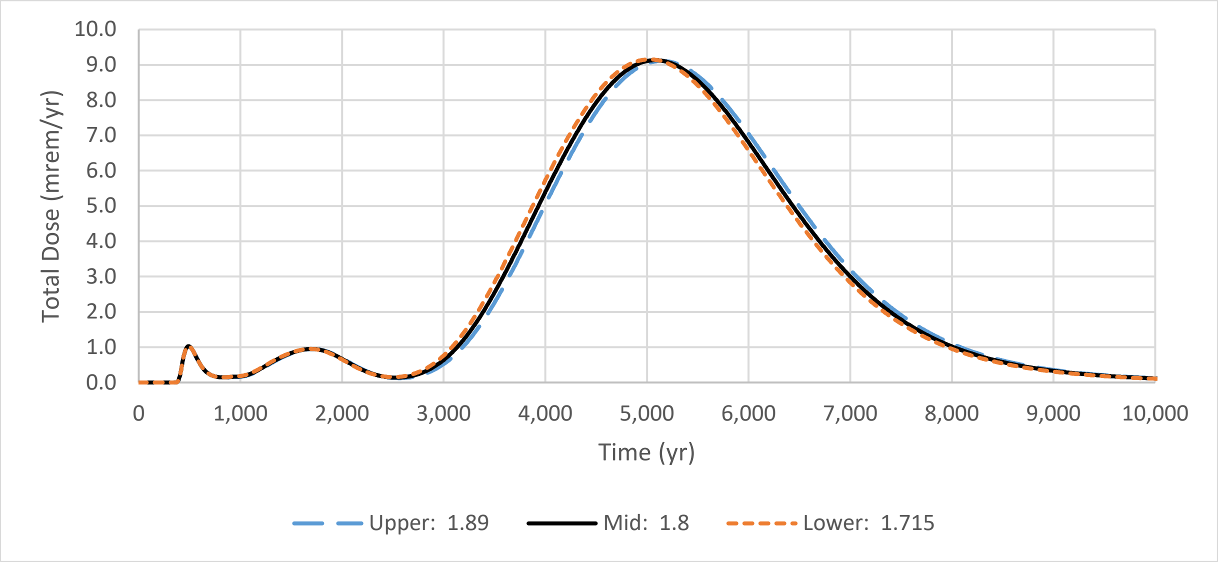
Model Simulation Log

ID: BC_V01_SA21.ROF	
Performed By: R. Hupfer	Date: 12/2/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA21	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to dry bulk density of unsaturated zone 5 [DENSUZ(5)], total porosity of unsaturated zone 5 [TPUZ(5)], effective porosity of unsaturated zone 5 [EPUZ(5)]	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA21\ BC_V01_SA21.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA21\BC_V01_SA21_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA21\BC_V01_SA21.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA21\ BC_V01_SA21.par OD\Projects\0011-D3\QA\BC\BC_V01_SA21\BC_V01_SA21_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA21\Out\BC_V01_SA21_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA21\BC_V01_SA21_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on dry bulk density of unsaturated zone 5 [DENSUZ(5)], total porosity of unsaturated zone 5 [TPUZ(5)], effective porosity of unsaturated zone 5 [EPUZ(5)]	

Dry Bulk Density of Unsaturated Zone 5 [DENSUZ(5)]

Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to dry bulk density of unsaturated zone 5. Peak total dose and timing of the peak dose for the 10,000-year simulation period are mildly sensitive to dry bulk density of unsaturated zone 5.

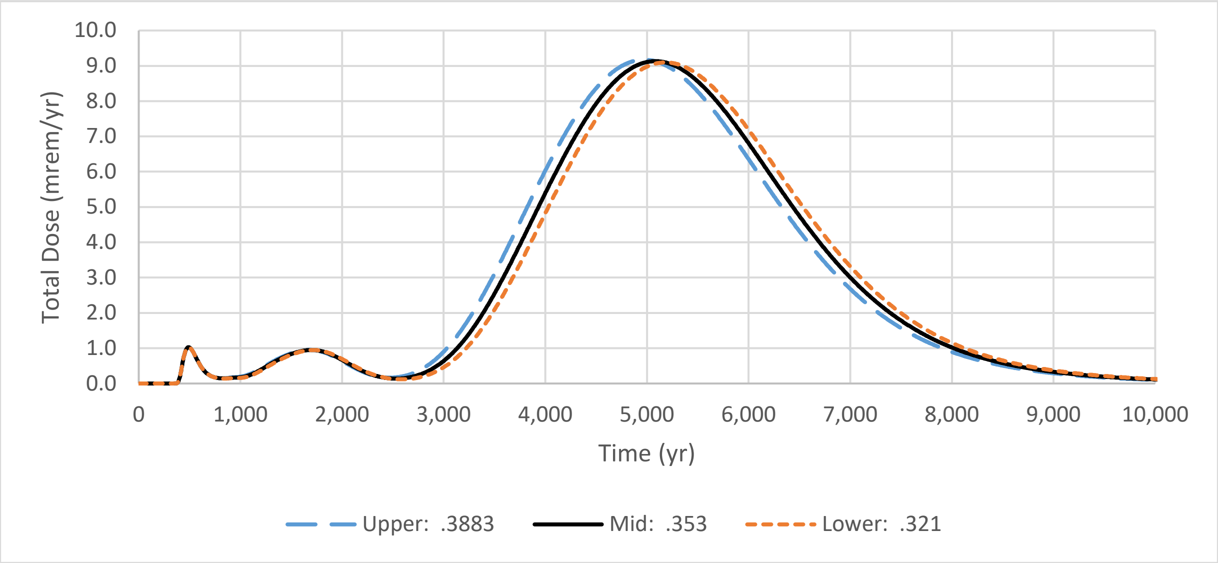
1.05x SA on Dry Bulk Density of Unsaturated Zone 5



DENSUZ(5) Value (g/cm3)	Upper: 1.89	Mid: 1.8	Lower: 1.715
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.11	9.13	9.15
Time of Peak Dose (yr)	5,142	5,084	5,025

Total Porosity of Unsaturated Zone 5 [TPUZ(5)]
Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to total porosity of unsaturated zone 5. Peak total dose and timing of peak dose for the 10,000-year simulation period are mildly sensitive to total porosity of unsaturated zone 5.

1.1x SA on Total Porosity of Unsaturated Zone 5

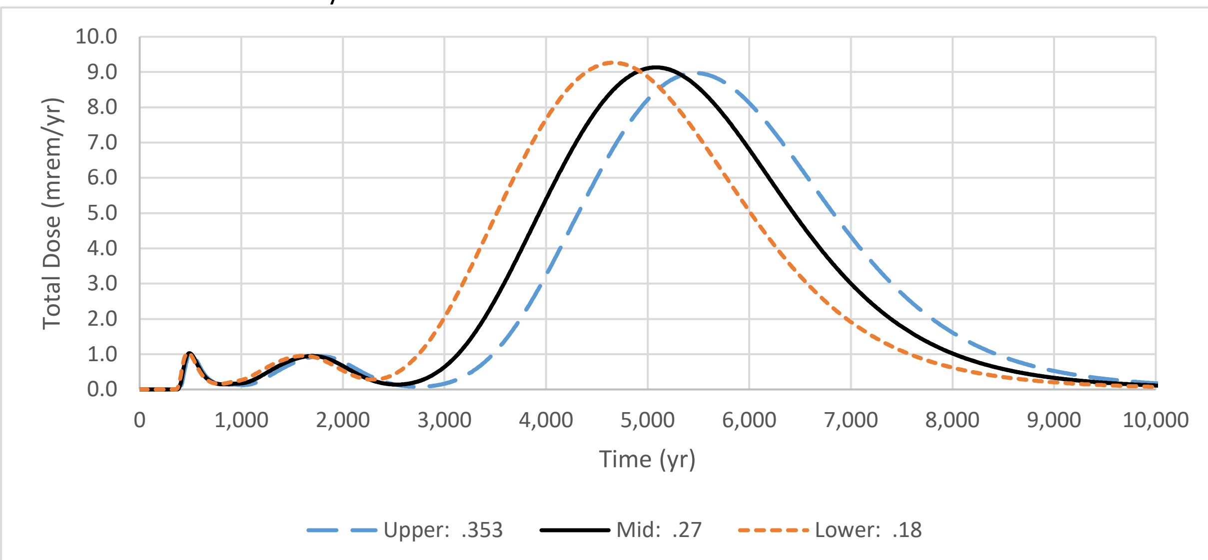


TPUZ(5) Value (--)	Upper: .3883	Mid: .353	Lower: .321
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.17	9.13	9.09
Time of Peak Dose (yr)	4,971	5,084	5,182

Effective Porosity of Unsaturated Zone 5 [EPUZ(5)]

Peak total dose for the 1,000-year compliance period is not sensitive to effective porosity of unsaturated zone 5, while timing of peak dose for the 1,000-year compliance period is mildly sensitive to effective porosity of unsaturated zone 5. Peak total dose and timing of peak dose for the 10,000-year simulation period are sensitive to effective porosity of unsaturated zone 5.

1.5x SA on Effective Porosity of Unsaturated Zone 5



EPUZ(5) Value (--)	Upper: .353	Mid: .27	Lower: .18
Peak Dose 1k (mrem/yr)	1.02	1.03	1.03
Time of Peak Dose (yr)	504	490	475
Peak Dose 10k (mrem/yr)	8.97	9.13	9.27
Time of Peak Dose (yr)	5,470	5,084	4,662

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 12/11/19

Signed: 4/9/2020

O. Warren 12/13/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA21.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/27/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 21						
Sensitivity analysis factor applied to dry bulk density of unsaturated zone 5 [DENSUZ(5)]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA21\BC_V01_SA21.ROF	Applied a sensitivity analysis factor of 1.05 to dry bulk density of unsaturated zone 5	Y	J. Davis 12/11/19 O. Warren 12/13/2019		
Sensitivity analysis factor applied to total porosity of unsaturated zone 5 [TPUZ(5)]		Applied a sensitivity analysis factor of 1.1 to total porosity of unsaturated zone 5	Y	J. Davis 12/11/19 O. Warren 12/13/2019		
Sensitivity analysis factor applied to effective porosity of unsaturated zone 5 [EPUZ(5)]		Applied a sensitivity analysis factor of 1.5 to effective porosity of unsaturated zone 5	Y	J. Davis 12/11/19 O. Warren 12/13/2019		
BC_V01_SA21_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA21\BC_V01_SA21_QA.xlsx	All comments in BC_V01_SA21_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA21.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/27/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA21.ROF	BC_V01.ROF
New Model File Date: 11/27/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA21.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/27/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA21.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/27/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

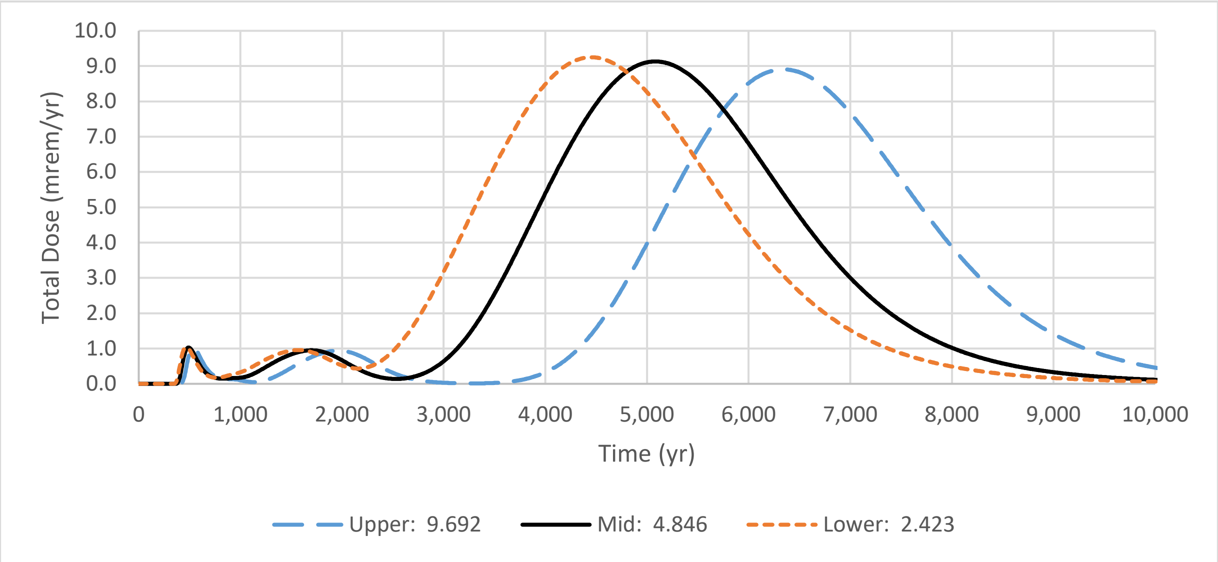
Model Simulation Log

ID: BC_V01_SA22.ROF	
Performed By: R. Hupfer	Date: 12/3/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA22	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to thickness of unsaturated zone 5 [H(5)] and longitudinal dispersivity of unsaturated zone 5 [ALPHALU(5)].	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA22\BC_V01_SA22.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA22\BC_V01_SA22_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA22\BC_V01_SA22.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA22\BC_V01_SA22.par OD\Projects\0011-D3\QA\BC\BC_V01_SA22\BC_V01_SA22_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA22\Out\BC_V01_SA22_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA22\BC_V01_SA22_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on thickness of unsaturated zone 5 [H(5)] and longitudinal dispersivity of unsaturated zone 5 [ALPHALU(5)]	

Thickness of Unsaturated Zone 5 [H(5)]

Peak total dose and timing of peak dose for the 1,000-year compliance period are mildly sensitive to thickness of unsaturated zone 5. Peak total dose for the 10,000-year simulation period is mildly sensitive to longitudinal thickness of UZ5 while timing of the peak dose for the 10,000-year simulation period is sensitive to thickness of unsaturated zone 5.

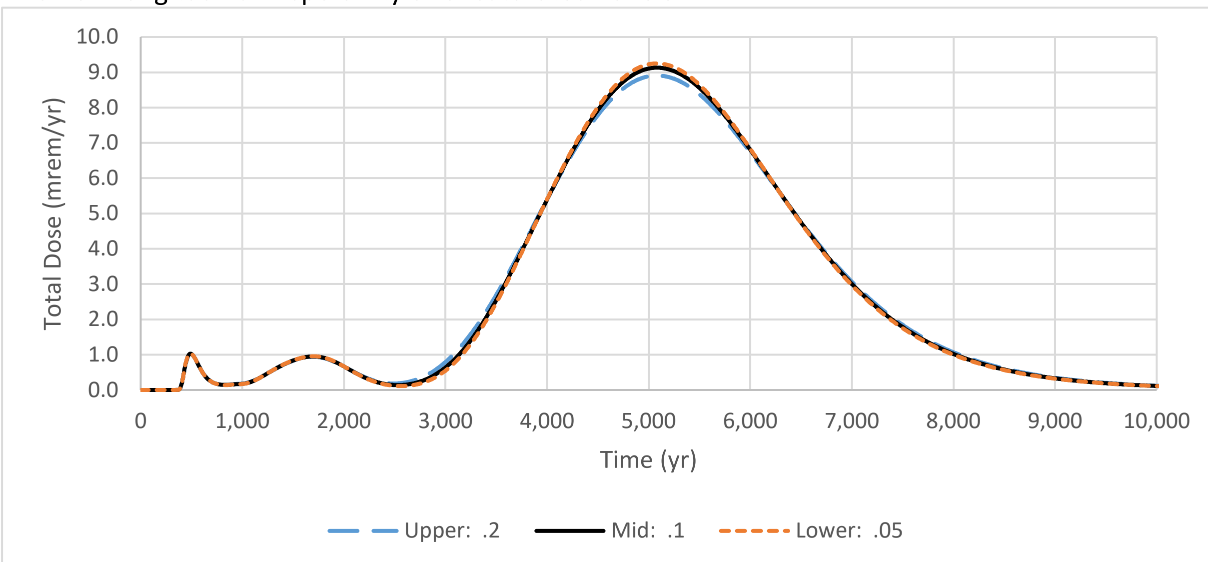
2x SA on Longitudinal Dispersivity of Unsaturated Zone 5



H(5) Value (m)	Upper: 9.692	Mid: 4.846	Lower: 2.423
Peak Dose 1k (mrem/yr)	1.01	1.03	1.03
Time of Peak Dose (yr)	539	490	470
Peak Dose 10k (mrem/yr)	8.91	9.13	9.25
Time of Peak Dose (yr)	6,342	5,084	4,452

Longitudinal Dispersivity of Unsaturated Zone 5 [ALPHALU(5)]
Peak total dose and timing of peak dose for the 1,000-year compliance period are not sensitive to longitudinal dispersivity of UZ5. Peak total dose and timing of peak dose for the 10,000-year simulation period are mildly sensitive to longitudinal dispersivity of unsaturated zone 5.

2x SA on Longitudinal Dispersivity of Unsaturated Zone 5

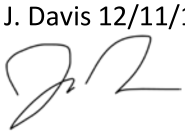


ALPHALU(5) Value (m)	Upper: .2	Mid: .1	Lower: .05
Peak Dose 1k (mrem/yr)	1.02	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	8.91	9.13	9.25
Time of Peak Dose (yr)	5,079	5,084	5,079

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 12/11/19



Signed: 4/9/2020

O. Warren 12/17/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA22.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/3/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 22						
Sensitivity analysis factor applied to dry longitudinal dispersivity of unsaturated zone 5 [ALPHALU(5)]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA22\ BC_V01_SA22.ROF	Applied a sensitivity analysis factor of 2 to longitudinal dispersivity of unsaturated zone 5	Y	J. Davis 12/11/19 O. Warren 12/17/2019		
Sensitivity analysis factor applied to thickness of unsaturated zone 5 [H(5)]		Applied a sensitivity analysis factor of 2 to thickness of unsaturated zone 5	Y	J. Davis 12/11/19 O. Warren 12/17/2019		
BC_V01_SA22_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_SA22\ BC_V01_SA22_QA.xlsx	All comments in BC_V01_SA22_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA22.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/3/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA22.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/3/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA22.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 12/3/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA22.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/3/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

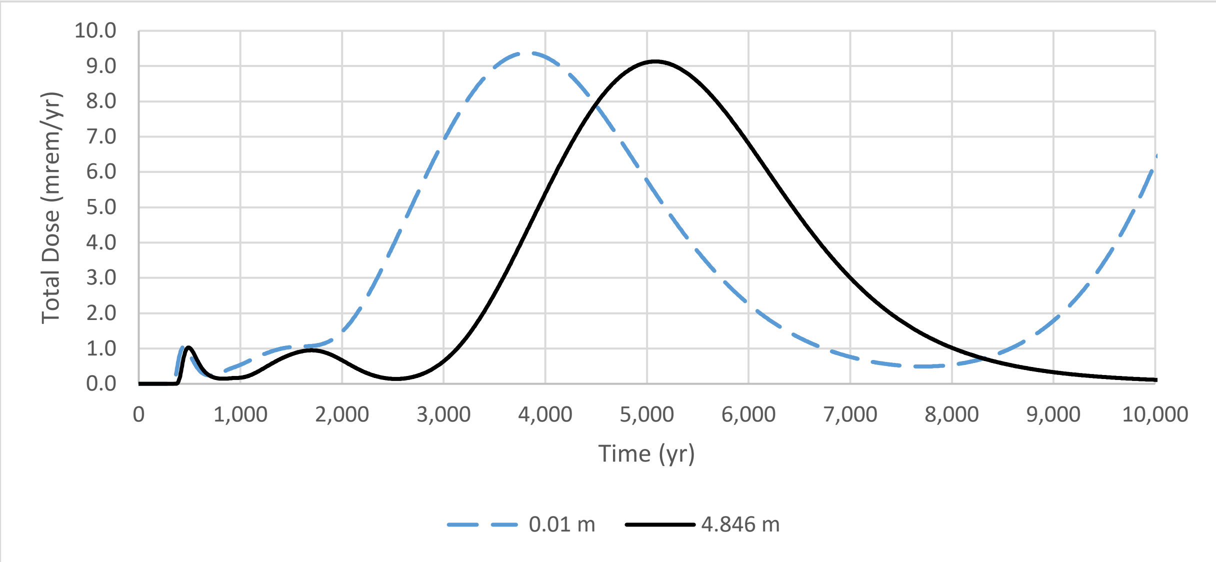
Model Simulation Log

ID: BC_V01_SA23.ROF	
Performed By: R. Hupfer	Date: 12/2/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA23	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to the minimum thickness of unsaturated zone 5 [H(5)], 0.01 m.	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA23\BC_V01_SA23.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA23\BC_V01_SA23_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA23\BC_V01_SA23.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA23\BC_V01_SA23.par OD\Projects\0011-D3\QA\BC\BC_V01_SA23\BC_V01_SA23_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA23\Out\BC_V01_SA23_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA23\BC_V01_SA23_RES.xlsx	
Comments on Model Outputs/Results: Thickness of unsaturated zone 5 [H(5)] changed to to the 0.01, the minimum value allowable in RESRAD-OFFSITE.	

Thickness of Unsaturated Zone 5 [H(5)]

Peak total dose and timing of peak dose for the 1,000-year compliance period are mildly sensitive to thickness of unsaturated zone 5. Peak total dose for the 10,000-year simulation period is mildly sensitive to longitudinal thickness of UZ5 while timing of the peak dose for the 10,000-year simulation period is sensitive to thickness of unsaturated zone 5.

Minimum Thickness of Unsaturated Zone 5 (0.01 m)



H(5) Value (m)	0.01 m	4.846 m
Peak Dose 1k (mrem/yr)	1.04	1.03
Time of Peak Dose (yr)	446	490
Peak Dose 10k (mrem/yr)	9.38	9.13
Time of Peak Dose (yr)	3,825	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 12/12/19

Signed: 4/9/2020

O. Warren 12/17/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA23.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/3/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 23						
Thickness of unsaturated zone 5 [H(5)]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA23\BC_V01_SA23.ROF	Changed thickness of unsaturated zone 5 [H(5)] to 0.01 m	Y	J. Davis 12/12/19 O. Warren 12/17/2019		
BC_V01_SA23_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA23\BC_V01_SA23_QA.xlsx	All comments in BC_V01_SA23_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA23.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/3/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA23.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/3/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA23.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/3/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA23.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/3/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

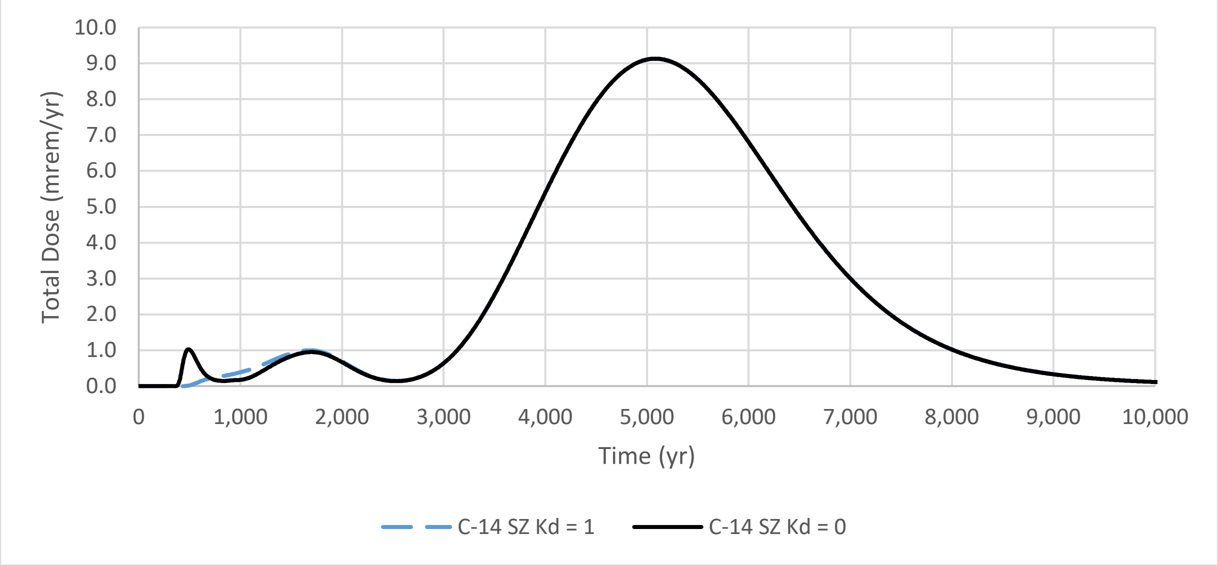
Model Simulation Log

ID: BC_V01_SA24.ROF	
Performed By: R. Hupfer	Date: 12/4/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA24	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to distribution coefficient of C-14 in the saturated zone [DCACTS(C-14)]	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA24\BC_V01_SA24.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA24\BC_V01_SA24_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA24\BC_V01_SA24.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA24\BC_V01_SA24.par OD\Projects\0011-D3\QA\BC\BC_V01_SA24\BC_V01_SA24_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA24\Out\BC_V01_SA24_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA24\BC_V01_SA24_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on distribution coefficient of C-14 in the saturated zone by changing this value from a minimum base case value of 0 cm^3/g to 1 cm^3/g.	

Distribution coefficient of C-14 in the saturated zone

Peak total dose and timing of peak dose for the 1,000-year compliance period are sensitive to the K_d of C-14 in the saturated zone. Peak total dose and timing of peak dose for the 10,000-year simulation period are not sensitive to the K_d of C-14 in the saturated zone.

Distribution Coefficient of C-14 in Saturated Zone



C-14 SZ Kd Value (cm3/g)	C-14 SZ Kd = 1	C-14 SZ Kd = 0
Peak Dose 1k (mrem/yr)	0.39	1.03
Time of Peak Dose (yr)	1,004	490
Peak Dose 10k (mrem/yr)	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 12/12/19

Signed: 4/9/2020

O. Warren 12/17/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA24.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/4/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 24						
Distribution coefficient of C-14 in saturated zone [DCACTS(C-14)]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA24\BC_V01_SA24.ROF	Changed distribution coefficient of C-14 in saturated zone to 1 cm^3/g	Y	J. Davis 12/12/19 O. Warren 12/17/2019		
BC_V01_SA24_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA24\BC_V01_SA24_QA.xlsx	All comments in BC_V01_SA24_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA24.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 12/4/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA24.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/4/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA24.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/4/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA24.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/4/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

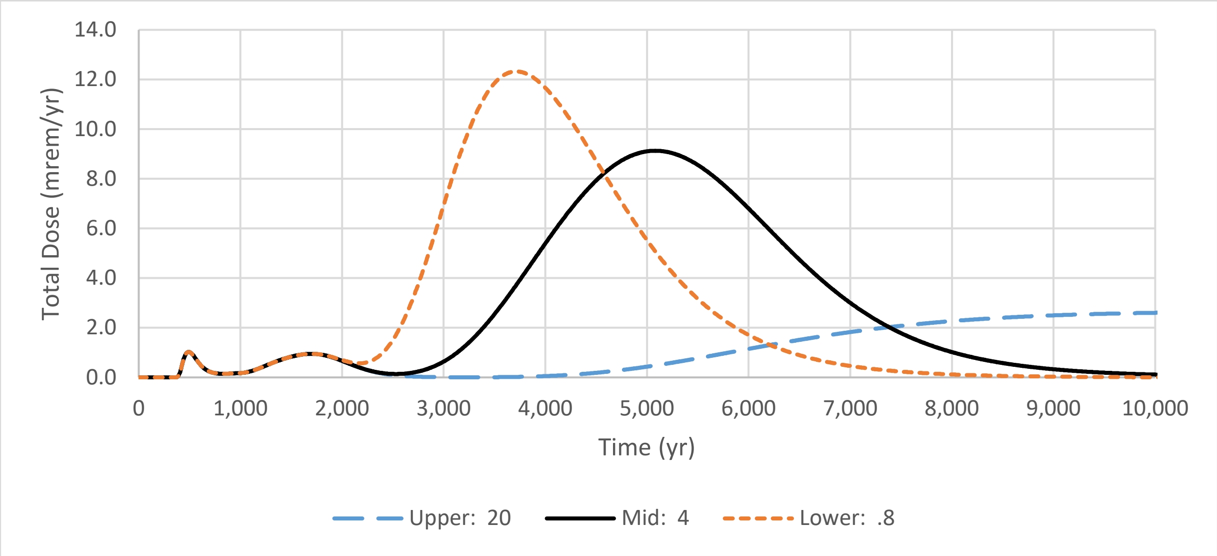
Model Simulation Log

ID: BC_V01_SA25.ROF	
Performed By: R. Hupfer	Date: 12/5/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA25	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to distribution coefficient of I-129 in the in the saturated zone [DCACTS(I-129)] and distribution coefficient of Tc-99 in the saturated zone [DCACTS(Tc-99)]	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA25\BC_V01_SA25.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA25\BC_V01_SA25_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA25\BC_V01_SA25.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA25\BC_V01_SA25.par OD\Projects\0011-D3\QA\BC\BC_V01_SA25\BC_V01_SA25_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA25\Out\BC_V01_SA25_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA25\BC_V01_SA25_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on I-129 saturated zone K_d, which was multiplied and divided by a factor of 5 and Tc-99 saturated zone K_d, which was multiplied and divided by a factor of 5.	

I-129 Saturated Zone K_d

Peak total dose and time of peak dose for the 1,000-year compliance period are not sensitive to I-129 saturated zone K_d. Peak total dose and timing of peak dose for the 10,000-year simulation period is sensitive to I-129 saturated zone K_d.

5x SA on I-129 Saturated zone K_d

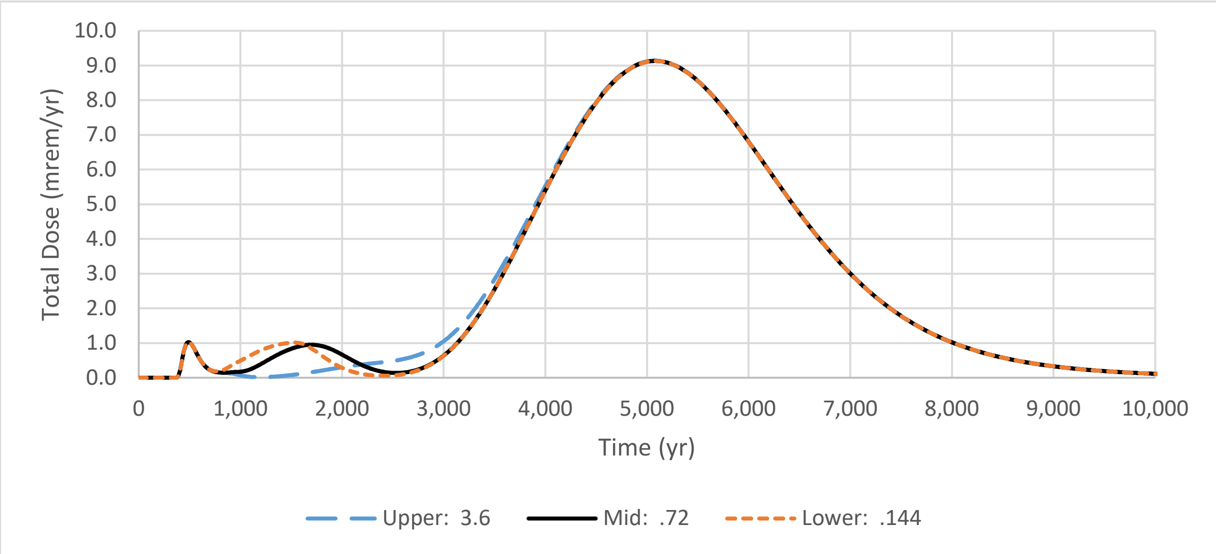


I-129 SZ Kd (cm3/g)	Upper: 20	Mid: 4	Lower: .8
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	2.61	9.13	12.32
Time of Peak Dose (yr)	10,030	5,084	3,712

Tc-99 Saturated Zone K_d

Peak total dose and time of peak dose are sensitive for the 1,000-year compliance period are not sensitive to Tc-99 saturated zone K_d. Peak total dose and timing of peak dose for the 10,000-year simulation period are mildly sensitive to Tc-99 saturated zone K_d.

5x SA on Tc-99 saturated zone Kd



Tc-99 SZ Kd (cm3/g)	Upper: 3.6	Mid: .72	Lower: .144
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.14	9.13	9.13
Time of Peak Dose (yr)	5,079	5,084	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis, 12/13/19

Signed: 4/9/2020

O. Warren 12/20/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA25.ROF	BC_V01.ROF
New Model File Date: 12/5/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 25						
Distribution coefficient of I-129 in saturated zone [DCACTS(I-129)]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA25\BC_V01_SA25.ROF	Applied a sensitivity analysis factor of 5 to distribution coefficient of I-129 in the saturated zone [DCACTS(I-129)]	Y	J. Davis, 12/13/19 O. Warren 12/20/2019		
Distribution coefficient of Tc-99 in saturated zone [DCACTS(Tc-99)]		Applied a sensitivity analysis factor of 5 to distribution coefficient of Tc-99 in the saturated zone [DCACTS(Tc-99)]	Y	J. Davis, 12/13/19 O. Warren 12/20/2019		
BC_V01_SA25_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA25\BC_V01_SA25_QA.xlsx	All comments in BC_V01_SA25_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA25.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/5/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA25.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/5/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA25.ROF	BC_V01.ROF
New Model File Date: 12/5/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA25.ROF	BC_V01.ROF
New Model File Date: 12/5/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print):	E-Signature (or sign/date/scan hardcopy): (Not required if no comments)
Ryan Hupfer	Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

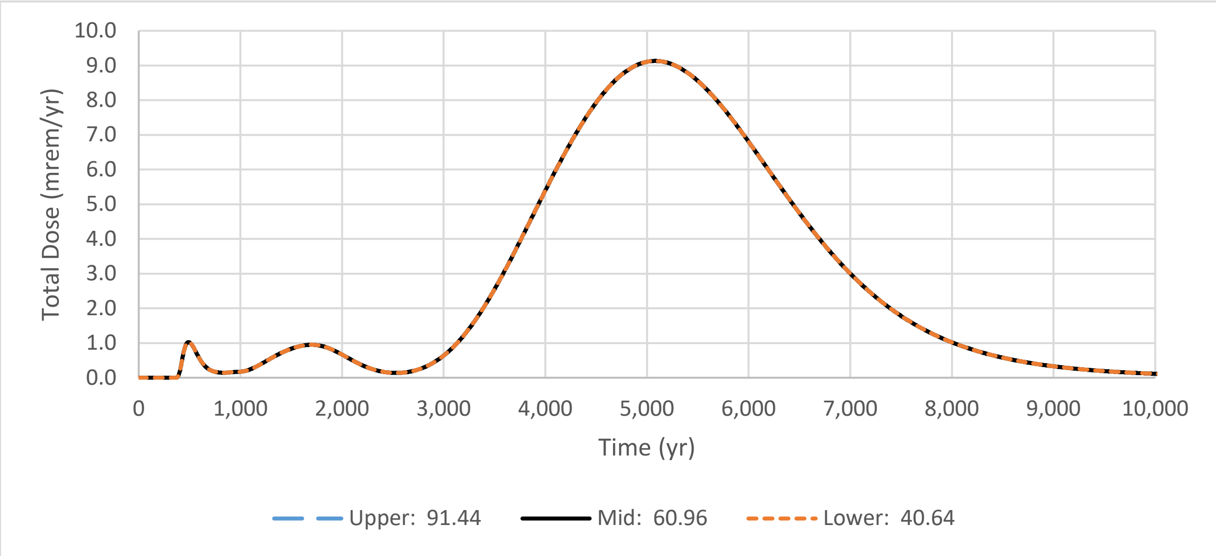
Model Simulation Log

ID: BC_V01_SA26.ROF	
Performed By: R. Hupfer	Date: 12/5/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA26	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to the thickness of the saturated zone [DPTHAQ], dry bulk density of saturated zone [DENSAQ], and hydraulic conductivity of saturated zone [HCSZ]	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA26\BC_V01_SA26.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA26\BC_V01_SA26_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA26\BC_V01_SA26.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA26\BC_V01_SA26.par OD\Projects\0011-D3\QA\BC\BC_V01_SA26\BC_V01_SA26_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA26\Out\BC_V01_SA26_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA26\BC_V01_SA26_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on thickness of the saturated zone, which was multiplied and divided by a factor of 1.5, dry bulk density of the saturated zone, which was multiplied and divided by a factor of 1.15, and hydraulic conductivity of the saturated zone, which was multiplied and divided by a factor of 2.	

Thickness of saturated zone [DPTHAQ]

Peak total dose and time of peak dose for the 1,000-year compliance period are not sensitive to the thickness of the saturated zone. Peak total dose and timing of peak dose for the 10,000-year simulation period are not sensitive to the thickness of the saturated zone.

1.5x SA on thickness of saturated zone

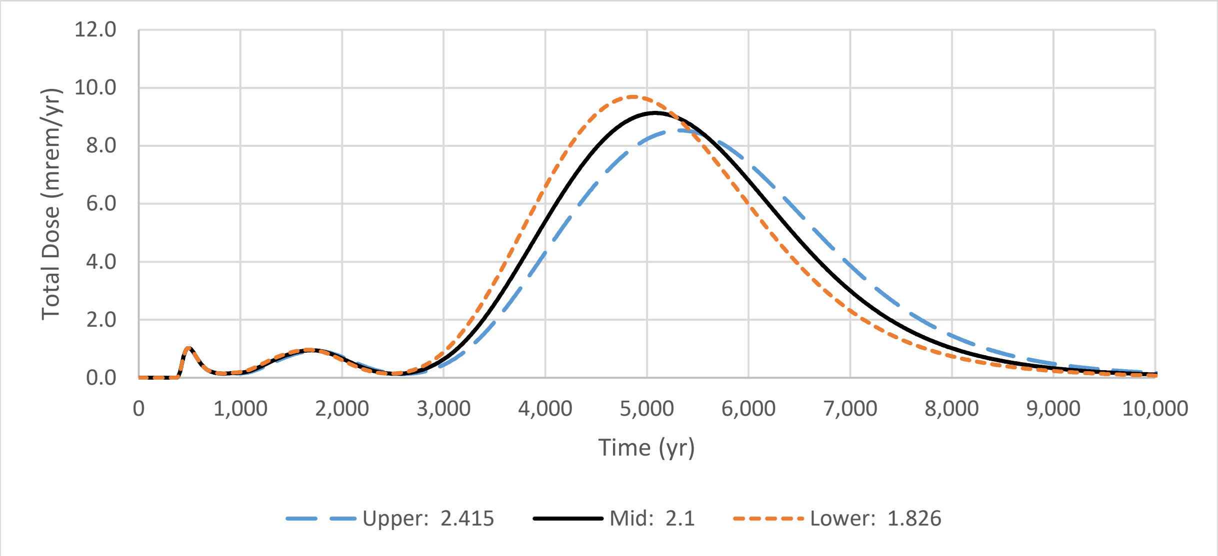


DPTHAQ Value (m)	Upper: 91.44	Mid: 60.96	Lower: 40.64
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.13	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084	5,084

Dry bulk density of saturated zone [DENSAQ]

Peak total dose and time of peak dose for the 1,000-year compliance period are not sensitive to the dry bulk density of the saturated zone. Peak total dose and timing of peak dose for the 10,000-year simulation period are sensitive to the dry bulk density of the saturated zone.

1.15x SA on Dry bulk density of saturated zone

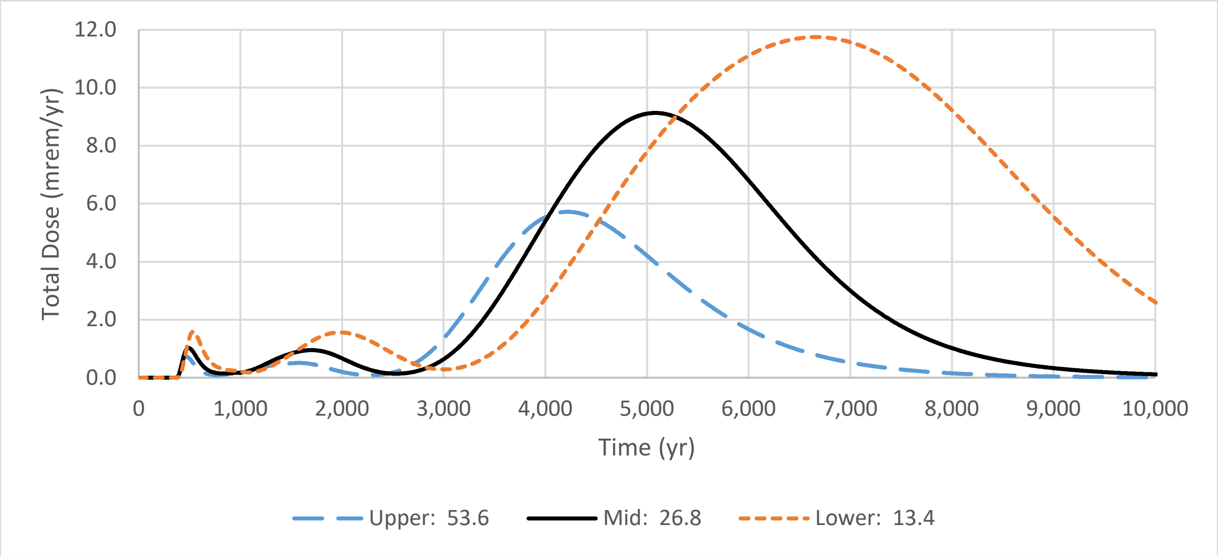


DENSAQ Value (g/cm3)	Upper: 2.415	Mid: 2.1	Lower: 1.826
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	8.53	9.13	9.69
Time of Peak Dose (yr)	5,324	5,084	4,868

Hydraulic conductivity of saturated zone [HCSZ]

Peak total dose and time of peak dose for the 1,000-year compliance period are sensitive to the hydraulic conductivity of the saturated zone. Peak total dose and timing of peak dose for the 10,000-year simulation period are sensitive to the hydraulic conductivity of the saturated zone.

2x SA on Hydraulic conductivity of saturated zone



HCSZ Value (m/yr)	Upper: 53.6	Mid: 26.8	Lower: 13.4
Peak Dose 1k (mrem/yr)	0.72	1.03	1.59
Time of Peak Dose (yr)	470	490	534
Peak Dose 10k (mrem/yr)	5.72	9.13	11.75
Time of Peak Dose (yr)	4,217	5,084	6,656

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 12/13/19

Signed: 4/9/2020

O. Warren 12/20/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA26.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/5/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 26						
Thickness of saturated zone [DPTHAQ]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA26\ BC_V01_SA26.ROF	Applied a sensitivity analysis factor of 1.5 to thickness of saturated zone	Y	J. Davis 12/13/19 O. Warren 12/20/2019		
Dry bulk density of saturated zone [DENSAQ]		Applied a sensitivity analysis factor of 1.15 to density of saturated zone	Y	J. Davis 12/13/19 O. Warren 12/20/2019		
Hydraulic conductivity of saturated zone [HCSZ]		Applied a sensitivity analysis factor of 2 to the hydraulic conductivity of saturated zone	Y	J. Davis 12/13/19 O. Warren 12/20/2019		
BC_V01_SA26_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_ SA26\ BC_V01_SA26_ QA.xlsx	All comments in BC_V01_SA26_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA26.ROF	BC_V01.ROF
New Model File Date: 12/5/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA26.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/5/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA26.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/5/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA26.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/5/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

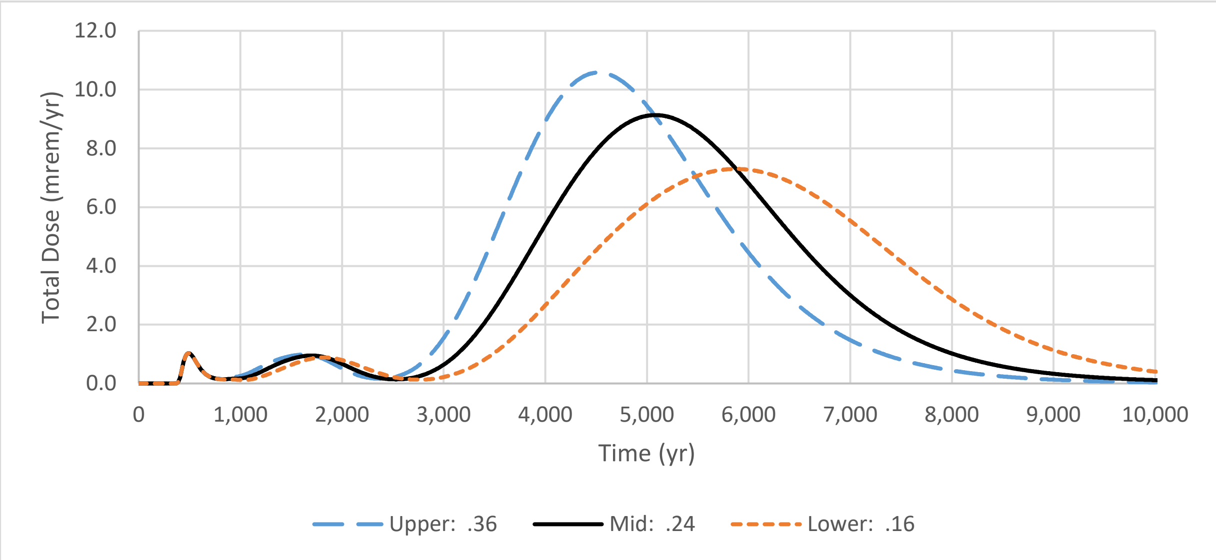
Model Simulation Log

ID: BC_V01_SA27.ROF	
Performed By: R. Hupfer	Date: 12/6/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA27	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to the total porosity of saturated zone [TPSZ], effective porosity of saturated zone [EPSZ], mean residence time of water in surface water body [TLAKE]	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA27\BC_V01_SA27.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA27\BC_V01_SA27_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA27\BC_V01_SA27.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA27\BC_V01_SA27.par OD\Projects\0011-D3\QA\BC\BC_V01_SA27\BC_V01_SA27_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA27\Out\BC_V01_SA27_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA27\BC_V01_SA27_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on total porosity of saturated zone, which was multiplied and divided by a factor of 1.5, effective porosity of saturated zone, which was multiplied and divided by a factor of 1.5, and mean residence time of water in the surface water body, which was multiplied and divided by a factor of 10.	

Total porosity of saturated zone [DPTHAQ]

Peak total dose and time of peak dose for the 1,000-year compliance period are not sensitive to the total porosity of saturated zone. Peak total dose and timing of peak dose for the 10,000-year simulation period are sensitive to the total porosity of saturated zone.

1.5x SA on Total porosity of saturated zone

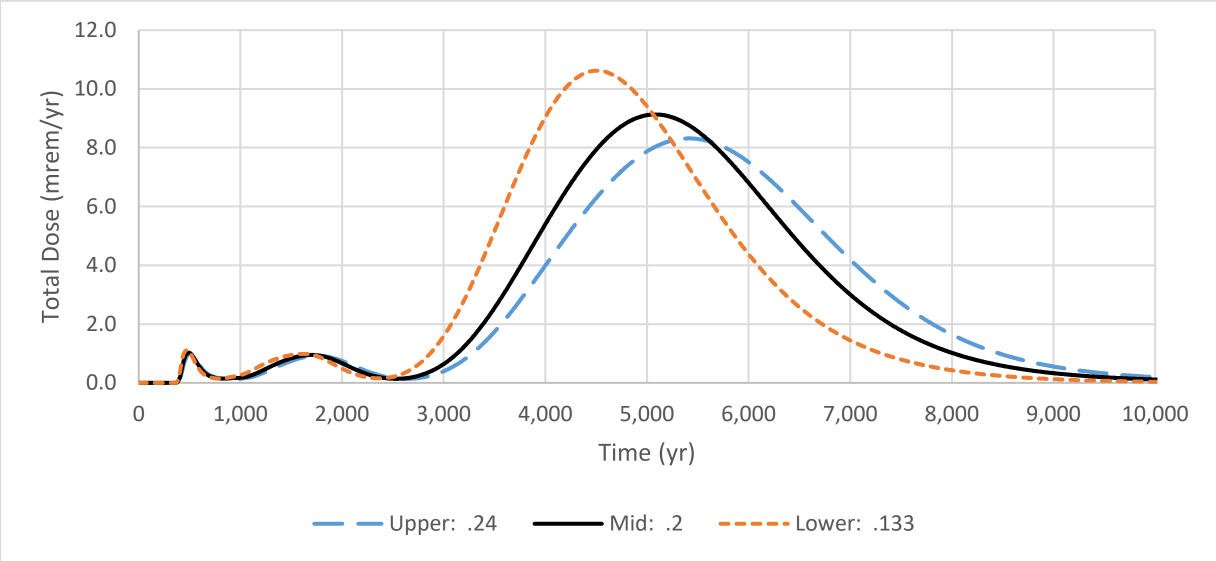


TPSZ Value (--)	Upper: .36	Mid: .24	Lower: .16
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	10.58	9.13	7.30
Time of Peak Dose (yr)	4,520	5,084	5,872

Effective porosity of saturated zone [DENSAQ]

Peak total dose and time of peak dose for the 1,000-year compliance period are sensitive to the effective porosity of saturated zone. Peak total dose and timing of peak dose for the 10,000-year simulation period are sensitive to the effective porosity of saturated zone.

1.5x SA on Effective porosity of saturated zone

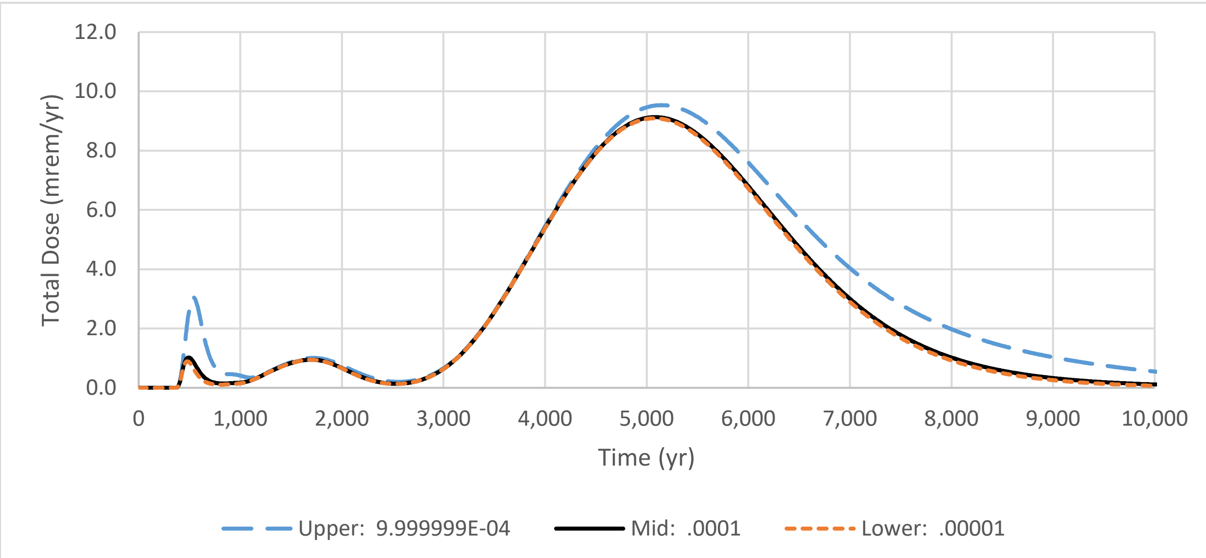


EPSZ Value (--)	Upper: .24	Mid: .2	Lower: .133
Peak Dose 1k (mrem/yr)	0.98	1.03	1.11
Time of Peak Dose (yr)	500	490	475
Peak Dose 10k (mrem/yr)	8.32	9.13	10.62
Time of Peak Dose (yr)	5,412	5,084	4,506

Mean residence time of water in surface water body [TLAKE]

Peak total dose and time of peak dose for the 1,000-year compliance period are sensitive to the mean residence time of water in surface water body. Peak total dose and timing of peak dose for the 10,000-year simulation period are sensitive to the mean residence time of water in surface water body.

10x SA on Mean residence time of water in surface water body



TLAKE Value (m/yr)	Upper: 1.0E-03	Mid: 1.0E-04	Lower: 1.0E-05
Peak Dose 1k (mrem/yr)	0.72	1.03	1.59
Time of Peak Dose (yr)	470	490	534
Peak Dose 10k (mrem/yr)	5.72	9.13	11.75
Time of Peak Dose (yr)	4,217	5,084	6,656

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 12/13/19

Signed: 4/9/2020

O. Warren 12/20/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA27.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/6/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 27						
Total porosity of saturated zone [TPSZ]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA27\BC_V01_SA27.ROF	Applied a sensitivity analysis factor of 1.5 to total porosity of saturated zone	Y	J. Davis 12/13/19 O. Warren 12/20/2019		
Effective porosity of saturated zone [EPSZ]		Applied a sensitivity analysis factor of 1.5 to effective porosity of saturated zone	Y	J. Davis 12/13/19 O. Warren 12/20/2019		
Mean residence time of water in surface water body [TLAKE]		Applied a sensitivity analysis factor of 10 to the mean residence time of water in the surface water body	Y	J. Davis 12/13/19 O. Warren 12/20/2019		
BC_V01_SA27_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA27\BC_V01_SA27_QA.xlsx	All comments in BC_V01_SA27_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA27.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/6/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA27.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/6/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA27.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/6/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA27.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/6/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

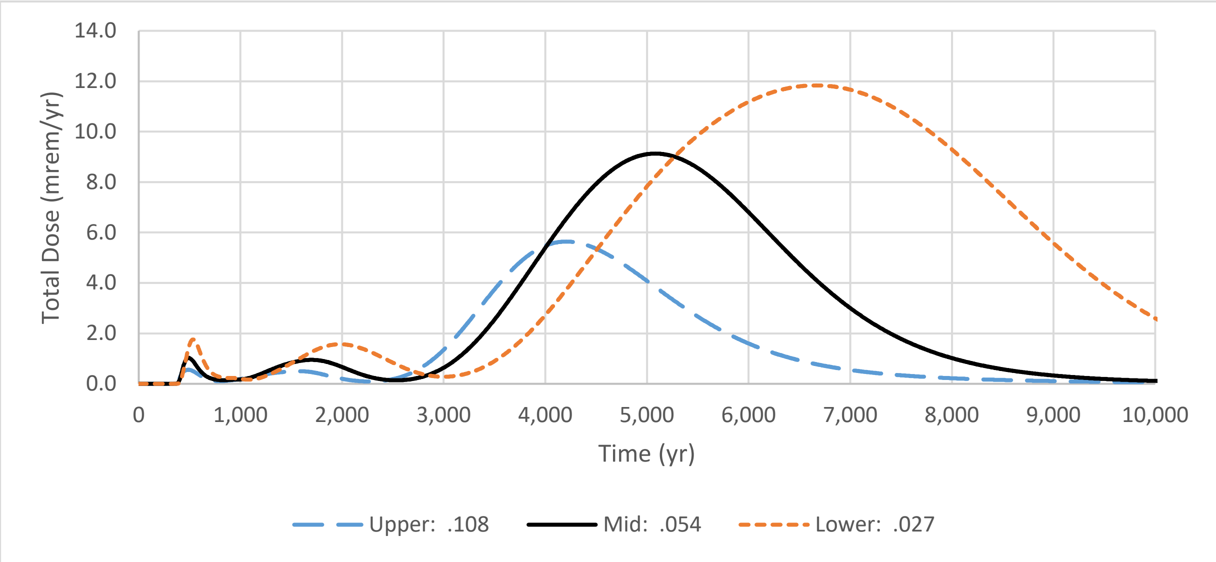
Model Simulation Log

ID: BC_V01_SA28.ROF	
Performed By: R. Hupfer	Date: 12/6/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA28	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to the hydraulic gradient of saturated zone to well [HGW] and longitudinal dispersivity of saturated zone to well [ALPHALOW].	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA28\BC_V01_SA28.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA28\BC_V01_SA28_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA28\BC_V01_SA28.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA28\BC_V01_SA28.par OD\Projects\0011-D3\QA\BC\BC_V01_SA28\BC_V01_SA28_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA28\Out\BC_V01_SA28_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA28\BC_V01_SA28_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on hydraulic gradient of saturated zone to well, which was multiplied and divided by a factor of 2, and longitudinal dispersivity of saturated zone to well, which was multiplied and divided by a factor of 2.	

