



Department of Energy
Washington, DC 20585

August 26, 2019

The Honorable Andrew R. Wheeler
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

Dear Mr. Administrator:

Enclosed please find the "Supplemental Response Regarding Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Dispute" dated August 26, 2019, which memorializes the Department's analysis of the current dispute with EPA Region 4 concerning regulation of wastewater effluents containing source, special nuclear and byproduct materials at the Department's Oak Ridge, Tennessee reservation. We anticipate that this will be the final written submission to be made by the Department before the currently-scheduled September 6, 2019, meeting.

I hope this submission will be helpful to you and your colleagues as you consider the merits of the issues presented by this dispute.

Sincerely,

A handwritten signature in blue ink that reads "Bill Cooper".

Bill Cooper
General Counsel

Enclosure

cc: Under Secretary for Science Dabbar
Acting Assistant Secretary White





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Washington, DC 20585

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MEMORANDUM

Supplemental Response Regarding Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Dispute

This dispute concerns the Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee, regarding the regulation of wastewater discharges of Atomic Energy Act (AEA) source, byproduct, and special nuclear materials (AEA-regulated materials) into surface water. The Department of Energy (DOE) submits this Supplemental Response to its April 5, 2019 and June 21, 2019 letters to the Administrator of the Environmental Protection Agency (EPA) and in response to the Region 4 Administrator's letter of March 21, 2019.

Summary

DOE regulates source, byproduct, and special nuclear materials at its sites pursuant to its authority under the AEA, and DOE sites operate pursuant to requirements contained in DOE Directives designed to ensure protection of human health and the environment.¹ DOE sites, such as the Oak Ridge Reservation (ORR), are subject to requirements flowing from both the AEA and CERCLA, and these statutes are complementary. The issue in the present dispute is the proper exercise of EPA's CERCLA section 120 remedial action selection authority, as it specifically relates to wastewater discharges of AEA-regulated materials at certain ORR facilities.

In this matter, Region 4 proffers that effluent limits derived from Clean Water Act (CWA)-based regulations are relevant and appropriate requirements for AEA-regulated materials. As EPA agrees, unlike other substances that are subject to regulation under the CWA, EPA's own regulations implementing the CWA prohibit EPA from regulating AEA-regulated materials. This jurisdictional bar is set forth in the CWA's regulatory definition of "pollutant" at 40 C.F.R. § 122.2 which explicitly excludes materials "regulated under the Atomic Energy Act," and the Supreme Court affirmed this jurisdictional bar in *Train v. Colorado Public Interest Research Group*, 426 U.S. 1 (1976). As explained below, nothing in CERCLA provides EPA with authority to regulate materials that are otherwise barred from the CWA, and Region 4 cannot sidestep a statutory bar to its authority by characterizing the prohibition simply as a "miss" on "jurisdictional prerequisites."² In addition to violating the CWA, if Region 4's attempt to impose CWA-based standards on AEA-regulated materials were sanctioned by the Administrator, such

¹ See Atomic Energy Act of 1954, 42 U.S.C. § 2011 *et seq.*

² Letter from Mary Walker, Acting Regional Administrator of the Environmental Protection Agency Region 4, to John Mullis II, Manager, Oak Ridge Office of Environmental Management (Mar. 21, 2019) (Region 4 Letter) at 6.

action would also contravene the requirements of the Administrative Procedure Act (APA) since it would result in establishment of a legislative rule without complying with the APA's notice and comment requirements.

Assuming, for the sake of argument, that Region 4 could overcome the CWA's jurisdictional bar, CERCLA requires applicable or relevant and appropriate requirements (ARARs) to be promulgated.³ Because the CWA does not permit the regulation of AEA-regulated materials, there are no promulgated CWA-based standards for AEA-regulated materials that Region 4 can apply. Therefore, CWA-based standards for AEA-regulated materials fail to meet the very definition of an ARAR. In addition, they fail to meet CERCLA section 121(d)(2)(A)'s requirement that ARARs be "relevant and appropriate under the circumstances" and the factors established in CERCLA's implementing regulations at 40 C.F.R. § 300.400(g) for determining relevance and appropriateness.

Region 4's attempt to impose CWA-based standards also violates the processes set forth in the CWA and its implementing regulations for establishing technology-based and water quality-based effluent limits, and the attempt results in unreasonable limits.