Hydraulic gradient of saturated zone to well [HGW]

Peak total dose and time of peak dose for the 1,000-year compliance period are sensitive to the hydraulic gradient of saturated zone. Peak total dose and timing of peak dose for the 10,000-year simulation period are sensitive to the hydraulic gradient of saturated zone to well.

2x SA on Hydraulic gradient of saturated zone to well

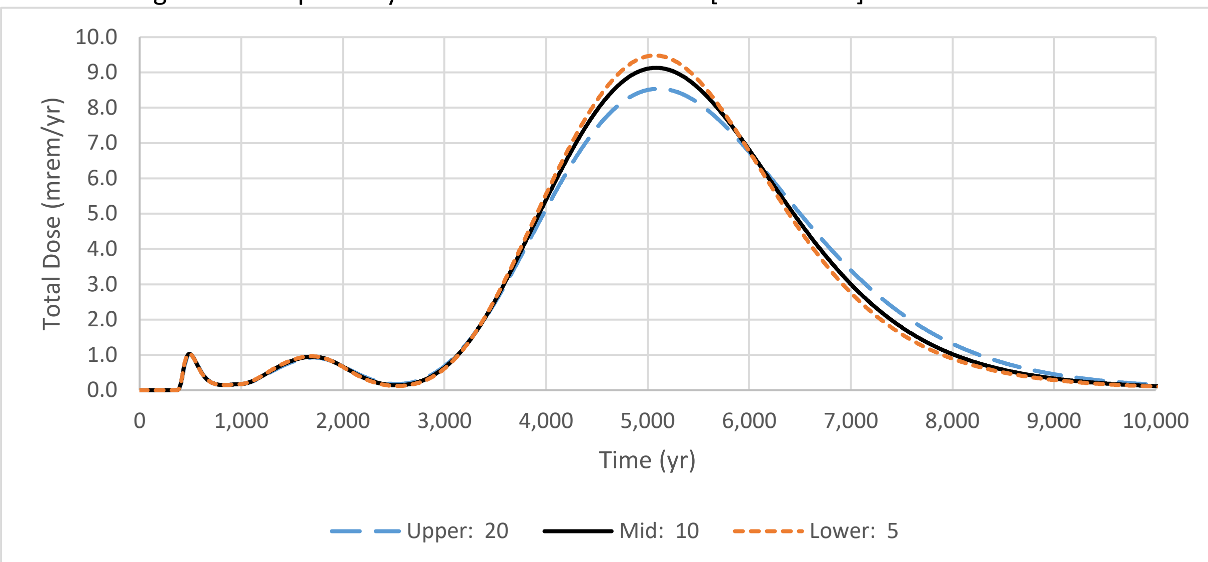


HGW Value (--)	Upper: .108	Mid: .054	Lower: .027
Peak Dose 1k (mrem/yr)	0.56	1.03	1.76
Time of Peak Dose (yr)	490	490	534
Peak Dose 10k (mrem/yr)	5.64	9.13	11.84
Time of Peak Dose (yr)	4,207	5,084	6,665

Longitudinal dispersivity of saturated zone to well [ALPHALOW]

Peak total dose and time of peak dose for the 1,000-year compliance period are mildly sensitive to the longitudinal dispersivity of saturated zone to well. Peak total dose and timing of peak dose for the 10,000-year simulation period are sensitive to the longitudinal dispersivity of saturated zone to well.

2x SA on Longitudinal dispersivity of saturated zone to well [ALPHALOW]

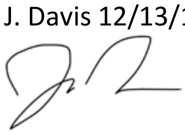


ALPHALOW Value (m)	Upper: 20	Mid: 10	Lower: 5
Peak Dose 1k (mrem/yr)	1.01	1.03	1.03
Time of Peak Dose (yr)	495	490	490
Peak Dose 10k (mrem/yr)	8.54	9.13	9.48
Time of Peak Dose (yr)	5,108	5,084	5,069

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 12/13/19



Signed: 4/9/2020

O. Warren 12/20/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA28.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/6/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 28						
Hydraulic gradient of saturated zone to well [HGW]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA28\ BC_V01_SA28.ROF	Applied a sensitivity analysis factor of 2 to hydraulic gradient of saturated zone to well [HGW]	Y	J. Davis 12/13/19 O. Warren 12/20/2019		
Longitudinal dispersivity of saturated zone to well		Applied a sensitivity analysis factor of 2 to longitudinal dispersivity of of saturated zone to well [ALPHALOW]	Y	J. Davis 12/13/19 O. Warren 12/20/2019		
BC_V01_SA28_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_ SA28\ BC_V01_SA28_ QA.xlsx	All comments in BC_V01_SA28_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA28.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/6/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA28.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/6/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA28.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/6/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA28.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/6/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

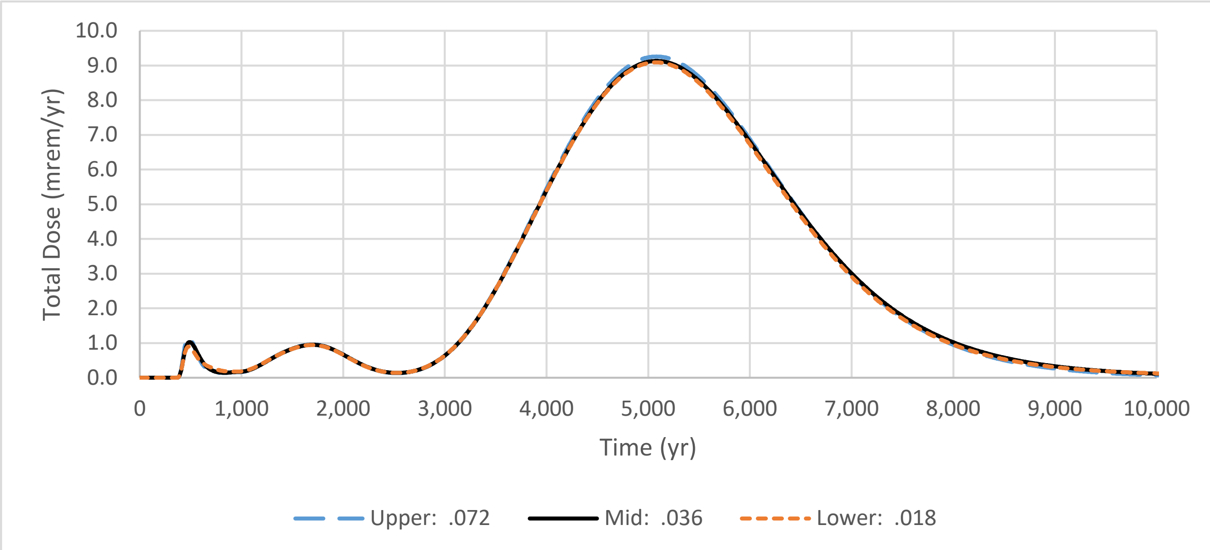
Model Simulation Log

ID: BC_V01_SA29.ROF	
Performed By: R. Hupfer	Date: 12/9/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA29	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to the hydraulic conductivity of saturated zone to well [HGSW], longitudinal dispersivity of saturated zone to surface water body [ALPHALOSW], and depth of aquifer contributing to surface water body [DPTHAQSW].	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA29\ BC_V01_SA29.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA29\BC_V01_SA29_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA29\BC_V01_SA29.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA29\ BC_V01_SA29.par OD\Projects\0011-D3\QA\BC\BC_V01_SA29\BC_V01_SA29_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA29\Out\BC_V01_SA29_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA29\BC_V01_SA29_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on hydraulic conductivity of saturated zone, which was multiplied and divided by a factor of 2, longitudinal dispersivity of saturated zone to surface water body, which was multiplied and divided by a factor of 2, and depth of aquifer contributing to surface water body, which was multiplied and divided by a factor of 2.	

Saturated zone hydraulic gradient to surface water body [HGSW]

Peak total dose and time of peak dose for the 1,000-year compliance period are mildly sensitive to HGSW. Peak total dose and timing of peak dose for the 10,000-year simulation period are mildly sensitive to HGSW.

2x SA on Saturated zone hydraulic gradient to surface water body

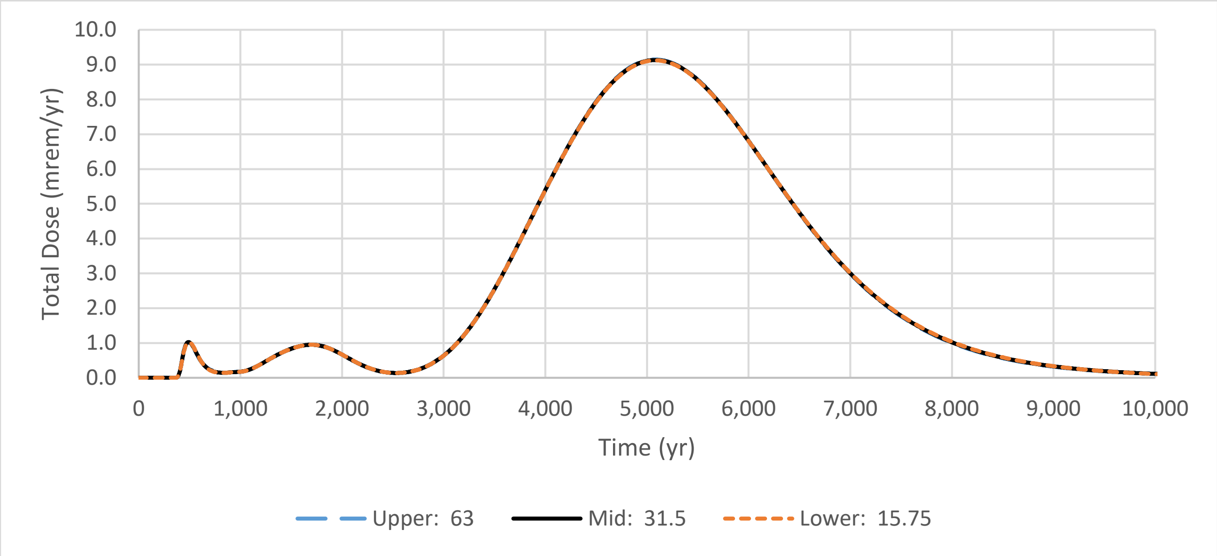


HGSW Value (--)	Upper: .072	Mid: .036	Lower: .018
Peak Dose 1k (mrem/yr)	1.17	1.03	0.90
Time of Peak Dose (yr)	480	490	480
Peak Dose 10k (mrem/yr)	9.26	9.13	9.09
Time of Peak Dose (yr)	5,079	5,084	5,074

Longitudinal dispersivity of saturated zone to surface water body [ALPHALOSW]

Peak total dose for the 1,000-year compliance period is not sensitive to ALPHALOSW, but time of peak dose for the 1,000-year compliance period is mildly sensitive to ALPHALOSW. Peak total dose and timing of peak dose for the 10,000-year simulation period are mildly sensitive to ALPHALOSW.

2x SA on Longitudinal dispersivity of saturated zone to surface water body

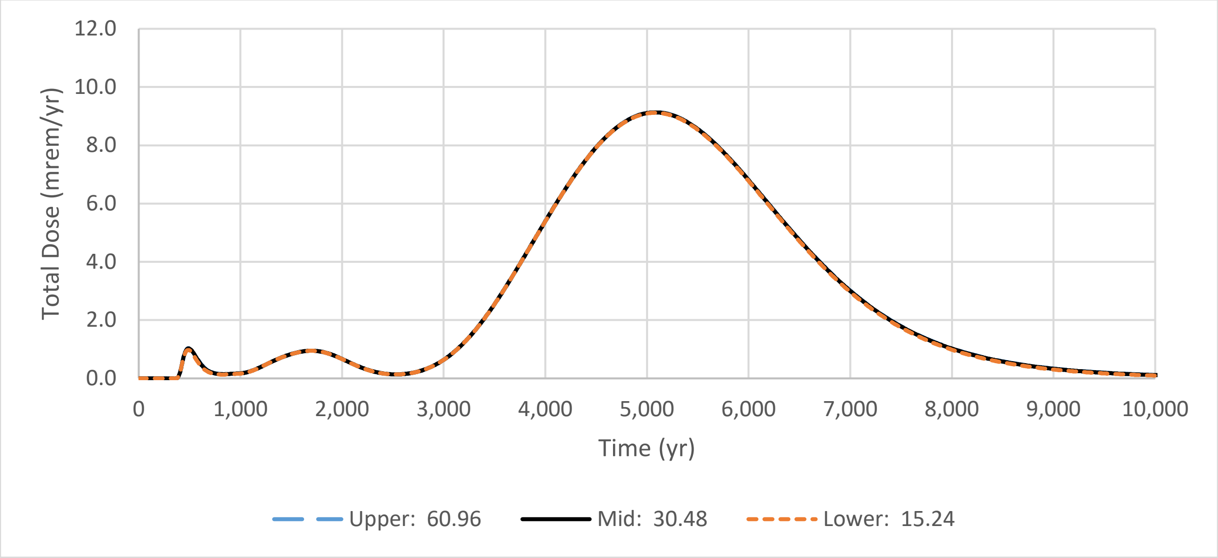


ALPHALOSW Value (--)	Upper: 63	Mid: 31.5	Lower: 15.75
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	495
Peak Dose 10k (mrem/yr)	9.14	9.13	9.12
Time of Peak Dose (yr)	5,079	5,084	5,084

Depth of aquifer contributing to surface water body [DPTHAQSW]

Peak total dose and time of peak dose for the 1,000-year compliance period are mildly sensitive to DPTHAQSW. Peak total dose and timing of peak dose for the 10,000-year simulation period are mildly sensitive to DPTHAQSW.

2x SA on Depth of aquifer contributing to surface water body [DPTHAQSW]



DPTHAQSW Value (m/yr)	Upper: 60.96	Mid: 30.48	Lower: 15.24
Peak Dose 1k (mrem/yr)	1.04	1.03	0.98
Time of Peak Dose (yr)	490	490	485
Peak Dose 10k (mrem/yr)	9.13	9.13	9.12
Time of Peak Dose (yr)	5,084	5,084	5,079

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 12/13/19

Signed: 4/9/2020

O. Warren 12/20/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA29.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/9/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 29						
Hydraulic conductivity of saturated zone to well [HGSW]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA29\BC_V01_SA29.ROF	Applied a sensitivity analysis factor of 2 to hydraulic conductivity of saturated zone to well [HGSW]	Y	J. Davis 12/13/19 O. Warren 12/20/2019		
Longitudinal dispersivity of saturated zone to surface water body [ALPHALOSW]		Applied a sensitivity analysis factor of 2 to longitudinal dispersivity of saturated zone to surface water body [ALPHALOSW]	Y	J. Davis 12/13/19 O. Warren 12/20/2019		
Depth of aquifer contributing to surface water body [DPTHAQSW]		Applied a sensitivity analysis factor of 2 to depth of aquifer contributing to surface water body [DPTHAQSW]	Y	J. Davis 12/13/19 O. Warren 12/20/2019		
BC_V01_SA29_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA29\BC_V01_SA29_QA.xlsx	All comments in BC_V01_SA29_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA29.ROF	BC_V01.ROF
New Model File Date: 12/9/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA29.ROF	BC_V01.ROF
New Model File Date: 12/9/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
BC_V01_SA29.ROF	BC_V01.ROF
New Model File Date: 12/9/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA29.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/9/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

Model Simulation Log

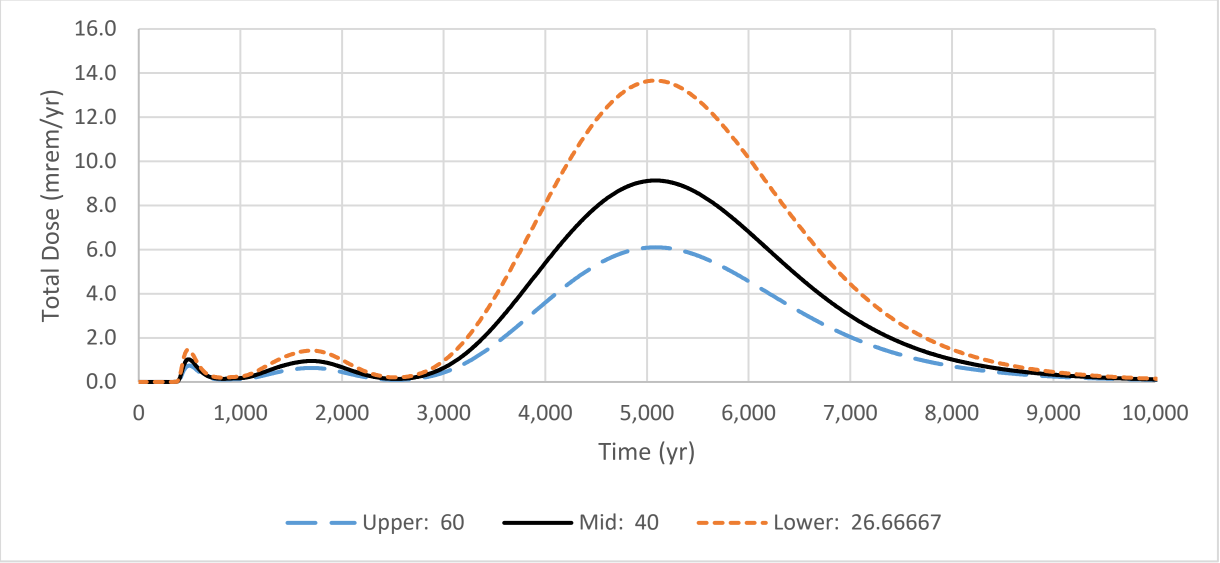
ID: BC_V01_SA30.ROF	
Performed By: R. Hupfer	Date: 12/9/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA30	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to the depth of aquifer contributing to well [DWIBWT], meat ingestion rate [DMI(1)], fraction of meat from affected area [FMEMI(1)], and fish ingestion rate [DFI(1)],	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA30\BC_V01_SA30.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA30\BC_V01_SA30_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA30\BC_V01_SA30.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA30\BC_V01_SA30.par OD\Projects\0011-D3\QA\BC\BC_V01_SA30\BC_V01_SA30_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA30\Out\BC_V01_SA30_GraphData.DAT OD\Projects\0011-D3\Sims\BC\BC_V01_SA30\BC_V01_SA30_RES.xlsx	

Comments on Model Outputs/Results:
Sensitivity analyses performed on depth of aquifer contributing to well, which was multiplied and divided by a factor of 1.5, meat ingestion rate, which was multiplied and divided by a factor of 1.19, fraction of meat from the affected area, which was multiplied and divided by a factor of 2, and fish ingestion rate, which was multiplied and divided by a factor of 2.

Depth of aquifer contributing to well [DWIBWT]

Peak total dose and timing of peak dose for the 1,000-year compliance period are sensitive to DWIBWT. Peak total dose and timing of peak dose for the 10,000-year simulation period are sensitive to DWIBWT.

1.5x SA on Depth of aquifer contributing to well [DWIBWT]

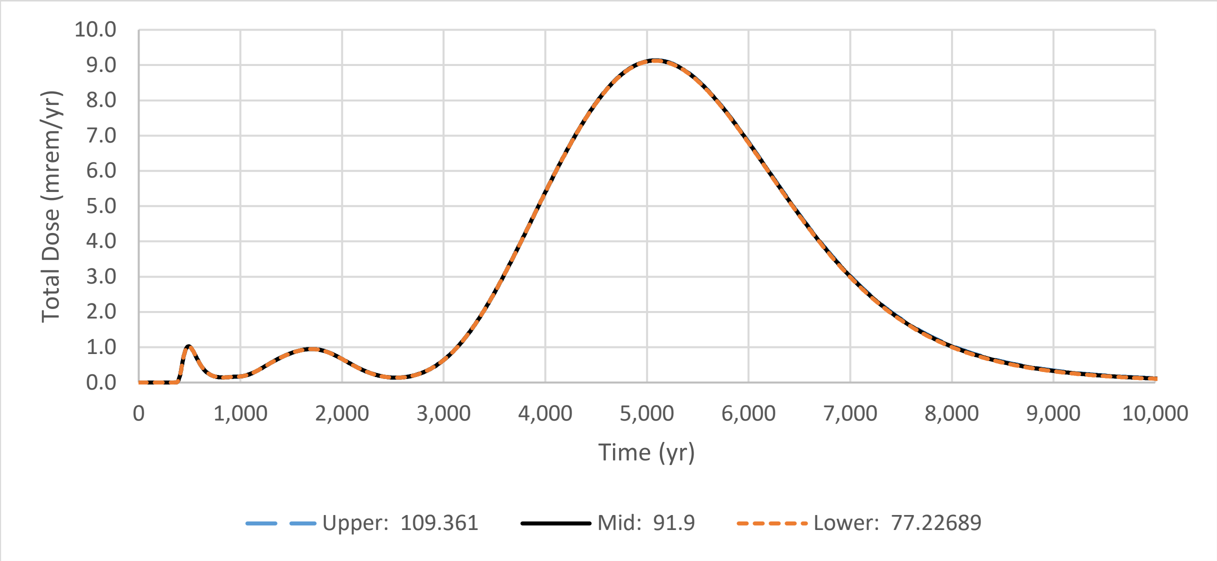


DWIBWT Value (m)	Upper: 60	Mid: 40	Lower: 26.667
Peak Dose 1k (mrem/yr)	0.74	1.03	1.46
Time of Peak Dose (yr)	500	490	485
Peak Dose 10k (mrem/yr)	6.10	9.13	13.66
Time of Peak Dose (yr)	5,084	5,084	5,079

Meat ingestion rate [DMI(1)]

Peak total dose and time of peak dose for the 1,000-year compliance period are not sensitive to the meat ingestion rate. Peak total dose and timing of peak dose for the 10,000-year simulation period are mildly sensitive to the meat ingestion rate.

1.19x SA on meat ingestion rate [DMI(1)]

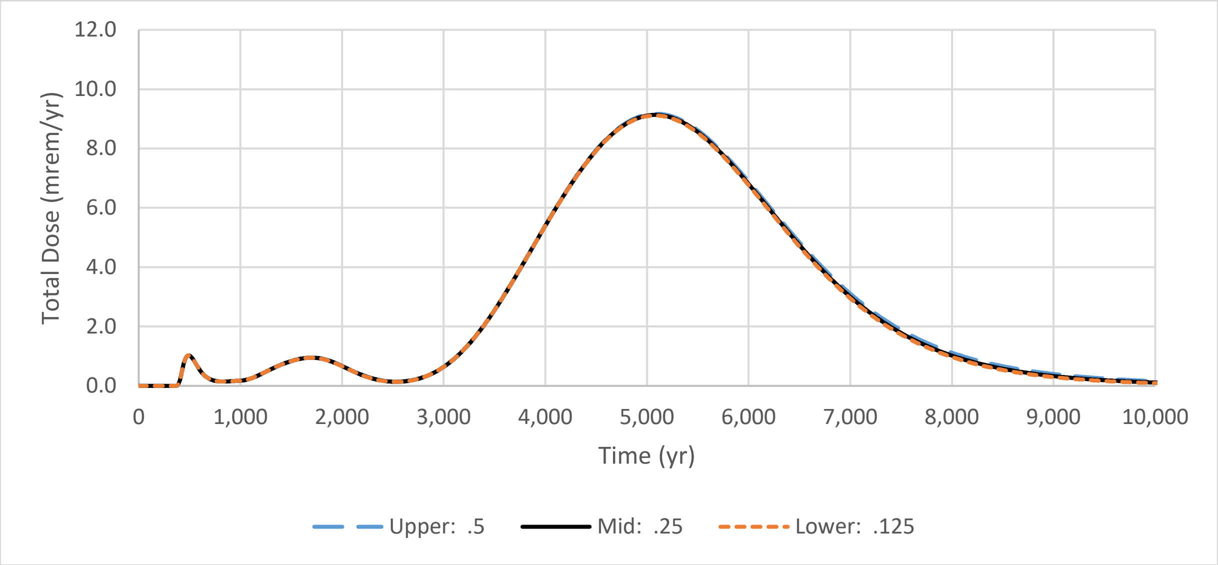


DMI(1) Value (kg/yr)	Upper: 109.361	Mid: 91.9	Lower: 77.22689
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.14	9.13	9.12
Time of Peak Dose (yr)	5,084	5,084	5,079

Fraction of meat from the affected are [FMEMI(1)]

Peak total dose and time of peak dose for the 1,000-year compliance period are not sensitive to FMEMI(1). Peak total dose and timing of peak dose for the 10,000-year simulation period are mildly sensitive to FMEMI(1).

2x SA on Fraction of meat from the affected area [FMEMI(1)]

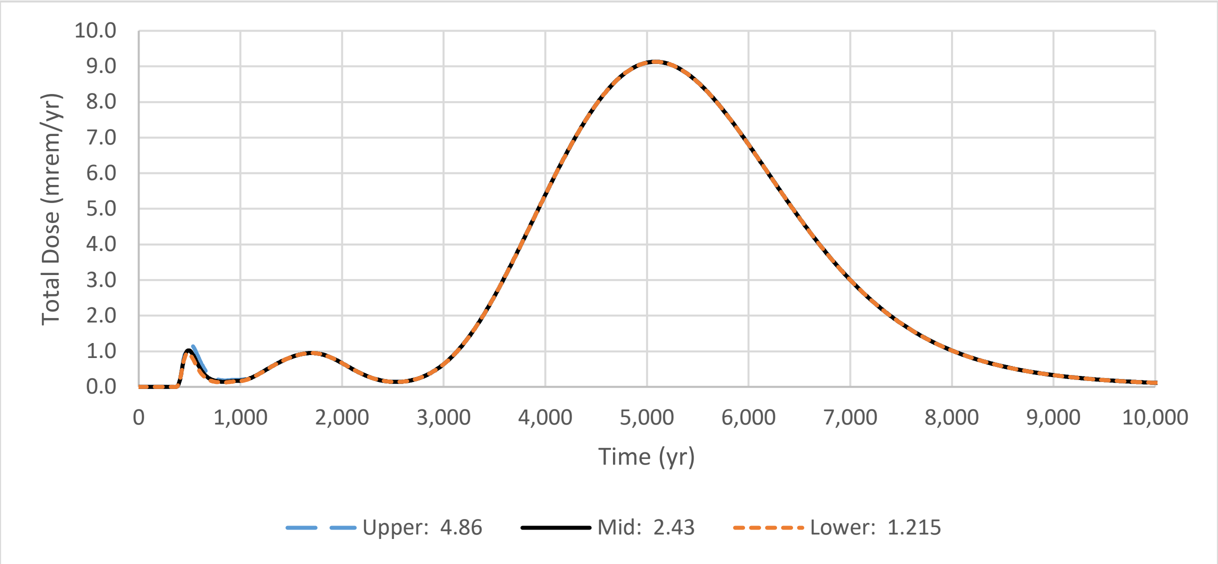


FMEMI(1) Value (--)	Upper: .5	Mid: .25	Lower: .125
Peak Dose 1k (mrem/yr)	1.03	1.03	1.03
Time of Peak Dose (yr)	490	490	490
Peak Dose 10k (mrem/yr)	9.17	9.13	9.11
Time of Peak Dose (yr)	5,088	5,084	5,079

Fish ingestion rate [DFI(1)]

Peak total dose and time of peak dose for the 1,000-year compliance period are sensitive to the fish ingestion rate. Peak total dose and timing of peak dose for the 10,000-year simulation period are not sensitive to the fish ingestion rate.

2x SA on Fish ingestion rate



DFI(1) Value (kg/yr)	Upper: 4.86	Mid: 2.43	Lower: 1.215
Peak Dose 1k (mrem/yr)	1.20	1.03	0.95
Time of Peak Dose (yr)	504	490	485
Peak Dose 10k (mrem/yr)	9.13	9.13	9.13
Time of Peak Dose (yr)	5,084	5,084	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 12/13/19

Signed: 4/9/2020

O. Warren 12/30/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA30.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/9/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 27						
Depth of aquifer contributing to well [DWIBWT]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA30\BC_V01_SA30.ROF	Applied a sensitivity analysis factor of 1.5 to depth of aquifer contributing to well [DWIBWT]	Y	J. Davis 12/13/19 O. Warren 12/30/2019		
Meat ingestion rate [DMI(1)]		Applied a sensitivity analysis factor of 1.19 to meat ingestion rate [DMI(1)]	Y	J. Davis 12/13/19 O. Warren 12/30/2019		
Fraction of meat from the affected area [FMEMI(1)]		Applied a sensitivity analysis factor of 2 to fraction of meat from affected area [FMEMI(1)]	Y	J. Davis 12/13/19 O. Warren 12/30/2019		
Fish ingestion rate [DFI(1)]		Applied a sensitivity analysis factor of 2 to fish ingestion rate [DFI(1)]	Y	J. Davis 12/13/19 O. Warren 12/30/2019		
BC_V01_SA30_QA.xlsx comments	OD\Projects\0011-D3\QA\BC\BC_V01_SA30\BC_V01_SA30_QA.xlsx	All comments in BC_V01_SA30_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA30.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/9/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA30.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/9/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA30.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/9/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA30.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/9/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

Model Simulation Log

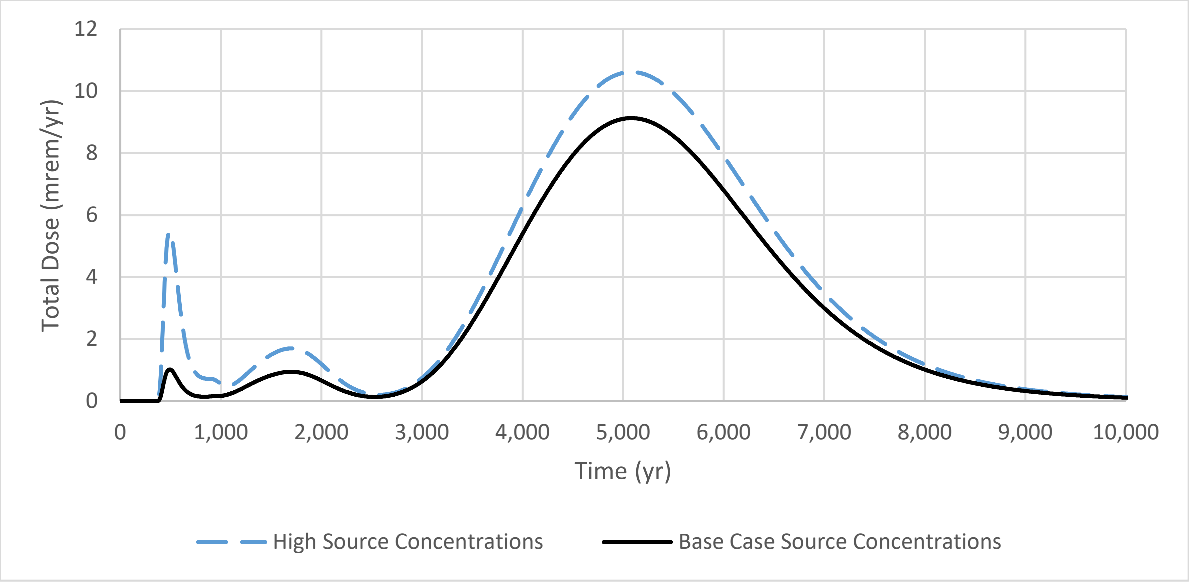
ID: BC_V01_SA31.ROF	
Performed By: R. Hupfer	Date: 1/9/2020
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA31	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to higher radionuclide source concentration in the waste compared to the base case values.	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA31\ BC_V01_SA31.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA31\BC_V01_SA31_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA31\BC_V01_SA31.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA31\ BC_V01_SA31.par OD\Projects\0011-D3\Sims\BC\BC_V01_SA31\Out\BC_V01_SA31_SUMMARY.REP OD\Projects\0011-D3\Sims\BC\BC_V01_SA31\BC_V01_SA31_RES.xlsx	

Comments on Model Outputs/Results:
Base case model simulated with radionuclide source concentrations higher than the base case to evaluate the impact of increased source concentrations on deterministic dose. Source concentrations used in SA 31 are the as-disposed waste concentrations for C-14, I-129, and Tc-99, which do not account for activity loss during the operational period. Source concentrations were not changed for any other simulated radionuclide, as dose contributions from all other radionuclides besides C-14, I-129 and Tc-99 are negligible.

Radionuclide	Base Case Source Concentration (pCi/g)	SA31 Source Concentration (pCi/g)
C-14	0.540	2.88
I-129	0.350	0.407
Tc-99	1.56	2.80

Soil Concentrations
Peak total dose for the 1,000-year compliance period is sensitive to increasing the waste source concentrations, which causes a higher peak dose. The timing of the peak dose during the compliance period is not sensitive to the source concentrations. Peak total dose for the 10,000-year simulation period is sensitive to increasing the source concentrations, which causes a higher peak dose. The timing of the peak dose during the 10,000-year simulation period is not sensitive to the source concentrations.

Sensitivity Analysis on radionuclide source concentrations



SA Value	High Concentrations	Base Case Concentrations
Peak Dose 1k (mrem/yr)	5.47	1.03
Time of Peak Dose (yr)	490	490
Peak Dose 10k (mrem/yr)	10.62	9.13
Time of Peak Dose (yr)	5,079	5,084

General Comments External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated
Checked by & date: N. Holt, PE 1/13/2020 Nathan Holt Signed: 4/9/2020 O. Warren, 3/9/2020 Olivia Warren Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA31.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/9/2020	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 31						
C-14 Soil Concentration	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA31\ BC_V01_SA31.ROF	Changed C-14 soil concentration to 2.88 pCi/g	Y	N. Holt, PE 1/13/2020 O. Warren, 3/9/2020		
I-129 Soil Concentration		Changed I-129 soil concentration to 0.407 pCi/g	Y	N. Holt, PE 1/13/2020 O. Warren, 3/9/2020		
Tc-99 Soil Concentration		Changed Tc-99 soil concentration to 2.80 pCi/g	Y	N. Holt, PE 1/13/2020 O. Warren, 3/9/2020		
BC_V01_SA31_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_ SA31\ BC_V01_SA31_ QA.xlsx	All comments in BC_V01_SA31_QA.xlsx have been addressed	Y	All comments have been addressed. O. Warren 3/11/2020 N. Holt, PE 3/13/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA31.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/9/2020	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA31.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/9/2020	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA31.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/9/2020	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA31.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/9/2020	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Nathan Holt Signed: 4/9/2020

Model Simulation Log

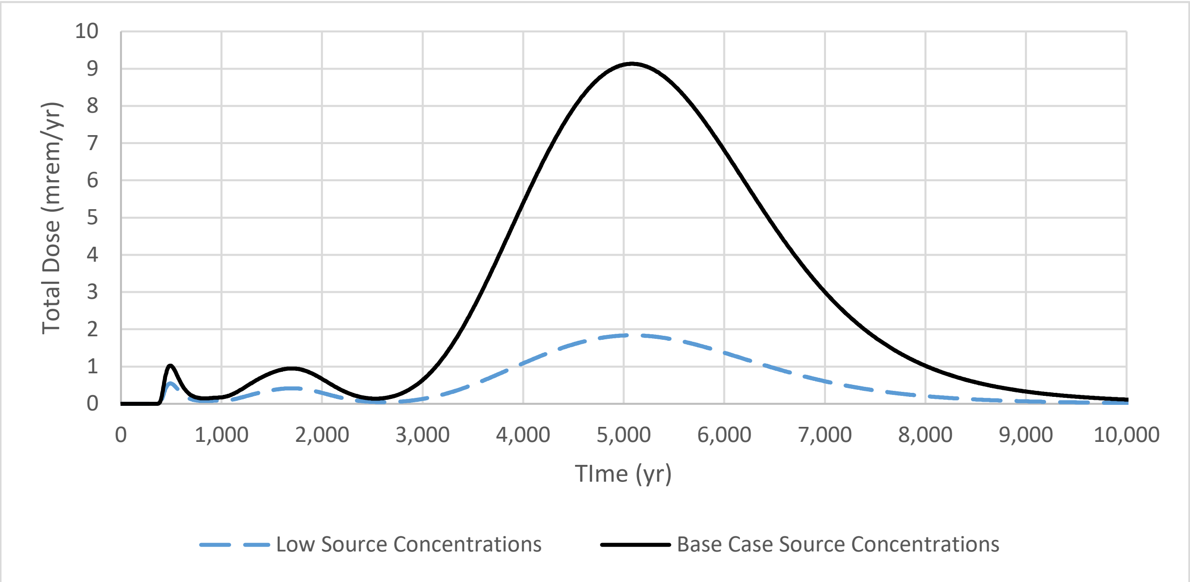
ID: BC_V01_SA32.ROF	
Performed By: R. Hupfer	Date: 1/9/2020
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model SA32	
Purpose of Simulation: To determine the sensitivity of the base case deterministic results to lower radionuclide source concentrations in the waste compared to the base case values.	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA32\BC_V01_SA32.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA32\BC_V01_SA32_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\BC\BC_V01_SA32\BC_V01_SA32.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\BC\BC_V01_SA32\BC_V01_SA32.par OD\Projects\0011-D3\Sims\BC\BC_V01_SA32\Out\BC_V01_SA32_SUMMARY.REP OD\Projects\0011-D3\Sims\BC\BC_V01_SA32\BC_V01_SA32_RES.xlsx	

Comments on Model Outputs/Results:
Base case model simulated with radionuclide source concentrations lower than the base case to evaluate the impact of decreased source concentrations on deterministic dose. Source concentrations used in SA 32 are the equal to 10% of the base case (as-disposed) value (C-14) or based on available data excluding the high outliers (I-129 and Tc-99). Source concentrations were not changed for any other simulated radionuclide, as dose contributions from all other radionuclides besides C-14, I-129 and Tc-99 are negligible.

Radionuclide	Base Case Source Concentration (pCi/g)	SA32 Source Concentration (pCi/g)
C-14	0.540	0.288
I-129	0.350	0.0705
Tc-99	1.56	0.684

Soil Concentrations
Peak total dose for the 1,000-year compliance period is sensitive to decreasing the source concentrations, which causes a lower peak dose. The timing of the peak dose during the compliance period is not sensitive to the source concentrations. Peak total dose for the 10,000-year simulation period is sensitive to decreasing the source concentrations, which causes a lower peak dose. The timing of the peak dose during the10,000-year simulation period is not sensitive to the source concentrations.

Sensitivity Analysis on radionuclide source concentrations



SA Value	Low Source Concentrations	Base Case Source Concentrations
Peak Dose 1k (mrem/yr)	0.55	1.03
Time of Peak Dose (yr)	490	490
Peak Dose 10k (mrem/yr)	1.84	9.13
Time of Peak Dose (yr)	5,079	5,084

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

N. Holt, PE 1/13/2020

 Signed: 4/9/2020

O. Warren, 3/9/2020

 Signed: 4/9/2020

Model Check Form

New Model ID (or filename): BC_V01_SA32.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/9/2020	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter changes made to assess sensitivity in the base case model sensitivity analysis 32						
C-14 Soil Concentration	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\BC\ BC_V01_SA32\ BC_V01_SA32.ROF	Changed C-14 soil concentration to 0.288 pCi/g	Y	N. Holt, PE 1/13/2020 O. Warren 3/9/2020		
I-129 Soil Concentration		Changed I-129 soil concentration to 0.0705 pCi/g	Y	N. Holt, PE 1/13/2020 O. Warren 3/9/2020		
Tc-99 Soil Concentration		Changed Tc-99 soil concentration to 0.684 pCi/g	Y	N. Holt, PE 1/13/2020 O. Warren 3/9/2020		
BC_V01_SA32_QA.xlsx comments	OD\Projects\0011-D3\ QA\BC\BC_V01_SA32\ BC_V01_SA32_QA.xlsx	All comments in BC_V01_SA32_QA.xlsx have been addressed	Y	All comments have been addressed. O. Warren 3/11/2020 N. Holt, PE 3/13/2020		

Model Check Form

New Model ID (or filename): BC_V01_SA32.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/9/2020	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA32.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/9/2020	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA32.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/9/2020	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): BC_V01_SA32.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/9/2020	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

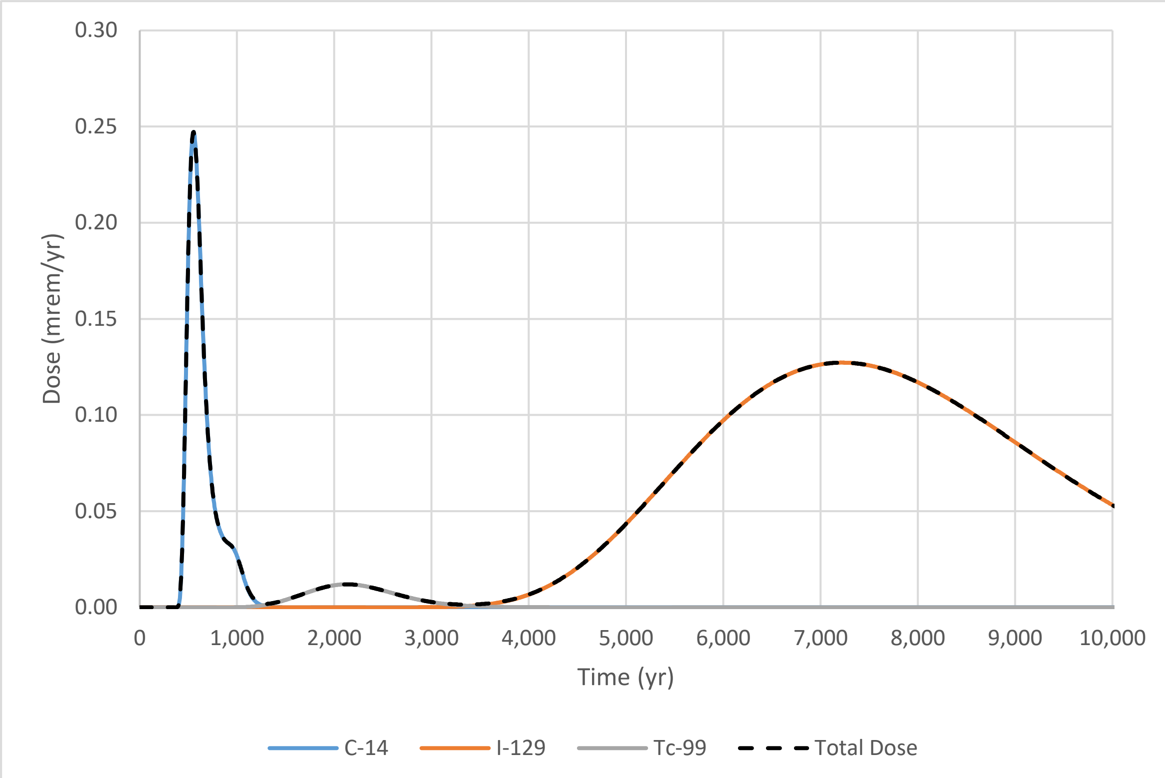
If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Nathan Holt Signed: 4/9/2020

Model Simulation Log

ID: CA_V01.ROF	
Performed By: R. Hupfer	Date: 11/4/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Composite Analysis	
Purpose of Simulation: To provide deterministic dose predictions for the base case scenario with all water for human consumption originating from the surface water body (Bear Creek) for a 10,000-year simulation period	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\CA\CA_V01\ CA_V01.ROF	
Comments on Input Data: Supporting Files: OD/Projects/0011-D3/QA/CA/CA_V01/CA_V01_QA.xlsx	
Names of Output Files: OD/Projects/0011-D3/QA/CA/CA_V01/CA_V01.par OD/Projects/0011-D3/Sims/CA/CA_V01/Out/CA_V01_SUMMARY.REP OD/Projects/0011-D3/Sims/CA/CA_V01/CA_V01_RES.xlsx	
Comments on Model Outputs/Results: Peak dose (all radionuclides, all pathway summed) for the compliance period is approximately of 0.25 mrem/yr and occurs at approximately 550 yr. C-14 contributes the most to the total dose during the compliance period (peak dose = 0.25 mrem/yr) The highest contributing pathways for the compliance period are (in descending order): ingestion of fish, water, plant (waterborne), milk (waterborne), and meat (waterborne) Peak dose for the 10,000-year simulation period is 0.25 mrem/yr and occurs at approximately 550 yr. C-14 contributes the most during the 10,000-year simulation period (peak dose = 0.25 mrem/yr) to total dose. The highest contributing pathways for the 10,000-year simulation period (in descending order) are: ingestion of fish, meat (waterborne), water, milk (waterborne), and plant (waterborne).	

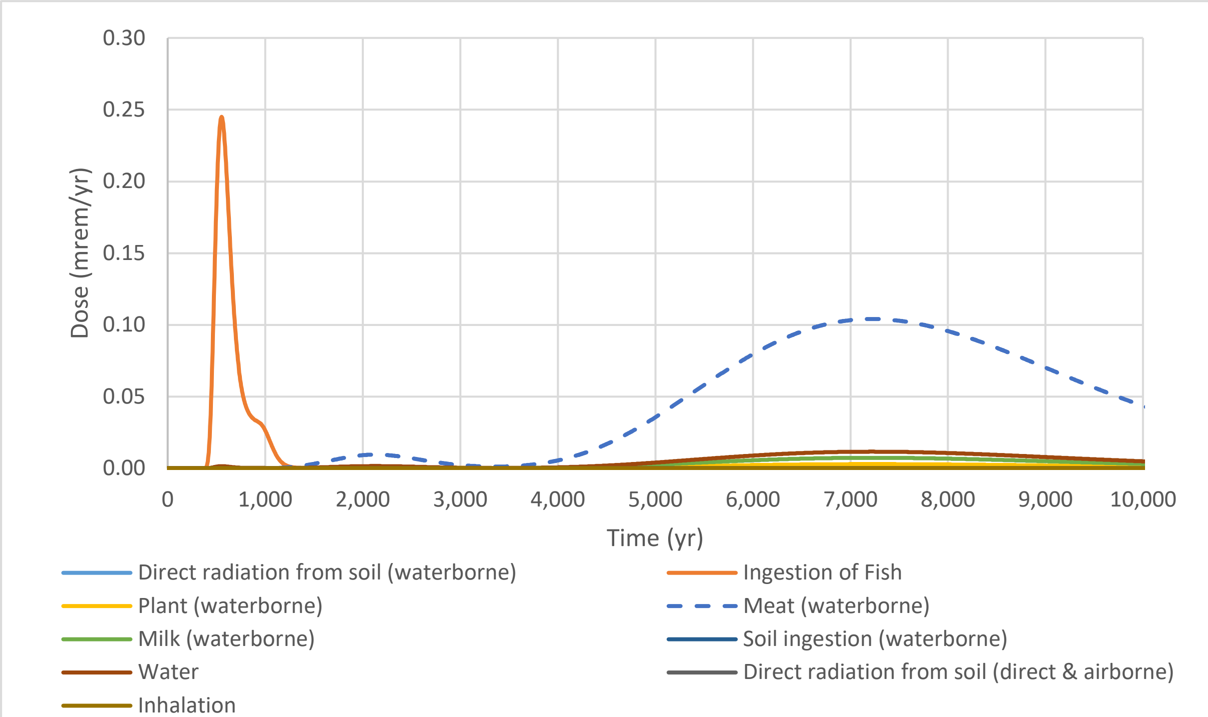
Total and Radionuclide Doses



Temporal plot of top contributing radionuclide (all pathways summed) and total dose (all pathways summed) for the 10,000-year simulation period.

Radionuclide	C-14	I-129	Tc-99	Total
Peak Dose Compliance Period (mrem/yr)	0.25	2.94E-43	4.72E-05	0.25
Time of Peak Dose (yr)	553	1,004	1,004	553
Peak Dose 10,000-year (mrem/yr)	0.25	0.13	0.01	0.25
Time of Peak Dose (yr)	553	7,219	2,130	553

Component Pathway Doses



General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis, PhD 1/7/2020

Signed: 4/9/2020

N. Holt, PE 1/7/2020

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): CA_V01.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/4/19	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter inputs in the base case model						
Fraction of water from surface water body for consumption by humans [FSWD]	Initial model check, parameter spreadsheet: OD/Projects/0011-D3/QA/CA/CA_V01/ CA_V01_QA.xlsx	Changed from 0 to 1, all water consumption from surface water body	Y	J. Davis, 1/7/2020 N. Holt, PE 1/7/2020		
Fraction of water from well for consumption by humans [FWWD]		Changed from 1 to 0, all water consumption from surface water body	Y	J. Davis, 1/7/2020 N. Holt, PE 1/7/2020		
Fraction of water from surface water body for use indoors of dwelling [FSWHH]		Changed from 0 to 1, all water for indoor use from surface water body	Y	J. Davis, 1/7/2020 N. Holt, PE 1/7/2020		
Fraction of water from well for use indoors of dwelling [FWWHH]		Changed from 1 to 0, all water for indoor use from surface water body	Y	J. Davis, 1/7/2020 N. Holt, PE 1/7/2020		
CA_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\CA\ CA_V01\ CA_V01_QA.xlsx	All comments in CA_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 N. Holt, PE 3/13/2020		

Model Check Form

New Model ID (or filename): CA_V01.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 11/4/19	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): CA_V01.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/4/19	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): CA_V01.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/4/19	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): CA_V01.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 11/4/19	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Nathan Holt Signed: 4/9/2020

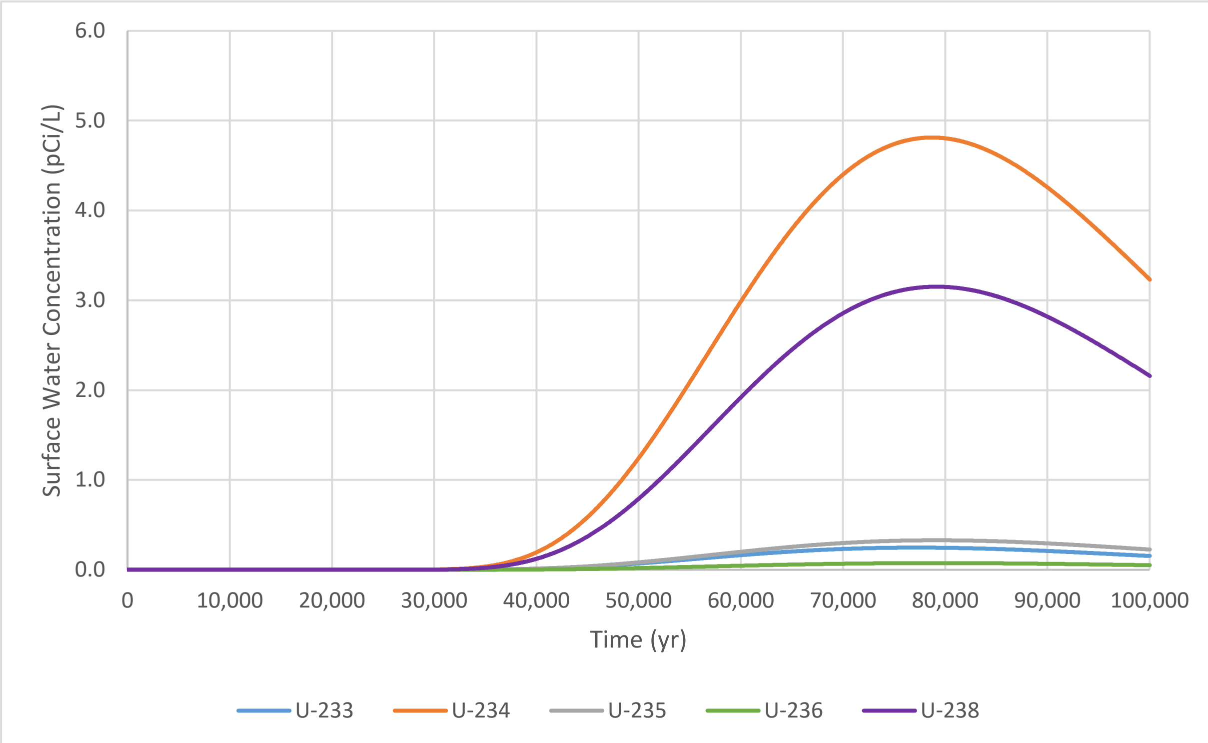
Model Simulation Log

ID: CA_V01_100K.ROF	
Performed By: R. Hupfer	Date: 1/7/2020
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Composite Analysis Model 100,000-Year	
Purpose of Simulation: To provide deterministic dose predictions for the base case scenario with all water for human consumption originating from the surface water body (Bear Creek) for a 100,000-year simulation period	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\CA\CA_V01_100K\CA_V01_100K.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\CA\CA_V01_100K\CA_V01_100K_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\CA\CA_V01_100K\CA_V01_100K.par OD\Projects\0011-D3\Sims\CA\CA_V01_100K\Out\CA_V01_100K_SUMMARY.REP OD\Projects\0011-D3\Sims\CA\CA_V01_100K\CA_V01_100K_RES.xlsx	
Comments on Model Outputs/Results: Peak surface water concentrations for U-isotopes the 100,000-year simulation occur between 75,000- and 80,000-years post-closure. Of the U-isotopes, U-234 is predicted to have the highest peak surface water concentration the highest surface water concentration for the U-isotopes, 4.81 pCi/L. U-232 is not predicted to be present in the surface water body during the 100,000-year simulation period.	

Predicted Peak Surface Water Concentrations for U Isotopes during the 100,000-Year Simulation of the Composite Analysis

Radionuclide	U-233	U-234	U-235	U-236	U-238
Peak Surface Water Concentration (pCi/L)	0.25	4.81	0.33	0.07	3.15
Time of Peak Concentration (yr)	77,123	78,686	79,125	79,125	79,125

Predicted Surface Water Concentrations for U-Isotopes During the 100,000-year simulation of the Composite Analysis

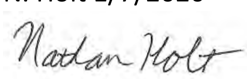


General Comments

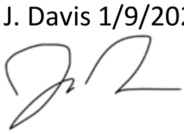
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

N. Holt 1/7/2020


Signed: 4/9/2020

J. Davis 1/9/2020


Signed: 4/9/2020

Model Check Form

New Model ID (or filename): CA_V01_100K.ROF	**Source Model ID (or filename):** CA_V01.ROF
New Model File Date: 11/4/19	**Source Model File Date:** 11/4/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter inputs in the base case model						
Reporting times [T(2) – T(10)]	Initial model check, parameter spreadsheet: OP/0011-D3/QA/CA/ CA_V01_100K/ CA_V01_100K_QA	Changed reporting times [T(2) – T(10)] to the following: 200; 1,000; 10,000; 20,000; 30,000; 40,000; 50,000; 80,000; 100,000	N	Found bug/error in the Kd for all Th isotopes agricultural area 3 value. J. Davis, 1/7/20	Resolved issue by changing Th-228 Kd in agricultural area 3 (pasture and silage field) to 2,999.999 ml/g, which rounds up to 3,000 ml/g in CA_V01_100K.par	Y. All values found to be correct. J. Davis 1/9/2020
Reporting times [T(2) – T(10)]	Initial model check, parameter spreadsheet: OP/0011-D3/QA/CA/ CA_V01_100K/ CA_V01_100K_QA	Changed reporting times [T(2) – T(10)] to the following: 200; 1,000; 10,000; 20,000; 30,000; 40,000; 50,000; 80,000; 100,000	Y	Reporting times correct and no Kd error found in CA_V01_100k.par file after the model was updated as described above. N. Holt, PE 1/7/2020		
CA_V01_100K_QA.xlsx comments	OD\Projects\0011-D3\QA\CA\ CA_V01_100K\ CA_V01_100K_ QA.xlsx	All comments in CA_V01_100K_QA.xlsx have been addressed	Y	All comments were addressed. J. Davis 3/10/2020 N. Holt, PE 3/13/2020		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
CA_V01_100K.ROF	CA_V01.ROF
New Model File Date: 11/4/19	**Source Model File Date:** 11/4/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): CA_V01_100K.ROF	**Source Model ID (or filename):** CA_V01.ROF
New Model File Date: 11/4/19	**Source Model File Date:** 11/4/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): CA_V01_100K.ROF	Source Model ID (or filename): CA_V01.ROF
New Model File Date: 11/4/19	**Source Model File Date:** 11/4/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): CA_V01_100K.ROF	**Source Model ID (or filename):** CA_V01.ROF
New Model File Date: 11/4/19	**Source Model File Date:** 11/4/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

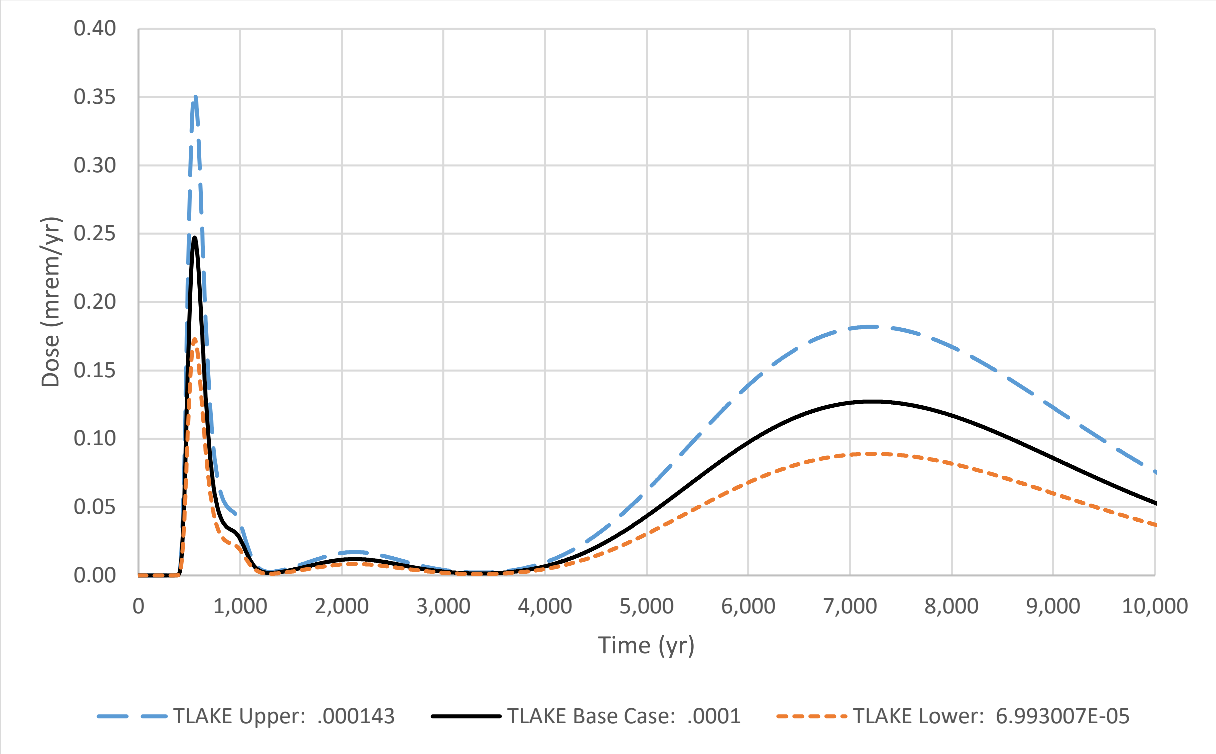
If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Nathan Holt Signed: 4/9/2020

Model Simulation Log

ID: CA_V01_SA1.ROF	
Performed By: R. Hupfer	Date: 1/14/2020
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Composite Analysis Sensitivity Analysis 1	
Purpose of Simulation: To determine the sensitivity of the composite analysis deterministic results to the mean residence time of water in surface water body.	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\CA\CA_V01_SA1\ CA_V01_SA1.ROF	
Comments on Input Data: Supporting Files: OD/Projects/0011-D3/QA/CA/CA_V01_SA1/CA_V01_SA1_QA.xlsx	
Names of Output Files: OD/Projects/0011-D3/QA/CA/CA_V01_SA1/CA_V01_SA1.par OD/Projects/0011-D3/QA/CA/CA_V01_SA1/CA_V01_SA1_GraphData.DAT OD/Projects/0011-D3/Sims/CA/CA_V01_SA1/Out/CA_V01_SA1_SUMMARY.REP OD/Projects/0011-D3/Sims/CA/CA_V01_SA1/CA_V01_SA1_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analysis performed on mean residence time of water in surface water body [TLAKE], which was multiplied and divided by a factor of 1.43. Peak total dose for the compliance period and 10,000-year simulation are sensitive to the mean residence time of water in the surface water body. A longer residence time causes a higher peak dose, while a shorter residence time causes a lower peak dose. Timing of the peak dose for the compliance period and 10,000-year simulation period are not sensitive to the mean residence time of water in surface water body.	

Total Dose



Mean Residence Time (yr)	1.43E-04	1.00E-04	6.99E-05
Peak Dose 10,000-year Simulation Period (mrem/yr)	0.35	0.25	0.17
Time of Peak Dose	553	553	553

General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 1/17/20

Signed: 4/9/2020

N. Holt, PE 1/17/2020

Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
CA_V01_SA1.ROF	CA_V01.ROF
New Model File Date: 1/17/20	**Source Model File Date:** 11/4/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analysis performed in the composite analysis model sensitivity analysis 1						
Sensitivity analysis factor applied to mean residence time of water in surface water body [TLAKE]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\CA\CA_V01_SA1\CA_V01_SA1.ROF	Applied a sensitivity analysis factor of 1.43 to mean residence time of water in surface water body [TLAKE]	Y	1.43 SA Factor applied. J. Davis 1/17/20 N. Holt, PE 1/17/2020		
CA_V01_SA1_QA.xlsx comments	OD\Projects\0011-D3\QA\CA\CA_V01_SA1\CA_V01_SA1_QA.xlsx	All comments in CA_V01_SA1_QA.xlsx have been addressed	Y	All comments were addressed. J. Davis 3/10/2020 N. Holt, PE 3/13/2020		

Model Check Form

New Model ID (or filename): CA_V01_SA1.ROF	**Source Model ID (or filename):** CA_V01.ROF
New Model File Date: 1/17/20	**Source Model File Date:** 11/4/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): CA_V01_SA1.ROF	**Source Model ID (or filename):** CA_V01.ROF
New Model File Date: 1/17/20	**Source Model File Date:** 11/4/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): CA_V01_SA1.ROF	**Source Model ID (or filename):** CA_V01.ROF
New Model File Date: 1/17/20	**Source Model File Date:** 11/4/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): CA_V01_SA1.ROF	**Source Model ID (or filename):** CA_V01.ROF
New Model File Date: 1/17/20	**Source Model File Date:** 11/4/19

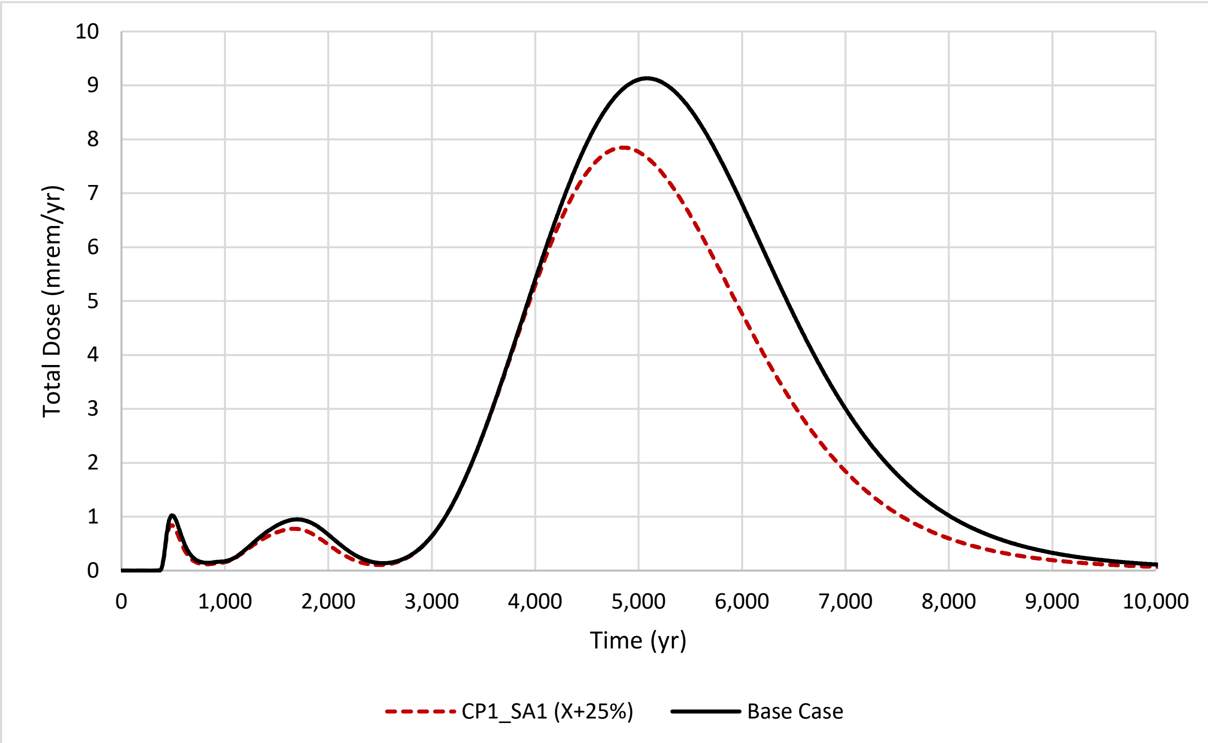
Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Nathan Holt Signed: 4/9/2020

Model Simulation Log

ID: CP1_SA1.ROF	
Performed By: R. Hupfer	Date: 1/31/2020
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: CP1_SA1	
Purpose of Simulation: To provide deterministic the sensitivity of base case model results to increasing the x-dimension of the primary contamination by 25% while maintaining the total waste volume of 2,200,000 yd^3	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\CP1\CP1_SA1\ CP1_SA1.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\CP1\CP1_SA1\CP1_SA1_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\CP1\CP1_SA1\CP1_SA1.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\CP1\CP1_SA1\ CP1_SA1.par OD\Projects\0011-D3\Sims\CP1\CP1_SA1\CP1_SA1_RES.xlsx	
Comments on Model Outputs/Results: Base case results are sensitive to increasing the x-dimension of the primary contamination by 25% while maintaining the total waste volume of 2,200,000 yd^3	



General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 2/6/20

Signed: 4/9/2020

O. Warren 3/10/2020

Signed: 4/13/2020

Model Check Form

New Model ID (or filename): CP1_SA1.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/31/2020	**Source Model File Date:** 10/25/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter inputs in the base case model						
X dimension of primary contamination [SOURCEXY(1)]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\CP1\CP1_SA1\CP1_SA1.ROF	X dimension of primary contamination [SOURCEXY(1)] changed to 313.25 m	Y	J. Davis 2/6/20 O. Warren 3/10/2020		
Y dimension of primary contamination [SOURCEXY(2)]		Y dimension of primary contamination [SOURCEXY(2)] changed to 306.16 m	Y	J. Davis 2/6/20 O. Warren 3/10/2020		
Length of contamination parallel to aquifer flow [LCZPAQ]		Length of contamination parallel to aquifer flow [LCZPAQ] changed to 319.4 m	Y	J. Davis 2/6/20 O. Warren 3/10/2020		
Shape factors dwelling location coordinate in x-direction		Shape factors dwelling location in x-direction changed to 239 m	Y	J. Davis 2/6/20 O. Warren 3/10/2020		
Shape factors dwelling location coordinate in y-direction		Shape factors dwelling location in y-direction changed to 568 m	Y	J. Davis 2/6/20 O. Warren 3/10/2020		

Model Check Form

New Model ID (or filename): CP1_SA1.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/31/2020	**Source Model File Date:** 10/25/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Shape factors radii	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\CP1\ CP1_SA1\ CP1_SA1.ROF	Shape factors radii changed to the following values: • 39.75 • 79.50 • 119.25 • 159.00 • 198.75 • 238.50 • 278.25 • 318.00 • 357.50 • 397.50 • 437.25 • 477.00	Y	J. Davis 2/6/20 O. Warren 3/10/2020		
Shape factors fractions	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\CP1\ CP1_SA1\ CP1_SA1.ROF	Shape factors fractions changed to the following values: • 0.000 • 0.000 • 0.003 • 0.180 • 0.230 • 0.230 • 0.220 • 0.180 • 0.160 • 0.140 • 0.110 • 0.018	Y	J. Davis 2/6/20 O. Warren 3/10/2020		

Model Check Form

New Model ID (or filename): CP1_SA1.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/31/2020	**Source Model File Date:** 10/25/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
CP1_SA1_QA.xlsx comments	OD\Projects\0011-D3\QA\CP1\CP1_SA1\CP1_SA1_QA.xlsx	All comments in CP1_SA1_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
New Model ID (or filename): CP1_SA1.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/31/2020	**Source Model File Date:** 10/25/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): CP1_SA1.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/31/2020	**Source Model File Date:** 10/25/2019

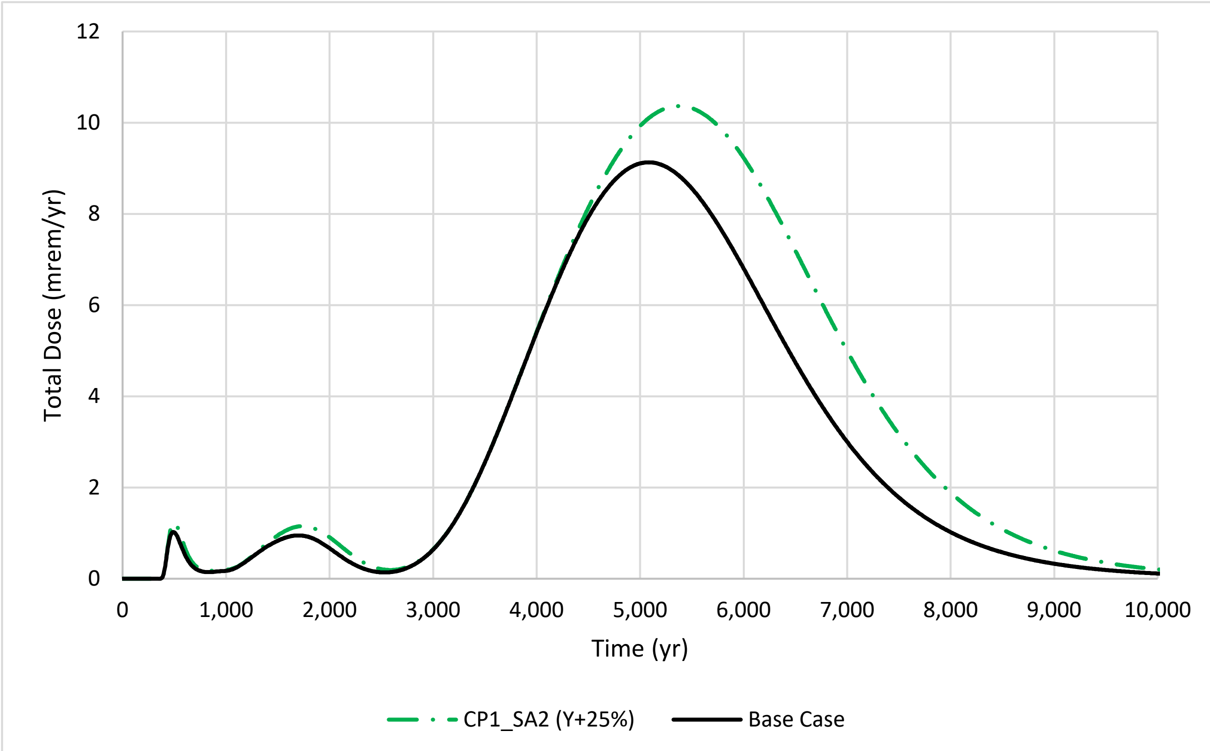
Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/13/2020

Model Simulation Log

ID: CP1_SA2.ROF	
Performed By: R. Hupfer	Date: 1/31/2020
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: CP1_SA2	
Purpose of Simulation: To provide deterministic the sensitivity of base case model results to increasing the y-dimension of the primary contamination by 25% while maintaining the total waste volume of 2,200,000 yd^3	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\CP1\CP1_SA2\CP1_SA2.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\CP1\CP1_SA2\CP1_SA2_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\CP1\CP1_SA2\CP1_SA2.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\CP1\CP1_SA2\CP1_SA2.par OD\Projects\0011-D3\Sims\CP1\CP1_SA2\CP1_SA2_RES.xlsx	
Comments on Model Outputs/Results: Base case results are sensitive to increasing the y-dimension of the primary contamination by 25% while maintaining the total waste volume of 2,200,000 yd^3	



General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis 2/6/20

Signed: 4/9/2020

O. Warren 3/10/2020

Signed: 4/13/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
CP1_SA2.ROF	BC_V01.ROF
New Model File Date: 1/31/2020	**Source Model File Date:** 9/20/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify parameter inputs in the base case model						
X dimension of primary contamination [SOURCEXY(1)]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\CP1\ CP1_SA2\ CP1_SA2.ROF	X dimension of primary contamination [SOURCEXY(1)] changed to 200.48 m	Y	J. Davis 2/6/20 O. Warren 3/10/2020		
Y dimension of primary contamination [SOURCEXY(2)]		Y dimension of primary contamination [SOURCEXY(2)] changed to 478.375 m	Y	J. Davis 2/6/20 O. Warren 3/10/2020		
Length of contamination parallel to aquifer flow [LCZPAQ]		Length of contamination parallel to aquifer flow [LCZPAQ] changed to 498.7 m	Y	J. Davis 2/6/20 O. Warren 3/10/2020		
Shape factors dwelling location coordinate in x-direction		Shape factors dwelling location in x-direction changed to 295 m	Y	J. Davis 2/6/20 O. Warren 3/10/2020		
Shape factors dwelling location coordinate in y-direction		Shape factors dwelling location in y-direction changed to 654 m	Y	J. Davis 2/6/20 O. Warren 3/10/2020		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
CP1_SA2.ROF	BC_V01.ROF
New Model File Date: 1/31/2020	**Source Model File Date:** 9/20/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Shape factors radii	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\CP1\CP1_SA2\CP1_SA2.ROF	Shape factors radii changed to the following values: • 50.3333 • 100.6667 • 151.0000 • 201.3333 • 251.6667 • 302.0000 • 352.3333 • 402.6667 • 453.0000 • 503.3333 • 553.6667 • 604.0000	Y	J. Davis 2/6/20 O. Warren 3/10/2020		
Shape factors fractions	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\CP1\CP1_SA2\CP1_SA2.ROF	Shape factors fractions changed to the following values: • 0.000 • 0.000 • 0.100 • 0.190 • 0.150 • 0.120 • 0.100 • 0.086 • 0.075 • 0.068 • 0.061 • 0.049	Y	J. Davis 2/6/20 O. Warren 3/10/2020		

Model Check Form

New Model ID (or filename): CP1_SA2.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/31/2020	**Source Model File Date:** 9/20/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
CP1_SA2_QA.xlsx comments	OD\Projects\0011-D3\QA\CP1\CP1_SA2\CP1_SA2_QA.xlsx	All comments in CP1_SA2_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): CP1_SA2.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/31/2020	**Source Model File Date:** 9/20/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): CP1_SA2.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/31/2020	**Source Model File Date:** 9/20/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

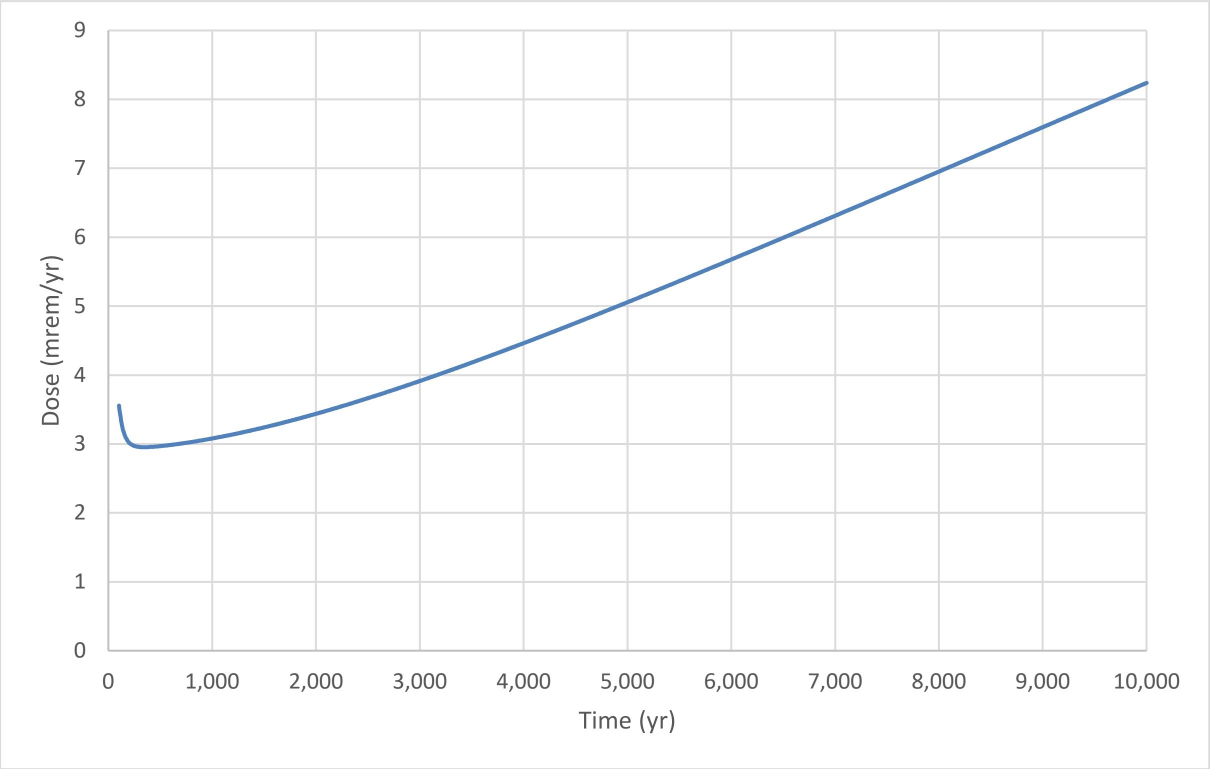
If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/13/2020

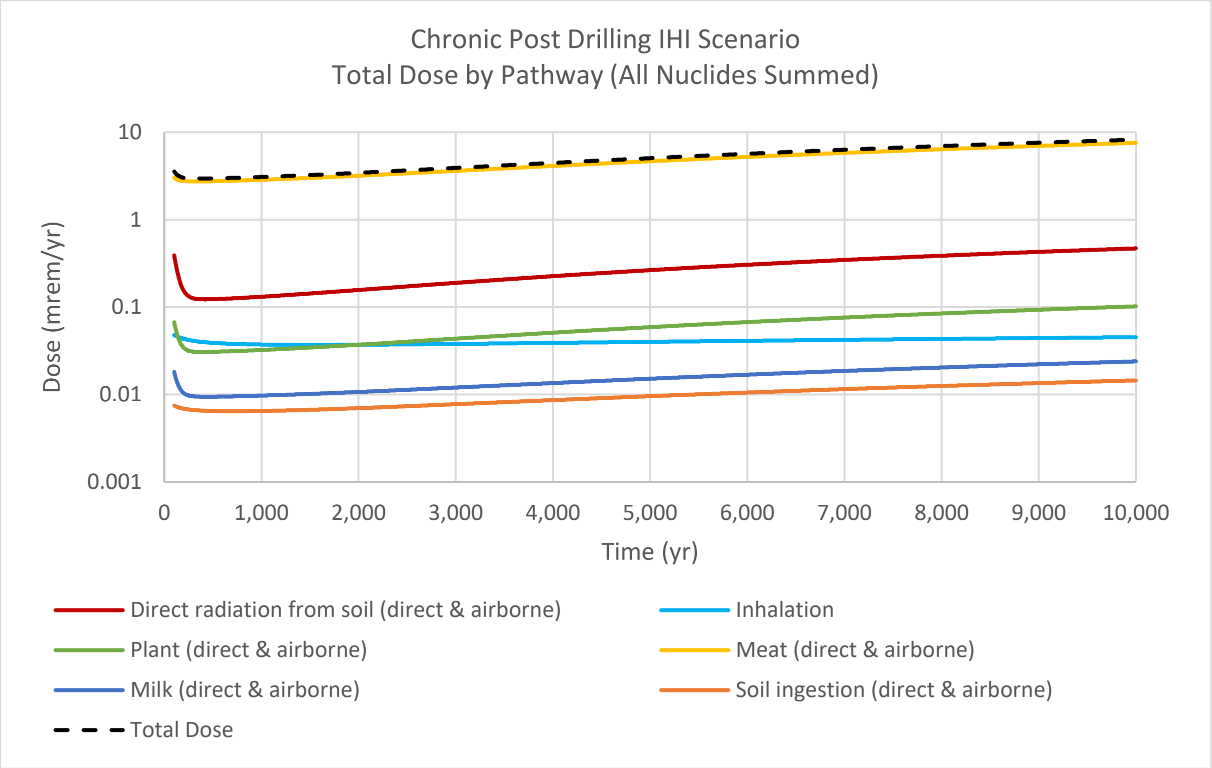
Model Simulation Log

ID: ICD_V01.ROF	
Performed By: Ryan Hupfer, PG	Date:10/28/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Inadvertent Human Intruder – Chronic Post Drilling	
Purpose of Simulation: Evaluation of the Inadvertent Human Intruder – Chronic Drilling scenario	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA/Desktop/RR-OS_Models/FLCEN0011/ICD/ICD_V01/ ICD_V01.ROF	
Comments on Input Data: Supporting Files: OD/Projects/0011-D3/QA/ICD_QA/ICD_V01_QA.xlsx	
Names of Output Files: OD/Projects/0011-D3/QA/ICD_QA/ICD_V01/ICD_V01.par OD/Projects/0011-D3/Sims/ICD/ICD_V01/ICD_V01_RES.xlsx	
Comments on Model Outputs/Results: Peak dose from 100 – 1,000 yr of 3.56 mrem/yr occurs at approximately 100 yr. Meat ingestion (direct and airborne) is the highest contributing pathway. U-234 is the radionuclide with the highest dose contribution.	

Total Dose



Dose from component pathways



General Comments External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, and soil ingestion pathways simulated
Checked by & date: J. Davis 10/29/2019 Signed: 4/9/2020 O. Warren 10/31/2019 Signed: 4/9/2020

Model Check Form

New Model ID (or filename): ICD_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 5/9/2019 09:12	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Update Inadvertent Human Intruder – Chronic Post Drilling Model						
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\ICD\ICD_V01\ICD_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\QA\ICD_QA\ICD_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	Y	Joshua Davis, PhD Values in ICD_V01_QA.xlsx are identical to those in output ICD_V01_SUMMARY.REP document and/or verified in the RESRAD model itself. 5/10/19		
Soil Concentrations	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\ICD\ICD_V01\ICD_V01.ROF	Updated soil concentrations based on new inventory values and well depth on 10/17/19	Y	Values were implemented correctly. J. Davis 10/29/19		
Fruit, grain, nonleafy vegetables transfer factors		Updated fruit, grain, nonleafy vegetables transfer factors to average of fruit, grain, and root vegetable transfer factors from PNNL 2003, as listed in *Transfer_Factors_V01.xlsx*	Y	Values were implemented correctly. J. Davis 10/29/19		
Smaller x coordinate of the surface water body [SWXY(1)]		Changed smaller x coordinate of the surface-water body to -575.4 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
ICD_V01.ROF	
New Model File Date: 5/9/2019 09:12	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Larger x coordinate of the surface water body [SWXY(2)]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\ICD\ICD_V01\ICD_V01.ROF	Changed larger x coordinate of the surface-water body to -475.4 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Soil b parameter of the contaminated zone [BCZ]		Changed soil b parameter of contaminated zone [BCZ] changed from 5.3 to 7.75 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Hydraulic conductivity of contaminated zone (below) [HCSZ]		Changed hydraulic conductivity of contaminated zone (below) [HCSZ] from 83.6 m/yr to 26.8 m/yr on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Runoff coefficient for fruit, grain, and nonleafy vegetables [RUNOF1]		Changed runoff coefficient for fruit, grain, and nonleafy vegetables [RUNOF1] to 0.625 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Runoff coefficient for leafy vegetables [RUNOF2]		Changed runoff coefficient for leafy vegetables [RUNOF2] to 0.625 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Runoff coefficient for pasture and silage field [RUNOF3]		Changed runoff coefficient for pasture and silage field [RUNOF3] to 0.625 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Runoff coefficient for grain field [RUNOF4]		Changed runoff coefficient for grain field [RUNOF4] to 0.625 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Runoff coefficient for dwelling site [RUNOFDWELL]		Changed runoff coefficient for dwelling site [RUNOFDWELL] to 0.625 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		

Model Check Form

New Model ID (or filename): ICD_V01.ROF	Source Model ID (or filename):
New Model File Date: 5/9/2019 09:12	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Dry bulk density of soil for dwelling site [RHOBDWELL]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\ ICD\ICD_V01\ ICD_V01.ROF	Changed dry bulk density of soil for dwelling site [RHOBDWELL] to 1.5 g/cm^3 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Total porosity of unsaturated zone 4 [TPUZ(4)]		Changed total porosity of unsaturated zone 4 [TPUZ(4)]to 0.419 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Effective porosity of unsaturated zone 4 [EPUZ(4)]		Changed effective porosity of unsaturated zone 4 [EPUZ(4)] to 0.234 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Field capacity of unsaturated zone 4 [FCUZ(4)]		Changed field capacity of unsaturated zone 4 [FCUZ(4)] to 0.307 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Hydraulic conductivity of unsaturated zone 4 [HCUZ(4)]		Changed hydraulic conductivity of unsaturated zone 4 [HCUZ(4)] to 3.15 m/yr on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Hydraulic conductivity of unsaturated zone 5 [HCUZ(5)]		Changed hydraulic conductivity of unsaturated zone 5 [HCUZ(5)] to 16.7 m/yr on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Dry bulk density of saturated zone [DENSAQ]		Changed dry bulk density of saturated zone [DENSAQ] to 2.1 g/cm^3 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Total porosity of saturated zone [TPSZ]		Changed total porosity of saturated zone [TPSZ] to 0.24 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		

Model Check Form

New Model ID (or filename): ICD_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 5/9/2019 09:12	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Effective porosity of saturated zone [EPSZ]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\ ICD\ICD_V01\ ICD_V01.ROF	Changed effective porosity of saturated zone [EPSZ] to 0.2 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Hydraulic conductivity of saturated zone [HCSZ]		Changed hydraulic conductivity of saturated zone [HCSZ] from 83.6 m/yr to 26.8 m/yr on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Hydraulic gradient to well [HGW]		Changed hydraulic gradient to well [HGW] to 0.054 m/m on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Hydraulic gradient to surface water body [HGSW]		Changed hydraulic gradient to surface water body [HGSW] to 0.036 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Depth of aquifer contributing to well [DWIBWT]		Changed depth of aquifer contributing to well [DWIBWT] to 40 m on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Distance from downgradient edge of contamination to surface water body in the direction parallel to aquifer flow [OFFLPAQS]		Changed distance from downgradient edge of contamination to surface water body in the direction parallel to aquifer flow [OFFLPAQS] to 315.468 m on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Convergence criterion [EPS]		Changed convergence criterion [EPS] to 0 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		

Model Check Form

New Model ID (or filename): ICD_V01.ROF	Source Model ID (or filename):
New Model File Date: 5/9/2019 09:12	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Fraction of meat from affected area [FMEMI(1)]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\ICD\ICD_V01\ICD_V01.ROF	Changed fraction of meat from affected area [FMEMI(1)] to 0.25 from 0.5 on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Pasture and silage intake for dairy cows [LFI(2,1)]		Changed pasture and silage intake for dairy cows [LFI(2,1)] to 44 kg/d on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Grain intake for dairy cows [LFI(2,2)]		Changed grain intake for dairy cows [LFI(2,2)] to 11 kg/d on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
Root depth of leafy vegetables [DROOT(2)]		Changed root depth of leafy vegetables [DROOT(2)] to 0.9 m on 10/17/19	Y	Value was implemented correctly. J. Davis 10/29/19		
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\ICD\ICD_V01\ICD_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\QA\ICD_QA\ICD_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	Y	All values correct. J. Davis 10/29/19	Contaminated zone b parameter changed to 7.75	Y J. Davis 10/29/19
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\ICD\ICD_V01\ICD_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\QA\ICD_QA\ICD_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	N	BCZ is 5.3 instead of 7.75. Nd-144 distribution coefficients missing from Kd sheet. All other values in ICD_V01.par matched those in ICD_V01_QA.xlsx. O. Warren 10/28/2019	The following changes were made to ICD_V01.ROF to address reviewer comments: •Contaminated zone b parameter [BCZ] changed to 7.75	Y O. Warren 10/31/2019

Model Check Form

New Model ID (or filename): ICD_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 5/9/2019 09:12	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
ICD_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\ICD_QA\ICD_V01\ICD_V01_QA.xlsx	All comments in ICD_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): ICD_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 5/9/2019 09:12	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): ICD_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 5/9/2019 09:12	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

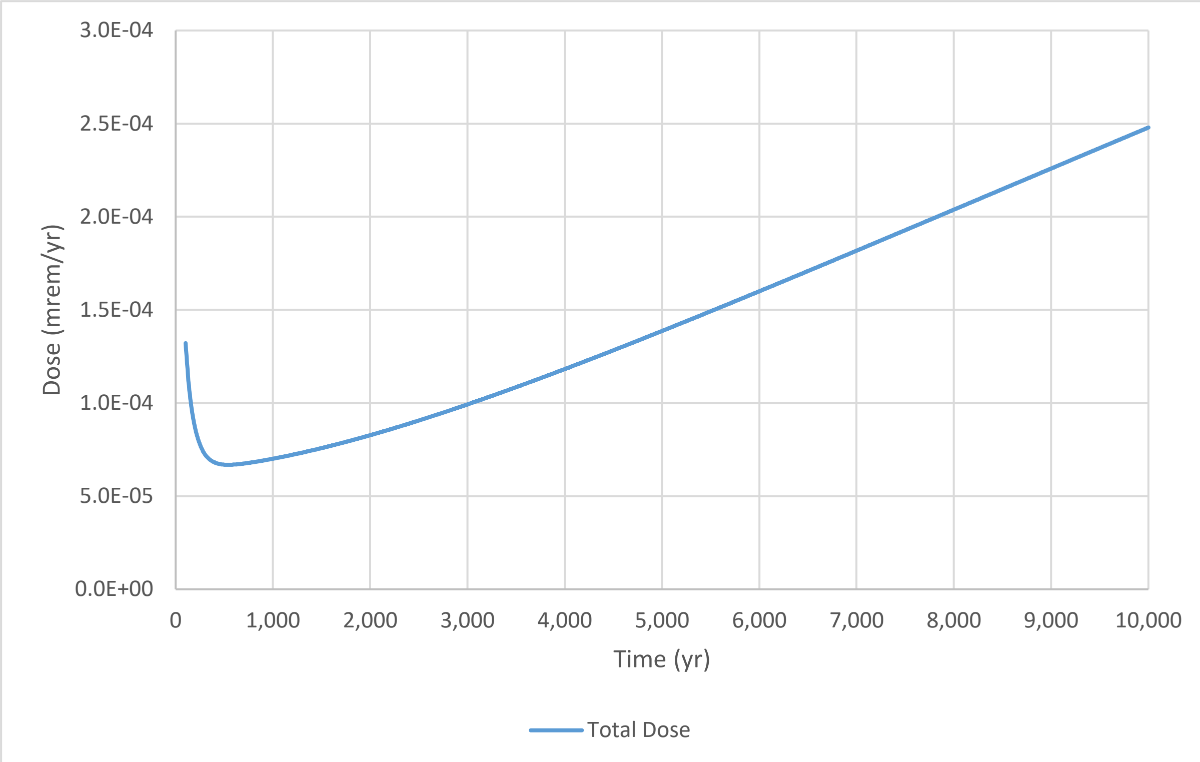
If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

ID: IDI_V01.ROF	
Performed By: Ryan Hupfer, PG	Date: 12/17/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Inadvertent Human Intruder – Acute Discovery	
Purpose of Simulation: Evaluation of the Inadvertent Human Intruder – Acute Discovery scenario	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA/Desktop/RR-OS_Models/FLCEN0011/IDI/IDI_V01/ IDI_V01.ROF	
Comments on Input Data: Supporting Files: OD/Projects/0011-D3/QA/IDI_QA/IDI_V01_QA/IDI_V01_QA.xlsx	
Names of Output Files: OD/Projects/0011-D3/QA/IDI_QA/IDI_V01_QA/IDI_V01.par OD/Projects/0011-D3/Sims/IDI/IDI_V01/Out/IDI_V01_SUMMARY.REP Dell Precision 7520 DESKTOP-MDFIMDA/Desktop/RR-OS_Models/FLCEN0011/IDI/IDI_V01/ IDI_V01.par OD/Projects/0011-D3/Sims/IDI_V01/IDI_V01_RES.xlsx	
Comments on Model Outputs/Results: All dose from external radiation pathway. Peak dose from 100 – 1,000 yr equal to 1.32E-04 mrem/yr, which occurs at 100 yr.	

Total Dose



General Comments

External gamma pathway simulated

Checked by & date:

J. Davis, PhD 12/17/19

Signed: 4/9/2020

O. Warren 12/30/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
IDI_V01.ROF	
New Model File Date: 5/9/2019 12:53	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Update Inadvertent Human Intruder – Acute Discovery model						
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\IDI\IDI_V01\IDI_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\QA\IDI_QA\IDI_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	Y	Verified values in IDI_V01_QA.xlsx were identical to those in IDI_V01_SUMMARY.REP and in the model itself. J. Davis 5/14/19		
Soil Concentrations	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\IDI\IDI_V01\IDI_V01.ROF	Updated soil concentrations to values listed in *EMDF PA Summary Inventory Data Tables rev0 June 19 2019_IHI.xlsx*	Y	Values were verified to be correct. J. Davis 10/22/2019		
Fruit, grain, nonleafy vegetables transfer factors		Updated fruit, grain, nonleafy vegetables transfer factors to average of fruit, grain, and root vegetable transfer factors from PNNL 2003, as listed in *Transfer_Factors_V01.xlsx*	N	Check H milk and Re Crustacea have errors	Changed Re-187 crustacea transfer factor to 1 and re-ran model	Y Correct values implemented J. Davis 10/22/2019
Soil b parameter of contaminated zone [BCZ]		Changed soil b parameter of contaminated zone [BCZ] from 5.3 to 7.75 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		

Model Check Form

New Model ID (or filename): IDI_V01.ROF	Source Model ID (or filename):
New Model File Date: 5/9/2019 12:53	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Hydraulic conductivity of contaminated zone (below) [HCSZ]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\IDI\IDI_V01\IDI_V01.ROF	Changed Hydraulic conductivity of contaminated zone (below) [HCSZ] from 83.6 m/yr to 26.8 m/yr on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Runoff coefficient for fruit, grain, and nonleafy vegetables [RUNOF1]		Changed runoff coefficient for fruit, grain, and nonleafy vegetables [RUNOF1] to 0.625 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Runoff coefficient for leafy vegetables [RUNOF2]		Changed runoff coefficient for leafy vegetables [RUNOF2] to 0.625 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Runoff coefficient for pasture and silage [RUNOF3]		Changed runoff coefficient for pasture and silage field [RUNOF3] to 0.625 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Runoff coefficient for grain field [RUNOF4]		Changed runoff coefficient for grain field [RUNOF4] to 0.625 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Runoff coefficient for dwelling site [RUNOFDWELL]		Changed runoff coefficient for dwelling site [RUNOFDWELL] to 0.625 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Total porosity of unsaturated zone 4 [TPUZ(4)]		Changed total porosity of unsaturated zone 4 [TPUZ(4)]to 0.419 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Effective porosity of unsaturated zone 4 [EPUZ(4)]		Changed effective porosity of unsaturated zone 4 [EPUZ(4)] to 0.234 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		

Model Check Form

New Model ID (or filename): IDI_V01.ROF	Source Model ID (or filename):
New Model File Date: 5/9/2019 12:53	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Field capacity of unsaturated zone 4 [FCUZ(4)]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\IDI\ IDI_V01\ IDI_V01.ROF	Changed field capacity of unsaturated zone 4 [FCUZ(4)] to 0.307 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Hydraulic conductivity of unsaturated zone 4 [HCUZ(4)]		Changed hydraulic conductivity of unsaturated zone 4 [HCUZ(4)] to 3.15 m/yr on 10/16/1	Y	Value was verified to be correct. J. Davis 10/22/2019		
Hydraulic conductivity of unsaturated zone 5 [HCUZ(5)]		Changed hydraulic conductivity of unsaturated zone 5 [HCUZ(5)] to 16.7 m/yr on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Bulk density of saturated zone [DENSAQ]		Changed bulk density of saturated zone [DENSAQ] to 2.1 g/cm^3 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Total porosity of saturated zone [TPSZ]		Changed total porosity of saturated zone to 0.24 [TPSZ] on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Effective porosity of saturated zone [EPSZ]		Changed effective porosity of saturated zone [EPSZ] to 0.2 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Hydraulic conductivity of saturated zone [HCSZ]		Changed hydraulic conductivity of saturated zone [HCSZ] from 83.6 m/yr to 26.8 m/yr	Y	Value was verified to be correct. J. Davis 10/22/2019		
Hydraulic gradient to well [HGW]		Changed hydraulic gradient to well [HGW] to 0.054 m/m on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Depth of aquifer contributing to well [DWIBWT]		Changed depth of aquifer contributing to well [DWIBWT] to 40 m on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
IDI_V01.ROF	
New Model File Date: 5/9/2019 12:53	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Distance from downgradient edge of contamination to surface water body in direction parallel to aquifer flow [OFFLPAQS]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\IDI\IDI_V01\IDI_V01.ROF	Changed distance from downgradient edge of contamination to surface water body in the direction parallel to aquifer flow [OFFLPAQS] to 315.468 m on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
Convergence criterion [EPS]		Changed convergence criterion [EPS] to 0 on 10/16/19	Y	Value was verified to be correct. J. Davis 10/22/2019		
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\IDI\IDI_V01\IDI_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\QA\IDI_QA\IDI_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	N	The Transfer Factor for Crustacea for Re-187 is 0 in IDI_V01.par rather than 1. All other values were correct. O. Warren 10/22/19	Changed Re-187 crustacea transfer factor to 1 and re-ran model on 10/22/19	Y O.Warren 10/22/19 Y J. Davis 10/22/2019
Sm-146 Kd in Unsaturated Zone 4	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\IDI\IDI_V01\IDI_V01.ROF	Changed Sm-146 Kd in unsaturated zone 4 from 1,000 to 999.9999 cm^3/g, which rounds up to 1,000 cm^3/g in the simulation summary file	N	Change was successfully implemented, but an error was found with LCZPAQ value	LCZPAQ was changed to correct value and simulation re-ran on 12/17/19	Y. J. Davis 12/17/19

Model Check Form

New Model ID (or filename): IDI_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 5/9/2019 12:53	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Sm-146 Kd in Unsaturated Zone 4	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\IDI\ IDI_V01\ IDI_V01.ROF	Changed Sm-146 Kd in unsaturated zone 4 from 1,000 to 999.9999 cm^3/g, which rounds up to 1,000 cm^3/g in the simulation summary file	Y	Value was verified to be correct. O. Warren 12/30/19		
IDI_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\IDI_QA\ IDI_V01_QA\ IDI_V01_QA.xlsx	All comments in IDI_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): IDI_V01.ROF	Source Model ID (or filename):
New Model File Date: 5/9/2019 12:53	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
IDI_V01.ROF	
New Model File Date: 5/9/2019 12:53	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

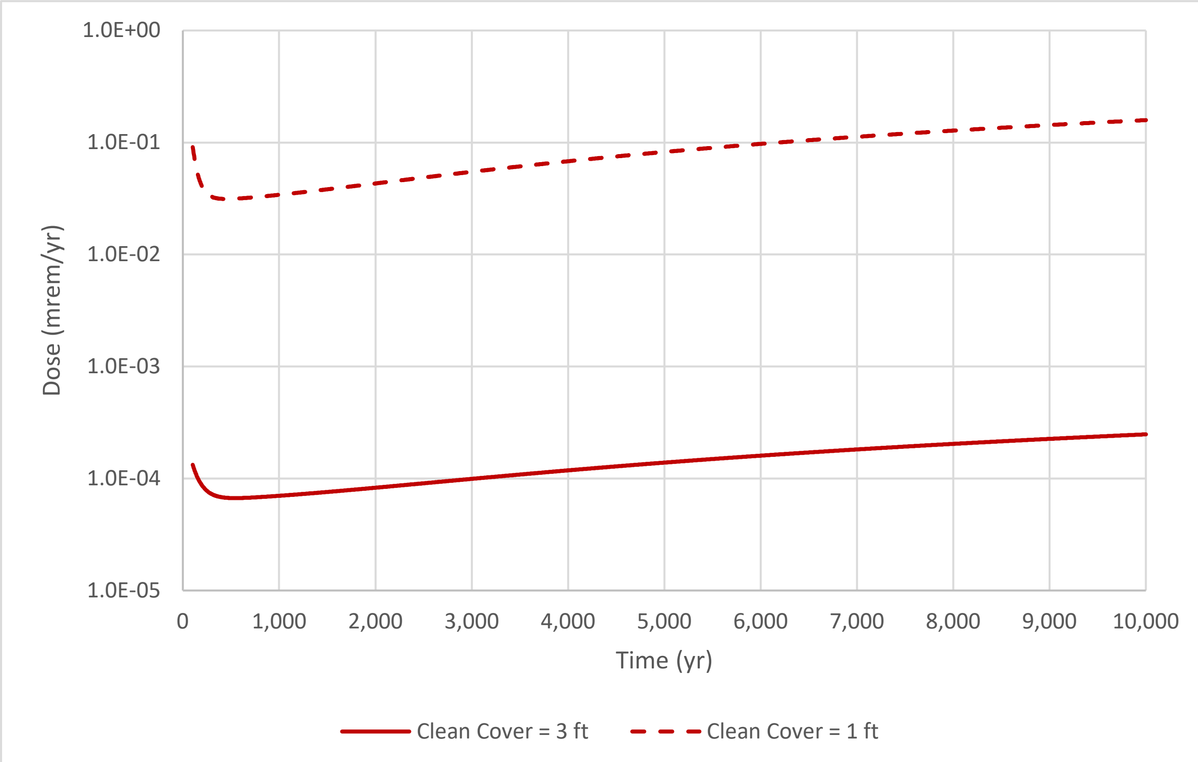
Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

ID: IDI_V01_SA.ROF	
Performed By: Ryan Hupfer, PG	Date: 12/17/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Inadvertent Human Intruder – Acute Discovery Sensitivity Analysis	
Purpose of Simulation: Inadvertent Human Intruder – Acute Discovery scenario sensitivity analysis on thickness of clean cover	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA/Desktop/RR-OS_Models/FLCEN0011/IDI/IDI_V01_SA/ IDI_V01_SA.ROF	
Comments on Input Data: Supporting Files: OD/Projects/0011-D3/QA/IDI_QA/IDI_V01_SA_QA/IDI_V01_SA_QA.xlsx	
Names of Output Files: OD/Projects/0011-D3/QA/IDI_QA/IDI_V01_SA_QA/IDI_V01_SA.par OD/Projects/0011-D3/QA/IDI_QA/IDI_V01_SA/Out/IDI_V01_SA_GraphData.DAT OD/Projects/0011-D3/Sims/IDI/IDI_V01_SA/Out/IDI_V01_SA_GraphData.DAT OD/Projects/0011-D3/Sims/IDI/IDI_V01_SA/Out/IDI_V01_SA_SUMMARY.REP OD/Projects/0011-D3/Sims/IDI/IDI_V01_SA/IDI_V01_SA_RES.xlsx	
Comments on Model Outputs/Results: Peak dose from 100 – 1,000 yr equal to 1.32E-04 mrem/yr for 3 ft clean cover. Peak dose from 100 – 1,000 yr equal to 9.08E-02 mrem/yr for 1 ft clean cover.	