DOE disputes Region 4's attempt to impose CWA-based standards on AEA-regulated materials because it contravenes the CWA, Supreme Court precedent, the APA and CERCLA itself. DOE does not dispute CERCLA's requirement that remedial actions be protective of human health and the environment and that they comply with ARARs. As explained below, the relevant and appropriate ARARs for wastewater discharges of AEA-regulated materials in this matter are specified Nuclear Regulatory Commission (NRC) standards. Attainment of these NRC standards and implementation of the requirements in DOE's Directives are protective of human health and the environment and are consistent with recommendations by expert scientific bodies on radiation protection.

Moreover, DOE's historical performance throughout Region 4 demonstrates the protectiveness of DOE's operations. Because the NRC standards are available ARARs and application of these ARARs along with implementation of DOE's Directives result in protection of human health and the environment, there is no basis for Region 4 to resort to application of the 10^{-4} to 10^{-6} risk range. However, even if this risk range were to be applied, DOE's operations, when using reasonable yet highly conservative assumptions, are within or more protective than the risk range.

I. Background

I. A. ORR has diverse missions and the existing and proposed facilities are necessary to support DOE's cleanup, science, and defense missions.

ORR is a DOE-controlled site that supports a diverse set of DOE activities ranging from weapons component production to scientific research and operation of the world's most powerful supercomputer. DOE's Office of Environmental Management (EM) is responsible for the cleanup of waste associated with nuclear weapons production and government-sponsored nuclear

³ See 42 U.S.C. § 9621(d)(2)(A); 40 C.F.R. § 300.5.

energy research, including ORR's historical activities, such as uranium enrichment for nuclear weapons and processing of source and special nuclear materials. ORR is listed on the National Priorities List, and EM's ORR cleanup activities are subject to CERCLA, consistent with the requirements of the *Federal Facility Agreement for the Oak Ridge Reservation* (FFA) to which DOE, Region 4, and the Tennessee Department of Environment and Conservation (TDEC) are parties.⁴

To facilitate the cleanup of ORR, the FFA parties agreed to DOE's construction and operation of an onsite facility for CERCLA remedial waste called the Environmental Management Waste Management Facility (EMWMF or the existing facility). See Appendix A, Figure 1. The authorized disposal capacity of the existing facility is 2.2 million cubic yards, and it is projected to reach its maximum capacity in the mid-2020s.⁵ In order to address forecasted waste generation from the remainder of ORR cleanup responsibilities, coupled with the existing facility's capacity constraints, additional onsite disposal capacity referred to as the Environmental Management Disposal Facility (EMDF or the proposed facility) is needed. While the current dispute centers on DOE's proposed and existing facilities, resolution of the present matter will have implications for other remediation and site reuse activities at ORR and could have implications for other DOE sites in Region 4 and nationwide.

I. B. The AEA authorizes DOE to establish radiation protection requirements, and CERCLA complements DOE's requirements.

DOE facilities that handle source, byproduct, or special nuclear materials, including the ORR facilities, operate under a comprehensive DOE Directives system designed to protect human health and the environment, pursuant to DOE's broad AEA authority. The AEA is the fundamental law governing the regulation of military and civilian nuclear materials. The AEA authorizes DOE to "provide for safe storage, processing, transportation, and disposal of hazardous waste (including radioactive waste) resulting from nuclear materials production, weapons production and surveillance programs, and naval nuclear propulsion programs."⁶ The AEA vests DOE and NRC with responsibility for regulating source, byproduct, and special nuclear materials.⁷ On the ORR, all nuclear materials covered by the CERCLA cleanup are either source, byproduct, or special nuclear materials and therefore are subject to DOE's AEA authority.

⁴ See *Federal Facility Agreement Under Section 120 of CERCLA and Sections 3008(h) and 6001 of RCRA*, Docket No. 89-04-FF (1991) (FFA).

⁵ See *Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal*, DOE/OR/01-2535&D5 (2017) (RI/FS) at ES-2, 1-3.

⁶ 42 U.S.C. § 2121(a)(3).

⁷ See 42 U.S.C. § 2201(b). The AEA established and vested the Atomic Energy Commission (AEC) with the authority to implement the AEA. Today, generally speaking, NRC is responsible for what were the AEC's commercial licensing and related regulatory functions, and DOE is responsible for what were the other functions of the AEC, including regulation of defense and non-defense nuclear facilities, and conduct of defense activities, and performance of other federal functions, including scientific research. EPA is authorized to establish "generally applicable environmental standards for the protection of the general environment from radioactive material . . . in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material." *Reorganization Plan No. 3 of 1970*, 35 Fed. Reg. 15623, 15624 (Oct. 6, 1970).