Value	Peak Dose (mrem/yr)	Time of Peak (yr)
Clean Cover = 3 ft	1.32E-04	102.549
Clean Cover = 1 ft	9.08E-02	102.549

3x SA on Clean Cover Thickness



General Comments
External gamma pathway simulated

Checked by & date:

J. Davis, PhD 12/17/19

Signed: 4/9/2020

N. Holt, PE 12/19/19

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): IDI_V01_SA.ROF	**Source Model ID (or filename):** IDI_V01.ROF
New Model File Date: 12/17/19	**Source Model File Date:** 5/9/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Update Inadvertent Human Intruder – Acute Discovery model						
Sensitivity analysis factor applied to cover thickness	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\IDI\ IDI_V01\ IDI_V01.ROF	Applied a sensitivity analysis factor of 3 to cover thickness [COVER0] to simulate the IHI Acute Drilling Scenario with a cover thickness of 0.3048 m (lower), 0.9144 m (base case) and 2.74 m (upper)	Y	J. Davis 12/17/19		
Sensitivity analysis factor applied to cover thickness	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\IDI\ IDI_V01\ IDI_V01.ROF	Applied a sensitivity analysis factor of 3 to cover thickness [COVER0] to simulate the IHI Acute Drilling Scenario with a cover thickness of 0.3048 m (lower), 0.9144 m (base case) and 2.74 m (upper)	Y	N. Holt, PE 12/19/19		
IDI_V01_SA_QA.xlsx comments	OD\Projects\0011-D3\QA\IDI_QA\ IDI_V01_SA_QA\ IDI_V01_SA_ QA.xlsx	All comments in IDI_V01_SA_QA.xlsx have been addressed	Y	N. Holt, PE 3/13/2020 J. Davis, 3/16/2020		

Model Check Form

New Model ID (or filename): IDI_V01_SA.ROF	**Source Model ID (or filename):** IDI_V01.ROF
New Model File Date: 12/17/19	**Source Model File Date:** 5/9/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): IDI_V01_SA.ROF	**Source Model ID (or filename):** IDI_V01.ROF
New Model File Date: 12/17/19	**Source Model File Date:** 5/9/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): IDI_V01_SA.ROF	Source Model ID (or filename): IDI_V01.ROF
New Model File Date: 12/17/19	**Source Model File Date:** 5/9/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): IDI_V01_SA.ROF	**Source Model ID (or filename):** IDI_V01.ROF
New Model File Date: 12/17/19	**Source Model File Date:** 5/9/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

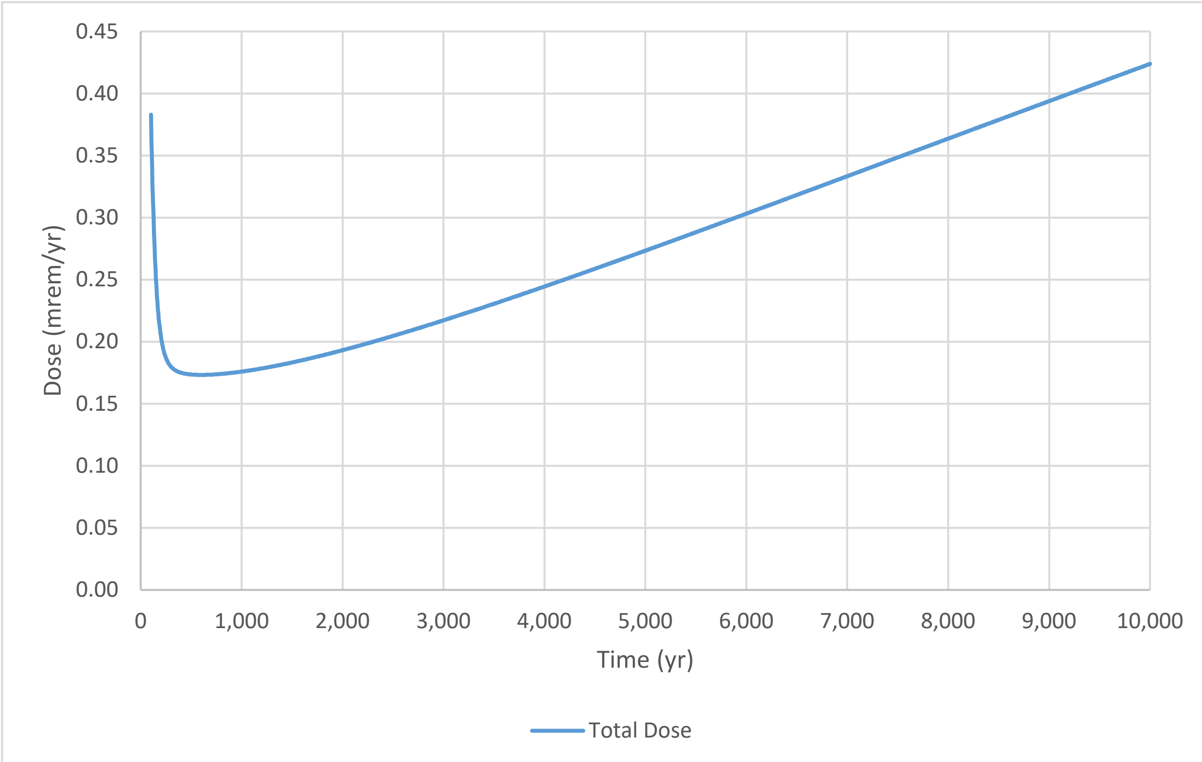
If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Nathan Holt Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

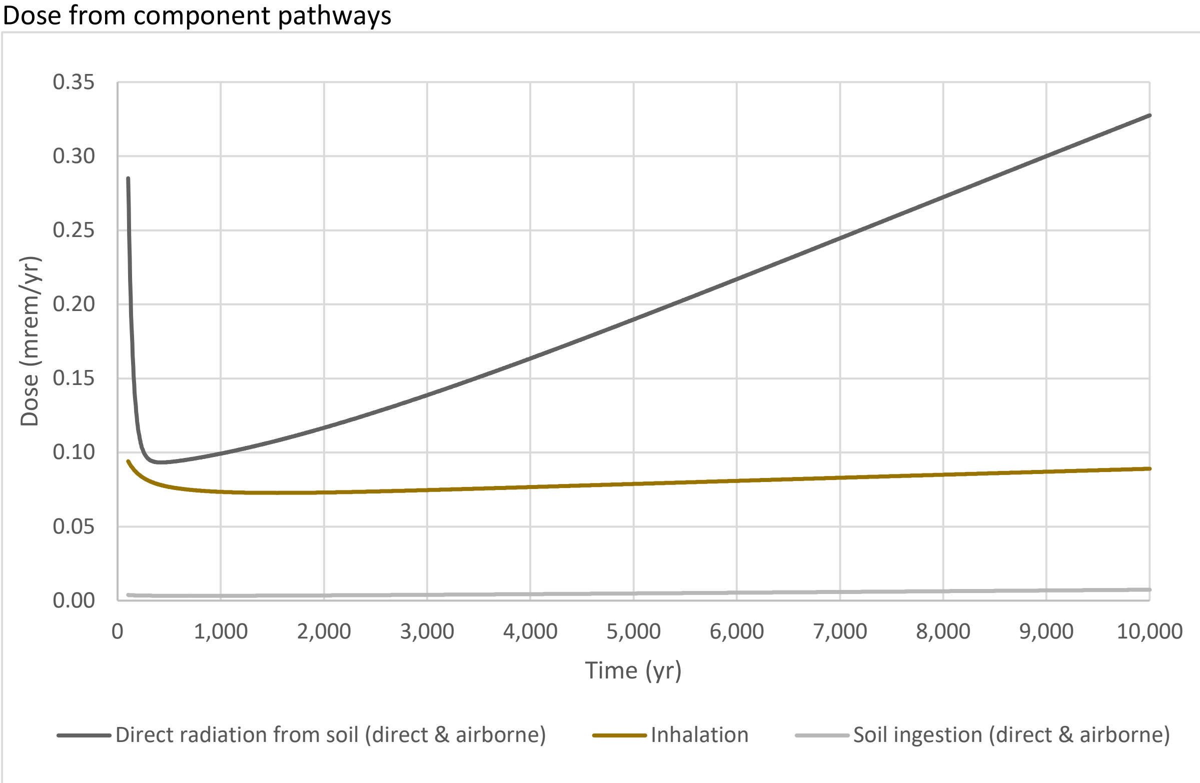
Model Simulation Log

ID: IDR_V01.ROF	
Performed By: Ryan Hupfer, PG	Date:10/22/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Inadvertent Human Intruder – Acute Drilling	
Purpose of Simulation: Evaluation of the Inadvertent Human Intruder – Acute Well Drilling scenario	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\IDR\IDR_V01\ IDR_V01.ROF	
Comments on Input Data: Supporting Files: Projects/0011-D3/QA/IDR_QA/IDR_V01/IDR_V01_QA.xlsx	
Names of Output Files: OD/Projects/0011-D3/QA/IDR_QA/IDR_V01/IDR_V01.par OD/Projects/0011-D3/Sims/IDR/IDR_V01/IDR_V01_Res.xlsx	
Comments on Model Outputs/Results: Peak dose from 100 – 1,000 yr for all radionuclides, all pathways is 0.38 mrem/yr and occurs at 103 yr. Peak dose from 100 – 10,000 yr for all radionuclides, all pathways is 0.42 mrem/yr and occurs at 10,000 yr.	

Total Dose



Dose from component pathways



General Comments External gamma, inhalation, and soil ingestion pathways simulated
Checked by & date: O.Warren 10/24/2019 Signed: 4/9/2020 J. Davis 10/29/2019 Signed: 4/9/2020

Model Check Form

New Model ID (or filename): IDR_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 5/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Update Inadvertent Human Intruder – Acute Drilling model						
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\IDR\ IDR_V01\ IDR_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\ QA\IDR_QA\ IDR_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	Y	Values from IDR_V01_QA.xlsx were found to be identical to those in IDR_V01_SUMMARY.REP and/or the RESRAD model. JD 5/10/19		
Soil Concentrations	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\IDR\ IDR_V01\ IDR_V01.ROF	Updated soil concentrations to values in *EMDF PA Summary Inventory Data Tables rev 0 June 19 2019_IHI.xlsx*, IDR_V01_QA.xlsx Soil Conc tab on 9/24/19	Y	Values were found to be correct. J. Davis 10/29/19		
Fruit, grain, non-leafy vegetables transfer factors		Updated fruit, grain, nonleafy vegetables transfer factors to average of fruit, grain, and root vegetable transfer factors from PNNL 2003, as listed in IDW_V01_QA.xlsx transfer factors tab on 9/24/19	Y	Values were found to be correct. J. Davis 10/29/19		
Depth of soil mixing layer [DM]		Changed depth of soil mixing layer [DM] to 0.0605 m on 10/16/19	Y	Values was found to be correct. J. Davis 10/29/19		

Model Check Form

New Model ID (or filename): IDR_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 5/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Thickness of contaminated zone [THICK0]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\IDR\IDR_V01\IDR_V01.ROF	Changed thickness of contaminated zone [THICK0] to 0.0605 m on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Soil b parameter of contaminated zone [BCZ]		Changed soil b parameter of contaminated zone [BCZ] changed from 5.3 to 7.75 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Longitudinal dispersivity of contaminated zone [ALPHACZ]		Changed longitudinal dispersivity of contaminated zone [ALPHACZ] to 0.00605 m on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Hydraulic conductivity of contaminated zone (below) [HCSZ]		Changed hydraulic conductivity of contaminated zone (below) [HCSZ] from 83.6 m/yr to 26.8 m/yr on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Runoff coefficient for fruit, grain, and nonleafy vegetables [RUNOF1]		Changed runoff coefficient for fruit, grain, and nonleafy vegetables [RUNOF1] to 0.625 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Runoff coefficient for leafy vegetables [RUNOF2]		Changed runoff coefficient for leafy vegetables [RUNOF2] to 0.625 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Runoff coefficient for pasture and silage field [RUNOF3]		Changed runoff coefficient for pasture and silage field [RUNOF3] to 0.625 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Runoff coefficient for grain field [RUNOF4]		Changed runoff coefficient for grain field [RUNOF4] to 0.625 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		

Model Check Form

New Model ID (or filename): IDR_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 5/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Runoff coefficient for dwelling site [RUNOFDWELL]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\IDR\IDR_V01\IDR_V01.ROF	Changed runoff coefficient for dwelling site [RUNOFDWELL] to 0.625 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Dry bulk density of soil for dwelling site [RHOBDWELL]		Changed dry bulk density of soil for dwelling site [RHOBDWELL] to 1.5 g/cm^3 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Total porosity of unsaturated zone 4 [TPUZ(4)]		Changed total porosity of unsaturated zone 4 [TPUZ(4)]to 0.419 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Effective porosity of unsaturated zone 4 [EPUZ(4)]		Changed effective porosity of unsaturated zone 4 [EPUZ(4)] to 0.234 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Field capacity of unsaturated zone 4 [FCUZ(4)]		Changed field capacity of unsaturated zone 4 [FCUZ(4)] to 0.307 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Hydraulic conductivity of unsaturated zone 4 [HCUZ(4)]		Changed hydraulic conductivity of unsaturated zone 4 [HCUZ(4)] to 3.15 m/yr on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Hydraulic conductivity of unsaturated zone 5 [HCUZ(5)]		Changed hydraulic conductivity of unsaturated zone 5 [HCUZ(5)] to 16.7 m/yr on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Dry bulk density of saturated zone [DENSAQ]		Changed dry bulk density of saturated zone [DENSAQ] to 2.1 g/cm^3 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
IDR_V01.ROF	
New Model File Date: 5/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Total porosity of saturated zone [TPSZ]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\IDR\ IDR_V01\ IDR_V01.ROF	Changed total porosity of saturated zone to 0.24 [TPSZ] on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Effective porosity of saturated zone [EPSZ]		Changed effective porosity of saturated zone [EPSZ] to 0.2 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Hydraulic conductivity of saturated zone [HCSZ]		Changed Hydraulic conductivity of saturated zone [HCSZ] from 83.6 m/yr to 26.8 m/yr on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Hydraulic gradient to well [HGW]		Changed hydraulic gradient to well [HGW] to 0.054 m/m on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Hydraulic gradient to surface water body [HGSW]		Changed hydraulic gradient to surface water body [HGSW] to 0.036 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Depth of aquifer contributing to well [DWIBWT]		Changed depth of aquifer contributing to well [DWIBWT] to 40 m on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Distance from downgradient edge of contamination to surface water body in the direction parallel to aquifer flow [OFFLPAQS]		Changed distance from downgradient edge of contamination to surface water body in the direction parallel to aquifer flow [OFFLPAQS] to 315.468 m on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		
Convergence criterion [EPS]		Changed convergence criterion [EPS] to 0 on 10/16/19	Y	Value was correctly implemented. J. Davis 10/29/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
IDR_V01.ROF	
New Model File Date:	**Source Model File Date:**
5/9/2019	

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\IDR\ IDR_V01\ IDR_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\ QA\IDR_QA\ IDR_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	Y	O. Warren 10/24/2019 J. Davis 10/29/19		
IDR_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\IDR_QA\ IDR_V01\ IDR_V01_QA.xlsx	All comments in IDR_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): IDR_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 5/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): IDR_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 5/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

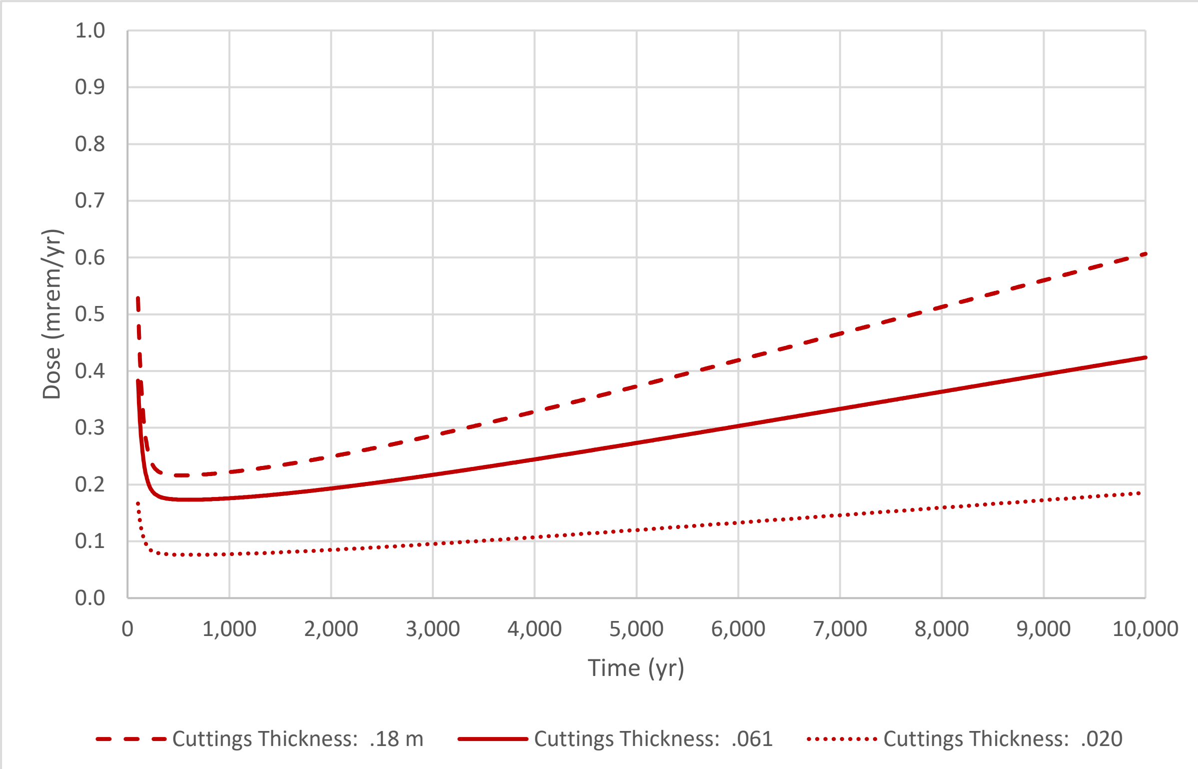
If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

ID: IDR_V01_SA.ROF	
Performed By: Ryan Hupfer, PG	Date:10/25/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Inadvertent Human Intruder – Acute Drilling Sensitivity Analysis	
Purpose of Simulation: Evaluation of the Inadvertent Human Intruder – Acute Well Drilling scenario sensitivity analysis on thickness of contaminated zone	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\IDR\IDR_V01_SA\IDR_V01_SA.ROF	
Comments on Input Data: Supporting Files: Projects/0011-D3/QA/IDR_QA/IDR_V01_SA/IDR_V01_SA_QA.xlsx	
Names of Output Files: OD/Projects/0011-D3/QA/IDR_QA/IDR_V01_SA/IDR_V01_SA.par OD/Projects/0011-D3/QA/IDR_QA/IDR_V01_SA/IDR_V01_SA_GraphData.DAT OD/Projects/0011-D3/Sims/IDR/IDR_V01_SA/Out/IDR_V01_SA_GraphData.DAT OD/Projects/0011-D3/Sims/IDR/IDR_V01_SA/IDR_V01_SA_RES.xlsx	
Comments on Model Outputs/Results: Predicted total dose is sensitive to thickness of waste.	

Total Dose



General Comments

External gamma, inhalation, and soil ingestion pathways simulated

Checked by & date:

J. Davis PhD 12/30/19

Signed: 4/9/2020

N. Holt PE 12/30/2019

Nathan Holt Signed: 4/9/2020

Model Check Form

New Model ID (or filename): IDR_V01_SA.ROF	**Source Model ID (or filename):** IDR_V01.ROF
New Model File Date: 10/25/2019	**Source Model File Date:** 5/9/2019

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Sensitivity analysis on waste thickness for Inadvertent Human Intruder – Acute Drilling model						
Sensitivity analysis factor applied to thickness of contaminated zone [THICK0]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\IDR\ IDR_V01\ IDR_V01.ROF	Applied a sensitivity analysis factor of 3 to the thickness of the contaminated zone [THICK0] to simulate the IHI Acute Drilling Scenario with a contaminated zone thickness of 0.0202 m (lower), 0.0605 m (base case) and 0.1815 m (upper)	Y	Verified distribution coefficients and 40 spot-checked parameters in IDR_V01_SA_QA.xlsx were identical to those in IDR_V01_SA.par. Verified the SA on thickness of the contaminated zone given in IDR_V01_SA_GraphData.DAT was correctly applied based on IDR_V01_SA.par. N. Holt, PE 11/18/2019 J. Davis 12/30/19		
IDR_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\IDR_QA\ IDR_V01_SA\ IDR_V01_SA_ QA.xlsx	All comments in IDR_V01_SA_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 N. Holt, PE 3/13/2020		

Model Check Form

New Model ID (or filename): IDR_V01_SA.ROF	**Source Model ID (or filename):** IDR_V01.ROF
New Model File Date: 10/25/2019	**Source Model File Date:** 5/9/2019

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
IDR_V01_SA.ROF	IDR_V01.ROF
New Model File Date: 10/25/2019	**Source Model File Date:** 5/9/2019

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): IDR_V01_SA.ROF	**Source Model ID (or filename):** IDR_V01.ROF
New Model File Date: 10/25/2019	**Source Model File Date:** 5/9/2019

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): IDR_V01_SA.ROF	**Source Model ID (or filename):** IDR_V01.ROF
New Model File Date: 10/25/2019	**Source Model File Date:** 5/9/2019

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

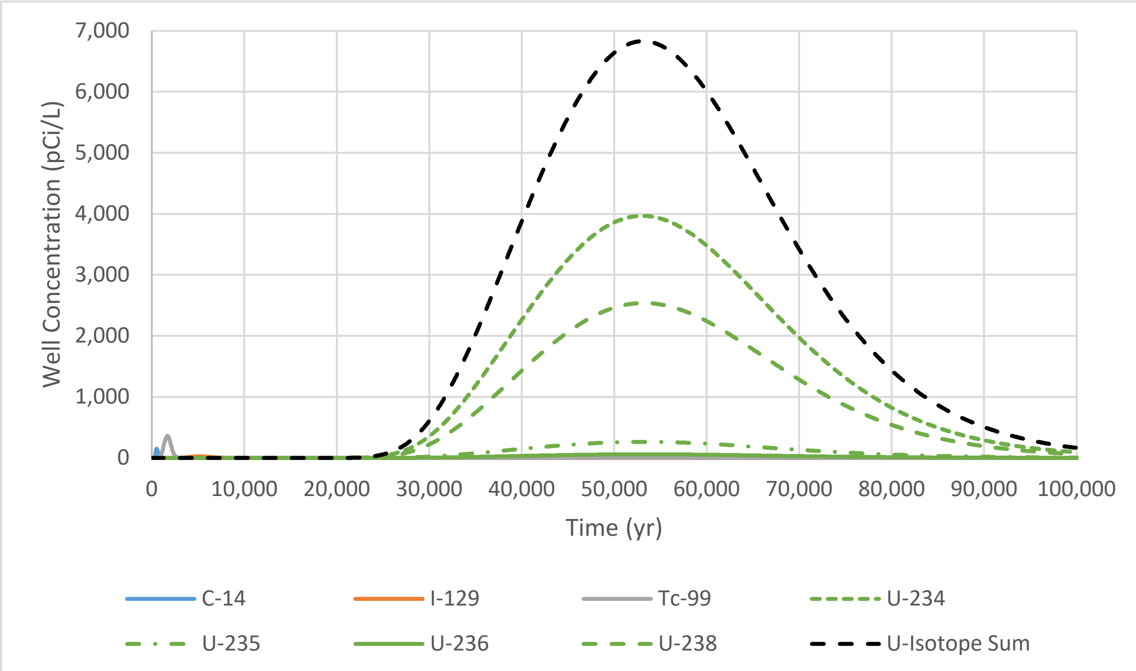
If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

ID: LTM_V01.ROF	
Performed By: R. Hupfer	Date: 12/10/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Long Term Model	
Purpose of Simulation: To determine the deterministic dose for the base case over the long term, 100,000-year simulation period.	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\LTM\LTM_V01\LTM_V01.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\LTM\LTM_V01\LTM_V01_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\LTM\LTM_V01\LTM_V01.par OD\Projects\0011-D3\Sims\LTM\LTM_V01\Out\LTM_V01_SUMMARY.REP Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\LTM\LTM_V01\LTM_V01.par OD\Projects\0011-D3\Sims\LTM\LTM_V01\LTM_V01_RES.xlsx	
Comments on Model Outputs/Results: U-isotope well concentrations increase over 100,000-year simulation period. Peak well concentrations for U-isotopes occur between 50,000 and 60,000 years post-closure.	

Well Concentrations



General Comments

External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

Checked by & date:

J. Davis, PhD 12/17/19

Signed: 4/9/2020

N. Holt, PE 12/20/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): LTM_V01.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/10/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 27						
Reporting times	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\LTM\ LTM_V01\ LTM_V01.ROF	Changed reporting times to the following values: • 200 yr • 1,000 yr • 10,000 yr • 20,000 yr • 30,000 yr • 40,000 yr • 50,000 yr • 80,000 yr • 100,000 yr	Y	J. Davis, 12/17/19		
Reporting times	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\LTM\ LTM_V01\ LTM_V01.ROF	Changed reporting times to the following values: • 200 yr • 1,000 yr • 10,000 yr • 20,000 yr • 30,000 yr • 40,000 yr • 50,000 yr • 80,000 yr • 100,000 yr	Y	N. Holt, PE 12/20/2019		
LTM_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\LTM\ LTM_V01\ LTM_V01_QA.xlsx	All comments in LTM_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 N. Holt, PE 3/13/2020		

Model Check Form

New Model ID (or filename): LTM_V01.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/10/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): LTM_V01.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/10/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): LTM_V01.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/10/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): LTM_V01.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 12/10/2019	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Nathan Holt Signed: 4/9/2020

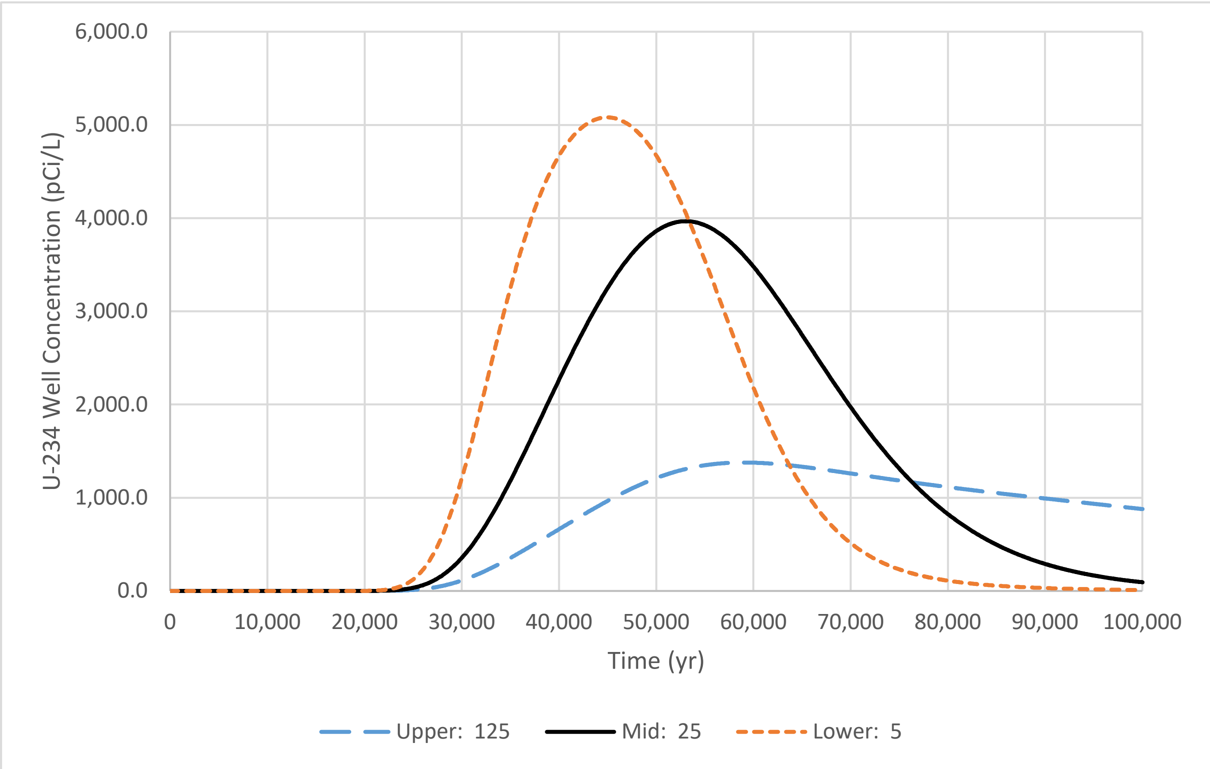
Model Simulation Log

ID: LTM_V01_SA1.ROF	
Performed By: R. Hupfer	Date: 12/10/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Long Term Model Sensitivity Analysis	
Purpose of Simulation: To determine the sensitivity of model results for the base case over the long term, 100,000-year simulation period to distribution coefficient of U-234 in the contaminated zone [DCACTC(U-234)], distribution coefficient of U-238 in the contaminated zone [DCACTC(U-238)], hydraulic gradient to well [HGW], and depth of aquifer contributing to well [DWIBWT].	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\LTM\LTM_V01_SA1\ LTM_V01-SA1.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\LTM\LTM_V01_SA1\LTM_V01_SA1_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\LTM\LTM_V01_SA1\LTM_V01_SA1.par OD\Projects\0011-D3\Sims\LTM\LTM_V01_SA1\Out\LTM_V01_SA1_SUMMARY.REP Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\LTM\LTM_V01_SA1\ LTM_V01_SA1.par OD\Projects\0011-D3\Sims\LTM\LTM_V01_SA1\LTM_V01_SA1_RES.xlsx	
Comments on Model Outputs/Results: Sensitivity analyses performed on distribution coefficient of U-234 in the contaminated zone, which was multiplied and divided by a factor of 5, distribution coefficient of U-238 in the contaminated zone, which was multiplied and divided by a factor of 5, hydraulic gradient to well, which was multiplied and divided by a factor of 1.33, and depth of aquifer contributing to well, which was multiplied and divided by a factor of 1.5.	

Distribution coefficient of U-234 in the contaminated zone

Both peak well concentration of U-234 and timing of peak well concentration for the 100,000-year simulation are sensitive to distribution coefficient of U-234 in the contaminated zone.

5x sensitivity analysis on distribution coefficient of U-234 in the contaminated zone

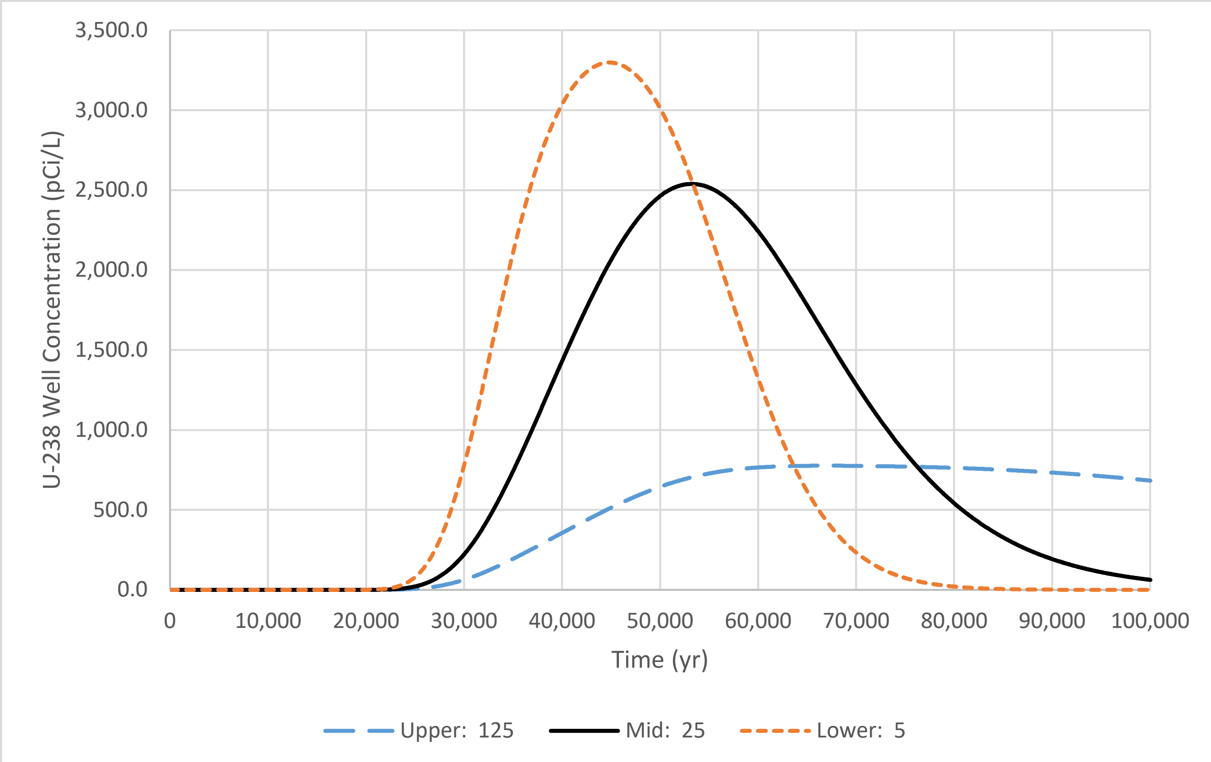


U-234 CZ KD Value (cm3/g)	Upper: 125	Mid: 25	Lower: 5
Peak Well Conc. 100k (pCi/L)	1377.92	3966.85	5081.01
Time of Conc. (yr)	58,953	53,043	44,935

Distribution coefficient of U-238 in the contaminated zone

Both peak well concentration of U-238 and timing of peak well concentration for the 100,000-year simulation are sensitive to distribution coefficient of U-238 in the contaminated zone.

5x sensitivity analysis on distribution coefficient of U-238 in the contaminated zone

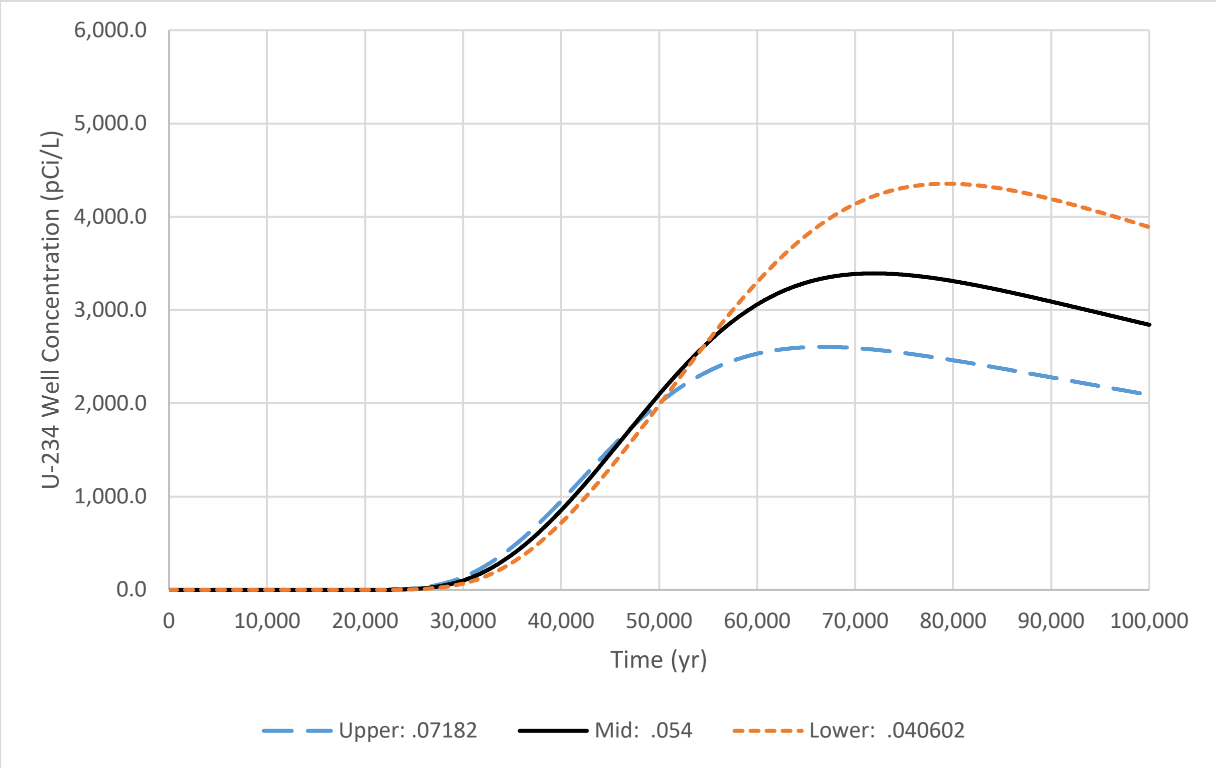


U-238 CZ KD Value (cm3/g)	Upper: 125	Mid: 25	Lower: 5
Peak Well Conc. 100k (pCi/L)	776.40	2538.62	3297.75
Time of Conc. (yr)	66,866	53,190	44,838

Hydraulic gradient to well

Both well concentrations and time of peak concentration for the 100,000-year simulation period are sensitive to hydraulic gradient to well.

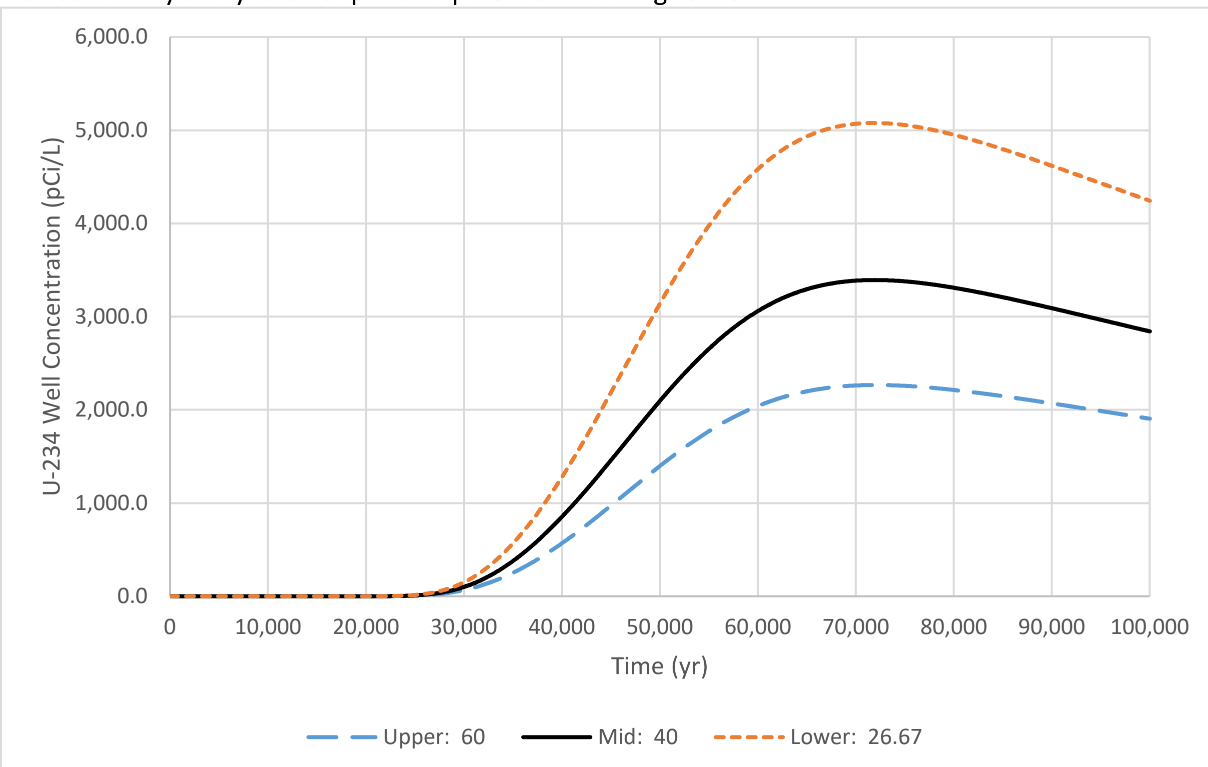
1.33x sensitivity analysis on hydraulic gradient to well



HGW Value (--)	Upper: .07182	Mid: .054	Lower: .040602
Peak Well Conc. 100k (pCi/L)	2604.82	3392.74	4354.06
Time of Peak Well Conc. (yr)	66,670	71,897	79,321

Depth of aquifer contributing to well
Peak well concentration for the 100,000-year simulation period is sensitive to depth of aquifer contributing to well. Time of peak concentration for the 100,000-year simulation period is mildly sensitive to depth of aquifer contributing to well.

1.5x sensitivity analysis on depth of aquifer contributing to well

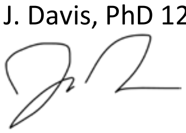


DWIBWT Value (m)	Upper: 60	Mid: 40	Lower: 26.67
Peak Well Conc. 100k (pCi/L)	2266.31	3392.74	5077.80
Time of Peak Well Conc. (yr)	71,994	71,897	71,848

General Comments
External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated

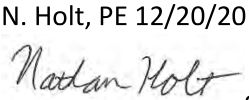
Checked by & date:

J. Davis, PhD 12/19/19



Signed: 4/9/2020

N. Holt, PE 12/20/2019



Signed: 4/9/2020

Model Check Form

New Model ID (or filename): LTM_V01_SA1.ROF	**Source Model ID (or filename):** LTM_V01.ROF
New Model File Date: 12/10/2019	**Source Model File Date:** 12/10/19

Parameter or Element	**Location**	**Change Description**	**Correct? Y,N**	**Checker Name and Comment**	**Analyst Response**	**Checker Concur? Y,N**
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the base case model sensitivity analysis 27						
Distribution coefficient of U-234 in the contaminated zone [DCACTC(U-234)]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\LTM\LTM_V01_SA1\LTM_V01_SA1.ROF	Applied a sensitivity analysis factor of 5 to distribution coefficient of U-234 in the contaminated zone [DCACTC(U-234)]	Y	J. Davis 12/19/19 N. Holt, PE 12/20/2019		
Distribution coefficient of U-238 in the contaminated zone [DCACTC(U-238)]		Applied a sensitivity analysis factor of 5 to distribution coefficient of U-238 in the contaminated zone [DCACTC(U-238)]	Y	J. Davis 12/19/19 N. Holt, PE 12/20/2019		
Hydraulic gradient to well [HGW]		Applied a sensitivity analysis factor of 1.33 to hydraulic gradient to well [HGW]	Y	J. Davis 12/19/19 N. Holt, PE 12/20/2019		
Depth of aquifer contributing to well [DWIBWT]		Applied a sensitivity analysis factor of 1.5 to depth of aquifer contributing to well [DWIBWT]	Y	J. Davis 12/19/19 N. Holt, PE 12/20/2019		
LTM_V01_SA1_QA.xlsx comments	OD\Projects\0011-D3\QA\LTM\LTM_V01_SA1\LTM_V01_SA1_QA.xlsx	All comments in LTM_V01_SA1_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 N. Holt, PE 3/13/2020		

Model Check Form

New Model ID (or filename): LTM_V01_SA1.ROF	**Source Model ID (or filename):** LTM_V01.ROF
New Model File Date: 12/10/2019	**Source Model File Date:** 12/10/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): LTM_V01_SA1.ROF	**Source Model ID (or filename):** LTM_V01.ROF
New Model File Date: 12/10/2019	**Source Model File Date:** 12/10/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): LTM_V01_SA1.ROF	**Source Model ID (or filename):** LTM_V01.ROF
New Model File Date: 12/10/2019	**Source Model File Date:** 12/10/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
LTM_V01_SA1.ROF	LTM_V01.ROF
New Model File Date: 12/10/2019	**Source Model File Date:** 12/10/19

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Name	E-Signature
Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Nathan Holt Signed: 4/9/2020

Model Simulation Log

ID: OP1_V01.ROF	
Performed By: R. Hupfer, PG	Date: 8/5/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Operational Period Leaching Simulation	
Purpose of Simulation: To determine the loss of radionuclide activity from the waste due to leaching for Cell 1	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA/Desktop/RR-OS_Models/FLCEN0011/OP/OP1_V01/ OP1_V01.ROF	
Comments on Input Data: • Changed contaminated zone b parameter [BCZ] from 5.3 to 7.75 • Changed total porosity in unsaturated zone 4 [TPUZ(4)] from 0.445 to 0.419 • Changed effective porosity in unsaturated zone 4 [EPUZ(4)] from 0.236 to 0.234 • Changed field capacity in unsaturated zone 4 [FCUZ(4)] from 0.393 to 0.307 • Changed hydraulic conductivity in unsaturated zone 4 [HCUZ(4)] from 0.599 to 3.15 m/yr • Changed hydraulic conductivity in unsaturated zone 5 [HCUZ(5)] from 11.13 to 16.7 m/yr • Changed effective porosity of saturated zone [EPSZ] from 0.2 to 0.27 Supporting file: OD/Projects/0011-D3/QA/OP/OP1_V01/OP1_V01_QA.xlsx	
Names of Output Files: OD/Projects/0011-D3/Sims/OP/OP1_V01/Out/OP1_V01_SUMMARY.REP OD/Projects/0011-D3/Sims/OP/OP1_V01/Out/OP1_V01_AQFLUXIN.DAT OP/Projects/0011-D3/Sims/OP/OP1_V01/OP1_V01_AQFLUX.xlsx OD/Projects/0011-D3/Sims/OP/OP_Flux.xlsx	
Comments on Model Outputs/Results: Discussion of model parameterization, model outputs, and results calculations can be found in calculation package CAW-90EMDF-G183.	

Cumulative radionuclide flux calculated using the following method with Timestep Flux Rate from OP1_V01_AQFLUXIN.DAT:
Timestep Flux Rate (pCi/yr) * Timestep Length (yr) = Timestep Flux (pCi)
Sum of Timestep Fluxes (pCi) = Cumulative Activity Leached (pCi) for Operational Period

Leaching summary from OP_Flux.xlsx

Cell	Time	C-14 Leached (pCi)	H-3 Leached (pCi)	I-129 Leached (pCi)	Tc-99 Leached (pCi)
1	12.27	1.73E+12	5.07E+12	4.86E+10	1.13E+12
2	13.86	2.51E+12	6.65E+12	5.79E+10	1.36E+12
3	12.70	2.09E+12	5.66E+12	4.42E+10	1.03E+12
4	6.28	1.15E+12	3.58E+12	2.15E+10	4.60E+11

Operational Period Leaching totals calculated in OP_Flux.xlsx

Radionuclide	**C-14**	**H-3**	**I-129**	**Tc-99**
Waste Kd (ml/g)	0	0	2	0.36
As Disposed Soil Concentration (pCi/g)	2.88	11.2	0.407	2.80
As Disposed Total Activity (pCi)	9.20E+12	3.58E+13	1.30E+12	8.95E+12
Total Leached Activity (pCi)	7.49E+12	2.10E+13	1.72E+11	3.97E+12
Post Operational Activity (pCi)	1.72E+12	1.48E+13	1.13E+12	4.97E+12
% Reduction due to Leaching	81.4	58.5	13.2	44.4
Post Operational Soil Concentration (pCi/g)	0.54	4.64	0.35	1.56

General Comments
C-14, H-3, I-129, and Tc-99 simulated, drinking water pathway simulated

Checked by & date:
O. Warren 8/6/2019
O. Warren 3/11/2020
Signed: 4/9/2020
J. Davis 8/9/2019
J. Davis 3/10/2020
Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)	
New Model File Date: 4/30/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Determine loss of radionuclide activity due to leaching for Cell 1						
All parameters	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\OP\ OP_190422_1\ OP_190422_1.ROF	Initial Model Check	Y	Values in OP_190422_1_QC.xlsx were found to be identical to those in OP1_V01_SUMMARY.REP J. Davis 4/30/19		
File Name	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP1_V01\ OP1_V01.ROF	Changed file name from OP_190422_1.ROF to OP1_V01.ROF	Y	J. Davis 6/24/19		
Y-Dimension of Primary Contamination [SOURCEXY(2)]		Changed from 92.6 m to 93.4 m to reflect corrected cell planar area percentage	Y	J. Davis 6/24/19		
Length of contamination parallel to aquifer flow [LCZPAQ]		Changed from 96.5 m to 97.3 m based on calculation using updated y-dimension of primary contamination	Y	J. Davis 6/24/19		
Runoff coefficient in primary contamination [RUNOFF]		Changed from 0.745 to 0.029, based on 22.8 in/yr infiltration from leachate and contact water	Y	J. Davis 6/24/19		
Thickness of contaminated zone [THICK0]		Changed from 14.1 m to 13.9 m based on updated cell planar area percentages	Y	J. Davis 6/24/19		

Model Check Form

New Model ID (or filename): OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)	**Source Model ID (or filename):**
New Model File Date: 4/30/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Longitudinal dispersivity of contaminated zone [ALPHALCZ]		Changed from 1.41 m to 1.39 m to reflect updated thickness of contaminated zone	Y	J. Davis 6/24/19		
Thickness of clean cover [COVER0]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP1_V01\ OP1_V01.ROF	Changed from 3.353 m to 0.3048 m based on assumption of 1 ft contouring layer.	Y	J. Davis 6/24/19		
Unsaturated zone 3 hydraulic conductivity [HCUZ(3)]		Changed from 0.315 m/yr to 0.6 m/yr to allow 22.8 in/yr infiltration to infiltrate	Y	J. Davis 6/24/19		
Thickness of Unsaturated Zone 5 [H(5)]		Changed from 4.572 m to 4.846 m base on updated vadose zone thickness (9.418 m total)	Y	J. Davis 6/24/19		
Shape Factors – Dwelling Location Y		Automatically updated based on new Y-dimension of primary contamination	Y	J. Davis 6/24/19		
Shape Factor Radius [RADSHAPE(1-24)]		Calculated based on new dwelling location specified in shape factors form	Y	J. Davis 6/24/19		
Shape Factor Fraction [FRACA(1-24)]		Calculated based on new dwelling location specified in shape factors form	Y	J. Davis 6/24/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)	
New Model File Date: 4/30/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Soil Concentrations	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\OP\ OP1_V01\ OP1_V01.ROF	Updated soil concentrations to values provided by S. Kenworthy on June 19, 2019 and listed in file *EMDF PA Summary Inventory Data Tables rev 0 June 19 2019.xlsx* on 7/11/19	Y	Soil Concentrations were implemented correctly. J. Davis 07/30/19		
Fruit, grain, nonleafy vegetables transfer factors		Updated fruit, grain, non-leafy vegetables transfer factors to average of fruit, grain, and root vegetable transfer factors from PNNL 2003, as listed in *Transfer_Factors_V01.xlsx* on 7/11/19	Y	Transfer Factors were implemented correctly. J. Davis 07/30/19		
Fraction of meat from affected area [FMEMI]		Changed fraction of meat from affected area [FMEMI(1)] to 0.25 from 0.5 on 7/11/19	Y	FMEMI(1) was correctly changed. J. Davis 07/30/19		
Effective porosity of saturated zone [EPSZ]		Changed Effective Porosity of Saturated Zone [EPSZ] to 0.2 from 0.27 on 7/11/19	Y	EPSZ was correctly changed. J. Davis 07/30/19		
Hydraulic gradient to well [HGW]		Changed hydraulic gradient to well [HGW] to 0.036 from 0.03 on 7/11/19	Y	HGW was correctly changed. J. Davis 7/30/19		
Hydraulic gradient to surface water body [HGSW]		Changed hydraulic gradient to surface water body [HGSW] to 0.036 from 0.03 on 7/11/19	Y	HGSW was correctly changed. J. Davis 7/30/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)	
New Model File Date: 4/30/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Depth of aquifer contributing to well [DWIBWT]		Changed Depth of Aquifer Contributing to Well [DWIBWT] to 40 m from 29 m on 7/11/19	Y	DWIBWT was correctly changed. J. Davis 7/30/19		
Groundwater convergence criteria [EPS]		Changed groundwater convergence criteria [EPS] to 0 from 0.05 on 7/11/19	Y	EPS was correctly changed. J. Davis 7/30/19		
All parameters	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\OP\ OP1_V01\ OP1_V01.ROF	Initial Model Check	Y	Values in OP1_V01_QA.xlsx were found to be identical to those in OP1_V01_SUMMARY.REP file and in model itself OP1_V01.ROF. O.Warren 07/19/2019		
Contaminated zone b parameter [BCZ]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP1_V01\ OP1_V01.ROF	Changed contaminated zone b parameter [BCZ] from 5.3 to 7.75 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Total porosity in unsaturated zone 4 [TPUZ(4)]		Changed total porosity in unsaturated zone 4 [TPUZ(4)] from 0.445 to 0.419 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Effective porosity in unsaturated zone 4 [EPUZ(4)]		Changed effective porosity in unsaturated zone 4 [EPUZ(4)] from 0.236 to 0.234 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Field capacity in unsaturated zone 4 [FCUZ(4)]		Changed field capacity in unsaturated zone 4 [FCUZ(4)] from 0.393 to 0.307 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)	
New Model File Date: 4/30/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Hydraulic conductivity in unsaturated zone 4 [HCUZ(4)]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP1_V01\ OP1_V01.ROF	Changed hydraulic conductivity in unsaturated zone 4 [HCUZ(4)] from 0.599 to 3.15 m/yr on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Hydraulic conductivity in unsaturated zone 5 [HCUZ(5)]		Changed hydraulic conductivity in unsaturated zone 5 [HCUZ(5)] from 11.13 to 16.7 m/yr on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Effective porosity of saturated zone [EPSZ]		Changed Effective Porosity of Saturated Zone [EPSZ] from 0.2 to 0.27 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
OP1_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\OP\ OP1_V01\ OP1_V01_QA.xlsx	All comments in OP1_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)	
New Model File Date: 4/30/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)	**Source Model ID (or filename):**
New Model File Date: 4/30/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)	**Source Model ID (or filename):**
New Model File Date: 4/30/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

ID: OP2_V01.ROF	
Performed By: R. Hupfer, PG	Date: 8/5/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Operational Period Leaching Simulation	
Purpose of Simulation: To determine the loss of radionuclide activity from the waste due to leaching for Cell 2	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA/Desktop/RR-OS_Models/FLCEN0011/OP/OP2_V01/ OP2_V01.ROF	
Comments on Input Data: • Changed contaminated zone b parameter [BCZ] from 5.3 to 7.75 • Changed total porosity in unsaturated zone 4 [TPUZ(4)] from 0.445 to 0.419 • Changed effective porosity in unsaturated zone 4 [EPUZ(4)] from 0.236 to 0.234 • Changed field capacity in unsaturated zone 4 [FCUZ(4)] from 0.393 to 0.307 • Changed hydraulic conductivity in unsaturated zone 4 [HCUZ(4)] from 0.599 to 3.15 m/yr • Changed hydraulic conductivity in unsaturated zone 5 [HCUZ(5)] from 11.13 to 16.7 m/yr Changed effective porosity of saturated zone [EPSZ] from 0.2 to 0.27 Supporting file: OD/Projects/0011-D3/QA/OP/OP2_V01/OP2_V01_QA.xlsx	
Names of Output Files: OD/Projects/0011-D3/Sims/OP/OP2_V01/Out/OP2_V01_SUMMARY.REP OD/Projects/0011-D3/Sims/OP/OP2_V01/Out/OP2_V01_AQFLUXIN.DAT OP/Projects/0011-D3/Sims/OP/OP2_V01/OP2_V01_AQFLUX.xlsx OD/Projects/0011-D3/Sims/OP/OP_Flux.xlsx	
Comments on Model Outputs/Results: Discussion of model parameterization, model outputs, and results calculations can be found in calculation package CAW-90EMDF-G183.	

Cumulative radionuclide flux calculated using the following method with Timestep Flux Rate from OP2_V01_AQFLUXIN.DAT:
Timestep Flux Rate (pCi/yr) * Timestep Length (yr) = Timestep Flux (pCi)
Sum of Timestep Fluxes (pCi) = Cumulative Activity Leached (pCi) for Operational Period

Leaching summary from OP_Flux.xlsx

Cell	Time	C-14 Leached (pCi)	H-3 Leached (pCi)	I-129 Leached (pCi)	Tc-99 Leached (pCi)
1	12.27	1.73E+12	5.07E+12	4.86E+10	1.13E+12
2	13.86	2.51E+12	6.65E+12	5.79E+10	1.36E+12
3	12.70	2.09E+12	5.66E+12	4.42E+10	1.03E+12
4	6.28	1.15E+12	3.58E+12	2.15E+10	4.60E+11

Operational Period Leaching totals calculated in OP_Flux.xlsx

Radionuclide	**C-14**	**H-3**	**I-129**	**Tc-99**
Waste Kd (ml/g)	0	0	2	0.36
As Disposed Soil Concentration (pCi/g)	2.88	11.2	0.407	2.80
As Disposed Total Activity (pCi)	9.20E+12	3.58E+13	1.30E+12	8.95E+12
Total Leached Activity (pCi)	7.49E+12	2.10E+13	1.72E+11	3.97E+12
Post Operational Activity (pCi)	1.72E+12	1.48E+13	1.13E+12	4.97E+12
% Reduction due to Leaching	81.4	58.5	13.2	44.4
Post Operational Soil Concentration (pCi/g)	0.54	4.64	0.35	1.56

General Comments
C-14, H-3, I-129, and Tc-99 simulated, drinking water pathway simulated

Checked by & date:

O. Warren 8/6/2019 O. Warren 3/11/2020

Signed: 4/9/2020

J. Davis 8/9/2019 J. Davis 3/10/2020

Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP2_V01.ROF (Changed file name on 5/29/19) OP_190422_2.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Determine loss of radionuclide activity due to leaching for Cell 2						
Y-Dimension of Primary Contamination [SOURCEXY(2)]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\OP\ OP_190422_2\ OP_190422_2. ROF	Modified to reflect volume % of Cell 2	Y	J. Davis 5/1/19		
Time over which transformation to releasable form occurs		Modified to reflect volume % of Cell 2	Y	J. Davis 5/1/19		
Times at which output is reported		Changed one reporting time to end of Cell 2 filling period	Y	J. Davis 5/1/19		
Length of contamination parallel to aquifer flow [LCZPAQ]		Modified to reflect new Cell 2 Y dimension	Y	J. Davis 5/1/19		
Thickness of contaminated zone [THICK0]		Modified to reflect volume % of Cell 2	Y	J. Davis 5/1/19		
Longitudinal dispersivity of contaminated zone [ALPHALCZ]		Modified to reflect thickness of contaminated zone	Y	J. Davis 5/1/19		
Dwelling location coordinate in X-direction		Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19		
Dwelling location coordinate in Y-direction		Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19		
Shape Factor Radius [RADSHAPE(1-24)]		Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP2_V01.ROF (Changed file name on 5/29/19) OP_190422_2.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Shape Factor Fraction [FRACA(1-24)]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\OP\ OP_190422_2\ OP_190422_2. ROF	Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19		
File Name	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP2_V01\ OP2_V01.ROF	Changed file name from OP_190422_2.ROF to OP2_V01.ROF	Y	J. Davis 6/25/19		
Y-Dimension of Primary Contamination [SOURCEXY(2)]		Changed from 102.2 m to 103.5 m to reflect corrected cell planar area percentage	Y	J. Davis 6/25/19		
Length of contamination parallel to aquifer flow [LCZPAQ]		Changed from 106.5 m to 107.9 m based on calculation using updated y-dimension of primary contamination	Y	J. Davis 6/25/19		
Runoff coefficient in primary contamination [RUNOFF]		Changed from 0.745 to 0.029, based on 22.8 in/yr infiltration from leachate and contact water	Y	J. Davis 6/25/19		
Thickness of contaminated zone [THICK0]		Changed from 19.5 m to 19.3 m based on updated cell planar area percentages	Y	J. Davis 6/25/19		
Longitudinal dispersivity of contaminated zone [ALPHALCZ]		Changed from 1.95 m to 1.93 m to reflect updated thickness of contaminated zone	Y	J. Davis 6/25/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP2_V01.ROF (Changed file name on 5/29/19) OP_190422_2.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Thickness of clean cover [COVER0]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP2_V01\ OP2_V01.ROF	Changed from 3.353 m to 0.3048 m based on 1 ft contouring layer	Y	J. Davis 6/25/19		
Unsaturated zone 3 hydraulic conductivity [HCUZ(3)]		Changed from 0.315 m/yr to 0.6 m/yr to allow 22.8 in/yr infiltration to infiltrate	Y	J. Davis 6/25/19		
Thickness of Unsaturated Zone 5 [H(5)]		Changed from 4.572 m to 4.846 m base on updated vadose zone thickness (9.418 m total)	Y	J. Davis 6/25/19		
Shape Factors – Dwelling Location Y		Automatically updated based on new Y-dimension of primary contamination	Y	J. Davis 6/25/19		
Shape Factor Radius [RADSHAPE(1-24)]		Calculated based on new dwelling location specified in shape factors form	Y	J. Davis 6/25/19		
Shape Factor Fraction [FRACA(1-24)]		Calculated based on new dwelling location specified in shape factors form	Y	J. Davis 6/25/19		
Y-Dimension of Primary Contamination [SOURCEXY(2)]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP2_V01\ OP2_V01.ROF	Changed from 103.5 m to 103.6 m to reflect corrected cell planar area percentage on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Length of contamination parallel to aquifer flow [LCZPAQ]		Changed from 107.9 m to 108.0 m based on calculation using updated y-dimension of primary contamination on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		

Model Check Form

New Model ID (or filename): OP2_V01.ROF (Changed file name on 5/29/19) OP_190422_2.ROF (Previous file name)	**Source Model ID (or filename):** OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Thickness of contaminated zone [THICK0]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP2_V01\ OP2_V01.ROF	Changed from 19.3 m to 19.2 m based on updated cell planar area percentages on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Longitudinal dispersivity of contaminated zone [ALPHALCZ]		Changed from 106.5 m to 107.9 m based on calculation using updated y-dimension of primary contamination on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Soil Concentrations		Updated soil concentrations to values provided by S. Kenworthy on June 19, 2019 and listed in file *EMDF PA Summary Inventory Data Tables rev 0 June 19 2019.xlsx* on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Fruit, grain, nonleafy vegetables transfer factors		Updated fruit, grain, non-leafy vegetables transfer factors to average of fruit, grain, and root vegetable transfer factors from PNNL 2003, as listed in *Transfer_Factors_V01.xlsx* on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Fraction of meat from affected area [FMEMI]		Changed fraction of meat from affected area [FMEMI(1)] to 0.25 from 0.5 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19 Parameter is inactive; value checked in model itself.		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP2_V01.ROF (Changed file name on 5/29/19) OP_190422_2.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Effective porosity of saturated zone [EPSZ]		Changed Effective Porosity of Saturated Zone [EPSZ] to 0.2 from 0.27 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Hydraulic gradient to well [HGW]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP2_V01\ OP2_V01.ROF	Changed hydraulic gradient to well [HGW] to 0.036 from 0.03 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Hydraulic gradient to surface water body [HGSW]		Changed hydraulic gradient to surface water body [HGSW] to 0.036 from 0.03 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Depth of aquifer contributing to well [DWIBWT]		Changed Depth of Aquifer Contributing to Well [DWIBWT] to 40 m from 29 m on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Groundwater convergence criteria [EPS]		Changed groundwater convergence criteria [EPS] to 0 from 0.05 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Contaminated zone b parameter [BCZ]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP1_V01\ OP1_V01.ROF	Changed contaminated zone b parameter [BCZ] from 5.3 to 7.75 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Total porosity in unsaturated zone 4 [TPUZ(4)]		Changed total porosity in unsaturated zone 4 [TPUZ(4)] from 0.445 to 0.419 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Effective porosity in unsaturated zone 4 [EPUZ(4)]		Changed effective porosity in unsaturated zone 4 [EPUZ(4)] from 0.236 to 0.234 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP2_V01.ROF (Changed file name on 5/29/19) OP_190422_2.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Field capacity in unsaturated zone 4 [FCUZ(4)]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP1_V01\ OP1_V01.ROF	Changed field capacity in unsaturated zone 4 [FCUZ(4)] from 0.393 to 0.307 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Hydraulic conductivity in unsaturated zone 4 [HCUZ(4)]		Changed hydraulic conductivity in unsaturated zone 4 [HCUZ(4)] from 0.599 to 3.15 m/yr on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Hydraulic conductivity in unsaturated zone 5 [HCUZ(5)]		Changed hydraulic conductivity in unsaturated zone 5 [HCUZ(5)] from 11.13 to 16.7 m/yr on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Effective porosity of saturated zone [EPSZ]		Changed Effective Porosity of Saturated Zone [EPSZ] from 0.2 to 0.27 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
OP2_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\OP\ OP2_V01\ OP2_V01_QA.xlsx	All comments in OP2_V01_QA.xlsx have been addressed	Y	All comments were addressed. J. Davis 3/11/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): OP2_V01.ROF (Changed file name on 5/29/19) OP_190422_2.ROF (Previous file name)	**Source Model ID (or filename):** OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): OP2_V01.ROF (Changed file name on 5/29/19) OP_190422_2.ROF (Previous file name)	**Source Model ID (or filename):** OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

ID: OP3_V01.ROF	
Performed By: R. Hupfer, PG	Date: 8/5/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Operational Period Leaching Simulation	
Purpose of Simulation: To determine the loss of radionuclide activity from the waste due to leaching for Cell 3	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA/Desktop/RR-OS_Models/FLCEN0011/OP/OP3_V01/ OP3_V01.ROF	
Comments on Input Data: • Changed contaminated zone b parameter [BCZ] from 5.3 to 7.75 • Changed total porosity in unsaturated zone 4 [TPUZ(4)] from 0.445 to 0.419 • Changed effective porosity in unsaturated zone 4 [EPUZ(4)] from 0.236 to 0.234 • Changed field capacity in unsaturated zone 4 [FCUZ(4)] from 0.393 to 0.307 • Changed hydraulic conductivity in unsaturated zone 4 [HCUZ(4)] from 0.599 to 3.15 m/yr • Changed hydraulic conductivity in unsaturated zone 5 [HCUZ(5)] from 11.13 to 16.7 m/yr • Changed effective porosity of saturated zone [EPSZ] from 0.2 to 0.27 Supporting file: OD/Projects/0011-D3/QA/OP/OP3_V01/OP3_V01_QA.xlsx	
Names of Output Files: OD/Projects/0011-D3/Sims/OP/OP3_V01/Out/OP3_V01_SUMMARY.REP OD/Projects/0011-D3/Sims/OP/OP3_V01/Out/OP3_V01_AQFLUXIN.DAT OP/Projects/0011-D3/Sims/OP/OP3_V01/OP3_V01_AQFLUX.xlsx OD/Projects/0011-D3/Sims/OP/OP_Flux.xlsx	
Comments on Model Outputs/Results: Discussion of model parameterization, model outputs, and results calculations can be found in calculation package CAW-90EMDF-G183.	

Cumulative radionuclide flux calculated using the following method with Timestep Flux Rate from OP3_V01_AQFLUXIN.DAT:
Timestep Flux Rate (pCi/yr) * Timestep Length (yr) = Timestep Flux (pCi)
Sum of Timestep Fluxes (pCi) = Cumulative Activity Leached (pCi) for Operational Period

Leaching summary from OP_Flux.xlsx

Cell	Time	C-14 Leached (pCi)	H-3 Leached (pCi)	I-129 Leached (pCi)	Tc-99 Leached (pCi)
1	12.27	1.73E+12	5.07E+12	4.86E+10	1.13E+12
2	13.86	2.51E+12	6.65E+12	5.79E+10	1.36E+12
3	12.70	2.09E+12	5.66E+12	4.42E+10	1.03E+12
4	6.28	1.15E+12	3.58E+12	2.15E+10	4.60E+11

Operational Period Leaching totals calculated in OP_Flux.xlsx

Radionuclide	**C-14**	**H-3**	**I-129**	**Tc-99**
Waste Kd (ml/g)	0	0	2	0.36
As Disposed Soil Concentration (pCi/g)	2.88	11.2	0.407	2.80
As Disposed Total Activity (pCi)	9.20E+12	3.58E+13	1.30E+12	8.95E+12
Total Leached Activity (pCi)	7.49E+12	2.10E+13	1.72E+11	3.97E+12
Post Operational Activity (pCi)	1.72E+12	1.48E+13	1.13E+12	4.97E+12
% Reduction due to Leaching	81.4	58.5	13.2	44.4
Post Operational Soil Concentration (pCi/g)	0.54	4.64	0.35	1.56

General Comments
C-14, H-3, I-129, and Tc-99 simulated, drinking water pathway simulated

Checked by & date:
O. Warren 8/6/2019 O. Warren 3/11/2020
Olivia Warren Signed: 4/9/2020

J. Davis 3/10/2020
Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP3_V01.ROF (Changed file name on 5/29/19) OP_190422_3.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Determine loss of radionuclide activity due to leaching for Cell 3						
Y-Dimension of Primary Contamination [SOURCEXY(2)]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\OP\ OP_190422_3\ OP_190422_3. ROF	Modified to reflect volume % of Cell 3	Y	J. Davis 5/1/19		
Time over which transformation to releasable form occurs		Modified to reflect volume % of Cell 3	Y	J. Davis 5/1/19		
Times at which output is reported		Changed one reporting time to end of Cell 3 filling period	Y	J. Davis 5/1/19		
Area of Primary Contamination		Calculated by RESRAD	Y	J. Davis 5/1/19		
Length of contamination parallel to aquifer flow [LCZPAQ]		Modified to reflect new Cell 3 Y dimension	Y	J. Davis 5/1/19		
Thickness of contaminated zone [THICK0]		Modified to reflect volume % of Cell 3	Y	J. Davis 5/1/19		
Longitudinal dispersivity of contaminated zone [ALPHALCZ]		Modified to reflect thickness of contaminated zone	Y	J. Davis 5/1/19		
Dwelling location coordinate in X-direction		Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19		
Dwelling location coordinate in Y-direction		Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19	Confirmed.	Y
Shape Factor Radius [RADSHAPE(1-24)]		Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19		

Model Check Form

New Model ID (or filename): OP3_V01.ROF (Changed file name on 5/29/19) OP_190422_3.ROF (Previous file name)	**Source Model ID (or filename):** OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Shape Factor Fraction [FRACA(1-24)]		Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19		
File Name	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP3_V01\ OP3_V01.ROF	Changed file name from OP_190422_3.ROF to OP3_V01.ROF	Y	J. Davis 6/25/19		
Y-Dimension of Primary Contamination [SOURCEXY(2)]		Changed from 80.8 m to 82.3 m to reflect corrected cell planar area percentage	Y	J. Davis 6/25/19		
Length of contamination parallel to aquifer flow [LCZPAQ]		Changed from 84.2 m to 85.8 m based on calculation using updated y-dimension of primary contamination	Y	J. Davis 6/25/19		
Runoff coefficient in primary contamination [RUNOFF]		Changed from 0.745 to 0.029, based on 22.8 in/yr infiltration from leachate and contact water	Y	J. Davis 6/25/19		
Thickness of contaminated zone [THICK0]		Changed from 21.4 m to 20.9 m based on updated cell planar area percentages	Y	J. Davis 6/25/19		
Longitudinal dispersivity of contaminated zone [ALPHALCZ]		Changed from 2.14 m to 2.09 m to reflect updated thickness of contaminated zone	Y	J. Davis 6/25/19		
Thickness of clean cover [COVER0]		Changed from 3.353 m to 0.3048 m based on 1 ft contouring layer	Y	J. Davis 6/25/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP3_V01.ROF (Changed file name on 5/29/19) OP_190422_3.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Unsaturated zone 3 hydraulic conductivity [HCUZ(3)]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP3_V01\ OP3_V01.ROF	Changed from 0.315 m/yr to 0.6 m/yr to allow 22.8 in/yr infiltration to infiltrate	Y	J. Davis 6/25/19		
Thickness of Unsaturated Zone 5 [H(5)]		Changed from 4.572 m to 4.846 m base on updated vadose zone thickness (9.418 m total)	Y	J. Davis 6/25/19		
Shape Factors – Dwelling Location Y		Automatically updated based on new Y-dimension of primary contamination	Y	J. Davis 6/25/19		
Shape Factor Radius [RADSHAPE(1-24)]		Calculated based on new dwelling location specified in shape factors form	Y	J. Davis 6/25/19		
Shape Factor Fraction [FRACA(1-24)]		Calculated based on new dwelling location specified in shape factors form	Y	J. Davis 6/25/19		
Y-Dimension of Primary Contamination [SOURCEXY(2)]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP3_V01\ OP3_V01.ROF	Changed Y-dimension of primary contamination from 82.3 to 82.4 m on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Length of contamination parallel to aquifer flow [LCZPAQ]		Changed length of contamination parallel to aquifer flow from 85.8 to 85.9 m on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Soil Concentrations		Updated soil concentrations to values provided by S. Kenworthy on June 19, 2019 and listed in file *EMDF PA Summary Inventory Data Tables rev 0 June 19 2019.xlsx* on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP3_V01.ROF (Changed file name on 5/29/19) OP_190422_3.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Fruit, grain, nonleafy vegetables transfer factors	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP3_V01\ OP3_V01.ROF	Updated fruit, grain, non-leafy vegetables transfer factors to average of fruit, grain, and root vegetable transfer factors from PNNL 2003, as listed in *Transfer_Factors_V01.xlsx* on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Fraction of meat from affected area [FMEMI]		Changed fraction of meat from affected area [FMEMI(1)] to 0.25 from 0.5 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19 Parameter is inactive; value checked in model itself.		
Effective porosity of saturated zone [EPSZ]		Changed Effective Porosity of Saturated Zone [EPSZ] to 0.2 from 0.27 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Hydraulic gradient to well [HGW]		Changed hydraulic gradient to well [HGW] to 0.036 from 0.03 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Hydraulic gradient to surface water body [HGSW]		Changed hydraulic gradient to surface water body [HGSW] to 0.036 from 0.03 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Depth of aquifer contributing to well [DWIBWT]		Changed Depth of Aquifer Contributing to Well [DWIBWT] to 40 m from 29 m on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		
Groundwater convergence criteria [EPS]		Changed groundwater convergence criteria [EPS] to 0 from 0.05 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP3_V01.ROF (Changed file name on 5/29/19) OP_190422_3.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Contaminated zone b parameter [BCZ]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP1_V01\ OP1_V01.ROF	Changed contaminated zone b parameter [BCZ] from 5.3 to 7.75 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Total porosity in unsaturated zone 4 [TPUZ(4)]		Changed total porosity in unsaturated zone 4 [TPUZ(4)] from 0.445 to 0.419 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Effective porosity in unsaturated zone 4 [EPUZ(4)]		Changed effective porosity in unsaturated zone 4 [EPUZ(4)] from 0.236 to 0.234 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Field capacity in unsaturated zone 4 [FCUZ(4)]		Changed field capacity in unsaturated zone 4 [FCUZ(4)] from 0.393 to 0.307 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Hydraulic conductivity in unsaturated zone 4 [HCUZ(4)]		Changed hydraulic conductivity in unsaturated zone 4 [HCUZ(4)] from 0.599 to 3.15 m/yr on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Hydraulic conductivity in unsaturated zone 5 [HCUZ(5)]		Changed hydraulic conductivity in unsaturated zone 5 [HCUZ(5)] from 11.13 to 16.7 m/yr on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Effective porosity of saturated zone [EPSZ]		Changed Effective Porosity of Saturated Zone [EPSZ] from 0.2 to 0.27 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		

Model Check Form

New Model ID (or filename): OP3_V01.ROF (Changed file name on 5/29/19) OP_190422_3.ROF (Previous file name)	**Source Model ID (or filename):** OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
OP3_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\OP\OP3_V01\OP3_V01_QA.xlsx	All comments in OP3_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP3_V01.ROF (Changed file name on 5/29/19) OP_190422_3.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print):	E-Signature (or sign/date/scan hardcopy): (Not required if no comments)
Ryan Hupfer	Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Olivia Warren Signed: 4/9/2020

Model Simulation Log

ID: OP4_V01.ROF	
Performed By: R. Hupfer, PG	Date: 8/5/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Operational Period Leaching Simulation	
Purpose of Simulation: To determine the loss of radionuclide activity from the waste due to leaching for Cell 4	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA/Desktop/RR-OS_Models/FLCEN0011/OP/OP4_V01/ OP4_V01.ROF	
Comments on Input Data: • Changed contaminated zone b parameter [BCZ] from 5.3 to 7.75 • Changed total porosity in unsaturated zone 4 [TPUZ(4)] from 0.445 to 0.419 • Changed effective porosity in unsaturated zone 4 [EPUZ(4)] from 0.236 to 0.234 • Changed field capacity in unsaturated zone 4 [FCUZ(4)] from 0.393 to 0.307 • Changed hydraulic conductivity in unsaturated zone 4 [HCUZ(4)] from 0.599 to 3.15 m/yr • Changed hydraulic conductivity in unsaturated zone 5 [HCUZ(5)] from 11.13 to 16.7 m/yr • Changed effective porosity of saturated zone [EPSZ] from 0.2 to 0.27 Supporting file: OD/Projects/0011-D3/QA/OP/OP4_V01/OP4_V01_QA.xlsx	
Names of Output Files: OD/Projects/0011-D3/Sims/OP/OP4_V01/Out/OP4_V01_SUMMARY.REP OD/Projects/0011-D3/Sims/OP/OP4_V01/Out/OP4_V01_AQFLUXIN.DAT OP/Projects/0011-D3/Sims/OP/OP4_V01/OP4_V01_AQFLUX.xlsx OD/Projects/0011-D3/Sims/OP/OP_Flux.xlsx	
Comments on Model Outputs/Results: Discussion of model parameterization, model outputs, and results calculations can be found in calculation package CAW-90EMDF-G183.	

Cumulative radionuclide flux calculated using the following method with Timestep Flux Rate from OP4_V01_AQFLUXIN.DAT:
Timestep Flux Rate (pCi/yr) * Timestep Length (yr) = Timestep Flux (pCi)
Sum of Timestep Fluxes (pCi) = Cumulative Activity Leached (pCi) for Operational Period

Leaching summary from OP_Flux.xlsx

Cell	Time	C-14 Leached (pCi)	H-3 Leached (pCi)	I-129 Leached (pCi)	Tc-99 Leached (pCi)
1	12.27	1.73E+12	5.07E+12	4.86E+10	1.13E+12
2	13.86	2.51E+12	6.65E+12	5.79E+10	1.36E+12
3	12.70	2.09E+12	5.66E+12	4.42E+10	1.03E+12
4	6.28	1.15E+12	3.58E+12	2.15E+10	4.60E+11

Operational Period Leaching totals calculated in OP_Flux.xlsx

Radionuclide	**C-14**	**H-3**	**I-129**	**Tc-99**
Waste Kd (ml/g)	0	0	2	0.36
As Disposed Soil Concentration (pCi/g)	2.88	11.2	0.407	2.80
As Disposed Total Activity (pCi)	9.20E+12	3.58E+13	1.30E+12	8.95E+12
Total Leached Activity (pCi)	7.49E+12	2.10E+13	1.72E+11	3.97E+12
Post Operational Activity (pCi)	1.72E+12	1.48E+13	1.13E+12	4.97E+12
% Reduction due to Leaching	81.4	58.5	13.2	44.4
Post Operational Soil Concentration (pCi/g)	0.54	4.64	0.35	1.56

General Comments
C-14, H-3, I-129, and Tc-99 simulated, drinking water pathway simulated

Checked by & date:
O. Warren 8/6/2019 O. Warren 3/11/2020
Signed: 4/9/2020

J. Davis 8/9/2019 J. Davis 3/10/2020
Signed: 4/9/2020

Model Check Form

New Model ID (or filename): OP4_V01.ROF (Changed file name on 5/29/19) OP_190422_4.ROF (Previous file name)	**Source Model ID (or filename):** OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back t a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Determine loss of radionuclide activity due to leaching for Cell 4						
Y-Dimension of Primary Contamination [SOURCEXY(2)]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\OP\ OP_190422_4\ OP_190422_4. ROF	Modified to reflect volume % of Cell 4	Y	J. Davis 5/1/19		
Time over which transformation to releasable form occurs		Modified to reflect volume % of Cell 4	Y	J. Davis 5/1/19		
Times at which output is reported		Changed one reporting time to end of Cell 4 filling period	Y	J. Davis 5/1/19		
Area of Primary Contamination		Calculated by RESRAD	Y	J. Davis 5/1/19		
Length of contamination parallel to aquifer flow [LCZPAQ]		Modified to reflect new Cell 4 Y dimension	Y	J. Davis 5/1/19		
Thickness of contaminated zone [THICK0]		Modified to reflect volume % of Cell 4	Y	J. Davis 5/1/19		
Longitudinal dispersivity of contaminated zone [ALPHALCZ]		Modified to reflect thickness of contaminated zone	Y	J. Davis 5/1/19		
Dwelling location coordinate in X-direction		Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19		
Dwelling location coordinate in Y-direction		Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19		
Shape Factor Radius [RADSHAPE(1-24)]		Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP4_V01.ROF (Changed file name on 5/29/19) OP_190422_4.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Shape Factor Fraction [FRACA(1-24)]		Calculated by RESRAD based on new Y dimension of primary contamination	Y	J. Davis 5/1/19		
File Name	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP4_V01\ OP4_V01.ROF	Changed file name from OP_190422_4.ROF to OP4_V01.ROF	Y	J. Davis 6/25/19		
Y-Dimension of Primary Contamination [SOURCEXY(2)]		Changed from 102.6 m to 103.4 m to reflect corrected cell planar area percentage	Y	J. Davis 6/25/19		
Length of contamination parallel to aquifer flow [LCZPAQ]		Changed from 107.0 m to 107.8 m based on calculation using updated y-dimension of primary contamination	Y	J. Davis 6/25/19		
Runoff coefficient in primary contamination [RUNOFF]		Changed from 0.745 to 0.029, based on 22.8 in/yr infiltration from leachate and contact water	Y	J. Davis 6/25/19		
Thickness of contaminated zone [THICK0]		Changed from 16.5 m to 16.4 m based on updated cell planar area percentages	Y	J. Davis 6/25/19		
Longitudinal dispersivity of contaminated zone [ALPHALCZ]		Changed from 1.65 m to 1.64 m to reflect updated thickness of contaminated zone	Y	J. Davis 6/25/19		
Thickness of clean cover [COVER0]		Changed from 3.353 m to 0.3048 m based on 1 ft contouring layer	Y	J. Davis 6/25/19		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP4_V01.ROF (Changed file name on 5/29/19) OP_190422_4.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Unsaturated zone 3 hydraulic conductivity [HCUZ(3)]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP4_V01\ OP4_V01.ROF	Changed from 0.315 m/yr to 0.6 m/yr to allow 22.8 in/yr infiltration to infiltrate	Y	J. Davis 6/25/19		
Thickness of Unsaturated Zone 5 [H(5)]		Changed from 4.572 m to 4.846 m base on updated vadose zone thickness (9.418 m total)	Y	J. Davis 6/25/19		
Shape Factors – Dwelling Location Y		Automatically updated based on new Y-dimension of primary contamination	Y	J. Davis 6/25/19		
Shape Factor Radius [RADSHAPE(1-24)]		Calculated based on new dwelling location specified in shape factors form	Y	J. Davis 6/25/19		
Shape Factor Fraction [FRACA(1-24)]		Calculated based on new dwelling location specified in shape factors form	Y	J. Davis 6/25/19		
Soil Concentrations	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP4_V01\ OP4_V01.ROF	Updated soil concentrations to values provided by S. Kenworthy on June 19, 2019 and listed in file *EMDF PA Summary Inventory Data Tables rev 0 June 19 2019.xlsx* on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/2019		
Fruit, grain, nonleafy vegetables transfer factors		Updated fruit, grain, non-leafy vegetables transfer factors to average of fruit, grain, and root vegetable transfer factors from PNNL 2003, as listed in *Transfer_Factors_V01.xlsx* on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/2019		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP4_V01.ROF (Changed file name on 5/29/19) OP_190422_4.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Fraction of meat from affected area [FMEMI]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP4_V01\ OP4_V01.ROF	Changed fraction of meat from affected area [FMEMI(1)] to 0.25 from 0.5 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/2019		
Effective porosity of saturated zone [EPSZ]		Changed Effective Porosity of Saturated Zone [EPSZ] to 0.2 from 0.27 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/2019		
Hydraulic gradient to well [HGW]		Changed hydraulic gradient to well [HGW] to 0.036 from 0.03 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/2019		
Hydraulic gradient to surface water body [HGSW]		Changed hydraulic gradient to surface water body [HGSW] to 0.036 from 0.03 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/2019		
Depth of aquifer contributing to well [DWIBWT]		Changed Depth of Aquifer Contributing to Well [DWIBWT] to 40 m from 29 m on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/2019		
Groundwater convergence criteria [EPS]		Changed groundwater convergence criteria [EPS] to 0 from 0.05 on 7/11/19	Y	O.Warren 7/19/19 J. Davis 7/30/2019		
Contaminated zone b parameter [BCZ]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP1_V01\ OP1_V01.ROF	Changed contaminated zone b parameter [BCZ] from 5.3 to 7.75 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
OP4_V01.ROF (Changed file name on 5/29/19) OP_190422_4.ROF (Previous file name)	OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N
Total porosity in unsaturated zone 4 [TPUZ(4)]	Dell Precision 7520 DESKTOP – MDFIMDA\ Desktop\ RR-OS_Models\ FLCEN0011\ OP\OP1_V01\ OP1_V01.ROF	Changed total porosity in unsaturated zone 4 [TPUZ(4)] from 0.445 to 0.419 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Effective porosity in unsaturated zone 4 [EPUZ(4)]		Changed effective porosity in unsaturated zone 4 [EPUZ(4)] from 0.236 to 0.234 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Field capacity in unsaturated zone 4 [FCUZ(4)]		Changed field capacity in unsaturated zone 4 [FCUZ(4)] from 0.393 to 0.307 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Hydraulic conductivity in unsaturated zone 4 [HCUZ(4)]		Changed hydraulic conductivity in unsaturated zone 4 [HCUZ(4)] from 0.599 to 3.15 m/yr on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Hydraulic conductivity in unsaturated zone 5 [HCUZ(5)]		Changed hydraulic conductivity in unsaturated zone 5 [HCUZ(5)] from 11.13 to 16.7 m/yr on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
Effective porosity of saturated zone [EPSZ]		Changed Effective Porosity of Saturated Zone [EPSZ] from 0.2 to 0.27 on 8/5/19	Y	O. Warren 8/6/2019 J. Davis 8/9/2019		
OP4_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\OP\ OP4_V01\ OP4_V01_QA.xlsx	All comments in OP4_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): OP4_V01.ROF (Changed file name on 5/29/19) OP_190422_4.ROF (Previous file name)	**Source Model ID (or filename):** OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): OP4_V01.ROF (Changed file name on 5/29/19) OP_190422_4.ROF (Previous file name)	**Source Model ID (or filename):** OP1_V01.ROF (Changed file name on 5/29/19) OP_190422_1.ROF (Previous file name)
New Model File Date: 4/30/2019	**Source Model File Date:** 4/30/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

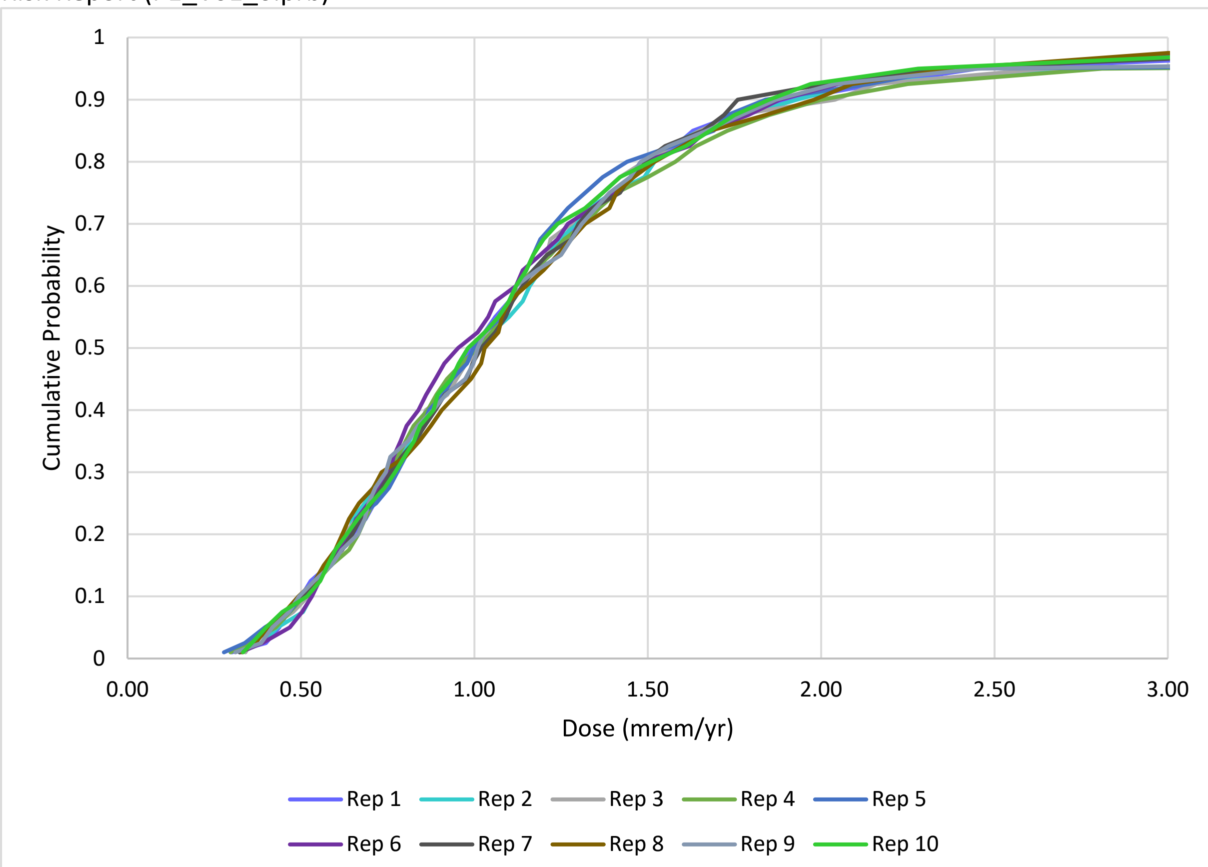
Model Simulation Log

ID: P1_V01_6.ROF	
Performed By: R. Hupfer	Date: 1/8/2020
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model Probabilistic Analysis 1K	
Purpose of Simulation: To determine the sensitivity of the base case model to uncertainty in model parameters	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P1_V01_6\P1_V01_6.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\P\P1_V01_6\P1_V01_6_QA.xlsx OD\Projects\0011-D3\QA\P\P1_V01_6\P1_V01_6_Prob_Inputs.xlsx	
Names of Output Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P1_V01_6\P1_V01_6.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P1_V01_6\P1_V01_6.smp Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P1_V01_6\P1_V01_6.rel Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P1_V01_6\P1_V01_6.prb Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P1_V01_6\P1_V01_6_reg.txt OD\Projects\0011-D3\QA\P\P1_V01_6\P1_V01_6.par OD\Projects\0011-D3\QA\P\P1_V01_6\P1_V01_6.smp OD\Projects\0011-D3\QA\P\P1_V01_6\P1_V01_6.rel OD\Projects\0011-D3\QA\P\P1_V01_6\P1_V01_6.prb	

Comments on Model Outputs/Results:
Peak of the Means from Probabilistic Dose and Risk Report (P1_V01_6.prb)

Repetition	Time of peak mean dose Years	Peak mean dose mrem/yr
1	1.03E+03	9.15E-01
2	1.03E+03	9.39E-01
3	1.03E+03	1.07E+00
4	1.03E+03	1.11E+00
5	1.03E+03	1.21E+00
6	1.03E+03	1.05E+00
7	1.03E+03	9.98E-01
8	1.03E+03	9.96E-01
9	1.03E+03	1.03E+00
10	1.03E+03	1.07E+00

Cumulative Distribution Function for Each Repetition from Data Included in Probabilistic Dose and Risk Report (P1_V01_6.prb)



General Comments External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated
Checked by & date: N. Holt, PE 1/21/2020 Nathan Holt Signed: 4/9/2020 J. Davis, PhD 1/21/20 Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
P1_V01_6.ROF	BC_V01.ROF
New Model File Date: 1/8/20	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify the probabilistic distributions and relationships specified in the base case model compliance period probabilistic analysis						
Reporting Times [T(2) – T(10)]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\P\ P1_V01_6\ P1_V01_6.ROF	Changed reporting times [T(2) – T(10)] to the following values as listed in P10_V01_6.par: 200, 300, 400, 500, 600, 700, 800, 900, 1000	Y	N. Holt, PE 1/21/2020 J. Davis 1/21/20		
Simulated Inventory		Reduced simulated inventory to the following radionuclides: C-14, I-129, Tc-99	Y	N. Holt, PE 1/21/2020 J. Davis 1/21/20		
Probabilistic Distributions		Assigned probabilistic distributions to 33 parameters as listed in P1_V01_6.smp and P1_V01_6_Prob_Inputs.xlsx	Y	N. Holt, PE 1/13/2020 J. Davis 1/21/20		
Rank Correlation Coefficients		Assigned rank correlation coefficients to 16 pairs of parameters for which distributions were assigned as listed in P1_V01_6.smp and P1_V01_6_Prob_Inputs.xlsx	Y	N. Holt, PE 1/13/2020 J. Davis 1/21/20		

Model Check Form

New Model ID (or filename): P1_V01_6.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/8/20	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Related Parameter	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P1_V01_6\P1_V01_6.ROF	Assigned functional relationships to 22 parameter pairs as listed in P1_V01_6.rel and P1_V01_6_Prob_Inputs.xlsx	Y	N. Holt, PE 1/13/2020 J. Davis 1/21/20		
P1_V01_6_QA.xlsx comments	OD\Projects\0011-D3\QA\P\P1_V01_6\P1_V01_6_QA.xlsx	All comments in P1_V01_6_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 N. Holt, PE 3/13/2020		
P1_V01_6_Prob_Inputs.xlsx comments	OD\Projects\0011-D3\QA\P\P1_V01_6\P1_V01_6_Prob_Inputs.xlsx	All comments in P1_V01_6_Prob_Inputs.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/10/2020 N. Holt, PE 3/13/2020		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
P1_V01_6.ROF	BC_V01.ROF
New Model File Date: 1/8/20	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): P1_V01_6.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/8/20	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): P1_V01_6.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 1/8/20	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): P1_V01_6.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/8/20	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

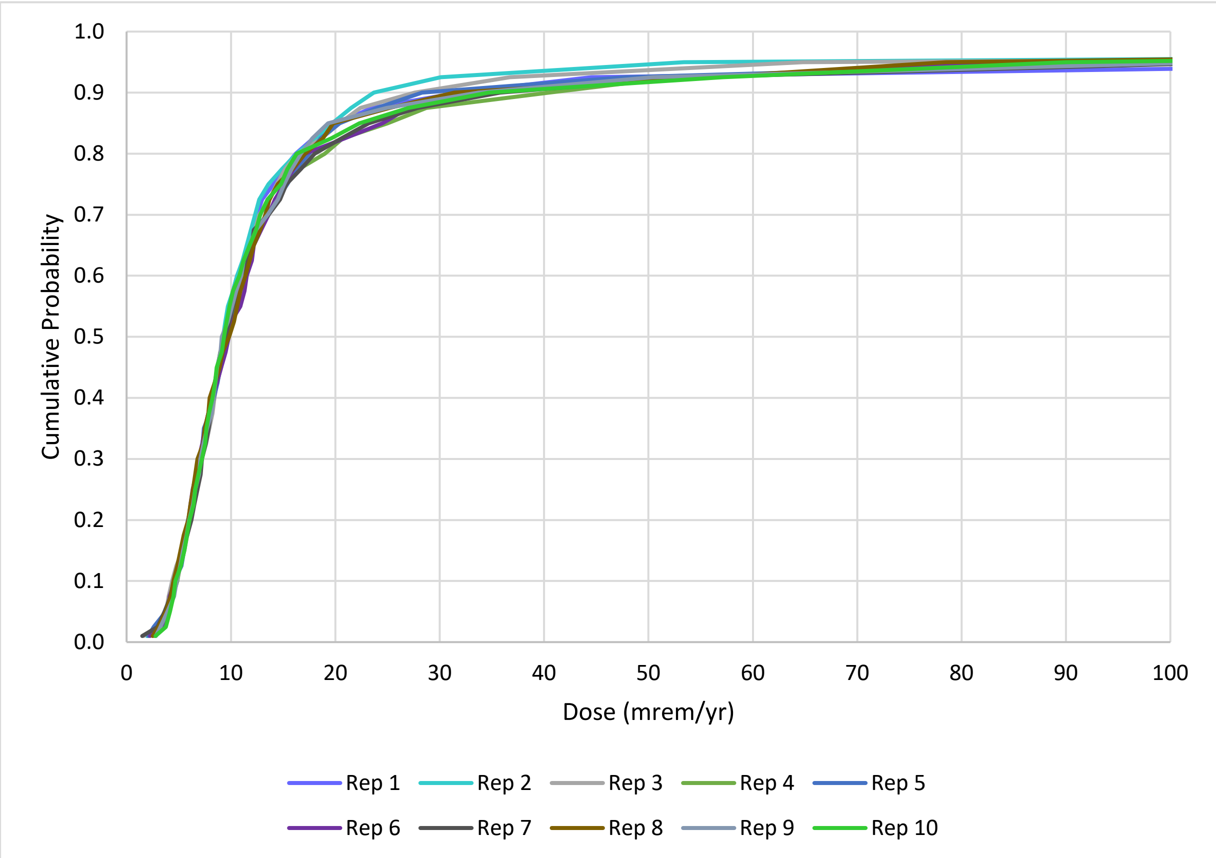
ID: P1_V01_7.ROF	
Performed By: R. Hupfer	Date: 1/30/2020
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Base Case Model Probabilistic Analysis 10K	
Purpose of Simulation: To determine the sensitivity of the base case model results for the 10,000-year simulation period to uncertainty in model parameters	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P10_V01_7\ P10_V01_7.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\P\P10_V01_7\P10_V01_7_QA.xlsx OD\Projects\0011-D3\QA\P\P10_V01_7\P10_V01_7_Prob_Inputs.xlsx	
Names of Output Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P10_V01_7\ P10_V01_7.par Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P10_V01_7\ P10_V01_7.smp Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P10_V01_7\ P10_V01_7.rel Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P10_V01_7\ P10_V01_7.prb Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\P\P10_V01_7\ P10_V01_7_reg.txt OD\Projects\0011-D3\QA\P\P10_V01_7\P10_V01_7.par OD\Projects\0011-D3\QA\P\P10_V01_7\P10_V01_7.smp OD\Projects\0011-D3\QA\P\P10_V01_7\P10_V01_7.rel OD\Projects\0011-D3\QA\P\P10_V01_7\P10_V01_7.prb	

Comments on Model Outputs/Results:
Peak of the Means from Probabilistic Dose and Risk Report (P10_V01_7.prb)

Peak of the mean dose (averaged over observations) at graphical times

Repetition	Time of peak mean dose (years)	Peak mean dose (mrem/yr)
1	10,030	25.77
2	10,030	37.26
3	10,030	29.34
4	10,030	16.77
5	10,030	32.98
6	10,030	18.94
7	10,030	29.70
8	10,030	22.35
9	10,030	22.30
10	10,030	21.71

Cumulative Distribution Function for Each Repetition from Data Included in Probabilistic Dose and Risk Report (P1_V01_7.prb)



General Comments External gamma, inhalation, plant ingestion, meat ingestion, milk ingestion, drinking water, and soil ingestion pathways simulated
Checked by & date: N. Holt, PE 2/5/2020  Signed: 4/9/2020 J. Davis 2/3/2020  Signed: 4/9/2020

Model Check Form

New Model ID (or filename): P10_V01_7.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/30/20	**Source Model File Date:** 10/25/19

Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)?
- If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.

Objective: Verify the probabilistic distributions and relationships specified in the base case model 10,000-year simulation period probabilistic analysis

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Reporting Times [T(2) – T(10)]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\P\ P1_V01_7\ P1_V01_7.ROF	Changed reporting times [T(2) – T(10)] to the following values as listed in P10_V01_6.par: 1,000; 1,500; 2,000; 3,000; 4,250; 5,500; 7,000; 8,500; 10,000	Y	N. Holt, PE 2/3/2020 J. Davis 2/3/2020		
Simulated Inventory		Reduced simulated inventory to the following radionuclides: C-14, I-129, Pu-239, Tc-99, U-234, U-235, U-238 The following radionuclides were simulated as progeny: Ac-227, Pa-231, Pb-210, Ra-226, Th-230	Y	N. Holt, PE 2/3/2020 J. Davis 2/3/2020		
Probabilistic Distributions		Assigned probabilistic distributions to 37 parameters as listed in P10_V01_7.smp and P10_V01_7_Prob_Inputs.xlsx	Y	N. Holt, PE 2/3/2020 J. Davis 2/3/2020		

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
P10_V01_7.ROF	BC_V01.ROF
New Model File Date: 1/30/20	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Rank Correlation Coefficients	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\P\ P1_V01_7\ P1_V01_7.ROF	Assigned rank correlation coefficients to 20 pairs of parameters for which distributions were assigned as listed in P10_V01_7.smp and P10_V01_7_Prob_Inputs.xlsx	Y	N. Holt, PE 2/3/2020 J. Davis 2/3/2020		
Related Parameter		Assigned functional relationships to 58 parameter pairs as listed in P10_V01_7.rel and P10_V01_7_Prob_Inputs.xlsx	Y	N. Holt, PE 2/3/2020 J. Davis 2/3/2020		
P10_V01_7_QA.xlsx comments	OD\Projects\0011-D3\ QA\P\P10_V01_7\ P10_V01_7_ QA.xlsx	All comments in P10_V01_7_QA.xlsx have been addressed	Y	All comments were addressed. J. Davis 3/10/2020 N. Holt, PE 3/16/2020		
P1_V01_7_Prob_Inputs .xlsx comments	OD\Projects\0011-D3\ QA\P\P10_V01_7\ P10_V01_7_ Prob_Inputs.xlsx	All comments in P10_V01_7_Prob_Inputs .xlsx have been addressed	Y	All comments were addressed. J. Davis 3/16/2020 N. Holt, PE 3/16/2020		

Model Check Form

New Model ID (or filename): P10_V01_7.ROF	Source Model ID (or filename): BC_V01.ROF
New Model File Date: 1/30/20	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): P10_V01_7.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/30/20	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): P10_V01_7.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/30/20	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): P10_V01_7.ROF	**Source Model ID (or filename):** BC_V01.ROF
New Model File Date: 1/30/20	**Source Model File Date:** 10/25/19

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

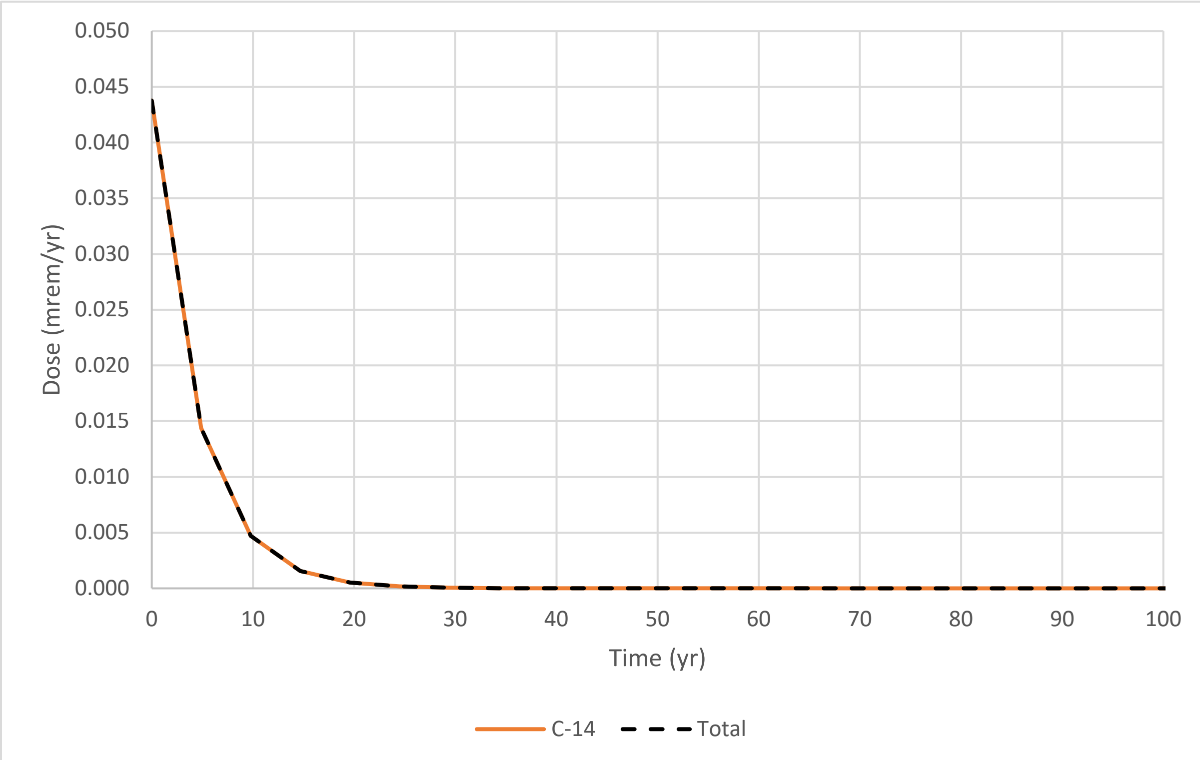
If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

ID: SAR_V01.ROF	
Performed By: Ryan Hupfer, PG	Date: 11/05/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Vapor release pathway screening model	
Purpose of Simulation: To determine the dose contribution from the atmospheric/inhalation pathway using parameters biased towards a greater dose from inhalation, which included availability of all radionuclide bearing material for release to the atmosphere at time zero, reduced cover thickness (6 ft/1.82 m) [COVER0], decreased vertical mixing height for inhalation (1 m) [HMIX], and increased C-14 evasion layer thickness (2 m) [DMC]. The first order with transport release option was selected, so RESRAD would calculate release to the atmosphere. Initial and final leach rates were set to 0/yr to ignore loss of radionuclides due to leaching, as a conservative assumption biased towards higher dose predictions.	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SAR\SAR_V01\SAR_V01.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\SAR\SAR_V01\SAR_V01_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\Sims\SAR_V01\Out\SUMMARY.REP Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SAR\SAR_V01\SAR_V01.par OD\Projects\0011-D3\Sims\SAR_V01\SAR_V01_Res.xlsx **Results** The atmospheric vapor release pathway screening model produced a peak dose of 0.044 mrem/yr at time zero (0 yr). After the peak dose at time zero, the total dose rapidly approaches 0 mrem/yr, decreasing to 5.49E-05 mrem/yr after approximately 30 years and eventually 0 mrem/yr at approximately 440 yr. C-14 was the only radionuclide that provided a contribution to the total dose. All pathways except the inhalation pathway were turned off, with the intent of only simulating dose	

from the inhalation pathway. A temporal dose plot of dose from C-14 and total dose (all radionuclides summed) is presented below.



General Comments
Inhalation pathway simulated using the first order with transport release option.

Checked by & date:
J. Davis, PhD 12/30/19

Signed: 4/9/2020
O. Warren 1/6/2020

Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
SAR_V01.ROF	
New Model File Date: 7/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Evaluate dose contribution from the inhalation pathway using parameters biased towards a greater pathway dose						
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\ SAR\SAR_V01\ SAR_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\ QA\SAR\SAR_V01\ SAR_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	Y	O. Warren 9/6/2019		
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\ SAR\SAR_V01\ SAR_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\ QA\SAR\SAR_V01\ SAR_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	N	Error with Ac-227 Initial Soil Concentration J. Davis 9/11/19	Changed Ac-227 initial soil concentration to intended value of 3.38E-02 pCi/g.	J. Davis 12/30/19 O. Warren 1/10/20
Contaminated zone b parameter [BCZ]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\ SAR\SAR_V01\ SAR_V01.ROF	Changed contaminated zone b parameter [BCZ] to 7.75	Y	J. Davis O. Warren 1/6/2020		
Hydraulic conductivity of saturated zone [HCSZ]		Changed hydraulic conductivity of saturated zone [HCSZ] to 26.8 m/yr	Y	J. Davis O. Warren 1/6/2020		
Runoff coefficient in fruit, grain, and nonleafy vegetables field [RUNOF(1)]		Changed runoff coefficient in fruit, grain, and nonleafy vegetables field [RUNOF1] to 0.734	Y	J. Davis O. Warren 1/6/2020		

Model Check Form

New Model ID (or filename): SAR_V01.ROF	Source Model ID (or filename):
New Model File Date: 7/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Runoff coefficient in leafy vegetables field [RUNOF(2)]	Dell Precision 7520 DESKTOP-MDFIMDA\ Desktop\RR-OS_Models\ FLCEN0011\ SAR\SAR_V01\ SAR_V01.ROF	Changed runoff coefficient in leafy vegetables field [RUNOF(2)] to 0.734	Y	J. Davis O. Warren 1/6/2020		
Runoff coefficient in pasture and silage field [RUNOF(3)]		Changed runoff coefficient in pasture and silage field [RUNOF(3)] to 0.734	Y	J. Davis O. Warren 1/6/2020		
Runoff coefficient in grain field [RUNOF(4)]		Changed runoff coefficient in grain field [RUNOF(4)] to 0.734	Y	J. Davis O. Warren 1/6/2020		
Runoff coefficient in dwelling area [RUNOFDWELL]		Changed runoff coefficient in dwelling area [RUNOFDWELL] to 0.636	Y	J. Davis O. Warren 1/6/2020		
Total porosity of unsaturated zone 4 [TPUZ(4)]		Changed total porosity of unsaturated zone 4 [TPUZ(4)] to 0.419	Y	J. Davis O. Warren 1/6/2020		
Effective porosity of unsaturated zone 4 [EPUZ(4)]		Changed effective porosity of unsaturated zone 4 [EPUZ(4)] to 0.234	Y	J. Davis O. Warren 1/10/2020		
Field capacity of unsaturated zone 4 [FCUZ(4)]		Changed field capacity of unsaturated zone 4 [FCUZ(4)] to 0.307	Y	J. Davis O. Warren 1/10/2020		
Hydraulic conductivity of unsaturated zone 4 [HCUZ(4)]		Changed hydraulic conductivity of unsaturated zone 4 [HCUZ(4)] to 3.15 m/yr	Y	J. Davis O. Warren 1/6/2020		
Hydraulic conductivity of unsaturated zone 5 [HCUZ(5)]		Changed hydraulic conductivity of unsaturated zone 5 [HCUZ(5)] to 16.7 m/yr	Y	J. Davis O. Warren 1/6/2020		
Dry bulk density of saturated zone [DENSAQ]		Changed dry bulk density of saturated zone [DENSAQ] to 2.1 g/cm^3	Y	J. Davis O. Warren 1/6/2020		

Model Check Form

New Model ID (or filename): SAR_V01.ROF	Source Model ID (or filename):
New Model File Date: 7/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Total porosity of saturated zone [TPSZ]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SAR\SAR_V01\SAR_V01.ROF	Changed total porosity of saturated zone [TPSZ] to 0.24	Y	J. Davis O. Warren 1/6/2020		
Effective porosity of saturated zone [PSZ]		Changed effective porosity of saturated zone [EPSZ] to 0.20	Y	J. Davis O. Warren 1/6/2020		
Hydraulic conductivity of saturated zone [HCSZ]		Changed hydraulic conductivity of saturated zone [HCCZ] to 26.8 m/yr	Y	J. Davis O. Warren 1/6/2020		
Hydraulic gradient of aquifer to well [HGW]		Changed hydraulic gradient of aquifer to well [HGW] to 0.054	Y	J. Davis O. Warren 1/6/2020		
SAR_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\SAR\SAR_V01\SAR_V01_QA.xlsx	All comments in SAR_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): SAR_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 7/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): SAR_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 7/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): SAR_V01.ROF	Source Model ID (or filename):
New Model File Date: 7/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

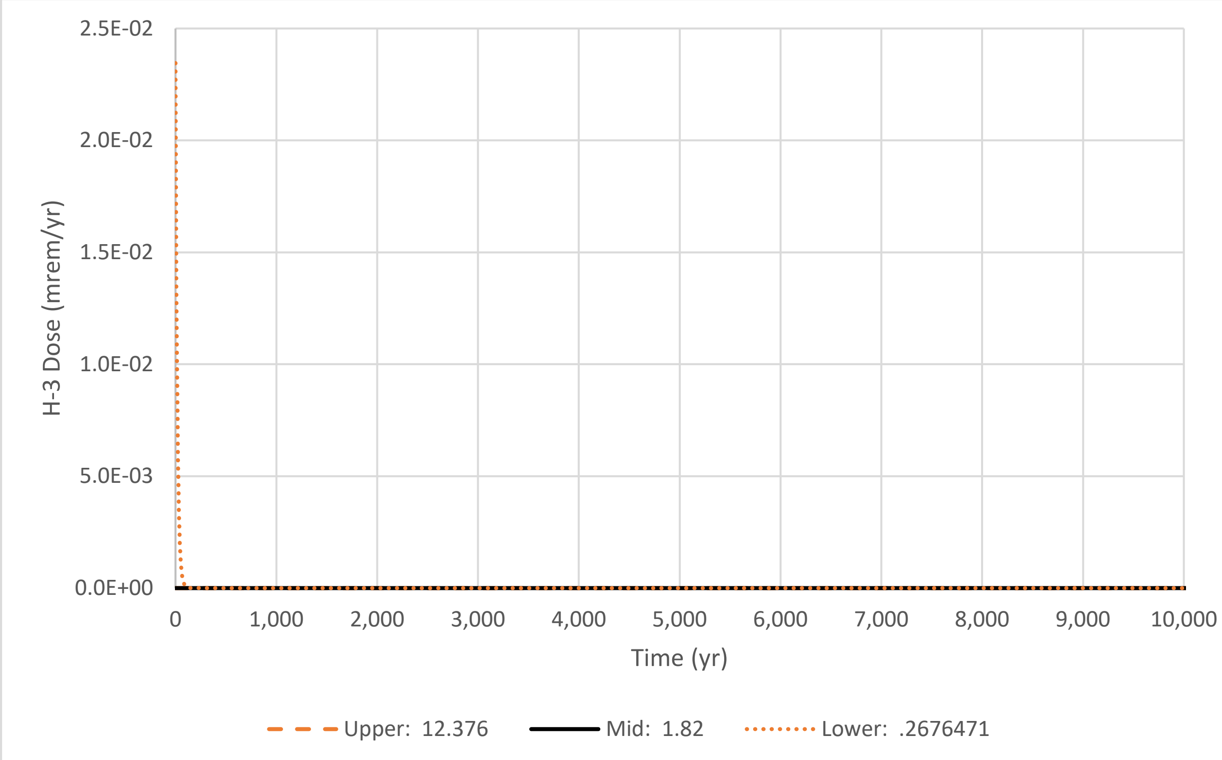
If checker has no comments, check here. ☐ Add additional rows above, as needed.