The AEA authorizes DOE and NRC to “establish by rule, regulation, or order, such standards and instructions to govern the possession and use of special nuclear material, source material, and byproduct material as [they] may deem necessary or desirable to promote the common defense and security or to protect health or to minimize danger to life or property.”⁸ The AEA also authorizes DOE and NRC to “prescribe such regulations or orders as [they] may deem necessary . . . to govern any activity authorized pursuant to this [Act], including standards and restrictions governing the design, location, and operation of facilities used in the conduct of such activity, in order to protect health and to minimize danger to life or property.”⁹ These and other sections of the AEA authorize DOE to establish requirements, including radiation protection standards, for DOE’s operations.

Consistent with its AEA authority, DOE has developed a comprehensive regulatory program through its Directives system that sets forth requirements, responsibilities, and procedures for Departmental elements and contractors. With respect to AEA-regulated materials, DOE Directives include limits on radiation exposure, procedures for management of radioactive waste materials, and monitoring and reporting requirements.¹⁰ These requirements are designed to ensure that the public, workers, and the environment are not exposed to unsafe levels of radioactivity. DOE’s radiation requirements are consistent with or more protective than recommendations of national and international scientific advisory bodies specializing in radiation protection.¹¹

DOE Directives require that DOE operations limit radiological exposures to the public and the environment so that resultant doses meet specific, safe, established requirements and, in addition, be “as low as reasonably achievable” (ALARA). Specifically, DOE Order 458.1, *Radiation Protection of the Public and the Environment*, establishes requirements to protect the public and the environment against undue risk from radiation associated with radiological activities conducted under the control of DOE.¹² DOE Order 458.1 limits a member of the public’s annual dose to 100 mrem from all sources and pathways, excluding doses such as from background and medical exposures.¹³ Additionally, to ensure that this public protection limit is met, DOE Order 458.1 establishes dose constraints for releases from single sources or pathways. In the case of the management, storage, and disposal of radioactive waste at DOE sites, DOE Order 458.1 requires that activities be conducted so that radiation exposure to members of the public does not

⁸ 42 U.S.C. § 2201(b).

⁹ 42 U.S.C. § 2201(i)(3).

¹⁰ See *Radiation Protection of the Public and the Environment*, DOE Order 458.1, Chg 3 (2013) (DOE Order 458.1); *Radioactive Waste Management*, DOE Order 435.1, Chg. 1 (2001) (DOE Order 435.1); *Radioactive Waste Management Manual*, DOE Manual 435.1-1 Chg 2 (2011) (DOE Manual 435.1-1); *Environment, Safety and Health Reporting*, DOE Order 231.1B, Chg 1 (2012). See also DOE Directives, available at: <https://www.directives.doe.gov/>.

¹¹ These scientific bodies include: International Commission on Radiological Protection (ICRP), United Nations Scientific Committee on the Effects of Ionizing Radiation (UNSCEAR), National Council on Radiation Protection and Measurements (NCRP), and National Research Council’s Committee on the Biological Effects of Ionizing Radiation.

¹² See DOE Order 458.1 at 1.a.

¹³ See *id.* at 4.b(1)(a).

result in a total effective dose greater than 25 mrem in a year from exposure pathways and radiation sources associated with the waste.¹⁴

In addition to the annual 25 mrem dose constraint for waste management, DOE Order 458.1 requires application of Best Available Technology (BAT) if discharges would exceed established standards set forth in DOE's *Derived Concentration Technical Standard*, DOE-STD-1196-2011.¹⁵ DOE also requires all radiological activities, including those at disposal sites, to comply with ALARA requirements to further reduce dose.¹⁶ ALARA is not a specific release or dose limit but a process that has the goal of optimizing control and management of releases of radioactive materials to the environment and doses so that they are as far below the applicable limits of DOE's Order 458.1 as reasonably achievable.¹⁷ DOE requires its contractors, as set forth in contractor requirements documents (CRD), to establish and implement programs to comply with DOE Orders.¹⁸

DOE's requirements and specific performance objectives for siting, design, operation, maintenance, and closure of waste disposal facilities are set forth in DOE Order 435.1, *Radioactive Waste Management*, and DOE Manual 435.1-1, *Radioactive Waste Management Manual*. The Low-Level Waste Disposal Facility Federal Review Group (LFRG) is a DOE advisory body composed of technical experts that reviews site-specific documentation to ensure radioactive waste disposal facilities meet the requirements in DOE Manual 435.1-1 and are protective of the public and the environment in accordance with DOE Order 435.1.¹⁹