Name	E-Signature
Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

ID: SAR_V01_SA1.ROF	
Performed By: Ryan Hupfer, PG	Date: 2/10/2020
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Vapor release pathway screening model sensitivity analysis 1	
Purpose of Simulation: To determine the sensitivity of the vapor release screening model deterministic results to thickness of cover [COVER0]	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SAR\SAR_V01_SA1\SAR_V01_SA1.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\SAR\SAR_V01_SA1\SAR_V01_SA1_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\Sims\SAR_V01_SA1\Out\SUMMARY.REP Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SAR\SAR_V01_SA1\SAR_V01_SA1.par OD\Projects\0011-D3\QA\SAR\SAR_V01_SA1\SAR_V01_SA1_GraphData.DAT OD\Projects\0011-D3\Sims\SAR\SAR_V01_SA1\Out\SAR_V01_SA1_GraphData.DAT OD\Projects\0011-D3\Sims\SAR\SAR_V01_SA1\SAR_V01_SA1_Res.xlsx	
Comments on Model Outputs/Results: Sensitivity analysis performed on thickness of cover [COVER0], which was multiplied and divided by a factor of 6.8. **Thickness of Cover [COVER0]** Peak total dose for the compliance period and 10,000-year simulation period are sensitive to thickness of cover. Timing of peak dose is not sensitive to thickness of cover.	

Factor of 6.8 sensitivity analysis on thickness of cover



Thickness of Cover (m)	Upper: 12.376	Mid: 1.82	Lower: .2676471
Peak Dose (mrem/yr)	0	0.0437567	93.440
Time of Peak (yr)	0	0	0

General Comments

Inhalation pathway simulated using the first order with transport release option.

Checked by & date:

J. Davis, PhD 2/12/20

Signed: 4/9/2020

O. Warren 3/3/2020

Signed: 4/9/2020

Model Check Form

New Model ID (or filename): SAR_V01_SA1.ROF	**Source Model ID (or filename):** SAR_V01.ROF
New Model File Date: 2/10/2020	**Source Model File Date:** 7/9/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Verify sensitivity analyses performed in the vapor model sensitivity analysis 1						
Sensitivity analysis factor applied to thickness of cover [COVER0]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SAR\SAR_V01_SA1\SAR_V01_SA1.ROF	Applied a sensitivity analysis factor of 6.8 to thickness of cover [COVER0]	Y	J. Davis. Sensitivity factor verified. 2/12/20 O. Warren 3/3/2020		
SAR_V01_SA1_QA.xlsx comments	OD\Projects\0011-D3\QA\SAR\SAR_V01_SA1\SAR_V01_SA1 QA.xlsx	All comments in SAR_V01_SA1_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): SAR_V01_SA1.ROF	**Source Model ID (or filename):** SAR_V01.ROF
New Model File Date: 2/10/2020	**Source Model File Date:** 7/9/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): SAR_V01_SA1.ROF	**Source Model ID (or filename):** SAR_V01.ROF
New Model File Date: 2/10/2020	**Source Model File Date:** 7/9/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): SAR_V01_SA1.ROF	**Source Model ID (or filename):** SAR_V01.ROF
New Model File Date: 2/10/2020	**Source Model File Date:** 7/9/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): SAR_V01_SA1.ROF	**Source Model ID (or filename):** SAR_V01.ROF
New Model File Date: 2/10/2020	**Source Model File Date:** 7/9/2019

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

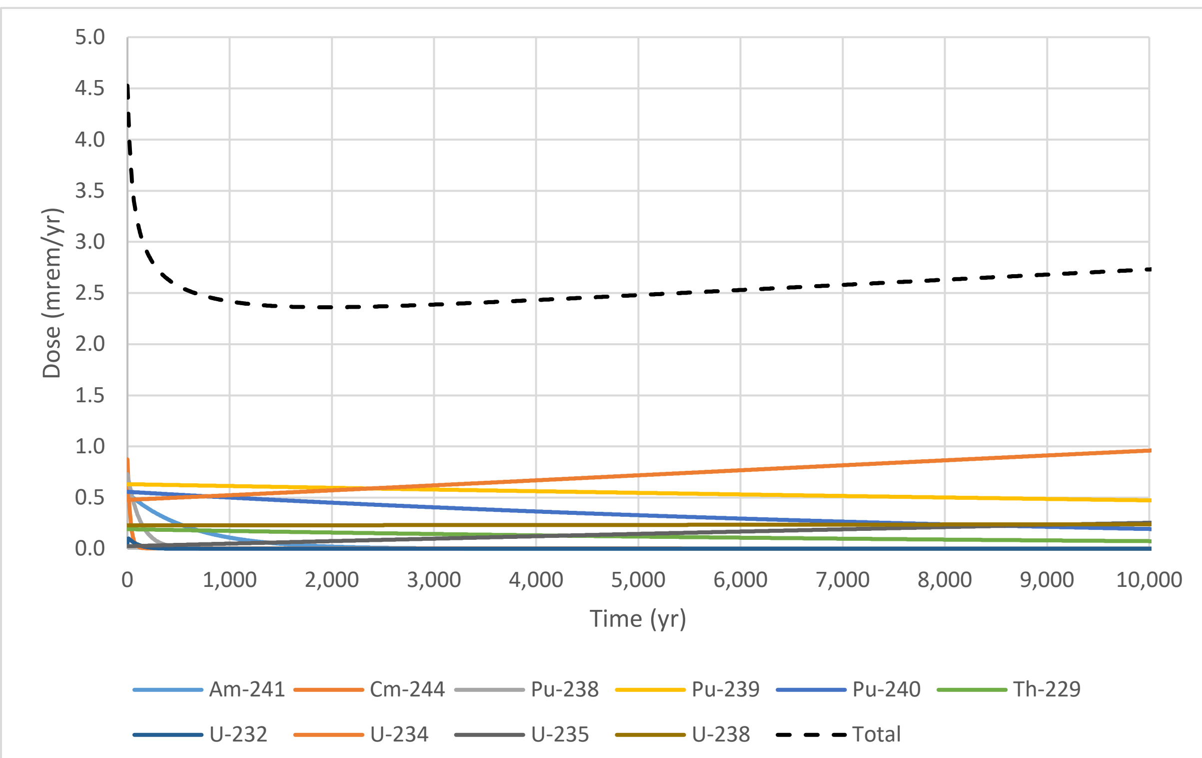
Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

Model Simulation Log

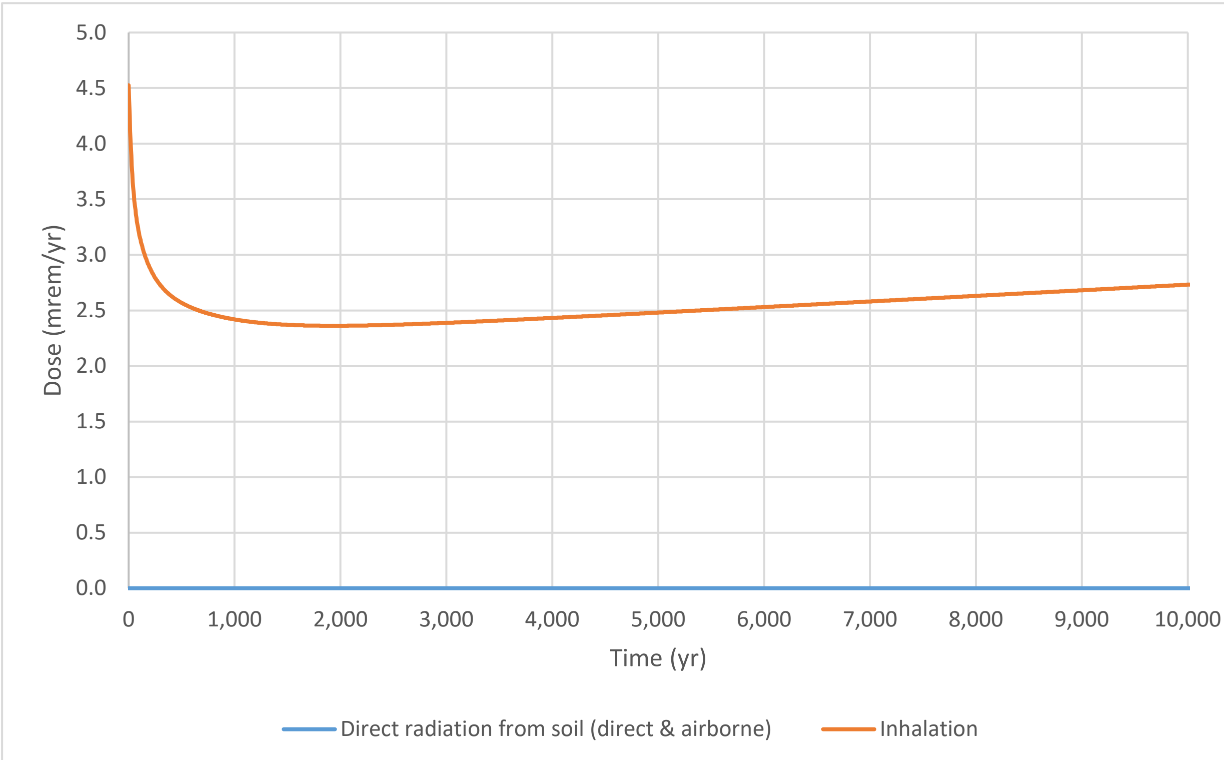
ID: SBO_V01.ROF	
Performed By: Ryan Hupfer, PG	Date: 12/19/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Biointrusion release pathway screening model	
Purpose of Simulation: To determine the dose contribution from the biointrusion pathway (inhalation and external pathways) using parameters biased towards a greater dose from inhalation and external exposure, which included availability of all radionuclide bearing material for release to the atmosphere at time zero, reduced cover thickness (3.2 ft/ 0.97 m) [COVER0], decreased vertical mixing height for inhalation (1 m) [HMIX], and increased C-14 evasion layer thickness (1 m) [DMC]. The first order with transport release option was selected, so RESRAD would calculate release to the atmosphere. Initial and final leach rates were set to 0/yr to prevent loss of radionuclides due to leaching, as a conservative assumption biased towards higher dose predictions.	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SBO\SBO_V01\SBO_V01.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\SBO\SBO_V01\SBO_V01_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\Sims\SBO\SBO_V01\Out\SBO_V01_SUMMARY.REP Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SBO\SBO_V01\SBO_V01.par OD\Projects\0011-D3\Sims\SBO\SBO_V01\SBO_V01_RES.xlsx **Results** The biointrusion release pathway screening model produced a peak dose of 4.53 mrem/yr occuring at time zero (0 yr). After the peak dose at time zero, the total dose declined to approximately 2.4 mrem/yr before increasing to 2.7 mrem/yr at 10,000 yr. Radionuclides that contributed significantly to the total dose are shown in **Table 1**.	

Table 1. Top contributing radionuclides for the biointrusion pathway screening model

Radionuclide	Peak Dose (mrem/yr)	Time of Peak Dose
Am-241	0.55	0
Cm-244	0.88	0
Pu-238	0.73	0
Pu-239	0.63	0
Pu-240	0.56	0
Th-229	0.19	0
U-232	0.10	9.79
U-233	0.45	10001
U-234	0.96	10001
U-235	0.25	10001
U-238	0.24	10001
Total	4.53	0



The component pathway with the highest dose contribution was inhalation with a minor contribution (<1E-08 mrem/yr) from direct radiation (direct and airborne).



General Comments
Inhalation and direct radiation pathways simulated using the first order with transport release option.

Checked by & date:

J. Davis, PhD 12/19/19

Signed: 4/9/2020

N. Holt, PE 12/23/2019

Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
SBO_V01.ROF	
New Model File Date: 7/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Evaluate dose contribution from the inhalation pathway using parameters biased towards a greater pathway dose						
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SBO\SBO_V01\SBO_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\QA\SBO\SBO_V01\SBO_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	N	Values in SBO_V01_QA.xlsx (parameters, transfer factors, Kd, and soil conc tabs) were identical to those in SBO_V01.PAR with the exception of distribution coefficients (Kd) of Am-241 and Am-243 for the saturated zone which were equal to the default value of 20 $cm^3\ g^{-1}$ N. Holt, PE 11/14/2019	Resolved issue by changing Am-241 Kd in the saturated zone to 4,099.999 ml/g, which rounds up to 4,100 ml/g in SBO_V01.par. By implementing this change to the Am-241 saturated zone Kd, the Am-243 saturated zone Kd reverted to the intended value of 4,100 ml/g.	Y. J Davis 12/19/19 Y. N. Holt 12/23/19
All parameters	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SBO\SBO_V01\SBO_V01.ROF	Initial model check, parameter spreadsheet: OD\Projects\0011-D3\QA\SBO\SBO_V01\SBO_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	Y	J. Davis 12/19/19		
SBO_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\SBO\SBO_V01\SBO_V01_QA.xlsx	All comments in SBO_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 N. Holt, PE 3/13/2020		

Model Check Form

New Model ID (or filename): SBO_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 7/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): SBO_V01.ROF	Source Model ID (or filename):
New Model File Date: 7/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): SBO_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 7/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): SBO_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 7/9/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct ? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Ryan Hupfer Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Nathan Holt, PE	**E-Signature (or sign/date/scan hardcopy):** Nathan Holt Signed: 4/9/2020

Model Simulation Log

ID: SGW_V01.ROF	
Performed By: Ryan Hupfer, PG	Date: 9/26/2019
Office Location/Company Drummond Carpenter, PLLC Orlando, FL	Contact Info: rhupfer@drummondcarpenter.com
Project Title and No.: Environmental Management Disposal Facility Performance Assessment	
Simulation Title and No.: Site 7 Groundwater Screening Model	
Purpose of Simulation: To determine which radionuclides significantly contribute to the total dose by performing a model simulation using highly conservative parameters biased towards higher dose from the groundwater pathway.	
Model Code Used/Version No.: RESRAD OFFSITE Version 3.2	
Configuration Control (Computer Hardware/OS): Computer: Dell Precision 7520 DESKTOP-MDFIMDA Operating System: Windows 10 Professional	
Names of Input Files: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SGW\SGW_V01\ SGW_V01.ROF	
Comments on Input Data: Supporting Files: OD\Projects\0011-D3\QA\SGW\SGW_V01\SGW_V01_QA.xlsx	
Names of Output Files: OD\Projects\0011-D3\QA\SGW\SGW_V01\SGW_V01.par OD\Projects\0011-D3\Sims\SGW\SGW_V01\Out\SGW_V01_SUMMARY.REP OD\Projects\0011-D3\Sims\SGW\SGW_V01\SGW_V01_Screen.xlsx	
Comments on Model Outputs/Results: SGW_V01_Screen.xlsx contains predicted peak doses for radionuclides simulated in the groundwater screening model. Radionuclides that produced a peak dose of less than 0.4 mrem/yr will not be simulated in the base case model. 43 radionuclides (excluding Cl-36) produced a peak dose greater than 0.4 mrem/yr and were retained for simulation in the base case model. 19 radionuclides did not produce a peak dose greater than 0.4 mrem/yr. 14 of the radionuclides that did not have a peak dose greater than 0.4 mrem/yr were screened from further analysis. 5 of the 19 radionuclides that had a peak dose less than 0.4 mrem/yr were retained because they are progeny of radionuclides that did pass this phase of screening. Results file: OD\Projects\0011-D3\Sims\SGW\SGW_V01\SGW_V01_Screen.xlsx	

Radionuclide	Half-Life (years)	Phase I: Half-life >5 years?	Phase II: Peak Groundwater Dose >0.4 mrem/yr for 10,000 year simulation?	Retain for Base Case?
Ac-227	2.18E+01	Yes	Yes	Yes
Am-241	4.32E+02	Yes	Yes	Yes
Am-243	7.38E+03	Yes	Yes	Yes
Ba-133	1.07E+01	Yes	No	No
Be-10	1.50E+06	Yes	Yes	Yes
C-14	5.73E+03	Yes	Yes	Yes
Ca-41	1.00E+05	Yes	Yes	Yes
Cd-113m	1.36E+01	Yes	No	No
Cf-249	3.51E+02	Yes	No	No
Cf-250	1.31E+01	Yes	No	No
Cf-251	8.98E+02	Yes	No	No
Cf-252	2.60E+00	No	N.S.	No
Cl-36	3.01E+05	Yes	Yes	Yes
Cm-243	2.85E+01	Yes	Yes	Yes
Cm-244	1.81E+01	Yes	Yes	Yes
Cm-245	8.50E+03	Yes	Yes	Yes
Cm-246	4.73E+03	Yes	Yes	Yes
Cm-247	1.56E+07	Yes	Yes	Yes
Cm-248	3.39E+05	Yes	Yes	Yes
Co-60	5.27E+00	Yes	No	No
Cs-134	2.10E+00	No	N.S.	No
Cs-135	2.30E+06	Yes	Yes	Yes
Cs-137	3.00E+01	Yes	No	No
Eu-152	1.33E+01	Yes	No	No
Eu-154	8.80E+00	Yes	No	No
Eu-155	4.80E+00	No	N.S.	No
Fe-55	2.70E+00	No	N.S.	No
H-3	1.24E+01	Yes	Yes	Yes
I-129	1.57E+07	Yes	Yes	Yes
K-40	1.28E+09	Yes	Yes	Yes
Kr-85	1.10E+01	Yes	N.S.*	No
Mo-93	3.50E+03	Yes	Yes	Yes
Mo-100	8.50E+18	Yes	N.S.*	No
Na-22	2.60E+00	No	N.S.	No
Nb-93m	1.36E+01	Yes	No	Yes^
Nb-94	2.03E+04	Yes	Yes	Yes
Ni-59	7.50E+04	Yes	Yes	Yes
Ni-63	9.60E+01	Yes	No	No
Np-237	2.14E+06	Yes	Yes	Yes

Pa-231	3.28E+04	Yes	Yes	Yes
Pb-210	2.23E+01	Yes	No	Yes^
Pd-107	6.50E+06	Yes	Yes	Yes
Pm-146	5.50E+00	Yes	No	No
Pm-147	2.60E+00	No	N.S.	No
Pu-238	8.77E+01	Yes	Yes	Yes
Pu-239	2.41E+04	Yes	Yes	Yes
Pu-240	6.54E+03	Yes	Yes	Yes
Pu-241	1.44E+01	Yes	Yes	Yes
Pu-242	3.76E+05	Yes	Yes	Yes
Pu-244	8.26E+07	Yes	Yes	Yes
Ra-226	1.60E+03	Yes	Yes	Yes
Ra-228	5.75E+00	Yes	No	Yes^
Re-187	4.12E+10	Yes	No	No
Sb-152	2.80E+00	No	N.S.	No
Se-79	6.50E+04	Yes	Yes	Yes
Sm-151	9.00E+01	Yes	No	No
Sn-121m	5.50E+01	Yes	No	No
Sn-126	1.00E+05	Yes	Yes	Yes
Sr-90	2.91E+01	Yes	Yes	Yes
Tc-99	2.13E+05	Yes	Yes	Yes
Th-228	1.90E+00	No	No	Yes^
Th-229	7.34E+03	Yes	No	Yes^
Th-230	7.70E+04	Yes	Yes	Yes
Th-232	1.41E+10	Yes	Yes	Yes
U-232	7.20E+01	Yes	Yes	Yes
U-233	1.59E+05	Yes	Yes	Yes
U-234	2.45E+05	Yes	Yes	Yes
U-235	7.04E+08	Yes	Yes	Yes
U-236	2.34E+07	Yes	Yes	Yes
U-238	4.47E+09	Yes	Yes	Yes
Zr-93	1.53E+06	Yes	Yes	Yes

N.S. Not Simulated due to screening in Phase I

N.S.* Not Simulated due to other reasons

Yes^ Retained because radionuclide is a progeny of other retained radionuclide
File: Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SGW\SGW_V01\SGW_V01.ROF

General Comments
Groundwater ingestion pathway simulated

Checked by & date: O. Warren 12/30/2019; Signed: 4/9/2020 J. Davis 1/6/2019 Signed: 4/9/2020

Model Check Form

New Model ID (or filename):	Source Model ID (or filename):
SGW_V01.ROF	
New Model File Date: 9/19/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Can this new model be traced (by following the Source Model IDs) back to a source model with a completed Initial Model Check Form (QA&DV Form 4)? - If so, proceed. If not, disregard this form and complete an Initial Model Check Form (QA&DV Form 4) for this model.						
Objective: Update groundwater pathway screening model to incorporate changes in design and assumptions						
All Parameters	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SGW\SGW_V01\SGW_V01.ROF	Rebuilt model on 9/19/19 because of issue with RESRAD-OFFSITE resetting specified Kd values to default values for select radionuclides. Reviewer needs to verify that values listed in SGW_V01.par are identical to values documented in SGW_V01_QA.xlsx. Parameter spreadsheet: OD\Projects\0011-D3\QA\SGW\SGW_V01\SGW_V01_QA.xlsx, tabs: Parameters, Transfer Factors, Kd, Soil Conc.	N	Length of contamination parallel to aquifer flow (LCZPAQ) and the transfer factor for Be-10 for Fruit, Grain, and Nonleafy Vegetables were incorrect. All other values in SGW V01.par matches those documented in SGW V01 QA.xlsx. O. Warren 9/24/2019 J. Davis 9/24/2019	Length of contamination parallel to aquifer flow changed from 389.9 m to 398.9m and Be-10 fruit, grain, and nonleafy vegetables transfer factor changed from 1.87E-04 (pCi/kg)/(pCi/kg) to 8.17E-04 (pCi/kg)/(pCi/kg) and simulation re-ran on 9/26/19	Y. Errors were found to be corrected. J. Davis 10/1/19 O. Warren 10/8/19

Model Check Form

New Model ID (or filename): SGW_V01.ROF	Source Model ID (or filename):
New Model File Date: 9/19/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N
Thickness of Saturated Zone [DPTHAQ]	Dell Precision 7520 DESKTOP-MDFIMDA\Desktop\RR-OS_Models\FLCEN0011\SGW\SGW_V01\SGW_V01.ROF	Changed the thickness of the saturated zone [DPTHAQ] from 60.96 m to 62 m to resolve the following error that occurred when the length of contamination parallel to aquifer flow was changed to the correct value of 398.9 m “Under the specified hydrological conditions, the recharge through the primary contamination is 21268.97 cubic meters per year. The ground water flow rate under the primary contamination is only 21010.34 cubic meters per year. Please adjust surface hydrological inputs and/or the thickness of the saturated and unsaturated zones to ensure that the ground water flow under the primary contamination exceeds the recharge through the primary contamination.”	Y	The new DPTHAQ values was found to be correct. J. Davis, 9/26/19 O. Warren 10/8/19		
SGW_V01_QA.xlsx comments	OD\Projects\0011-D3\QA\SGW\SGW_V01\SGW_V01_QA.xlsx	All comments in SGW_V01_QA.xlsx have been addressed	Y	All comments have been addressed. J. Davis 3/11/2020 O. Warren 3/11/2020		

Model Check Form

New Model ID (or filename): SGW_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 9/19/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): SGW_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 9/19/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): SGW_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 9/19/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

Model Check Form

New Model ID (or filename): SGW_V01.ROF	**Source Model ID (or filename):**
New Model File Date: 9/19/2019	**Source Model File Date:**

Parameter or Element	Location	Change Description	Correct? Y,N	Checker Name and Comment	Analyst Response	Checker Concur? Y,N

If checker has no comments, check here. ☐ Add additional rows above, as needed.

Analyst Name (print): Ryan Hupfer	**E-Signature (or sign/date/scan hardcopy):** (Not required if no comments) Signed: 4/9/2020
Checker Name (print): Joshua Davis	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020
Checker Name (print): Olivia Warren	**E-Signature (or sign/date/scan hardcopy):** Signed: 4/9/2020

ATTACHMENT B.6.
INFORMATION/DATA TRANSFER TRANSMITTALS

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Data Transfer Transmittal Log

Performance Assessment for the Environmental Management Disposal Facility
Oak Ridge, Tennessee (UCOR-5094/R2)

Transmittal Number	Date	Description	Information Provided by	Information Received by	Files Transferred
001-Rev0	April 16, 2019	Radionuclide Solid-aqueous Partition Coefficients (K_d values) for Use in Performance Modeling	Steve Kenworthy (UCOR)	Changsheng Lu (Jacobs Engineering) Chad Drummond (Drummond Carpenter)	FINAL EMDF Kd tech review and approval April 12 2019.pdf Kd value technical review EMDF PA April 12 2019 Rev 0.xlsx
001-Rev1	March 31 2020	Radionuclide Solid-aqueous Partition Coefficients (K_d values) for Use in Performance Modeling	Steve Kenworthy (UCOR)	Changsheng Lu (Jacobs Engineering) Chad Drummond (Drummond Carpenter)	EMDF Kd tech review and approval March 31 2020 rev1.pdf Kd value technical review EMDF PA March 31 2020 rev 1.xlsx EMWMF WQ data for EMDF PA.xlsx
002-Rev0	May 2, 2019	HELP mode output infiltration rates for the three following time periods:0-200 years, 200 to 1,000 years, and post 1,000 years for use in Performance Modeling.	Changsheng Lu (Jacobs)	Chad Drummond (Drummond Carpenter)	None
002-Rev1	April 13, 2020	HELP mode output infiltration rates for the three EMDF performance conditions	Changsheng Lu (Jacobs)	Chad Drummond (Drummond Carpenter)	None
003-Rev0	June 21, 2019	Estimated Radionuclide Inventory and Activity Concentrations for use in Performance Assessment.	Steve Kenworthy (UCOR)	Changsheng Lu (Jacobs Engineering) Chad Drummond (Drummond Carpenter)	EMDF PA Summary Inventory Data Tables Rev 0 June 19 2019.pdf EMDF PA Summary Inventory Data Tables Rev 0 June 19 2019.xlsx (protection password rev2PACAemdf)

Transmittal Number	Date	Description	Information Provided by	Information Received by	Files Transferred
003-Rev1	March 31, 2020	Estimated Radionuclide Inventory and Activity Concentrations for use in Performance Assessment.	Steve Kenworthy (UCOR)	Changsheng Lu (Jacobs Engineering) Chad Drummond (Drummond Carpenter)	EMDF PA Summary Inventory Data Tables Rev 0 June 19 2019.pdf EMDF PA Summary Inventory Data Tables Rev 0 June 19 2019.xlsx (protection password rev2PACAemdf)
004-Rev0	June 26, 2019	Waste Zone Parameters calculated based on preliminary design for use in Performance Modeling for use in Performance Assessment.	Changsheng Lu (Jacobs)	Changsheng Lu (Jacobs Engineering) Chad Drummond (Drummond Carpenter)	None
005-Rev0	June 26, 2019	Groundwater Zone and Model Parameters based on Groundwater model and results for use in Performance Modeling for use in Performance Assessment.	Changsheng Lu (Jacobs)	Changsheng Lu (Jacobs Engineering) Chad Drummond (Drummond Carpenter)	None
006-Rev0	August 5, 2019	HELP-based material properties for RESRAD & STOMP models	Steve Kenworthy (UCOR)	Changsheng Lu (Jacobs Engineering) Chad Drummond (Drummond Carpenter)	Spreadsheet titled “HELP-based material properties for RESRAD STOMP Aug 5 2019.xlsx. Information provided documented the HELP-based material properties used in STOMP and RESRAD-OFFSITE models. Spreadsheet also calculated the average EMDF as-disposed waste bulk density
006-Rev1	April 1, 2019	Properties of EMDF materials and waste for use in performance models.	Steve Kenworthy (UCOR)	Changsheng Lu (Jacobs Engineering) Chad Drummond (Drummond Carpenter)	EMDF PA-CA model material properties table April 1 2020.xlsx

Transmittal Number	Date	Description	Information Provided by	Information Received by	Files Transferred
007-Rev0	August 16, 2019	RESRAD-OFFSITE simulation results across the waste footprint, (C-14, H-3, I-129, and Tc-99) from the waste to the underlying groundwater. These results were used to calculate inventory losses due to predicted leaching during the operational period.	RYAN Hupfer (Drummond Carpenter)	Changsheng Lu (Jacobs Engineering), Steve Kenworthy (UCOR)	None Table 1, which presented in the submittal which presented the Pre-operational and Post-operational Source Concentration results for C-14, H-3, I-129, and Tc-99.
008-Rev0	October 25, 2020	Maximum waste stream average activity concentrations for radon flux analysis	Steve Kenworthy (UCOR)	Changsheng Lu (Jacobs Engineering) Chad Drummond (Drummond Carpenter)	EMDF max Rn parent conc Oct 2019.xlsx
009-Rev0	April 1, 2020	Conasauga Group Properties for Use in EMDF Performance Modeling	Steve Kenworthy (UCOR)	Changsheng Lu (Jacobs Engineering) Chad Drummond (Drummond Carpenter)	Conasauga group properties for EMDF RESRAD aquifer.xlsx Effective Porosity Conasauga Group Mudrock Dorsch et al 1996.pdf Effective Porosity Saprolite Nolichucky Shale Dorsch Katsube 1996.pdf
010-Rev0	April 1, 2020	Supporting information for EMDF dose analysis - TDEC well data and Bear Creek recreational fish ingestion rate	Steve Kenworthy (UCOR)	Changsheng Lu (Jacobs Engineering) Chad Drummond (Drummond Carpenter)	Fish ingestion rate for EMDF PA April 1 2020.pdf TDEC well data EMDF PA April 1 2020.xlsx

UCOR

Information/Data Transfer Transmittal

Project	EMDF Performance Assessment	**Date**	April 16, 2019
Subject	Radionuclide Solid-aqueous Partition Coefficients (K_d values) for Use in Performance Modeling in *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)		
Mode of Communication	e-mail		
Information Provided By	Steve Kenworthy, UCOR	**Submittal No.**	001-Rev0
Information Received by	Changsheng Lu (Jacobs Engineering) and Chad Drummond (Drummond Carpenter)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1	**DESCRIPTION OF INFORMATION/DATA PROVIDED** Partition coefficient values adopted for EMDF Performance Assessment (PA) and Composite Analysis (CA) modeling are provided in the accompanying table (pdf file and spreadsheet). Three values are provided for each radionuclide in the EMDF PA estimated inventory; K_d for the waste (as disposed), for saprolite and bedrock, and for the release-to-groundwater radionuclide screening model. Changes made to the original (R1 PA) K_d values were in response to two Key PA Issues (K01-PA11-01, I-129 K_d in contamination zone and K-02-PA11-02, K_d of I-129, C-14, and Tc-99 in vadose and saturated zone) from the LFRG review. Corrective actions to these Issues (primarily changes to the K_d values) were reviewed with the LFRG and incorporation into the PA table and text was verified with the LFRG. These values and the references and other supporting information are also provided in Table 3.3 of the EMDF PA. Technical review of the K_d values included confirmation of each value from the original sources cited in the table as primary references, as well as confirmation by S. Kenworthy that each value is appropriate as a base-case assumption for EMDF PA and CA modeling.
2	**ELECTRONIC FILES TRANSFERRED**
	FINAL EMDF Kd tech review and approval April 12 2019.pdf *Kd value technical review EMDF PA April 12 2019 Rev 0.xlsx*
3	**NAME AND SIGNATURE OF INFORMATION PROVIDER**
	Steve Kenworthy – UCOR Steve Kenworthy 4-16-19

UCOR

Information/Data Transfer Transmittal

Project	EMDF Performance Assessment	**Date**	March 31, 2020
Subject	Radionuclide Solid-aqueous Partition Coefficients (K_d values) for Use in Performance Modeling in *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)		
Mode of Communication	e-mail		
Information Provided By	Steve Kenworthy, UCOR	**Submittal No.**	001-Rev1
Information Received by	Changsheng Lu (Jacobs Engineering) and Chad Drummond (Drummond Carpenter)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1 **DESCRIPTION OF INFORMATION/DATA PROVIDED**

Partition coefficient values adopted for EMDF Performance Assessment (PA) and Composite Analysis (CA) modeling are provided in the accompanying table (pdf file and spreadsheet). Three values are provided for each radionuclide in the EMDF PA estimated inventory; K_d for the waste (as disposed), for saprolite and bedrock, and for the release-to-groundwater radionuclide screening model. Changes made to the original (R1 PA) K_d values were in response to two Key PA Issues (K01-PA11-01, I-129 K_d in contamination zone and K-02-PA11-02, K_d of I-129, C-14, and Tc-99 in vadose and saturated zone) from the LFRG review. Corrective actions to these Issues (primarily changes to the K_d values) were reviewed with the LFRG and incorporation into the PA table and text was verified with the LFRG. These values and the references and other supporting information are also provided in Table 3.4 of the EMDF PA.

Technical review of the K_d values included confirmation of each value from the original sources cited in the table as primary references, as well as confirmation by S. Kenworthy that each value is appropriate as a base-case assumption for EMDF PA and CA modeling.

Revision 1: This revision was issued to update the K_d table reference to reflect the revision 2 PA, to add a missing reference to the K_d table attachment, and to provide documentation for the Environmental Management Waste Management Facility water quality monitoring data that supports the technical review of K_d data (as cited in Sect. 3.2.2 of the rev 2 EMDF PA). The water quality data are provided as the attached file *EMWMF WQ data for EMDF PA.xlsx*

2 **ELECTRONIC FILES TRANSFERRED**

EMDF Kd tech review and approval March 31 2020 rev1.pdf

Kd value technical review EMDF PA March 31 2020 rev 1.xlsx

EMWMF WQ data for EMDF PA.xlsx

3 **NAME AND SIGNATURE OF INFORMATION PROVIDER**

Steve Kenworthy – UCOR

STEPHEN KENWORTHY (Affiliate)

Digitally signed by STEPHEN KENWORTHY (Affiliate)
Date: 2020.04.01 11:14:53 -04'00'

Project	EMDF Performance Assessment	**Date**	May 2, 2019
Subject	HELP model output infiltration rates for the three following time periods: 0-200 years, 200 to 1,000 years, and post 1,000 years), for use in Performance Modeling in *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)		
Mode of Communication	e-mail		
Information Provided By	Changsheng Lu, Jacobs Engineering	**Submittal No.**	002-Rev0
Information Received by	Chad Drummond (Drummond Carpenter)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1 **DESCRIPTION OF INFORMATION/DATA PROVIDED**

Infiltration rates for the EMDF Performance Assessment (PA) and Composite Analysis (CA) modeling are provided below based on HELP model simulations. Technical review of the HELP model simulations and results have been conducted by Steve Fox, which included verification of the HELP model output for each the following time period following closure of the EMDF: 0 – 200 years; 200 – 1,000 years, and post 1,000 years.

- **0 – 200 years – 0 inch/year**
- **200 – 1,000 years – 0.43 inch/year**
- **Post 1,000 years – 0.88 inch/year**

2 **ELECTRONIC FILES TRANSFERRED**

None.

3 **NAME AND SIGNATURE OF INFORMATION PROVIDER**

Changsheng Lu – Jacobs

Project	EMDF Performance Assessment	**Date**	March 31, 2020
Subject	HELP model output infiltration rates for the three EMDF performance conditions (Full design, Partial Design, and Long-Term Performance), for use in Performance Modeling in *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)		
Mode of Communication	e-mail		
Information Provided By	Changsheng Lu, Jacobs Engineering	**Submittal No.**	002-Rev1
Information Received by	Chad Drummond (Drummond Carpenter)		

Distribution			
<u>DOE</u>	**<u>UCOR</u>**	**<u>Drummond Carpenter LCC</u>**	**<u>Jacobs Engineering</u>**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1	**DESCRIPTION OF INFORMATION/DATA PROVIDED** Infiltration rates for the EMDF Performance Assessment (PA) and Composite Analysis (CA) modeling are provided below based on HELP model simulations. Technical review of the HELP model simulations and results have been conducted by Steve Fox, which included verification of the HELP model output for each the following performance conditions (and corresponding performance periods following closure of the EMDF): • **Full design performance – 0 inch/year (design performance period: – EMDF closure through 200 years post-closure)** • **Partial design performance – 0.43 inch/year (representative of the degrading performance period from 200 to 1000 years post-closure)** • **Long-term performance – 0.88 inch/year (long-term performance period, > 1000 years post-closure)** *Revision 1 was made to incorporate the distinction between performance conditions (and corresponding HELP model values) and post-closure performance periods, for consistency with the EMDF PA documentation*
2	**ELECTRONIC FILES TRANSFERRED**
	None.
3	**NAME AND SIGNATURE OF INFORMATION PROVIDER**
	Changsheng Lu – Jacobs

Project	EMDF Performance Assessment	**Date**	June 21, 2019
Subject	Estimated Radionuclide Inventory and Activity Concentrations for Use in *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)		
Mode of Communication	e-mail		
Information Provided By	Steve Kenworthy, UCOR	**Submittal No.**	003-Rev0
Information Received by	Changsheng Lu (Jacobs Engineering) and Chad Drummond (Drummond Carpenter)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		
	Karen Balo		

1 **DESCRIPTION OF INFORMATION/DATA PROVIDED**

Estimated radionuclide activity and activity concentrations for projected EMDF waste, including screening concentration values, waste total activity and waste average concentrations, and source (as-disposed) concentrations are provided in the accompanying summary tables (pdf file and spreadsheet) for modeling in the EMDF Performance Assessment (PA) and Composite Analysis (CA). These estimated values DO NOT account for losses due to leaching of radionuclides that can occur during waste disposal operations. Corrections for operational losses of inventory are documented in a separate calculation.

These values are provided in Tables ES.2, 3.2, 3.8, C.6, B.5, B.6, B.3.1, B.3.2, E.6, F.7, G.9, G.18, H.3, and I.1 of the EMDF PA report (UCOR-5094/R1, 2018), with the exception of values for H-3, C-14, Tc-99 and I-129 which are reduced from the estimated initial values to account for losses during waste disposal operations.

Quality assurance review of the radiological inventory data included confirmation of each value from the sources cited in the database records described in the Data and Calculation Package for the EMDF Radiological Inventory (CAW-90EMDF-F898), as well as independent checking of the inventory calculations (waste mass, average activity concentrations, and EMDF waste total activity). This QA effort and resulting actions taken to correct or update the database are documented in the files that accompany the Data and Calculation Package.

2 **ELECTRONIC FILES TRANSFERRED**

EMDF PA Summary Inventory Data Tables rev 0 June 19 2019.pdf

EMDF PA Summary Inventory Data Tables rev 0 June 19 2019.xlsx (*protection password* **rev2PACAemdf**)

3 **NAME AND SIGNATURE OF INFORMATION PROVIDER**

Steve Kenworthy – UCOR

Isotope Name	Screening Value (pCi/g)	Estimated Waste Inventory (Ci)	EMDF Waste Average Concentration (pCi/g)	Source (As-Disposed) Concentration (pCi/g)
Ac-227	4.89E+04	7.54E-03	5.50E-03	2.92E-03
Am-241	2.30E+03	1.52E+02	1.11E+02	5.90E+01
Am-243	2.29E+01	7.65E+00	5.59E+00	2.97E+00
Ba-133	2.71E+01	4.14E+00	3.02E+00	1.60E+00
Be-10	7.16E+05	6.52E-05	4.76E-05	2.53E-05
C-14	6.27E+05	7.43E+00	5.43E+00	2.88E+00
Ca-41	4.11E+06	1.09E-01	7.92E-02	4.21E-02
Cd-113m	1.11E+05	NA	NA	NA
Cf-249	3.92E-04	2.80E-06	2.05E-06	1.09E-06
Cf-250	1.70E-02	1.91E-05	1.39E-05	7.40E-06
Cf-251	7.36E-05	5.42E-07	3.96E-07	2.10E-07
Cf-252	1.25E+03	3.37E-07	2.46E-07	1.31E-07
Cm-243	4.37E+01	1.11E+00	8.10E-01	4.30E-01
Cm-244	5.26E+05	3.26E+02	2.38E+02	1.26E+02
Cm-245	9.80E+01	9.87E-02	7.21E-02	3.83E-02
Cm-246	1.97E+00	4.10E-01	2.99E-01	1.59E-01
Cm-247	2.35E+01	2.68E-02	1.96E-02	1.04E-02
Cm-248	2.29E+01	1.44E-03	1.05E-03	5.59E-04
Co-60	1.93E+06	5.15E-02	3.76E-02	2.00E-02
Cs-134	1.39E+05	2.73E-08	1.99E-08	1.06E-08
Cs-135	2.46E+06	NA	NA	NA
Cs-137	3.82E+08	3.04E+03	2.22E+03	1.18E+03
Eu-152	5.84E+05	7.40E+01	5.40E+01	2.87E+01
Eu-154	7.85E+05	1.67E+01	1.22E+01	6.49E+00
Eu-155	9.98E+05	1.74E-02	1.27E-02	6.74E-03
Fe-55	4.71E+07	2.31E-06	1.68E-06	8.95E-07
H-3	4.84E+06	2.88E+01	2.10E+01	1.12E+01
I-129	4.86E+05	1.05E+00	7.66E-01	4.07E-01
K-40	5.65E+01	8.46E+00	6.18E+00	3.28E+00
Kr-85	1.16E+08	9.17E-01	6.69E-01	3.55E-01
Mo-100	2.55E-03	1.08E-05	7.92E-06	4.20E-06
Mo-93	4.99E+03	1.00E+00	7.30E-01	3.88E-01
Na-22	5.96E-01	2.12E-06	1.55E-06	8.22E-07
Nb-93m	3.00E+03	6.01E-01	4.39E-01	2.33E-01
Nb-94	1.90E+05	4.20E-02	3.07E-02	1.63E-02
Ni-59	1.55E+06	7.84E+00	5.73E+00	3.04E+00
Ni-63	1.03E+07	1.74E+03	1.27E+03	6.73E+02
Np-237	5.63E+01	8.37E-01	6.12E-01	3.25E-01
Pa-231	3.17E+00	6.15E-01	4.49E-01	2.39E-01
Pb-210	4.48E+02	9.50E+00	6.93E+00	3.68E+00
Pd-107	3.34E+06	NA	NA	NA
Pm-146	1.24E-01	2.28E-04	1.66E-04	8.84E-05
Pm-147	2.67E+06	5.66E-04	4.13E-04	2.20E-04
Pu-238	7.15E+03	2.42E+02	1.77E+02	9.38E+01
Pu-239	1.85E+05	1.50E+02	1.10E+02	5.83E+01
Pu-240	8.44E+03	1.60E+02	1.17E+02	6.20E+01
Pu-241	2.83E+05	5.25E+02	3.83E+02	2.04E+02
Pu-242	4.98E+01	4.45E-01	3.25E-01	1.73E-01
Pu-244	1.11E+01	9.49E-03	6.93E-03	3.68E-03
Ra-226	1.35E+01	2.07E+00	1.51E+00	8.01E-01
Ra-228	3.46E+00	5.69E-02	4.15E-02	2.21E-02
Re-187	1.94E-03	4.40E-06	3.21E-06	1.71E-06
Sb-125	1.37E+06	7.82E-08	5.71E-08	3.03E-08
Se-79	2.47E+06	NA	NA	NA
Sm-151	5.75E+06	NA	NA	NA
Sn-121m	6.41E+01	NA	NA	NA
Sn-126	1.89E+06	NA	NA	NA
Sr-90	3.93E+08	4.96E+02	3.62E+02	1.92E+02
Tc-99	1.35E+06	7.23E+00	5.28E+00	2.80E+00
Th-228	1.14E+05	5.45E-06	3.98E-06	2.11E-06
Th-229	3.48E+03	1.47E+01	1.08E+01	5.71E+00
Th-230	1.48E+02	4.94E+00	3.61E+00	1.92E+00
Th-232	2.67E+06	9.07E+00	6.62E+00	3.52E+00
U-232	8.43E+05	2.63E+01	1.92E+01	1.02E+01
U-233	5.49E+05	1.07E+02	7.83E+01	4.16E+01
U-234	1.67E+03	1.62E+03	1.19E+03	6.30E+02
U-235	2.57E+03	1.02E+02	7.47E+01	3.97E+01
U-236	4.87E+02	2.32E+01	1.69E+01	8.98E+00
U-238	2.07E+09	9.83E+02	7.18E+02	3.81E+02
Zr-93	5.56E+05	NA	NA	NA

Values in Red Indicate Data Limited RN with non-standard basis of estimate (refer to CAW-90EMDF-F898)
NA indicates that data could not be traced to original source

Project	EMDF Performance Assessment	**Date**	April 1, 2020
Subject	Estimated Radionuclide Inventory and Activity Concentrations for Use in *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)		
Mode of Communication	e-mail		
Information Provided By	Steve Kenworthy, UCOR	**Submittal No.**	003-Rev1
Information Received by	Changsheng Lu (Jacobs Engineering) and Chad Drummond (Drummond Carpenter)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		
	Karen Balo		

1	**DESCRIPTION OF INFORMATION/DATA PROVIDED** Estimated radionuclide activity and activity concentrations for projected EMDF waste, including screening concentration values, waste total activity and waste average concentrations, and source (as-disposed) concentrations are provided in the accompanying summary tables (pdf file and spreadsheet) for modeling in the EMDF Performance Assessment (PA) and Composite Analysis (CA). These estimated values DO NOT account for losses due to leaching of radionuclides that can occur during waste disposal operations. Corrections for operational losses of inventory are documented in a separate calculation. These values are reported in Tables ES.2, 2.15, 2.16, 3.3, 3.14, B.5, B.6, B.3.1, B.3.2, E.6, F.3, G.9, G.18, H.3, and I.1 of the EMDF PA report (UCOR-5094/R2, 2020), with the exception of values for H-3, C-14, Tc-99 and I-129 which are reduced from the estimated initial values to account for losses during waste disposal operations. Quality assurance review of the radiological inventory data included confirmation of each value from the sources cited in the database records described in the Data and Calculation Package for the EMDF Radiological Inventory (CAW-90EMDF-F898R1), as well as independent checking of the inventory calculations (waste mass, average activity concentrations, and EMDF waste total activity). This QA effort and resulting actions taken to correct or update the database are documented in the files that accompany the Data and Calculation Package. Revision 1 was issued to update the PA sections references and to cite the revised inventory calculation document.
2	**ELECTRONIC FILES TRANSFERRED**
	EMDF PA Summary Inventory Data Tables rev 0 June 19 2019.pdf *EMDF PA Summary Inventory Data Tables rev 0 June 19 2019.xlsx* (*protection password* **rev2PACAemdf**)
3	**NAME AND SIGNATURE OF INFORMATION PROVIDER**
	Steve Kenworthy – UCOR

Project	EMDF Performance Assessment	Date	June 26, 2019
Subject	Waste Zone Parameters calculated based on preliminary design for use in Performance Modeling in *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)		
Mode of Communication	e-mail		
Information Provided By	Changsheng Lu, Jacobs Engineering	Submittal No.	004-Rev0
Information Received by	Chad Drummond (Drummond Carpenter), Changsheng Lu (Jacobs)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1	**DESCRIPTION OF INFORMATION/DATA PROVIDED** Waste zone parameters adopted for the EMDF Performance Assessment (PA) and Composite Analysis (CA) modeling are provided in the accompanying page (figures and tables). These parameters were calculated and measured based on preliminary design data (UCOR, 2019a). SURFER and MS EXCEL programs were utilized for the surface and volume calculation and delineation. Detailed description of the processes is provided in the "Design Parameter Calc Data Package EMDF PA". The calculation package is included as a supporting document in the EMDF PA project.
2	**ELECTRONIC FILES TRANSFERRED**
	None.
3	**NAME AND SIGNATURE OF INFORMATION PROVIDER**
	Changsheng Lu - Jacobs

Preliminary design defines the top and bottom of the waste surface as shown in Figure 1. Based on the two surfaces, the volumes and planar areas for the waste zone and individual cells were calculated used the SURFER program.

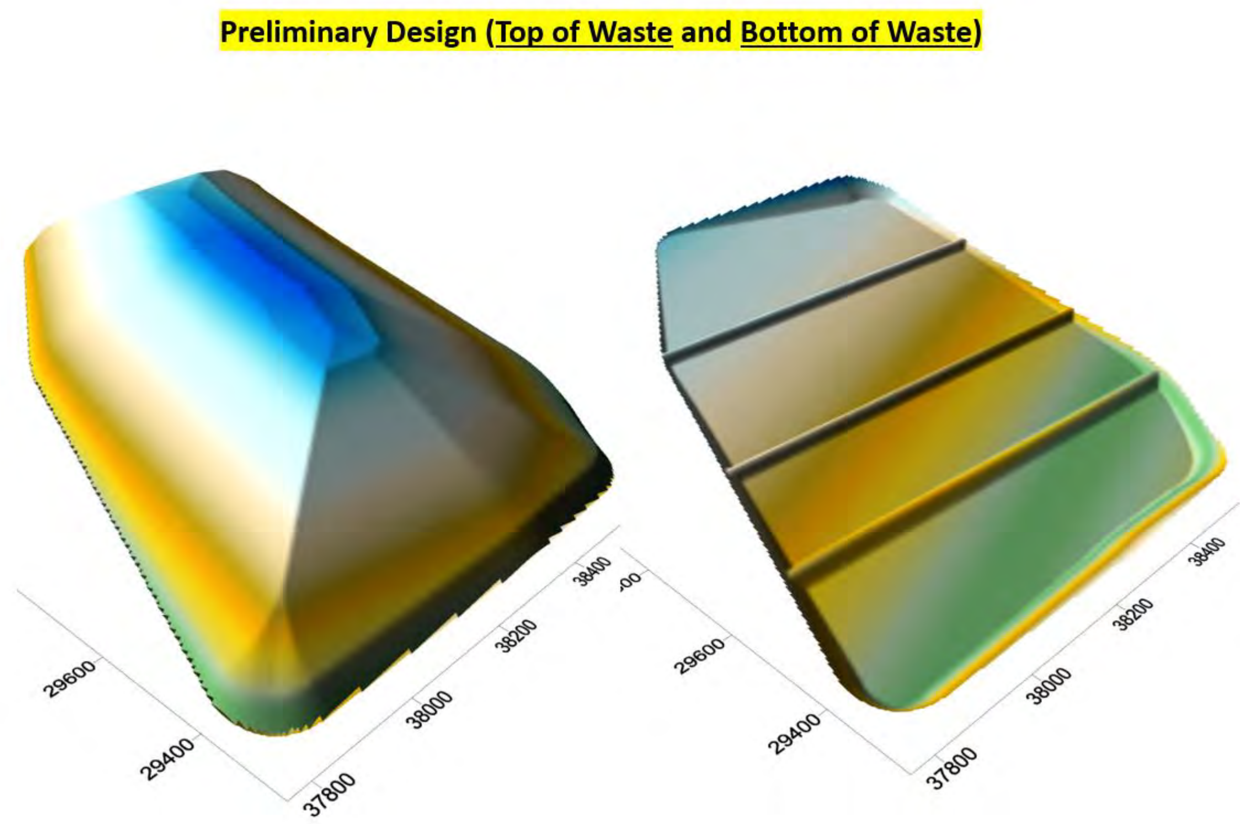


Figure 1. 3D surfaces of the waste zone based on preliminary design (note that Cell 1 is at the top of the figure and Cell 4 is at the bottom)

Table 1 lists the overall waste cell area and volume information.

Waste Extent (Planer) -ft2	1032375
Waste Extent (Planer) -Acres	23.70
Cell Volume (CY)	2200000
Cell Volume (ft3)	59400000
Average Waste Thickness (ft)	57.54
Average Waste Thickness (inch)	690.45

Table 2 lists the individual cell information.

	C-1	C-2	C-3	C-4
Volume %	19.4%	29.7%	25.7%	25.2%
Planar Area %	24.4%	27.1%	21.5%	27.0%
Minimum Thickness (ft)	0	0	0	0
Maximum Thickness (ft)	90.35	109.71	112.69	105.85
Average Thickness (ft)	45.74	63.13	68.71	53.66

In addition, cell dimensions at selected locations were also measured as shown in Figure 2 and Figure 3.

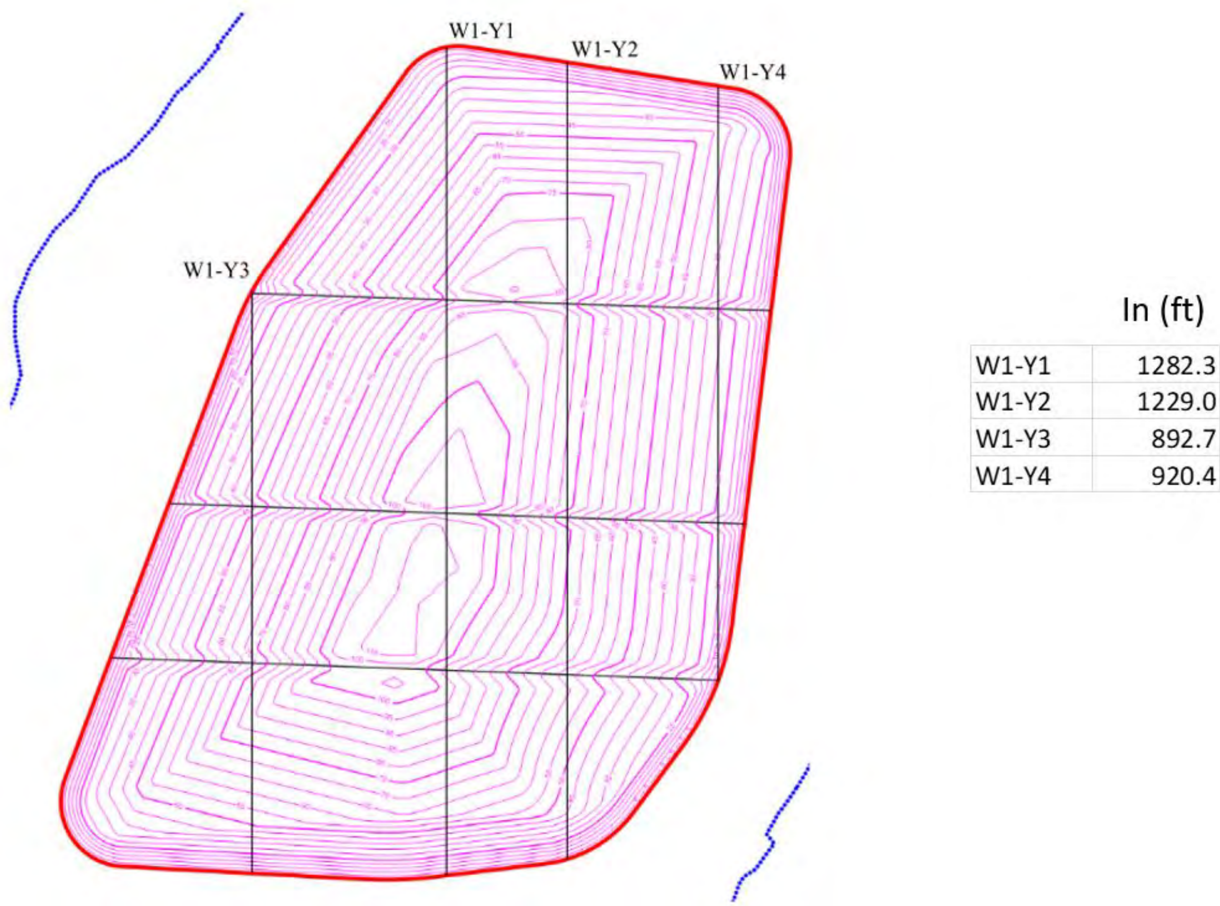
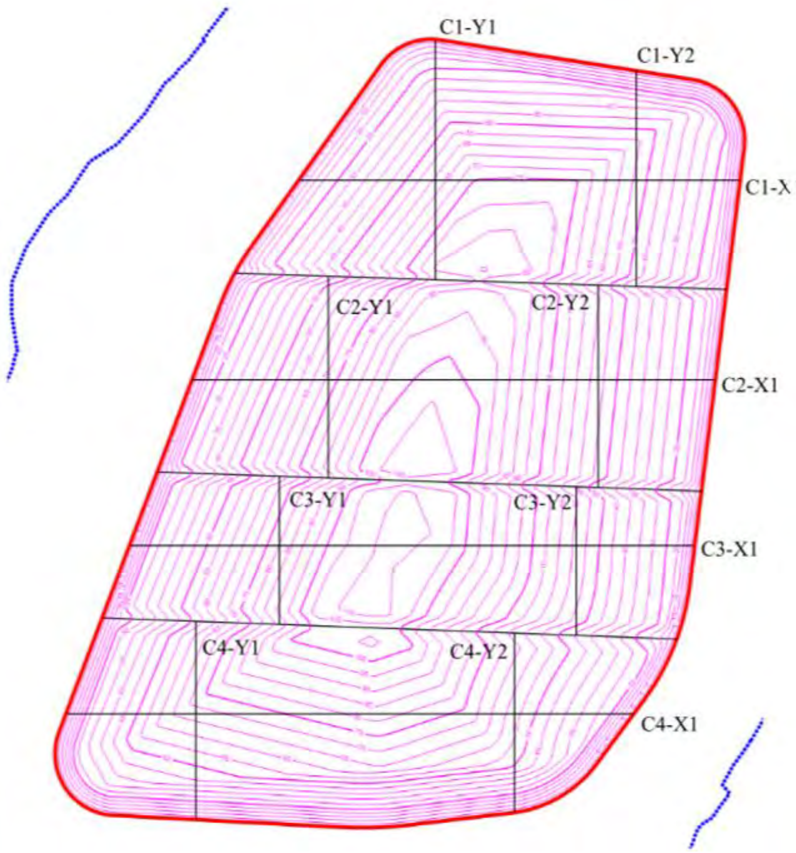


Figure 2. EMDF overall cell dimensions



	In (ft)
C1-X1	716.4
C1-Y1	389.7
C1-Y2	350.6
C2-X1	857.2
C3-Y1	325.3
C3-Y2	332.1
C3-X1	924.5
C3-Y1	241.4
C3-Y2	239.4
C4-X1	922.1
C4-Y1	321.1
C4-Y2	298.8

Figure 3. Cell-specific EMDF cell dimensions (note that Cell 1 is at the top of the figure and Cell 4 is at the bottom)

Project	EMDF Performance Assessment	**Date**	June 26, 2019
Subject	Groundwater Zone and Model Parameters based on GW model and results for use in Performance Modeling in *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)		
Mode of Communication	e-mail		
Information Provided By	Changsheng Lu, Jacobs Engineering	**Submittal No.**	005-Rev0
Information Received by	Chad Drummond (Drummond Carpenter), Changsheng Lu (Jacobs)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1	**DESCRIPTION OF INFORMATION/DATA PROVIDED** Groundwater zone and related parameters adopted for the EMDF Performance Assessment (PA) and Composite Analysis (CA) modeling are provided in the accompanying page (figures and tables). These data include average and cell-specific depth to water from the waste for the future condition, groundwater hydraulic gradient to the assessment point, and other aquifer zone parameters. These parameters were predicted based on future condition CBCV Groundwater Model used in the EMDF design and PA analysis. SURFER program was utilized for the additional result data calculation. Detailed description of the processes is provided in groundwater flow model appendix and associated groundwater flow modeling calculation package. The modeling appendix and modeling calculation package are the supporting documents in the EMDF PA project.
2	**ELECTRONIC FILES TRANSFERRED**
	None.
3	**NAME AND SIGNATURE OF INFORMATION PROVIDER**
	Changsheng Lu - Jacobs

EMDF preliminary design defines the bottom of the waste shown in Figure 1. Based on the maximum extent of waste footprint and model-predicted maximum impacted location, the 100-meter well location will be located near the NT-11 as shown.

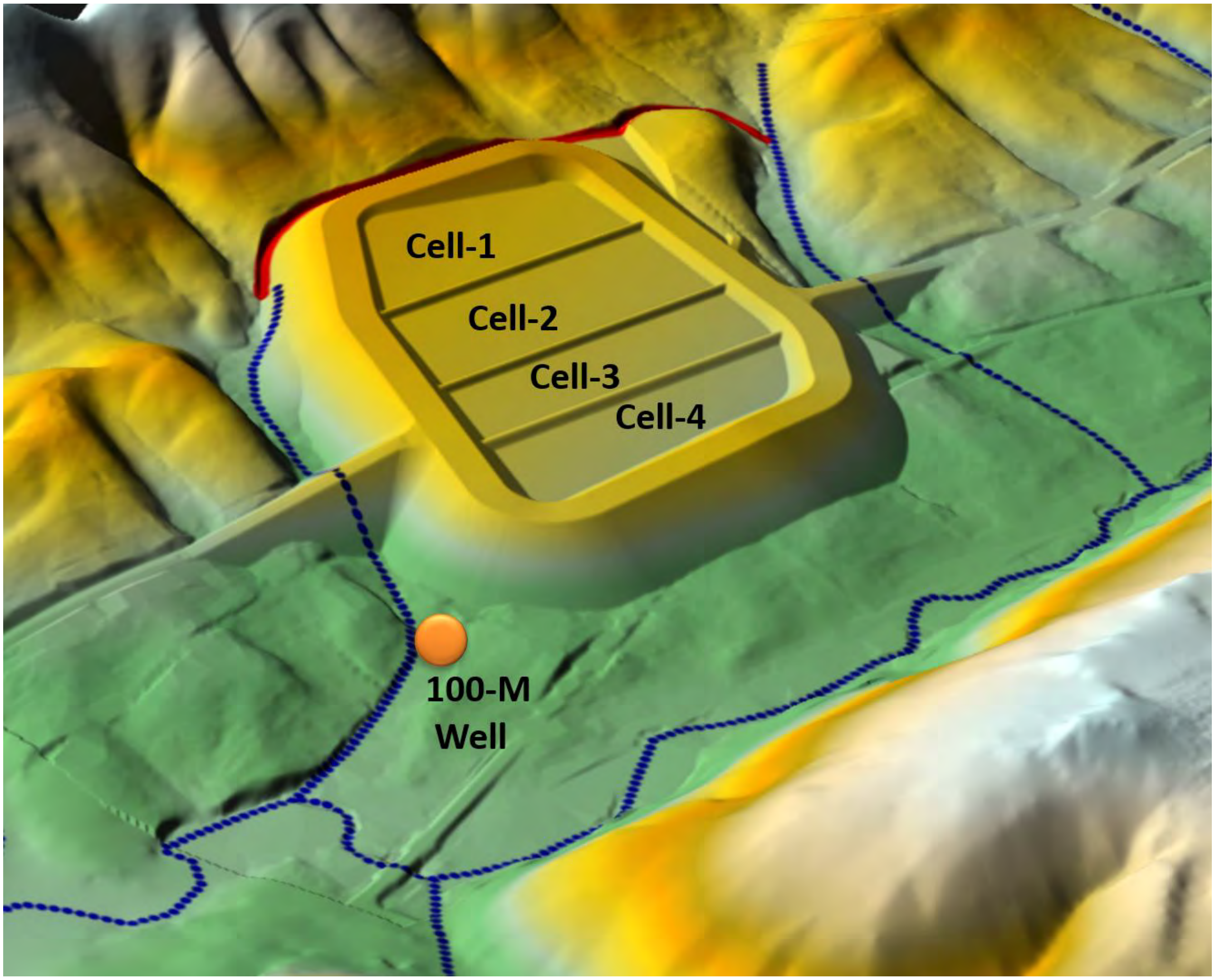


Figure 1. EMDF bottom of the Waste and 100-m well location

Used the long-term infiltration rate of 0.88 in/yr, the CBCV future condition model predicted the watertable condition within the EMDF footprint. The depths to groundwater water from the bottom of waste for the waste zone were calculated utilized SURFER program based on the two surfaces (waste bottom and watertable) as shown in Figure 2.

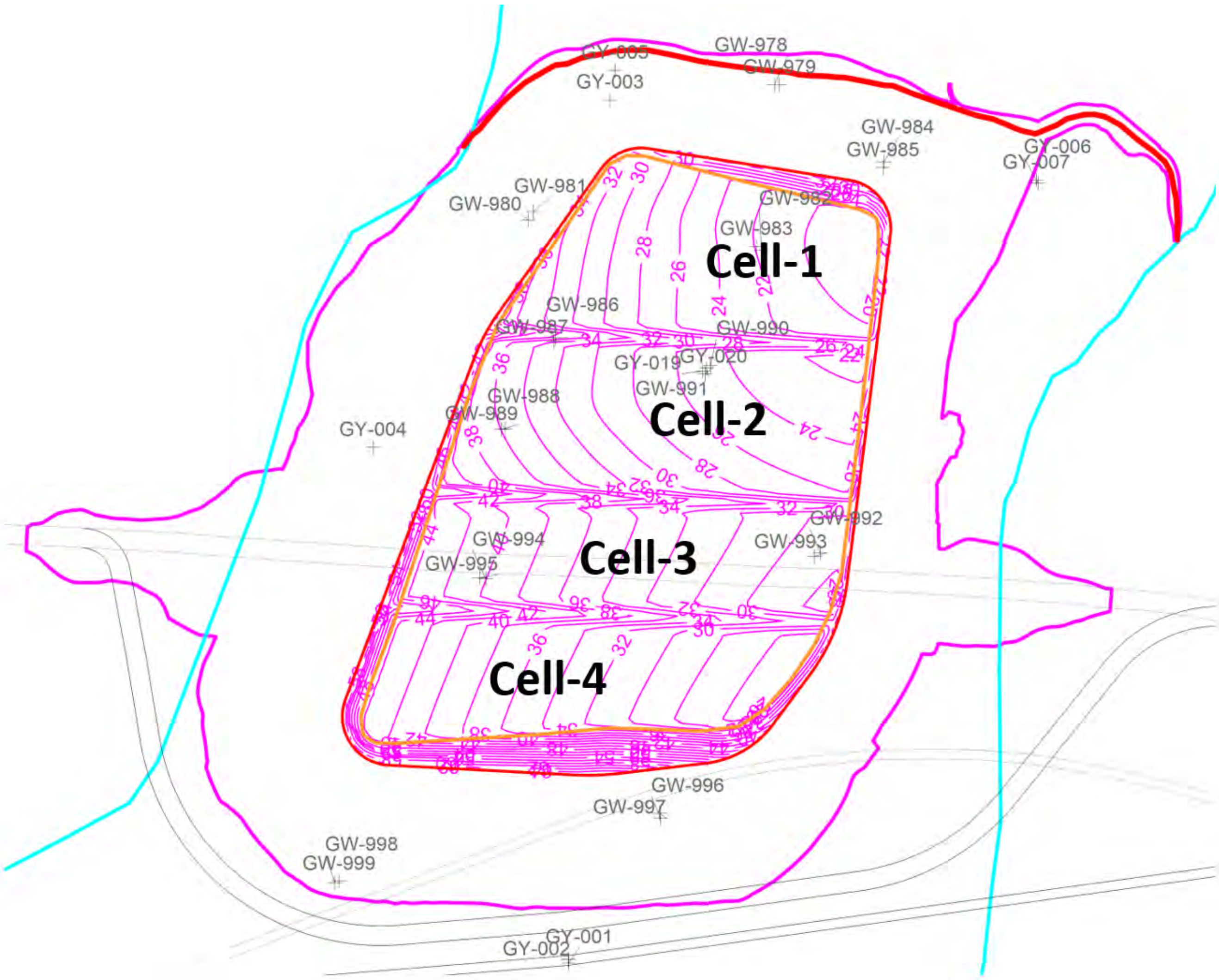


Figure 2. Depth to groundwater (in ft) under the waste zone

Detailed information on the depths to groundwater for the waste zone were analyzed used SURFER program. It was done for both the whole waste zone and the bottom of the cell (bottom flat portion) zone. Since the sharp rise in elevation in waste elevation surrounding the berm, the depth to groundwater also increases sharply for the zone. Since the average depths to water (in ft) for the bottom flat portion would provide thinner vadose zones (thus more adverse impact), these numbers are assumed. Table 1 lists the numbers and their statistics for the single waste zone and cell-specific zones.

	BOW Flat Portion Only				
	4-Cells	**Cell-1**	**Cell-2**	**Cell-3**	**Cell-4**
Count:	9030	2226	2665	2090	2049
1%-tile:	19.02	18.58	21.75	25.80	24.88
5%-tile:	20.87	19.14	22.73	26.81	25.59
10%-tile:	22.76	19.75	23.37	27.56	26.53
25%-tile:	26.04	21.48	25.27	29.94	29.41
50%-tile:	30.33	25.37	28.60	34.16	34.16
75%-tile:	35.52	29.73	33.34	39.02	39.22
90%-tile:	40.12	32.94	36.83	42.35	42.28
95%-tile:	42.29	34.56	38.43	43.52	43.41
99%-tile:	44.53	38.00	42.29	46.36	45.39
Minimum:	**18.36**	**18.36**	**21.14**	**25.23**	**24.67**
Maximum:	**49.90**	**44.33**	**47.51**	**49.90**	**49.54**
Arithmetic Mean:	**30.90**	**25.92**	**29.50**	**34.63**	**34.34**
Median:	**30.34**	**25.37**	**28.60**	**34.16**	**34.16**
Geometric Mean:	**30.23**	**25.44**	**29.07**	**34.20**	**33.85**
Harmonic Mean:	29.57	24.99	28.65	33.78	33.37
Root Mean Square:	31.56	26.40	29.94	35.05	34.82
Trim Mean (10%):	30.80	25.71	29.28	34.51	34.27
Interquartile Mean:	30.46	25.42	28.84	34.28	34.20
Midrange:	34.13	31.35	34.33	37.56	37.11
Winsorized Mean:	30.85	25.76	29.35	34.55	34.28
TriMean:	30.56	25.49	28.95	34.32	34.24

Based model-predicted water levels and distance from the cell upper portion to the 100-meter zone, the hydraulic gradients were calculated as shown in Figure 3. The general hydraulic gradient to the 100-m well location is 0.036.

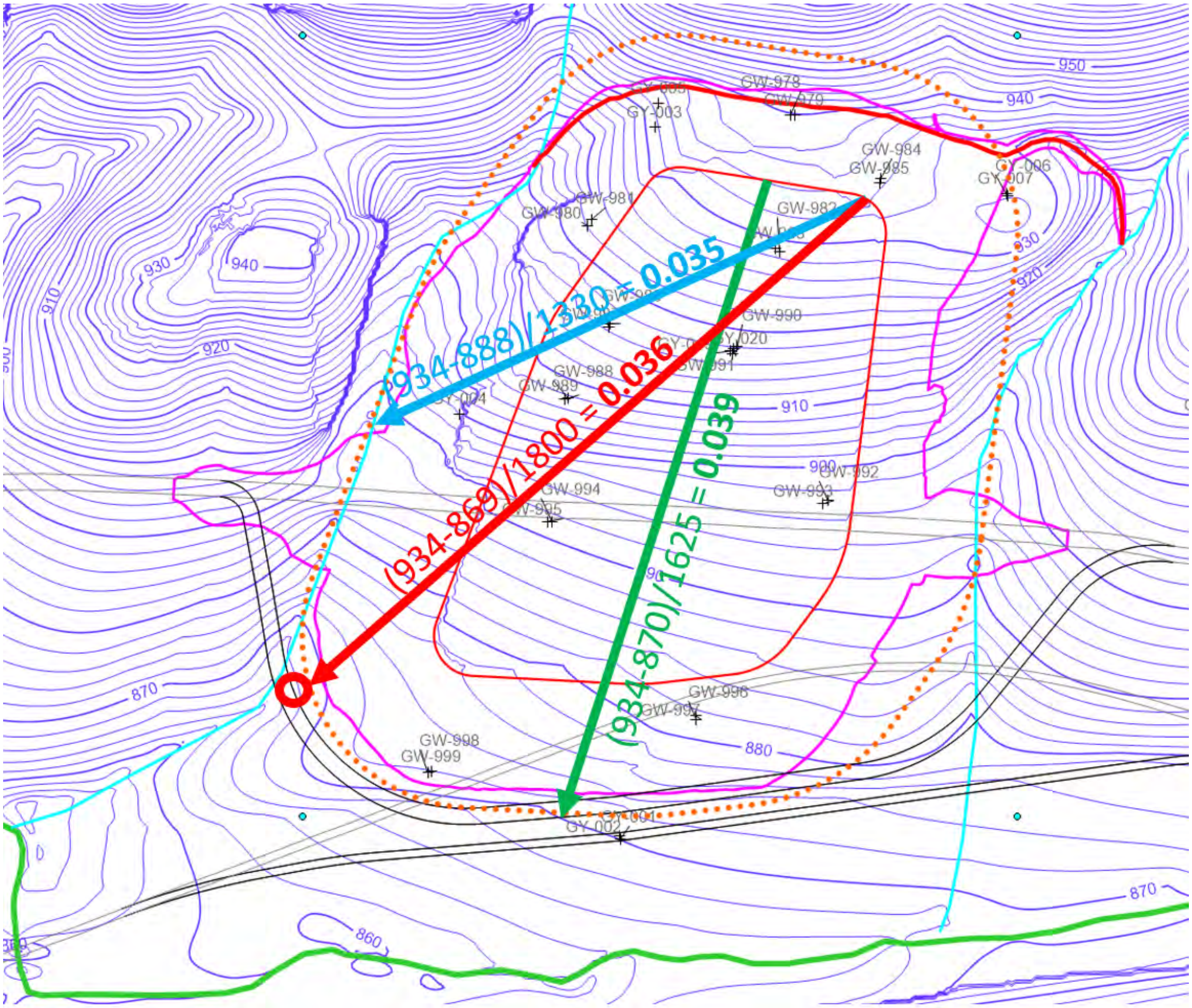


Figure 3. Calculated groundwater hydraulic gradients

The aquifer hydraulic properties used in the groundwater model for the relevant area and depth are listed in Table 2. The 100-m well location is located in the shallow portion of the Nolichucky Formation.

		HYDRAULIC CONDUCTIVITY				
Geologic Formation	**Model Layer**	**Kx**	**Ky**	**Kz**	**Unit**	**Ky/Kx(Kz)**
Nolichucky	1	5.29E-05	**2.65E-04**	5.29E-05	cm/s	5
Nolichucky	2--4	3.35E-06	3.35E-05	3.35E-06	cm/s	10
Maryville-Rogersville-Rutledge	1	3.53E-05	1.76E-04	3.53E-05	cm/s	5
Maryville-Rogersville-Rutledge	2--4	1.27E-06	1.27E-05	1.27E-06	cm/s	10

Project	EMDF Performance Assessment	**Date**	Aug 5, 2019
Subject	HELP-based material properties for RESRAD & STOMP models utilized for *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)		
Mode of Communication	e-mail		
Information Provided By	Steve Kenworthy, UCOR	**Submittal No.**	006-Rev0
Information Received by	Changsheng Lu (Jacobs Engineering) and Chad Drummond (Drummond Carpenter)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1 **DESCRIPTION OF INFORMATION/DATA PROVIDED**

The purpose of this EMDF Performance Assessment information transmittal is to support Quality Assurance review of the inputs for the STOMP and RESRAD-OFFSITE models, and to document the basis for the as-disposed average waste bulk density used in the PA models. The QA activities for the HELP, STOMP, and RESRAD-OFFSITE models are documented in separate calculation packages for each model.

The attached spreadsheet contains a table of material properties used in the HELP model for the EMDF design performance condition (as documented in the HELP calculation package) and derived material property values for the EMDF cover for use in the STOMP and RESRAD-OFFSITE models (on the *HELP & RESRAD* worksheet). For the cover, the STOMP and RESRAD-OFFSITE models use calculated thickness-weighted average values of bulk density, total porosity and (calculated) effective porosity. The STOMP and RESRAD-OFFSITE models use the calculated harmonic mean value of saturated hydraulic conductivity (K_{sat}) for the EMDF cover. For the layers of the saturated zone below the waste, including the protective material layer, leachate drainage layer, compacted clay liner, and geologic buffer layer, the STOMP and RESRAD-OFFSITE models use the HELP model input values for bulk density, total and (calculated) effective porosity, field capacity, and K_{sat}. For the waste zone, the STOMP and RESRAD-OFFSITE models use the HELP model input values for total and (calculated) effective porosity, field capacity, and K_{sat}, and a value for the waste bulk density (1900 kg/m^3) that is calculated on a separate worksheet in the attached file.

These input parameter values are also provided in Tables 3.5, 3.7, 3.14, C.2, C.4, E.2, E.3, G.14, and H.2 of the EMDF PA report (UCOR-5094/R1, 2018).

2 **ELECTRONIC FILES TRANSFERRED**

HELP-based material properties for RESRAD STOMP Aug 5 2019 rev1.xlsx (*protection password* **rev2PACAemdf**)

3 **NAME AND SIGNATURE OF INFORMATION PROVIDER**

Steve Kenworthy – UCOR

UCOR

Information/Data Transfer Transmittal

Project	EMDF Performance Assessment	**Date**	April 1 2020
Subject	Properties of EMDF materials and waste for performance models		
Mode of Communication	e-mail		
Information Provided By	Steve Kenworthy, UCOR	**Submittal No.**	006-Rev1
Information Received by	Changsheng Lu (Jacobs Engineering) and Chad Drummond (Drummond Carpenter)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1 **DESCRIPTION OF INFORMATION/DATA PROVIDED**

The purpose of this revised EMDF information transmittal is to supplement the Quality Assurance (QA) documentation of EMDF Performance Assessment (PA) model inputs that represent properties of engineered materials, waste and natural materials. Revision 1 of this transmittal incorporates the development of two new data and calculation packages for the EMDF PA modeling that replace the data tables included with the original (006-rev 0) transmittal. The QA activities for the HELP, STOMP, MODFLOW, MT3D, and RESRAD-OFFSITE models are documented in separate calculation packages for each model, which are referenced in the attached MS-Excel spreadsheet.

The attached spreadsheet contains a table of material properties and associated information used as inputs to each model. The records are in a database format to facilitate model and material inter-comparison. The data fields include material categories (engineered, waste, natural), material zone designations (generic and model-specific), model zone and input parameter identification, input values, units, and fields describing the basis for input values and identifying the QA documents applicable for each model and input parameter.

This material does not replace or substitute for the other PA model QA documentation described in the *Quality Assurance Report for Modeling of the Bear Creek Valley Low-level Radioactive Waste Disposal Facilities, Oak Ridge, Tennessee*, UCOR-5234

2 **ELECTRONIC FILES TRANSFERRED**

EMDF PA-CA model material properties table April 1 2020.xlsx (*protection password* **rev2PACAemdf**)

3 **NAME AND SIGNATURE OF INFORMATION PROVIDER**

Steve Kenworthy – UCOR

STEPHEN KENWORTHY (Affiliate)

Digitally signed by STEPHEN KENWORTHY (Affiliate)
Date: 2020.04.01 11:42:06 -04'00'

Project	EMDF Performance Assessment	**Date**	August 16, 2019
Subject	Transmittal of Calculated Post-operational Source Concentrations		
Mode of Communication	e-mail		
Information Provided By	Ryan Hupfer, PG (Drummond Carpenter, PLLC)	**Submittal No.**	007-Rev0
Information Received by	Changsheng Lu (Jacobs Engineering) and Steve Kenworthy (UCOR)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter, PLLC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1 **DESCRIPTION OF INFORMATION/DATA PROVIDED**

Definitions

- Pre-operational concentration – The as-disposed inventory concentration, which is the isotope-specific soil concentration in the waste after accounting for daily cover.
- Post-operational concentration – The waste concentration after the as-disposed inventory concentration is reduced to account for leaching during the operational period.

Referenced Transmittals

- UCOR Transmittal 003-Rev0 "Estimated Radionuclide Inventory and Activity Concentrations for Use in *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee (*UCOR-5049/R2)"

Post-operational concentrations for the Environmental Management Disposal Facility (EMDF) source for C-14, H-3, I-129, and Tc-99 are provided in Table 1. The post-operational concentrations account for model-predicted losses due to leaching of radionuclides that occur during the operational period, which includes activities such as waste placement, addition of daily cover, grading, and final cover installation. Post-operational concentrations for C-14, H-3, I-129, and Tc-99 will be used as input concentrations to base case and other model simulations. Leaching losses for other simulated radionuclides were not quantified and pre-operational concentrations (referred to as as-disposed inventory concentrations) provided in UCOR Transmittal 003-Rev0 will be used in the base case model simulation.

To predict leaching of C-14, H-3, I-129, and Tc-99 during the operational period, four RESRAD-OFFSITE simulations were performed with one simulation performed for each of the four disposal cells with initial source concentrations specified as pre-operational concentration values from UCOR Transmittal 003-Rev0. Simulations were performed using four modified versions of the base case model representing the specific operations of each cell. These modified model versions included revised infiltration assumptions (increased infiltration rate expressed as decreased runoff coefficient), release assumptions (time over which radionuclides are releasable and leaching duration), cell dimensions (y-dimension and waste thickness), and cover assumptions (cover thickness).

RESRAD-OFFSITE simulation results provided flux across the waste footprint (C-14, H-3, I-129, and Tc-99) from the waste to the underlying groundwater, which were used to calculate inventory losses due to predicted leaching during the operational period.

Table 1. Pre-operational and Post-operational Source Concentration Summary

Radionuclide	C-14	H-3	I-129	Tc-99
Pre-operational Source Concentration (pCi/g)*	2.88	11.2	0.407	2.80
Pre-operational Activity (pCi)**	9.20E+12	3.58E+13	1.30E+12	8.95E+12
Total Leached Activity, Operational Period (pCi)	7.49E+12	2.10E+13	1.72E+11	3.97E+12
Post-operational Activity (pCi)	1.72E+12	1.48E+13	1.13E+12	4.97E+12
% Reduction due to Leaching	81.4	58.5	13.2	44.4
Post-operational Source Concentration (pCi/g)	0.54	4.64	0.35	1.56

* From UCOR Transmittal 003-Rev0

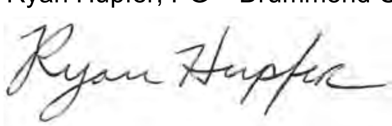
** As-disposed activity calculated by multiplying the as-disposed soil concentration by the waste mass; waste mass for calculation of total activity = 3.20E+12 g [Waste Volume (1.68E+06 m^3) * Waste Density (1.9E+06 g/m^3)]

2 **ELECTRONIC FILES TRANSFERRED**

None.

3 **NAME AND SIGNATURE OF INFORMATION PROVIDER**

Ryan Hupfer, PG – Drummond Carpenter, PLLC



Project	EMDF Performance Assessment	Date	Oct 25, 2019
Subject	Maximum waste stream average activity concentrations for radon flux analysis in *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)		
Mode of Communication	e-mail		
Information Provided By	Steve Kenworthy, UCOR	Submittal No.	008-Rev0
Information Received by	Changsheng Lu (Jacobs Engineering)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1	**DESCRIPTION OF INFORMATION/DATA PROVIDED** For Appendix H of UCOR-5094/R2, estimated EMDF maximum waste stream average activity concentrations for Ra-226, Th-230, U-234, and U-238 are used in a sensitivity analysis to evaluate the impact of non-uniform distributions of radon parent radionuclides within the disposal cell. The attached spreadsheet includes the estimated waste stream average activity concentrations (pCi/g) for all radionuclides, filtered to display the waste-stream maximum values for the four radon parents. The maximum values are identified by the yellow cell shading for the ORNL Remedial Action and Y-12 D&D Remaining Facilities waste streams.
2	**ELECTRONIC FILES TRANSFERRED**
	EMDF max Rn parent conc Oct 2019.xlsx (*protection password* **rev2PACAemdf**)
3	**NAME AND SIGNATURE OF INFORMATION PROVIDER**
	Steve Kenworthy – UCOR

UCOR

Information/Data Transfer Transmittal

Project	EMDF Performance Assessment	**Date**	March, 31. 2020
Subject	Conasauga Group Properties for Use in EMDF Performance Modeling		
Mode of Communication	e-mail		
Information Provided By	Steve Kenworthy, UCOR	**Submittal No. 009**	009-Rev0
Information Received by	Changsheng Lu (Jacobs Engineering) and Chad Drummond (Drummond Carpenter)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1 **DESCRIPTION OF INFORMATION/DATA PROVIDED**

This UCOR information transfer includes values for physical properties representative of Conasauga group sedimentary rocks at the Central Bear Creek Valley site. The attached MS-Excel spreadsheet summarizes laboratory porosity measurements on Conasauga group saprolite and rock samples from Bear Creek Valley and Melton Valley. Values of average grain density, bulk density and effective porosity representative of the Nolichucky and Maryville Formations are tabulated along with specific references to the source data for both saprolite and bedrock materials. Total porosity values are calculated from these data, and the saprolite and bedrock values for bulk density and porosity (total and effective) are averaged to obtain single values to represent the saturated zone (aquifer) in the RESRAD-OFFSITE model.

The spreadsheet also tabulates the values of porosity (total and effective) and bulk density for MT3D model layers 1 to 4 (all geologic units) and values of hydraulic conductivity of the Nolichucky shale (in the direction parallel to geologic strike) used for MT3D model layers 1-4. Transmissivity-weighted average hydraulic conductivity values for MT3D model layers 1&2 and 1,2,&3 are calculated. The weighted average of model layers 1&2 is identified as the value applied to the saturated zone in the RESRAD-OFFSITE model.

In addition to the spreadsheet documenting the model input parameter values and their basis (the data and calculations), copies of two publications containing the laboratory data analysis are attached to this information transfer.

2 **ELECTRONIC FILES TRANSFERRED**

Conasauga group properties for EMDF RESRAD aquifer.xlsx {worksheet protection password: rev2PACAemdf}

Effective Porosity Conasauga Group Mudrock Dorsch et al 1996.pdf

Effective Porosity Saprolite Nolichucky Shale Dorsch Katsube 1996.pdf

3 **NAME AND SIGNATURE OF INFORMATION PROVIDER**

Steve Kenworthy – UCOR

STEPHEN KENWORTHY (Affiliate)

Digitally signed by STEPHEN KENWORTHY (Affiliate)
Date: 2020.03.31 09:59:27 -04'00'

UCOR

Information/Data Transfer Transmittal

Project	EMDF Performance Assessment	**Date**	April 1, 2020
Subject	Supporting information for EMDF dose analysis - TDEC well data and Bear Creek recreational fish ingestion rate		
Mode of Communication	e-mail		
Information Provided By	Steve Kenworthy, UCOR	**Submittal No.**	010-Rev0
Information Received by	Changsheng Lu (Jacobs Engineering) and Chad Drummond (Drummond Carpenter)		

Distribution			
DOE	**UCOR**	**Drummond Carpenter LCC**	**Jacobs Engineering**
Susan DePaoli	Marshall Davenport	Chad Drummond	Steve Fox
	Steve Kenworthy	Ryan Hupfer	Changsheng Lu
	Julie Pfeffer		

1 **DESCRIPTION OF INFORMATION/DATA PROVIDED**

Information that supports the all-pathways dose analysis of the EMDF Performance Assessment (PA) includes

1. Tennessee Department of Environment and Conservation (TDEC) data on residential well construction depths. The TDEC data support the range of saturated zone vertical intervals (well depths) considered in the PA, including the base case assumption (40 m or 131 ft) and range of depths considered for sensitivity and uncertainty analysis.
2. A summary description of the basis for calculating the fish ingestion rate associated with recreational catch in Bear Creek near the EMDF. The fish ingestion rate calculation was developed for use in setting landfill wastewater discharge limits for the EMDF and EMWMF. The ingestion rate is pessimistic (biased toward higher than expected dose estimates) given the limited numbers of large game fish in Bear Creek near the EMDF.

2 **ELECTRONIC FILES TRANSFERRED**

TDEC well data EMDF PA April 1 2020.xlsx {*worksheet protection password:* **rev2PACAemdf**}

Fish ingestion rate for EMDF PA April 1 2020.pdf

3 **NAME AND SIGNATURE OF INFORMATION PROVIDER**

Steve Kenworthy – UCOR

STEPHEN KENWORTHY (Affiliate)

Digitally signed by STEPHEN KENWORTHY (Affiliate)
Date: 2020.04.01 11:47:19 -04'00'

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APPENDIX C.
INDEPENDENT TECHNICAL REVIEW DOCUMENTATION

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ATTACHMENT C.1.
COMPOSITE ANALYSIS DOCUMENT REVIEW REQUEST FORMS

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Oak Ridge LLC

Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5095/R2	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER:	Marshall Davenport		574-3261	11/14/2019
	Name (Print)	**Mail Stop**	**Telephone Number**	**Date**

DISTRIBUTION				
			PURPOSE OR REVIEW	
REVIEWER	**ORGANIZATION (DEPARTMENT/ DISCIPLINE)**	**MAIL STOP**	**REQUIRED REVIEW**	**ADDITIONAL REVIEW/ INFORMATION**
Julie Pfeffer	UCOR- EMDF Project Manager		Review of entire document for technical defensibility, focusing on accurate incorporation of commitments in corrective actions prepared for Issues identified by LFRG during its review of the initial revision of this document, and consistency with the draft EMDF Performance Assessment (UCOR-5094/R2), and DOE positions regarding ORR on-site disposal	*Low Level Waste Disposal Facility Federal Review Group (LFRG) Review Report for the Preliminary Disposal Authorization Statement Documentation for the Proposed Environmental Management Disposal Facility at the Oak Ridge Reservation*, draft *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)

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Document Review Request

Comments Due to Preparer by: **12/5/2019** **Date**	**NOTE: Comments were also provided on Comment Response Table.**

TO BE COMPLETED BY REVIEWER
REVIEWER'S NAME/ORGANIZATION: Julie Pfeffer
ACCEPTED, NO COMMENTS [ ] **COMMENTS ON DOCUMENT [X]** **COMMENTS ATTACHED [ ]**
COMMENTS RESOLVED: Julie L Pfeffer **DATE:** 2/13/20

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Oak Ridge LLC

Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5095	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Marshall Davenport (Name (Print)) — Mail Stop: — Telephone Number: 574-3261 — Date: 11/14/2019

DISTRIBUTION				
			PURPOSE OR REVIEW	
REVIEWER	**ORGANIZATION (DEPARTMENT/ DISCIPLINE)**	**MAIL STOP**	**REQUIRED REVIEW**	**ADDITIONAL REVIEW/ INFORMATION**
Steve Kenworthy	UCOR- EMDF Performance Assessment primary author		Review of entire document for technical defensibility, focusing on consistency with the draft EMDF Performance Assessment (UCOR-5094/R2).	Draft *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2)

Comments Due to Preparer by: ____________ Date	**NOTE:**

TO BE COMPLETED BY REVIEWER
REVIEWER'S NAME/ORGANIZATION: Steve Kenworthy

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PROC-DE-0705

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Oak Ridge LLC

Document Review Request

ACCEPTED, NO COMMENTS [ ]	COMMENTS ON DOCUMENT [X]	COMMENTS ATTACHED [ ]
COMMENTS RESOLVED: Stephen Kenworthy		DATE: Feb 13, 2020

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Oak Ridge LLC

Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5095	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Marshall Davenport (Name (Print)) | Mail Stop: | 574-3261 (Telephone Number) | 11/18/2019 (Date)

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Dick Ketelle	UCOR-Oak Ridge, TN		Technical accuracy of Section 3.2 ("Composite analysis conceptual model").	A few editorial items and several comments are included in Track Changes.

Comments Due to Preparer by: 12/4/2019 (Date) | **NOTE:**

TO BE COMPLETED BY REVIEWER

REVIEWER'S NAME/ORGANIZATION: Dick Ketelle

ACCEPTED, NO COMMENTS [ ] **COMMENTS ON DOCUMENT [X]** **COMMENTS ATTACHED [ ]**

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Document Review Request

COMMENTS RESOLVED: R.H. Ketelle DATE: 1/7/2020

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Oak Ridge LLC

Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5095	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Marshall Davenport (Name (Print)) | Mail Stop: | 574-3261 (Telephone Number) | 11/14/2019 (Date)

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Bruce Phillips	UCOR- EMWMF Waste Management representative		Review of entire document for technical accuracy and defensibility.	

Comments Due to Preparer by: 12/5/2019 (Date)

NOTE:

TO BE COMPLETED BY REVIEWER

REVIEWER'S NAME/ORGANIZATION: Bruce Phillips

ACCEPTED, NO COMMENTS [ ] **COMMENTS ON DOCUMENT [X]** **COMMENTS ATTACHED [ ]**

COMMENTS RESOLVED: Bruce Phillips **DATE:** 2/13/2020

Form-141 (8/11) Rev. 0
PROC-DE-0705

UCOR
URS | CH2M
Oak Ridge LLC

Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5095/R2	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Marshall Davenport (Name (Print)) | Mail Stop: | 574-3261 (Telephone Number) | 11/19/2019 (Date)

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Annette Primrose	UCOR- EMWMF Waste Management representative		Review of entire document for technical defensibility, focusing on consistency with the requirements of the OREM and EMWMF waste management programs.	

Comments Due to Preparer by: 12/5/2019 (Date)

NOTE: Comments were provided on electronic copy of document (filename: UCOR-5095 R2 Composite Analysis for internal rvw 11-14-19 ALP.docx).

TO BE COMPLETED BY REVIEWER

Form-141 (8/11) Rev. 0
PROC-DE-0705

UCOR
URS | CH2M
Oak Ridge LLC

Document Review Request

REVIEWER'S NAME/ORGANIZATION: Annette Primrose

ACCEPTED, NO COMMENTS [ ]   COMMENTS ON DOCUMENT [X]   COMMENTS ATTACHED [ ]

COMMENTS RESOLVED: [signature]   DATE: 1/7/2020

Form-141 (8/11) Rev. 0
PROC-DE-0705

UCOR
URS | CH2M
Oak Ridge LLC

Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5095	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Marshall Davenport (Name (Print)) — Mail Stop: — Telephone Number: 574-3261 — Date: 2/1/2020

DISTRIBUTION				
			PURPOSE OR REVIEW	
REVIEWER	**ORGANIZATION (DEPARTMENT/ DISCIPLINE)**	**MAIL STOP**	**REQUIRED REVIEW**	**ADDITIONAL REVIEW/ INFORMATION**
Steve Fox	Jacobs Engineering- New Bedford, MA		Verification of accurate output from modeling to document, verification of accurate output from calculation packages to document, verification from Information/Data Transfers to document, verification of accurate output from other sources to document, as appropriate, and verification of consistency between Bear Creek Valley conceptual site model (Section 3.2) and modeling	Calculation packages

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Oak Ridge LLC

Document Review Request

Comments Due to Preparer by:	**Upon completion of final draft** **Date**	**NOTE: Steve Fox and Marshall Davenport met on Friday, February 7, 2020 and performed this verification review of the Composite Analysis.**

TO BE COMPLETED BY REVIEWER		
REVIEWER'S NAME/ORGANIZATION: Steve Fox		
ACCEPTED, NO COMMENTS [X]	**COMMENTS ON DOCUMENT [ ]**	**COMMENTS ATTACHED [ ]**
COMMENTS RESOLVED: ______	**DATE:** ______	

Form-141 (8/11) Rev. 0
PROC-DE-0705

UCOR
URS | CH2M
Oak Ridge LLC

Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5095	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Marshall Davenport (Name (Print)) — Mail Stop: — Telephone Number: 574-3261 — Date: 1/30/2020

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW	
			REQUIRED REVIEW	**ADDITIONAL REVIEW/ INFORMATION**
Susan DePaoli	DOE-OREM		Review of entire document for technical defensibility, focusing on accurate incorporation of commitments in Issues identified by LFRG during its review of the initial revision of this document and consistency with DOE positions regarding ORR on-site disposal.	*Low Level Waste Disposal Facility Federal Review Group (LFRG) Review Report for the Preliminary Disposal Authorization Statement Documentation for the Proposed Environmental Management Disposal Facility at the Oak Ridge Reservation*

Comments Due to Preparer by: 3/17/2020

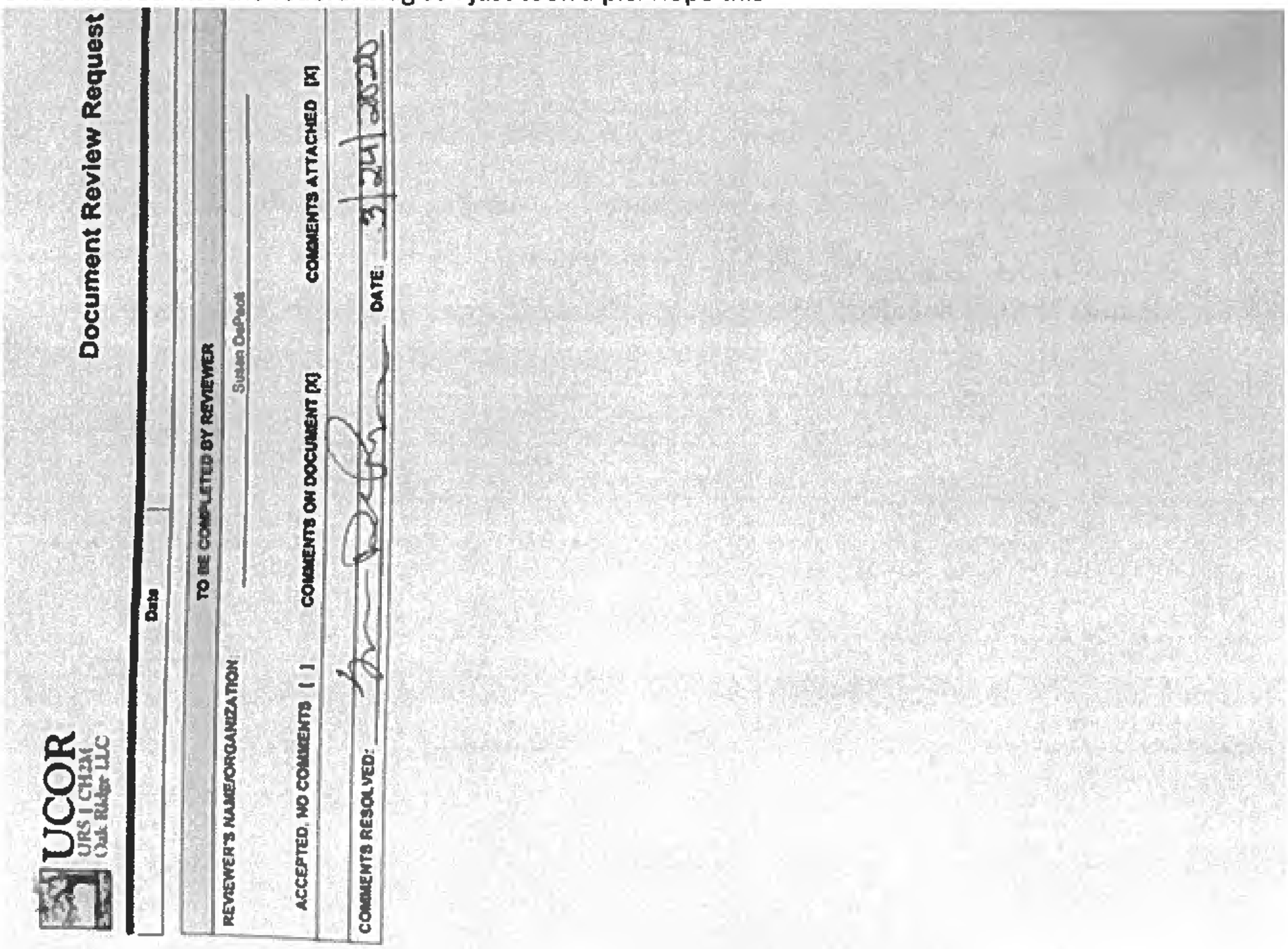
NOTE: Comments were provided via attached comment response table and on electronic copy of the document.

Form-141 (8/11) Rev. 0
PROC-DE-0705

Davenport Iii, John M (MDN)

From: Susan DePaoli <suzdepaoli@gmail.com>
Sent: Tuesday, March 24, 2020 4:23 PM
To: Davenport Iii, John M (MDN)
Subject: Re: Documentation of CA review Completion

We are not allowed into the federal bldg so I just took a pic. Hope this


UCOR
URS | CH2M
Oak Ridge LLC

Document Review Request

Date

TO BE COMPLETED BY REVIEWER

REVIEWER'S NAME/ORGANIZATION: Susan DePaoli

ACCEPTED, NO COMMENTS [ ] COMMENTS ON DOCUMENT [X] COMMENTS ATTACHED [X]

COMMENTS RESOLVED: ________ DATE: 3/24/2020

works

Sent from my iPhone

> On Mar 23, 2020, at 1:56 PM, Susan DePaoli <suzdepaoli@gmail.com> wrote:
>
> Hi Marshall! Yes I did see this. I'm planning to go to the office tomorrow and will take care of this there so I can send a scan.
>
> Sent from my iPhone
>
>> On Mar 23, 2020, at 8:30 AM, Davenport Iii, John M (MDN) <John.DavenportIii@ettp.doe.gov> wrote:

OSWDF (EMDF) Comment Resolution Matrix

Document Number: UCOR-5095/R2	**Document Title:** Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee	**Document Dated:** February 2020
Organization/Project: EMDF		**Comment Due Date:**

Reviewer Initials and Name	SD = Susan DePaoli RS = Roger Seitz

Comment No.	Reviewer	Section, Page, Paragraph	Comment/Suggested Change/Rationale	Resolution
1.	RS	General	I suggest that you include a message that neither of the two disposal facilities (EMWMF and EMDF) are significant contributors to a receptor dose in the context of the CA performance measure of 100 mrem/yr. You could qualify that, since peak doses for the PAs are less than the general screening value of 1 mrem/yr (also at 100 m, not in Bear Creek) identified in the Tech Std (albeit with pessimistic assumptions about cover performance), both are considered quantitatively in the CA. This makes an important statement about the low risks posed by the two disposal facilities. You could add something in the Exec Summary, Sect 1.1 and at the beginning of Chapter 6 (perhaps include the quotes below in Section 1.1 and refer to them in the Exec Summary, Chapters 6 and 7). I noticed Section 6.2 hints at these points, but the points could be made more strongly there and mentioned in again in Chapter 7. Here are a couple quotes from the Tech Std that you could include for perspective: A) CA requirement in DOE M 435.1-1 Chg. 2, Chapter IV.P.(3) - note the emphasis on current LLW disposal facility impacts rather than other sources: "*The composite analysis results shall be used for planning, radiation protection activities, and future use commitments to minimize the likelihood that current low-level waste disposal activities will result in the need for future corrective or remedial actions to adequately protect the public and the environment.*" B) You can put some emphasis on demonstrating that dose contributions from the EMDF and EMWMF cannot lead to a need for future corrective or remedial action. Such an	Text has been added to Section 6 focusing on the contributions of the EMDF and the EMWMF to the composite dose at the POA. This text assesses the EMDF and EMWMF dose in relation to the 1 mrem/year general screening value and includes the referenced CA requirement from the manual. It concludes that disposal activities will not result in a future corrective or remedial action. It references the example provided in the comment (Page 3-3 of the standard). A summary has been added to the Executive Summary and a reference to Section 6 has been added to Section 1.2.

Comment No.	Reviewer	Section, Page, Paragraph	Comment/Suggested Change/Rationale	Resolution
			approach has been described in an example provided on Page 3-3 of the DOE Technical Standard (DOE-STD-5002-2017) that states: *"A disposal facility is developed in a location where there is potential overlap with plumes from other facilities that have been addressed in an existing, LFRG approved CA prepared for another disposal facility. The PA for the new disposal facility provides results projecting doses resulting from the new facility below 1 mrem/yr at any location where potential interactions with other plumes could occur. Given the low doses associated with the facility at points of potential interaction with other plumes, the potential for this facility to impact other cleanup decisions at downstream facilities is limited. Given the insignificant interaction associated with the plumes from the new facility, the results for the existing, approved CA serve as the basis for screening the need to address downstream impacts separately in a new CA and allow the CA requirements for the new facility to be addressed as an appendix within the PA for the new facility."*	
2.	SD	throughout	Search on "Amentum-led", I believe it should be "AECOM-led". (saw this in Appendix A,B and main text – might be in other appendices)	Sentence correct as written; will make consistent throughout document during final edit.
3.	SD	Pg ES-1 Para 1	Awkward introduction (see comment in document)….if you keep it this way, I suggest making it more clear that the first paragraph is a general discussion of 435 CA purpose as opposed to a discussion of ORR CA (which is what I expected, so it read very strange at first).	The order of the first two paragraphs has been switched. Appropriate revisions have been made to facilitate transition. The same changes were made to the Introduction.
4.	SD	Pg ES-1 Para 3	Delete last sentence in paragraph.	Sentence deleted.
5.	SD	Pg ES-2 Para 4	First sentence appears to be saying "Estimates of current and future risk….were obtained from analyses… and codified….as ELCR 1e-5"?? The goal is 10-5, but I don't think the sentence states that…I'm not understanding what you are trying to say in this sentence. (may have some words missing?)	Sentence revised to: The other existing BCV sources were evaluated using the CERCLA process. This process included the Remedial Investigation (RI) of BCV (DOE 1997a) and the *Feasibility Study for the Bear Creek Valley at the Y-12 Plant, Oak Ridge, Tennessee* (DOE 1997b), and codified a risk goal as an excess lifetime cancer risk (ELCR) of 1X 10-5 at Bear Creek kilometer (BCK) 9.2 in the Phase 1 BCV ROD (DOE 2000a).

OSWDF (EMDF) Comment Resolution Matrix

Comment No.	Reviewer	Section, Page, Paragraph	Comment/Suggested Change/Rationale	Resolution
6.	SD	Pg ES-3	General, the pathways analyzed to give the base case doses for EMWMF and EMDF (and all BCV sources) are not specified….were they all pathways? If not, if just major pathways were considered, then state that.	It was an all pathways evaluation. Sentence revised to: "…the 1000-year compliance period for the all pathways exposure assessment in DOE1998a and 1998b."
7.	SD	Pg 3 Table 1	Remove line in middle of table, bulletize the entries in the table (the line implies a relationship between the row entries, while I see that for the first "row", the second row relates EMWMF inventory to Phase I ROD info (which is not what you want, I would think)….was the POA unchanged between 1999 CA and this CA? (if it was, should be in the table)	Revised table per comment. POA was changed from 1999 CA to 2020 CA. Will be revised during final edit/format.
8.	SD	Pg 4 Para 2	Sentence 2, begins "The concentrations…"….what concentrations are you referring to? GW? SW? Both? Inventory conc (which is what it reads like, however, I don't think that is what you mean)	Revised the sentence to read "This dose was predicted using…" and moved this sentence to follow the next sentence ("The predicted concentrations …").
9.	SD	Pg 5 Para 2	Was the "dose" extrapolated back to 7.73 or the concentration? (really should be saying the concentration, which corresponds to a dose under a given scenario)	It is the dose. We presented a predicted dose from the EMWMF at BCK 10.5 based on a waste inventory and PATHRAE modeling (modeled using the 1998 RI/FS exposure scenario). This dose was then adjusted from BCK 10.5 to BCK 7.73 based on mixing ratios in Bear Creek. (This is what we did in the Rev. 1 CA.). The process we used for the other existing BCV sources was the same except we used surface water concentrations at BCK 9.2 to get a dose at BCK 9.2 rather than modeling a waste disposal inventory
10.	SD	Sect. 1.2 Pg 6 Para 1	Delete last 4 sentences (beginning with "This operating DAS contains…..")	Sentences deleted
11.	SD	Pgs. 8-10 Table 2	There is a stray "P" in the upper left corner of table	Will be corrected in final edit/format.
12.	SD	Sect. 1.4 Pg 11 Para 1	Replace "upper end of the valley" with "western side…" which matches the figure and our discussion of the valley as eastern and western	OK, but will use "eastern end" rather than "western side."
13.	SD	Sect. 1.4, P 11 Para 2	Mid-paragraph, modify sentence as follows "These future land use designations in the ROD are defined solely for purposes~~s~~ of setting target cleanup levels and do not reflect ~~the very low likelihood that the EMDF site will ever be released from DOE ownership~~. DOE future land usage plans.	Text revised per comment.

Comment No.	Reviewer	Section, Page, Paragraph	Comment/Suggested Change/Rationale	Resolution
14.	RS	Sect. 1.5.1	It is not real clear what is meant by "no less conservative" in points 2 and 3. Probably should expand a bit to make the point more clearly, e.g., input parameters and assumptions in the CA and PAs were selected with the intent to deliberately bias projected doses to be higher than expected. Not sure what the right words are, but something to that effect. Also, I think Land Use is a key assumption, it seems that you discuss it as such later in the document. In that case, impacts would be lower if actual land use was assumed.	"(In general, input parameters and assumptions were selected with the intent to deliberately bias projected doses to be higher than expected.)" added to the end of the 2nd bullet. The 3rd bullet was revised in response to Comment 15 below.
15.	SD	Sect. 1.5.1 No. 3 in list	Reword 3rd key assumption: "the conclusions of the EMDF Performance Assessment and EMWMF Performance Assessment, and future versions' conclusions of those performance assessments, remain valid and are no less conservative than those modeled within this composite analysis. This assumption considers that the EMDF is located at the CBCV site"	Text revised per comment.
16.	SD	Sect. 1.5.2 1st sentence	Remove word "was"	Removed.
17.	SD	Sect. 1.5.2 bullet 4	Is the sentence ending ".....at the same time." accurate as written (very specific!)? Or should "at the same time" be deleted?	This is accurate as written. We assumed the potential migration from the two disposal facilities would start at the same time to simplify the explanation of the 1,000-year post closure compliance period in the CA.
18.	RS	Sect. 1.5.2 bullet 4	Isn't U already in the creek? This statement does not seem to reflect the presence of contamination in the creek from older sources.	Uranium is currently in Bear Creek. This bullet explains the assumed start of the 1,000-year compliance period. For simplicity, we assumed that remediation in BCV would be completed, and contaminants would begin migrating from the two disposal facilities at the same time rather than have differing compliance periods because of small differences in assumed starts.
19.	SD	Sect. 1.5.2 bullets 5 and 6	These are the kinds of statements I expected to see in the exec summary that should discuss the exposure pathways considered, and major exposure pathways for the composite analysis sources. Add to the exec summary	Clarified as appropriate in ES based on Comment 6.
20.	SD	Sect. 1.5.2 Pg 14 bullet 1	Second sentence, discusses the RA, add what site/sites it applies to. (e.g., "....in the selected remedial action alternative for other sources in BCV...."	Sentence revised to "This would prevent long term, unrestricted public access to the capped EMWMF and other waste sources in BCV and preserved the integrity of the caps over the waste areas."

Comment No.	Reviewer	Section, Page, Paragraph	Comment/Suggested Change/Rationale	Resolution
21.	SD	Sect. 1.5.2 Pg 14 bullet 4	"These contaminants were observed to have high leach rates…." Yet we have a Kd of 50 for uranium. The high leach rate applies to Tc-99, but I do not think we should say that for U. Contradicts our Kd. It is the high concentration of U in the source that drives the concentration seen in SW, presumably. Suggest "These contaminants are observed in SW and GW either due to high mobility (Tc) or significant source inventories (U)." or something along those lines. Could also add that Tc is reported on in the RER, although not as routinely as U….. "For this reason, only the primary radionuclides of uranium (and occasionally Tc) are regularly monitored in Bear Creek….."	Bullet reworded as follows: The BCV RI and Phase I ROD identified the primary radionuclide contaminants of concern as Tc-99 and uranium isotopes. The primary radionuclides of uranium are regularly monitored at BCK 9.2 to determine if surface water and groundwater complies with the uranium flux goals in the Phase I BVC ROD. These contaminants are observed in groundwater and surface water due to either high mobility (Tc-99) or significant source inventories having been disposed just above or in groundwater- attributes that are expected to persist into the future. Some source inventories and historical operations at Y-12 clearly support the inclusion of Tc-99 and uranium where Tc-99 is a fission product impurity contained in uranium metal produced from the extraction of uranium from spent nuclear fuel. Technetium-99 is regularly monitored in Bear Creek at BCK 7.87. Monitoring results are presented in the RERs.
22.	SD	Sect. 2.1.1 Pg. 15 Para 3	Need to reword first sentence. ….suggest ----- "The EMWMF ROD limits radionuclide concentrations in waste such that a receptor is limited to an ELCR of 1×10^{-5} for the first 1000 years after closure and an ELCR of 1×10^{-4} after 1000 years (DOE 1999b, pages 2-20 and B-4; DOE 2001b, Sect. 1.2) at the convergence of NT-5 and Bear Creek (BCK 10.5) (DOE 1998b, Fig. 4).	Sentence revised per comment.
23.	SD	Pg 18 Para 1	First sentence should note additional 25% contingency waste volume to bring to 1.95M cy (since you also state the capacity of the LF). See that on page 44 we have the 1.95 M cy (which includes the 25% contingency)	25% contingency added. Revised EMDF volume on Page 44 to 2.2 million cy.
24.	SD	Pgs 14 and 18	See comments in document, watershed statements somewhat contradict each other. Also on page 45, 2nd paragraph.	Deleted portion of sentence on Page 14 to remove inconsistency with this statement. This sentence was not revised.
25.	SD	Pg 21	Is the 52.6 in of annual rainfall consistent with the PA? I thought we typically say 54-55 in of rain per year.	PA says 50.91 inches. The CA references the EMDF RI/FS. The amounts in the PA come from the 30-year period from 1960 to 1990 on the ORR that was used in the original EMWMF modeling. This value was presented and used in the performance modeling to remain as consistent as possible with the performance modeling previously performed. The minor discrepancy results from the data set used for the averaging. No text change.

Comment No.	Reviewer	Section, Page, Paragraph	Comment/Suggested Change/Rationale	Resolution
26.	SD	Sect. 2.4.1 Pg 30	Suggest modification ..... "A radionuclide waste inventory for the closed EMWMF was predicted based on actual waste disposed to-date (UCOR 2019a) and was modeled using PATHRAE-RAD to calculate a dose in Bear Creek at the convergence of NT-5 (BCK 10.5) for this composite analysis ~~instead of the originally predicted inventory.~~"	Sentence modified per comment.
27.	SD	Sect. 2.4.4.3 Pg 41 Para 3	Modify the 1st sentence as follows.... "Therefore, to comply with the Phase I BCV ROD remedial action objectives at the Integration Point (BCK 9.2), future releases from the other existing BCV sources have to be reduced ~~at the Integration Point (BCK 9.2)~~. Additional remediation will be required in BCV to further mitigate the future release of these radionuclides and meet the ROD objectives.	Sentence revised per comment.
28.	RS	Sect. 2.4.4.2 2nd para.	Just to be clear, suggest including the DOE 2015 citation with the first sentence, if that is correct.	The DOE 2015 citation is the reference for both sentences.
29.	SD	Sect. 2.5.1 Pg 43 Para 1	Modify sentence. "Based on achieving the 78% reduction through implementation of remedial actions for other BCV sources , ~~These~~ resultant concentrations would be ~~were then reduced to the following~~: 1.88 pCi/L for U-234, 0.17 pCi/L for U-235, 4.18 pCi/L for U-238, and 8.72 pCi/L for Tc-99.	Sentence revised per comment.
30.	SD	Sect. 2.5.2 Pg 44 Para 2	Is this modification accurate? "It was conservatively assumed that radiological inventory in waste accepted for disposal occupied the entire ~~waste form~~ facility capacity following disposal and facility closure."	Yes, sentence revised per comment.
31.	SD	Sect. 2.5.2 Pg 44 Para 3	Is this sentence in the middle of this paragraph a remnant from previous CA.....delete it? "The predicted concentrations for the primary radionuclides at EMWMF closure were used to calculate the resulting dose for the exposure pathways in DOE 1998a and 1998b"	No. It is saying that we that we used the same PATHRAE modeling scenario for the EMWMF in this CA that we used in the original RI/FS and WAC modeling in 1998. Sentence revised to clarify.

Comment No.	Reviewer	Section, Page, Paragraph	Comment/Suggested Change/Rationale	Resolution
32.	RS	Sect. 3.2.1	Should there be any concern that EMWMF and EMDF use different source term models (did EMWMF use first order release?). This may not be the place to mention that, since both PAs are assumed to stand on their own. Maybe this is something to just be prepared to address, but not discuss in the CA.	Comment noted- no text change. We did make the point during the on-site review in Sept. 2018 that we preferred to continue to use the PATHRAE model because that's what was used in 1998 and the use of a different model with input parameters consistent with those used for the EMDF could provide results that were different than the original modeling and could result in a WAC that was not consistent with what is being used. The CA only states that we used PATHRAE and the original modeling scenarios. We support our position by stating that the recent EMWMF operational DAS was issued following the resolution of LFRG issues using PATHRAE.
33.	SD	Sect. 3.4 Pg 69 Para 5	The sentence in this section for EMDF states that C-14 through fish ingestion is the primary pathway. Then for EMWMF the sentence is "This dose results primarily from exposure to the mobile radionuclides C-14, I-129, tritium, and Tc-99." Assume this is through SW ingestion? State the pathway as is done for EMDF. (do a search, I've seen the sentence in other sections as well).	It is surface water consumption. Added to sentence. Also added to same sentence in Executive Summary.
34.	RS	Sect. 5.3	"This concentration results primarily ..." Should this say "The projected dose results primarily..."? Concentration does not seem to fit there.	No. We chose to present concentrations rather than dose following 10,000 years. This is consistent with the PA.
35.	SD	Sect. 6.1 Pg 90 bullet 1	Mid paragraph, modify sentence "EMDF also ~~has~~ contributes a very low contaminant concentration at the POA."	Sentence revised per comment.
36.	SD	Sect. 7 Pg 91 Para 2	Modify sentence. Releases of uranium from these sources currently exceed the post-remediation goals defined in the ROD.	"currently" added.
37.	SD	Sect. 7 Pg 91 Para 2	Modify sentence: The sensitivity analysis conducted in Sect. 5.2 predicted a dose in the event that no further remedial actions were completed in BCV using current contaminant concentrations in Bear Creek. The predicted dose is below the administratively limited dose constraint of 30 mrem/year specified by DOE M 435.1.	Sentence added.
38.	SD	Sect. 7 Pg 92 Last para	Modify sentence "This Composite Analysis evaluated a source term for EMWMF for projected waste inventory at closure, which was based on actual waste disposed to date	Sentence modified per comment.

OSWDF (EMDF) Comment Resolution Matrix

Comment No.	Reviewer	Section, Page, Paragraph	Comment/Suggested Change/Rationale	Resolution
39.	SD	Sect. 8.1 Pg 96	Statement ….. "because the ridge and valley hydrogeology of ORR does not support the interaction of separate watersheds through the groundwater pathway." See comment 20 above. Need to be consistent.	The inconsistent text on Page 14 was deleted. This statement was not revised.
40.	SD	App A Pg A-4 Para 2	Modify "…and the proposed conceptual design for the EMDF…."	Appendix A revised per comment.

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Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5095	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Marshall Davenport (Name (Print)) | Mail Stop: | 574-3261 (Telephone Number) | 1/30/2020 (Date)

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Roger Seitz	Consultant to DOE-OREM		Review of entire document for technical defensibility, focusing on accurate incorporation of commitments in Issues identified by LFRG during its review of the initial revision of this document and consistency with the draft EMDF Performance Assessment (UCOR-5094/R2) and approaches to DOE Order 435.1 compliance at other DOE sites.	*Low Level Waste Disposal Facility Federal Review Group (LFRG) Review Report for the Preliminary Disposal Authorization Statement Documentation for the Proposed Environmental Management Disposal Facility at the Oak Ridge Reservation*, draft *Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5094/R2).

Comments Due to Preparer by: 3/17/2020 (Date)

NOTE:

TO BE COMPLETED BY REVIEWER

REVIEWER'S NAME/ORGANIZATION: Roger Seitz/DOE-OREM

ACCEPTED, NO COMMENTS [ ] **COMMENTS ON DOCUMENT [ ]** **COMMENTS ATTACHED [X]**

COMMENTS RESOLVED: R Seitz **DATE:** 3/23/2020

Form-141 (8/11) Rev. 0
PROC-DE-0705

Davenport Iii, John M (MDN)

From: Roger Seitz <rogerseitz5@gmail.com>
Sent: Thursday, March 19, 2020 4:57 PM
To: Davenport Iii, John M (MDN)
Subject: Re: CA comments

Hi Marshall,
Those responses are fine with me.

Roger Seitz
Email: rogerseitz5@gmail.com
Mobile: +1 (803) 522-2847

On Thu, Mar 19, 2020 at 2:10 PM Davenport Iii, John M (MDN) <John.DavenportIii@ettp.doe.gov> wrote:

Roger-

Thanks for the comments. Please see my responses below. Let me know if I need to modify any responses. Thanks for the review.

Marshall

From: Roger Seitz <rogerseitz5@gmail.com>
Sent: Tuesday, March 17, 2020 8:48 AM
To: DePaoli, Susan (CONTR) <susan.depaoli@orem.doe.gov>; Davenport Iii, John M (MDN) <John.DavenportIii@ettp.doe.gov>; Pfeffer, Julie (JP2) <Julie.Pfeffer@ettp.doe.gov>
Subject: CA comments

Hello all,

Sorry it took so long, I kept getting distracted when I tried to finish this last week and yesterday.

Overall the CA is looking good. I have a few comments and one general messaging suggestion.

1) General - I suggest that you include a message that neither of the two disposal facilities (EMWMF and EMDF) are significant contributors to a receptor dose in the context of the CA performance measure of 100 mrem/yr. You could qualify that, since peak doses for the PAs are less than the general screening value of 1 mrem/yr (also at 100 m, not in Bear Creek) identified in the Tech Std (albeit with pessimistic assumptions about cover performance), both are considered quantitatively in the CA. This makes an important statement about the low risks posed by the two disposal facilities. You could add something in the Exec Summary, Sect 1.1 and at the beginning of Chapter 6 (perhaps include the quotes below in Section 1.1 and refer to them in the Exec Summary, Chapters 6 and 7). I noticed Section 6.2 hints at these points, but the points could be made more strongly there and mentioned in again in Chapter 7.

Here are a couple quotes from the Tech Std that you could include for perspective:

A) CA requirement in DOE M 435.1-1 Chg. 2, Chapter IV.P.(3) - note the emphasis on current LLW disposal facility impacts rather than other sources:

"The composite analysis results shall be used for planning, radiation protection activities, and future use commitments to minimize the likelihood that current low-level waste disposal activities will result in the need for future corrective or remedial actions to adequately protect the public and the environment."

B) You can put some emphasis on demonstrating that dose contributions from the EMDF and EMWMF cannot lead to a need for future corrective or remedial action. Such an approach has been described in an example provided on Page 3-3 of the DOE Technical Standard (DOE-STD-5002-2017) that states:

"A disposal facility is developed in a location where there is potential overlap with plumes from other facilities that have been addressed in an existing, LFRG approved CA prepared for another disposal facility. The PA for the new disposal facility provides results projecting doses resulting from the new facility below 1 mrem/yr at any location where potential interactions with other plumes could occur. Given the low doses associated with the facility at points of potential interaction with other plumes, the potential for this facility to impact other cleanup decisions at downstream facilities is limited. Given the insignificant interaction associated with the plumes from the new facility, the results for the existing, approved CA serve as the basis for screening the need to address downstream impacts separately in a new CA and allow the CA requirements for the new facility to be addressed as an appendix within the PA for the new facility."

Excellent comment. I put the details of this comment in Section 6 of the CA right after where we compare the composite dose to the 100 and 30 mrem/year limits. I referenced the example that you provided to support the conclusion that the disposal activities will not lead to a future corrective or remedial action. I summarized the Section 6 text in the Executive Summary and referred to Section 6 in a sentence at the end of Section 1.2 that mentioned the interpretation of the results.

2) Section 1.5.1 - It is not real clear what is meant by "no less conservative" in points 2 and 3. Probably should expand a bit to make the point more clearly, e.g., input parameters and assumptions in the CA and PAs were selected with the intent to deliberately bias projected doses to be higher than expected. Not sure what the right words are, but something to that effect. Also, I think Land Use is a key assumption, it seems that you discuss it as such later in the document. In that case, impacts would be lower if actual land use was assumed.

I used your words (In general, input parameters and assumptions were selected with the intent to deliberately bias projected doses to be higher than expected.) at the end of point 2. I modified point 3 in response to a comment by Susan and didn't think we needed to make the same point again. We do not think land use is a key assumption because we assumed its use is unrestricted and we assessed a resident farmer. If the land use were to change, its use would become more restricted and, although the dose would be less, the conclusion in the CA would not change.

3) Section 1.5.2 - fourth bullet - Isn't U already in the creek? This statement does not seem to reflect the presence of contamination in the creek from older sources.

Yes, there is U in Bear Creek now and there will be U in the creek following completion of remedial actions. The purpose of this bullet is to simplify the start of the 1,000-year compliance period. We assumed that the 1,000- year compliance period would start with the completion of the remediation in BCV, the closure of the EMDF, and the closure of the EMWMF. And those activities would all happen at the same time. That way, we did not have to define multiple compliance periods starting only a few years apart based on different activities.

4) Section 2.4.4.2 - second paragraph - just to be clear, suggest including the DOE 2015 citation with the first sentence, if that is correct.

It is correct. That reference supports both of those sentences.

5) Section 3.2.1 - should there be any concern that EMWMF and EMDF use different source term models (did EMWMF use first order release?). This may not be the place to mention that, since both PAs are assumed to stand on their own. Maybe this is something to just be prepared to address, but not discuss in the CA.

Did not address in CA. We did say that we used PATHRAE and the same input parameters as we used in the 1998 modeling because we wanted to be consistent with that modeling in the CA and in the Corrective Action to the LFRG Key Issue concerning the use of PATHRAE.

6) Larger paragraph above Section 5.4 - "This concentration results primarily ..." Should this say "The projected dose results primarily..." Concentration does not seem to fit there.

No, it is concentration. We chose to present peak concentrations rather than peak dose after 10,000 years to be consistent with the PA.

Roger Seitz

Email: rogerseitz5@gmail.com

Mobile: +1 (803) 522-2847

ATTACHMENT C.2.
PERFORMANCE ASSESSMENT DOCUMENT REVIEW REQUEST FORMS

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Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5094	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Steve Kenworthy (Name (Print)) — Mail Stop: — Telephone Number: 574-3261 — Date: 2/24/2020

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW	
			REQUIRED REVIEW	ADDITIONAL REVIEW/ INFORMATION
Julie Pfeffer	UCOR- EMDF Project Manager		Review of entire document for technical defensibility, focusing on accurate incorporation of commitments in corrective actions prepared for Issues identified by LFRG during its review of the initial revision of this document, and consistency with the EMWMF/EMDF Composite Analysis (UCOR-5095/R2), and DOE positions regarding ORR on-site disposal	*Low Level Waste Disposal Facility Federal Review Group (LFRG) Review Report for the Preliminary Disposal Authorization Statement Documentation for the Proposed Environmental Management Disposal Facility at the Oak Ridge Reservation, Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5095/R2)

Form-141 (8/11) Rev. 0
PROC-DE-0705

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Document Review Request

Comments Due to Preparer by: 3/2/2020 (Date)	**NOTE:**

TO BE COMPLETED BY REVIEWER
REVIEWER'S NAME/ORGANIZATION: Julie Pfeffer
ACCEPTED, NO COMMENTS [ ] **COMMENTS ON DOCUMENT [X]** **COMMENTS ATTACHED [ ]**
COMMENTS RESOLVED: Julie L Pfeffer **DATE:** 3/4/20

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Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5094	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER:	Steve Kenworthy		574-3261	2/24/2020
	Name (Print)	**Mail Stop**	**Telephone Number**	**Date**

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Marshall Davenport	UCOR- EMWMF/EMDF Composite Analysis primary author		Review of entire document for technical defensibility, focusing on consistency with the EMWMF/EMDF Composite Analysis (UCOR-5095/R2) and the OREM waste management program requirements.	*Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5095/R2)

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Document Review Request

Comments Due to Preparer by: **3/1/2020** **Date**	**NOTE: See file Q:/General_Plant_&_CP/EMDF/DOCUMENTS/Document Preparation/PA-Steve/D2 Prep/D2 Review Comments/EMDF PA Main Text-UCOR review Feb 24 2020 (JMD) for comments.** **Also participated in 2/25-28 verification review with Steve Fox and Steve Kenworthy.**

TO BE COMPLETED BY REVIEWER		
REVIEWER'S NAME/ORGANIZATION: Marshall Davenport		
ACCEPTED, NO COMMENTS [ ]	**COMMENTS ON DOCUMENT [X]**	**COMMENTS ATTACHED [ ]**
COMMENTS RESOLVED: Marshall Davenport	**DATE:** 3/4/2020	

Form-141 (8/11) Rev. 0
PROC-DE-0705

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Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER

DOCUMENT NUMBER:	**DRAFT REVISION NUMBER:**	**DOCUMENT TITLE:**
UCOR-5094	R2	Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Steve Kenworthy (Name (Print)) | Mail Stop: | 574-3261 (Telephone Number) | 2/24/2020 (Date)

DISTRIBUTION

REVIEWER	**ORGANIZATION (DEPARTMENT/ DISCIPLINE)**	**MAIL STOP**	**PURPOSE OR REVIEW**	
			REQUIRED REVIEW	**ADDITIONAL REVIEW/ INFORMATION**
Steve Fox	Jacobs Engineering- New Bedford, MA		Verification of accurate output from appendices and calculation packages to document, verification from Information/Data Transfers to document, and verification of accurate output from other sources to document, as appropriate	

Comments Due to Preparer by: **3/1/2020**

NOTE: Steve Fox, Steve Kenworthy, and Marshall Davenport met 2/25-28/2020 and performed this verification review of the Performance Assessment.

Form-141 (8/11) Rev. 0
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Date	

TO BE COMPLETED BY REVIEWER		
REVIEWER'S NAME/ORGANIZATION:	Steve Fox/ Jacobs Engineering	
	Steve Fox Digitally signed by Steve Fox DN: cn=Steve Fox, o=Jacobs Engineering, ou, email=steve.fox@jacobs.com, c=US Date: 2020.03.04 10:45:18 -05'00'	
ACCEPTED, NO COMMENTS [X]	COMMENTS ON DOCUMENT [ ]	COMMENTS ATTACHED [ ]
COMMENTS RESOLVED: ______		DATE: ______

Form-141 (8/11) Rev. 0
PROC-DE-0705

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Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5094	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Steve Kenworthy (Name (Print)) | Mail Stop: | 574-3261 (Telephone Number) | 2/24/2020 (Date)

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Bruce Phillips	UCOR- subject matter expert		Review of entire document for technical accuracy and defensibility.	

Comments Due to Preparer by: 3/2/2020 (Date)

NOTE:

TO BE COMPLETED BY REVIEWER

REVIEWER'S NAME/ORGANIZATION: Bruce Phillips

ACCEPTED, NO COMMENTS [ ] **COMMENTS ON DOCUMENT [X]** **COMMENTS ATTACHED [ ]**

COMMENTS RESOLVED: Bruce Phillips **DATE:** 03/05/2020

Form-141 (8/11) Rev. 0
PROC-DE-0705

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Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5094	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Steve Kenworthy (Name (Print)) — Mail Stop: — Telephone Number: 574-3261 — Date: 2/24/2020

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Annette Primrose	UCOR- subject matter expert		Review of entire document for technical accuracy and defensibility.	

Comments Due to Preparer by: 3/2/2020 (Date)

NOTE:

TO BE COMPLETED BY REVIEWER

REVIEWER'S NAME/ORGANIZATION: Annette Primrose

ACCEPTED, NO COMMENTS [ ] **COMMENTS ON DOCUMENT [X]** **COMMENTS ATTACHED [ ]**

COMMENTS RESOLVED: [signature] **DATE:** 3/17/2020

Form-141 (8/11) Rev. 0
PROC-DE-0705

Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5094	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Marshall Davenport (**Name (Print)**) — **Mail Stop** — 574-3261 (**Telephone Number**) — 2/20/2020 (**Date**)

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Susan DePaoli	DOE-OREM		Review of entire document for technical defensibility, focusing on accurate incorporation of commitments in Issues identified by LFRG during its review of the initial revision of this document and consistency with DOE positions regarding ORR on-site disposal.	*Low Level Waste Disposal Facility Federal Review Group (LFRG) Review Report for the Preliminary Disposal Authorization Statement Documentation for the Proposed Environmental Management Disposal Facility at the Oak Ridge Reservation*

Comments Due to Preparer by:	**3/10/2020**	**NOTE: Executive Summary Comments were provided on a Comment Response Matrix and a mark-up of the Performance Assessment was also provided.**

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Document Review Request

Date	

TO BE COMPLETED BY REVIEWER		
REVIEWER'S NAME/ORGANIZATION: Susan DePaoli		
ACCEPTED, NO COMMENTS [ ]	COMMENTS ON DOCUMENT [X]	COMMENTS ATTACHED [X]
COMMENTS RESOLVED: Susan DePaoli		DATE: 4-15-2020

Form-141 (8/11) Rev. 0
PROC-DE-0705

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Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5094	**DRAFT REVISION NUMBER:** R2	**DOCUMENT TITLE:** Performance Assessment for the Environmental Management Disposal Facility, Oak Ridge, Tennessee

PREPARER: Marshall Davenport (Name (Print)) — Mail Stop: — Telephone Number: 574-3261 — Date: 2/20/2020

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Roger Seitz	Consultant to DOE-OREM		Review of entire document for technical defensibility, focusing on accurate incorporation of commitments in Issues identified by LFRG during its review of the initial revision of this document and consistency with the EMWMF/EMDF Composite Analysis (UCOR-5095/R2) and approaches to DOE Order 435.1 compliance at other DOE sites.	*Low Level Waste Disposal Facility Federal Review Group (LFRG) Review Report for the Preliminary Disposal Authorization Statement Documentation for the Proposed Environmental Management Disposal Facility at the Oak Ridge Reservation, Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5095/R2).

Comments Due to Preparer by: 3/10/2020 (Date)   **NOTE:**

TO BE COMPLETED BY REVIEWER

REVIEWER'S NAME/ORGANIZATION: Roger Seitz

ACCEPTED, NO COMMENTS [ ]   **COMMENTS ON DOCUMENT [ ]**   **COMMENTS ATTACHED [X]**

COMMENTS RESOLVED: [signature]   **DATE:** 4/16/2020

Form-141 (8/11) Rev. 0
PROC-DE-0705

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ATTACHMENT C.3.
COMPOSITE ANALYSIS – PERFORMANCE ASSESSMENT QUALITY ASSURANCE REPORT DOCUMENT REVIEW REQUEST FORMS

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Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5234	**DRAFT REVISION NUMBER:** R0	**DOCUMENT TITLE:** Quality Assurance Report for Modeling of the Bear Creek Valley Low-Level Radioactive Waste Disposal Facilities in Bear Creek Valley, Oak Ridge, Tennessee"

PREPARER: Marshall Davenport (Name (Print)) | Mail Stop: | 574-3261 (Telephone Number) | 2/19/2020 (Date)

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Julie Pfeffer	UCOR, EMDF Project Manager		Review of entire document for completeness, focusing on accurate incorporation of commitments in Key QA Issues identified by LFRG during its review of the initial revision of the PA and the CA.	*Low Level Waste Disposal Facility Federal Review Group (LFRG) Review Report for the Preliminary Disposal Authorization Statement Documentation for the Proposed Environmental Management Disposal Facility at the Oak Ridge Reservation*

Comments Due to Preparer by: **2/26/2020** (**Date**)

NOTE: Comments were provided on 2 hard copy mark-ups, one from the independent technical review and one from a cross-check with internal and external references and section call-outs.

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Document Review Request

TO BE COMPLETED BY REVIEWER		
REVIEWER'S NAME/ORGANIZATION:	Julie Pfeffer	
ACCEPTED, NO COMMENTS [ ]	COMMENTS ON DOCUMENT [X]	COMMENTS ATTACHED [ ]
COMMENTS RESOLVED: Julie L Pfeffer		DATE: 4/15/20

Form-141 (8/11) Rev. 0
PROC-DE-0705

Linton, Jennifer L (JL9)

From:	Davenport Iii, John M (MDN)
Sent:	Wednesday, April 15, 2020 6:45 AM
To:	Linton, Jennifer L (JL9)
Subject:	FW: Resolved Comments on the EMDF PA/CA QA Report
Attachments:	QA Report-RTC-MMilo.doc

Good morning Jen-
Here is the Mark Milo statement that his comments on the PA/CA QA Report were satisfactorily addressed. I have attached the Comment Response Matrix that I prepared to record his comments and the responses. Let's put this email and the matrix in the Appendix to document his review. Thank you.
Marshall

From: Milo, Mark A (M2M) <Mark.Milo@ettp.doe.gov>
Sent: Tuesday, April 14, 2020 2:23 PM
To: Davenport Iii, John M (MDN) <John.DavenportIii@ettp.doe.gov>
Subject: RE: Resolved Comments on the EMDF PA/CA QA Report

John,

Thank you. I understood and concur with all of the responses to my comments.

Mark
Mark Milo
Quality Assurance
UCOR, an Amentum-led partnership with Jacobs
865-241-4726

From: Davenport Iii, John M (MDN) <John.DavenportIii@ettp.doe.gov>
Sent: Monday, April 13, 2020 4:02 PM
To: Milo, Mark A (M2M) <Mark.Milo@ettp.doe.gov>
Subject: Resolved Comments on the EMDF PA/CA QA Report

Hi Mark-
I hope everything is going well and you are staying safe. I have resolved all of the comments you provided me on the PA/CA QA Report. The resolutions are on the attached Comment Response Matrix. If you are OK with my responses, please sign at the bottom of the attached UCOR Form-141 and return it to me. If you are unable to scan the signed version and send it back, let me know. We'll figure out a plan B. Thanks and stay safe.
Marshall

OSWDF (EMDF) Comment Resolution Matrix

Document Number: UCOR-5234/R0	**Document Title:** Quality Assurance Report for Modeling of the Bear Creek Valley Low-level Radioactive Waste Disposal Facilities, Oak Ridge, Tennessee	**Document Dated:** March 2020
Organization/Project: EMDF		**Comment Due Date:** Feb. 26, 2020

Reviewer Initials and Name	Mark Milo (UCOR EMDF Project QA Representative)

Comment No.	Reviewer	Section, Page, Paragraph	Comment/Suggested Change/Rationale	Resolution
1.		Sect. 3.1.1, Discussion of UCOR Form-457	Suggest adding: UCOR FORM-457, Official Application Certification for Production is completed after a technical evaluation of the software application is completed and compliance to SQA requirements are verified. This includes software categorization, verification of model verification and validation (V&V), PC operability testing, and certification for Production. These activities are documented per UCOR's SQA program and are maintained in the Server Asset Management and official Applications (SAMOA) system.	This language has been added to the second paragraph in Sect.3.1.2 (Software Quality Assurance).
2.		Sect. 3.1	For the HELP program, there is a statement in the SAMOA Validation Test Folder that states PC Operability testing was conducted, but there is no documentation included in the folder. Sect. 3.1 states HELP was downloaded from the EPA. However, Form-2174 shows Scientific Software Group as the vendor.	SAMOA was checked to verify that documentation included PC operability testing. HELP was downloaded from the U.S. Army Corps of Engineers Waterways Experiment Station (ref: PA HELP calculation package). Form-2174 for HELP was revised as such.
3.		Sect. 5.1	I do not favor this wording and feel it would be better just to leave it out. Drop a period after …less than Class 3. We do not need to put ourselves in a position to defend it. NQA-1 is listed as a compliance document in our contract. NQA-1 is a national consensus quality standard that UCOR uses in the development and implementation of our QAPP and describes how the (QA) criteria of 10 CFR Part 830. Change Rev Number of QAP-4141 to R6.	This statement was revised per a similar J. Pfeffer comment. (See introduction in Sect. 2.). Revision of QAPP was changed in QA Report, PA, CA, and calc packages, as appropriate.
4.		Sect. 5.1	Subcontractors are required to either perform work under the UCOR QA program or address all elements of 10 CFR Sect. 830.122 and EM-QA-001 applicable to their scope of work in their project/functional specific QA Plans when required by subcontract language. Is this the case for the calcs supplied by DC? The software application requires validation testing when acquired, developed or changed. Do we need to	The calcs developed by DC were developed in accordance with a written DC procedure. UCOR reviewed that procedure and concluded it was functionally equivalent to the UCOR procedure. Additionally, the DC calc packages were reviewed and approved using the UCOR procedure and a cover sheet (as well as a UCOR calculation number) was completed to document this review and approval. RESRAD-OFFSITE is a DOE-developed

Comment No.	Reviewer	Section, Page, Paragraph	Comment/Suggested Change/Rationale	Resolution
			address software validation testing in Paragraph 5? The management assessment was a broader scope than indicated here. It looked at the overall compliance to the SQA program including software for preliminary design.	and maintained model. DC's use of this model is documented in the SAMOA system.
5.		Sect. 5.1	Usually, when you require a vendor or subcontractor to follow a UCOR QA Program, that entails that they follow UCOR procedures. Can we credit that the DC procedure was reviewed by UCOR and determined to meet the UCOR QA Program requirements?	Yes, see above response. However. The DC calc were independently evaluated using the UCOR calc preparation, review, and approval procedure.
6.		Sect. 3.1.1	Section 3.1.1 of the QA Report states that, hardware and operational system's (PC's) operability testing was conducted by running a sample problem and comparing the output from the testing run to the original output file. If this was applied to the modeling discussed in this paragraph, do we want to reiterate the statement in 3.1.1 or reference back to it.	Considering the re-structuring of the QA report, no. It is also documented in the calc packages.
7.		Sect, 5.2	Typo: reqRUSLE2uirements	Corrected.
8.		Sect. 2.6.2	This statement looks like it was picked up from the V&V file for the STOMP in SAMOA. Since we are not certifying STOMP as meeting NQA-1 (how would we really know without an audit or review), I would delete this sentence.	Statement deleted.
9.		Sect. 2.6.3	Does UCOR have and implement these (software problem reporting and corrective actions for software) for the CA/PA? If not or not exactly, we should consider removing or provide specific reference to these.	These are documented in the Jacobs software QA system when an application is acquired. DC only used the RESRAD-OFFSITE model (ad DOE-owned and controlled application). They communicate directly with Dr. Yu at ANL. UCOR issues guidance to subcontractor regarding problem reporting.
10.			Not sure of the timeline for this software (RESRAD). But was decommissioned in SAMOA in Jan. 2017.	Verified that the information on RESRAD-OFFSITE was up-to-date during the Feb. 2020 management assessment.
11.		Sect. 5.3	STOMP is noted in the QA Report applying to a Jacobs calculation but the SAMOA form-452 states that STOMP will be used by Pro2Serve at their offsite office to perform EMDF modeling. It also states that configuration management of STOMP is performed in accordance with Pro2Sreve processes. Section 5.3 of the QA Report states that Jacobs controls the software including configuration management under the Jacobs Procedure FOSOP 202. Form-2174 states STOMP is maintained on Pro2Serve computers.	That entry in SAMOA is correct for Pro2Serve. However, there is another entry in SAMOA for the Jacobs use of STOMP to support the EMDF PA and CA.

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Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5234	**DRAFT REVISION NUMBER:** R0	**DOCUMENT TITLE:** Quality Assurance Report for Modeling of the Bear Creek Valley Low-Level Radioactive Waste Disposal Facilities, Oak Ridge, Tennessee

PREPARER: Marshall Davenport (Name (Print)) — Mail Stop: — 574-3261 (Telephone Number) — 2/19/2020 (Date)

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Steve Kenworthy	UCOR, PA primary author		Review of entire document for completeness, focusing on accurate incorporation of commitments in Key QA Issues identified by LFRG during its review of the initial revision of the PA and the CA.	*Low Level Waste Disposal Facility Federal Review Group (LFRG) Review Report for the Preliminary Disposal Authorization Statement Documentation for the Proposed Environmental Management Disposal Facility at the Oak Ridge Reservation*

Comments Due to Preparer by: 2/26/2020 (Date) **NOTE:**

TO BE COMPLETED BY REVIEWER

REVIEWER'S NAME/ORGANIZATION: Steve Kenworthy

ACCEPTED, NO COMMENTS [X] **COMMENTS ON DOCUMENT [ ]** **COMMENTS ATTACHED [ ]**

COMMENTS RESOLVED: Steve Kenworthy **DATE:** 4-14-20

Form-141 (8/11) Rev. 0
PROC-DE-0705

Document Review Request

TO BE COMPLETED BY DOCUMENT PREPARER		
DOCUMENT NUMBER: UCOR-5234	**DRAFT REVISION NUMBER:** R0	**DOCUMENT TITLE:** Quality Assurance Report for Modeling of the Bear Creek Valley Low-level Radioactive Waste Disposal Facilities, Oak Ridge, Tennessee

PREPARER:	Marshall Davenport		574-3261	2/19/2020
	Name (Print)	**Mail Stop**	**Telephone Number**	**Date**

DISTRIBUTION

REVIEWER	ORGANIZATION (DEPARTMENT/ DISCIPLINE)	MAIL STOP	PURPOSE OR REVIEW: REQUIRED REVIEW	PURPOSE OR REVIEW: ADDITIONAL REVIEW/ INFORMATION
Susan DePaoli	DOE-OREM		Review of entire document for completeness, focusing on accurate incorporation of commitments in Key QA Issues identified by LFRG during its review of the initial revision of the PA and the CA.	*Low Level Waste Disposal Facility Federal Review Group (LFRG) Review Report for the Preliminary Disposal Authorization Statement Documentation for the Proposed Environmental Management Disposal Facility at the Oak Ridge Reservation*

Comments Due to Preparer by:	**2/26/2020** **Date**	**NOTE: Comments were embedded in an electronic copy of the report and a Comment Response Matrix attached to a 3/23/2020 email from S. DePaoli to J.M. Davenport.**

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Document Review Request

TO BE COMPLETED BY REVIEWER		
REVIEWER'S NAME/ORGANIZATION: Susan DePauli		
ACCEPTED, NO COMMENTS [ ]	**COMMENTS ON DOCUMENT [X]**	**COMMENTS ATTACHED [X]**
COMMENTS RESOLVED: Susan DePaoli	**DATE:** 4/15/2020	

APPENDIX D.
PROC-IT-6008 MANAGEMENT ASSESSMENT

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A management assessment of the compliance of the EMDF Project Software with the requirements in the current revision (Revision 3) of PROC-IT-6008, "Application Lifecycle Management" was conducted by UCOR in March 2019 (Management Assessment Number MA-EMDF-19-002), as presented in this appendix. The following were the lines of inquiry:

1. Has the project software been evaluated by Software Quality Assurance Subject Matter Expert for inclusion into the UCOR Application Lifecycle Management Program?
2. Has Form-457, Software Categorization Form, been completed by the Application Owner and approved by the Cyber Security Manager for software identified for inclusion in the UCOR Application Lifecycle Management Program?
3. Has Form-2174, Required Application Identification, been completed by the Application Owner for software identified for inclusion in the UCOR Application Lifecycle Management Program?
4. Has Form-452, Official Application Certification for Production, been completed by the Application Owner and approved by the Cyber Security Manager for software identified for inclusion in the UCOR Application Lifecycle Management Program?
5. Has validation testing been completed for any protected software applications as determined on Form-457, Software Categorization Form for software identified for inclusion in the UCOR Application Lifecycle Management Program?
6. Has a Software Configuration Management (CM) Plan, or approved equivalent CM plan, been developed and approved by the UCOR IT Organization for software identified for inclusion in the UCOR Application Lifecycle Management Program?
7. Do the data and documents stored in SAMOA meet the requirement to undergo an annual review in which the information and uploaded documents are reviewed for factual accuracy?
8. Are exemptions or deviations from PROC-IT-6008, when applicable, documented on Form-452, Official Application Certification for Production for software identified for inclusion in the UCOR Application Lifecycle Management Program?
9. Has Application Owner training, module 31163, been completed by all designated Application Owners?

There were no observations or findings identified during this assessment.

UCOR an AECOM-led partnership with Jacobs — Management Assessment Report — QAS

Assessment OUO: No

Organization: 1FC000 EMDF Project

Assessment Number: MA-EMDF-19-002

Title:
EMDF Project Software Compliance

Responsible Assessor: Hempen-Potter, Traci (H5T)

Date Started: 3/11/2019

Date Completed: 3/20/2019

Driver Type: NA

Site: Site-wide

Focus Area: Quality Assurance

Location: EMDF

Subcontractor: Not Applicable

SCC: Not Applicable

Purpose of Assessment:
Evaluate Environmental Management Disposal Facility (EMDF) project implementation and compliance of UCOR software application control requirements for software being used to support the EMDF project.

Summary of Results:
Evaluation of EMDF project implementation and compliance of UCOR software application control requirements for software being used to support the EMDF project resulted in no observations or findings. Requirements evaluated include: Evaluation of applications by Software Quality Assurance (SQA) Subject Matter Expert (SME); completion of required forms; completion of Validation Testing; approval of Software Configuration Management (CM) Plan; performance of annual review; documentation of exemptions or deviations; and Application Owner Training. All areas of compliance and implementation were satisfactory/applicable.

This Assessment was Performed By

Hempen-Potter, Traci (H5T)

Basis/Requirements for this Assessment

PROC-IT-6008, R3, Application Lifecycle Management

Persons Contacted (by job title)

Software Quality Assurance Subject Matter Expert (SQA SME)

Software Application Owners

Documents Reviewed

DOE O 414.1C, Quality Assurance

UCOR-4141, URS CH2M Oak Ridge LLC Quality Assurance Program Plan Oak Ridge, Tennessee

PROC-IT-6008, Application Lifecycle Management

Form-452, Official Application Certification for Production

Form-457, Software Categorization Form
Form-2174, Required Application Information
Form-3060, Annual Application Review
Server Asset Management and Official Applications System (SAMOA)

Attachments

No Results Returned

Evaluation Checklist

Number:	Basis/Requirement:	Line of Inquiry:
1	PROC-IT-6008, Application Lifecycle Management	Has project software been evaluated by SQA SME for inclusion into the UCOR Application Lifecycle Management Program?

Result: Satisfactory **Closed During Assessment:** No

Comment:
Project software has been evaluated by SQA SME for inclusion into the UCOR Application Lifecycle Management Program. A listing of software being used to support the EMDF project was provided to SQA SME and it was determined that the following applications should be included in, and maintained in accordance with, the UCOR Application Lifecycle Management Program: EMDF Infiltration Calculator, FLOWMASTER, HELP, HELP-CH2M, HELP-P2S, BENTLEY InRoads (Jacobs & CH2M), LANDGEM, Model Scenarios Assumptions Modflow MT3D, MODFLOW-2000, MODPATH, MT3DMS, PA Inventory Data, PATHRAE-RAD, PondPack, RESRAD-EMDF, RUSLE2, SLIDE, SLOPE/W, STOMP, Summary Inventory Data, and TR-55

Requirement(s) Not Met:
No Results Returned

Immediate Action(s) Taken:
No Results Returned

Recommended Corrective Action(s):
No Results Returned

Objective Evidence Attachment(s):
No Results Returned

Number:	Basis/Requirement:	Line of Inquiry:
2	PROC-IT-6008, Application Lifecycle Management	Has Form-457, Software Categorization Form, been completed by the Application Owner and approved by the Cyber Security Manager for software identified for inclusion in the UCOR Application Lifecycle Management Program?

Result: Satisfactory **Closed During Assessment:** No

Comment:
Form-457, Software Categorization Form, has been completed by the Application Owner and approved by the Cyber Security Manager for software identified for inclusion in the UCOR Application Lifecycle Management Program. A search of SAMOA was performed and Form-457 was verified to be on file and complete for the following applications: EMDF Infiltration Calculator, FLOWMASTER, HELP, HELP-CH2M, HELP-P2S, BENTLEY InRoads (Jacobs & CH2M), LANDGEM, Model Scenarios Assumptions Modflow MT3D, MODFLOW-2000, MODPATH, MT3DMS, PA Inventory Data, PATHRAE-RAD, PondPack, RESRAD-EMDF, RUSLE2, SLIDE, SLOPE/W, STOMP, Summary Inventory Data, and TR-55

Requirement(s) Not Met:
No Results Returned

Immediate Action(s) Taken:

No Results Returned

Recommended Corrective Action(s):

No Results Returned

Objective Evidence Attachment(s):

No Results Returned

Number: 3

Basis/Requirement: PROC-IT-6008, Application Lifecycle Management

Line of Inquiry: Has Form-2174, Required Application Information, been completed by the Application Owner for software identified for inclusion in the UCOR Application Lifecycle Management Program?

Result: Satisfactory **Closed During Assessment:** No

Comment:
Form-2174, Required Application Information, has been completed by the Application Owner for software identified for inclusion in the UCOR Application Lifecycle Management Program. A search of SAMOA was performed and Form-2174 was verified to be on file and complete for the following applications: EMDF Infiltration Calculator, FLOWMASTER, HELP, HELP-CH2M, HELP-P2S, BENTLEY InRoads (Jacobs & CH2M), LANDGEM, Model Scenarios Assumptions Modflow MT3D, MODFLOW-2000, MODPATH, MT3DMS, PA Inventory Data, PATHRAE-RAD, PondPack, RESRAD-EMDF, RUSLE2, SLIDE, SLOPE/W, STOMP, Summary Inventory Data, and TR-55

Requirement(s) Not Met:

No Results Returned

Immediate Action(s) Taken:

No Results Returned

Recommended Corrective Action(s):

No Results Returned

Objective Evidence Attachment(s):

No Results Returned

Number: 4

Basis/Requirement: PROC-IT-6008, Application Lifecycle Management

Line of Inquiry: Has Form-452, Official Application Certification for Production, been completed by the Application Owner and approved by the Cyber Security Manager for software identified for inclusion in the UCOR Application Lifecycle Management Program?

Result: Satisfactory **Closed During Assessment:** No

Comment:
Form-452, Official Application Certification for Production, has been completed by the Application Owner and approved by the Cyber Security Manager for software identified for inclusion in the UCOR Application Lifecycle Management Program. A search of SAMOA was performed and Form-452 was verified to be on file and complete for the following applications: EMDF Infiltration Calculator, FLOWMASTER, HELP, HELP-CH2M, HELP-P2S, BENTLEY InRoads (Jacobs & CH2M), LANDGEM, Model Scenarios Assumptions Modflow MT3D, MODFLOW-2000, MODPATH, MT3DMS, PA Inventory Data, PATHRAE-RAD, PondPack, RESRAD-EMDF, RUSLE2, SLIDE, SLOPE/W, STOMP, Summary Inventory Data, and TR-55

Requirement(s) Not Met:

No Results Returned

Immediate Action(s) Taken:

No Results Returned

Recommended Corrective Action(s):

No Results Returned

Objective Evidence Attachment(s):

No Results Returned

Number: 5

Basis/Requirement: PROC-IT-6008, Application Lifecycle Management

Line of Inquiry: Has Validation Testing been completed for any Protected software applications as determined on Form-457, Software Categorization Form for software identified for inclusion in the UCOR Application Lifecycle Management Program?

Result: Satisfactory **Closed During Assessment:** No

Comment:
Validation Testing has been completed for any Protected software applications as determined on Form-457, Software Categorization Form for software identified for inclusion in the UCOR Application Lifecycle Management Program. A search of SAMOA was performed and Validation Testing was verified to be on file and complete for the following applications: EMDF Infiltration Calculator, FLOWMASTER, HELP, HELP-CH2M, HELP-P2S, BENTLEY InRoads (Jacobs & CH2M), LANDGEM, Model Scenarios Assumptions Modflow MT3D, MODFLOW-2000, MODPATH, MT3DMS, PA Inventory Data, PATHRAE-RAD, PondPack, RESRAD-EMDF, RUSLE2, SLIDE, SLOPE/W, STOMP, Summary Inventory Data, and TR-55

Requirement(s) Not Met:

No Results Returned

Immediate Action(s) Taken:

No Results Returned

Recommended Corrective Action(s):

No Results Returned

Objective Evidence Attachment(s):

No Results Returned

Number: 6

Basis/Requirement: PROC-IT-6008, Application Lifecycle Management

Line of Inquiry: Has a Software Configuration Management (CM) Plan, or approved equivalent CM plan, been developed and approved by the UCOR IT Organization for software identified for inclusion in the UCOR Application Lifecycle Management Program?

Result: Satisfactory **Closed During Assessment:** No

Comment:
A Software CM Plan, or approved equivalent CM plan, been developed and approved by the UCOR IT Organization for software identified for inclusion in the UCOR Application Lifecycle Management Program. Form-452 was verified to be on file and approved to include an equivalent that "Configuration Management is performed according to (supplier) processes and has been endorsed by UCOR as equivalent to UCOR processes" for the following applications: EMDF Infiltration Calculator, FLOWMASTER, HELP, HELP-CH2M, HELP-P2S, BENTLEY InRoads (Jacobs & CH2M), LANDGEM, Model Scenarios Assumptions Modflow MT3D, MODFLOW-2000, MODPATH, MT3DMS, PA Inventory Data, PATHRAE-RAD, PondPack, RESRAD-EMDF, RUSLE2, SLIDE, SLOPE/W, STOMP, Summary Inventory Data, and TR-55

Requirement(s) Not Met:

No Results Returned

Immediate Action(s) Taken:

No Results Returned

Recommended Corrective Action(s):

No Results Returned

Objective Evidence Attachment(s):

No Results Returned

Number: 7

Line of Inquiry: Do the data and documents stored in SAMOA meet the requirement

Basis/Requirement: PROC-IT-6008, Application Lifecycle Management

to undergo an annual review in which the information and uploaded documents are reviewed for factual accuracy?

Result: Satisfactory **Closed During Assessment:** No

Comment:
Data and documents stored in SAMOA meet the requirement to undergo an annual review in which the information and uploaded documents are reviewed for factual accuracy. Form-3060, Annual Application Review was reviewed for the following applications and has been completed by the Application Owner and approved by the Cyber Security Manager for the 2019 Annual Review. EMDF Infiltration Calculator, FLOWMASTER, HELP, HELP-CH2M, HELP-P2S, BENTLEY InRoads (Jacobs & CH2M), LANDGEM, Model Scenarios Assumptions Modflow MT3D, MODFLOW-2000, MODPATH, MT3DMS, PA Inventory Data, PATHRAE-RAD, PondPack, RESRAD-EMDF, RUSLE2, SLIDE, SLOPE/W, STOMP, Summary Inventory Data, and TR-55

Requirement(s) Not Met:

No Results Returned

Immediate Action(s) Taken:

No Results Returned

Recommended Corrective Action(s):

No Results Returned

Objective Evidence Attachment(s):

No Results Returned

Number: 8

Basis/Requirement: PROC-IT-6008, Application Lifecycle Management

Line of Inquiry: Are exemptions or deviations from PROC-IT-6008, when applicable, documented on Form-452, Official Application Certification for Production for software identified for inclusion in the UCOR Application Lifecycle Management Program?

Result: Satisfactory **Closed During Assessment:** No

Comment:
Exemptions or deviations from PROC-IT-6008, when applicable, are documented on Form-452, Official Application Certification for Production for software identified for inclusion in the UCOR Application Lifecycle Management Program. Form-452 was reviewed for the included applications and no exemptions or deviations were noted. Verification was received from SQA SME that there were no exemptions or deviations granted for the following applications: EMDF Infiltration Calculator, FLOWMASTER, HELP, HELP-CH2M, HELP-P2S, BENTLEY InRoads (Jacobs & CH2M), LANDGEM, Model Scenarios Assumptions Modflow MT3D, MODFLOW-2000, MODPATH, MT3DMS, PA Inventory Data, PATHRAE-RAD, PondPack, RESRAD-EMDF, RUSLE2, SLIDE, SLOPE/W, STOMP, Summary Inventory Data, and TR-55

Requirement(s) Not Met:

No Results Returned

Immediate Action(s) Taken:

No Results Returned

Recommended Corrective Action(s):

No Results Returned

Objective Evidence Attachment(s):

No Results Returned

Number: 9

Basis/Requirement: PROC-IT-6008, Application Lifecycle Management

Line of Inquiry: Has Application Owner training, module 31163, been completed by all designated Application Owners?

Result: Satisfactory **Closed During Assessment:** No

Comment:
Application Owner training, module 31163, been completed by all designated Application Owners. Forms-452, 457, 2174, and 3060 were reviewed for Application Owner designations and LEARN training records were reviewed to verify training module completion.

Requirement(s) Not Met:

No Results Returned

Immediate Action(s) Taken:

No Results Returned

Recommended Corrective Action(s):

No Results Returned

Objective Evidence Attachment(s):

No Results Returned

Approvals / Concurrence

Current State:	Responsible Assessor:	Assessor Approval:	
Complete	Hempen-Potter, Traci (H5T)	Approved 3/19/2019 6:02:44 PM	
WCO Review Required:	**Waste Certification Official:**	**WCO Concurrence:**	**WCO Comments:**
No			
Organization Manager:	**Organization Manager Approval:**	**Organization Manager Comments:**	
Pfeffer, Julie (JP2)	Approved 3/20/2019 6:52:32 AM		

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