Compliance with DOE Directives' radiation requirements is verified and demonstrated through a combination of measurements, monitoring, and calculations to evaluate doses, and the results are reported in Annual Site Environmental Reports (ASERs). DOE Order 231.1B requires publication of an ASER that describes site environmental performance including discharges of radioactive materials to the environment and the total effective dose to a representative person or the maximally exposed member of the public.²⁰ Data specific to ORR activities has been published annually since 1971.²¹ An analysis of the protectiveness of the DOE Directives system as documented in the ASER reports is provided below in Section II. E.

DOE has decades of experience with CERCLA, as does EPA, because both agencies implement the statute.²² Executive Order 12580 delegates several of the President's CERCLA authorities to

¹⁴ See *id.* at 4.h(1)(a); 4.h(1)(c).

¹⁵ See *id.* at 4.g(5)(a). See also 4.g(5) (requirements for BAT).

¹⁶ See *id.* at 4.b(1)(b); 4(d); 4.h(1)(a); 4.h(1)(c); Attachment 2.

¹⁷ See *id.* at Attachment 2.

¹⁸ See, e.g., DOE Order 458.1 at Attachment 1; DOE Order 435.1 at Attachment 1.

¹⁹ See DOE Manual 435.1-1 at 2.E(1)(a).

²⁰ See *Environment, Safety and Health Reporting*, DOE Order 231.1B, Chg 1 (2012) (DOE Order 231.1B) at 4(a); Attachment 2 at 1.

²¹ See ORR ASERs, available at <https://doeic.science.energy.gov/ASER/>.

²² DOE's authorities under CERCLA include 42 U.S.C. §§ 9604(a), (b) and (c)(4) (authority to respond to hazardous substance releases and to select and implement removal and remedial actions), 9613(k) (authority to create administrative records for use in selection of a response action), 9617(a) and (c) (authority to prepare and submit to the public for review a proposed plan for remedial actions), 9619 (authority to indemnify a contractor taking a response action), and 9621 (responsibility to select appropriate remedial actions that attain a degree of

DOE, including evaluating, selecting, and implementing the response action that DOE determines is appropriate.²³ DOE exercises the President's delegated authority consistent with the requirements of CERCLA section 120 and the FFA, which provides that if the parties are unable to reach agreement, the Administrator shall select the remedy.²⁴

There is nothing in CERCLA's text or legislative history that indicates that CERCLA displaces or supersedes DOE's existing authorities under the AEA with respect to AEA-regulated radionuclides. In fact, maintaining the applicability and scope of other existing regulatory authorities seemed to be an intended result of CERCLA, including the 1986 amendments that reauthorized CERCLA. As Senator Stafford, the chairman of the Committee on Environment and Public Works and the floor manager of the bill upon which the CERCLA amendments were largely based, put it, "[t]he statute does not and is not intended to replace other laws which provide the regulatory foundations to address a variety of these toxic chemical concerns. The existing statute and this reauthorization are structured to *complement* these laws. It is intended to provide the authority and resources to clean up hazardous substance releases" (emphasis added).²⁵ CERCLA itself does not establish cleanup standards for any waste stream. Indeed, the text of CERCLA section 121(d) directs the choice of remedies to either applicable or other previously established analogous regulatory standards.

II. Legal Analysis

II. A. Region 4's CWA-based ARARs violate the CWA because AEA-regulated materials are barred from EPA's regulation under the CWA.

EPA has long-recognized that it is barred from regulating AEA materials under the CWA.²⁶ AEA-regulated materials are exempted from the definition of "pollutant" in EPA's National Pollutant Discharge Elimination System (NPDES) regulation which states, "[p]ollutant means . . . radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 *et seq.*)),²⁷" and the regulations include a note stating "[r]adioactive materials covered by the Atomic Energy Act are those encompassed in its definition of source, byproduct, or special nuclear materials."²⁷

The Supreme Court upheld EPA's lack of jurisdiction over AEA-regulated materials under the CWA in *Train v. Colorado Public Interest Research Group*.²⁸ In *Train*, Colorado-based organizations and residents challenged the EPA Administrator's failure to set standards under the Federal Water Pollution Control Act (FWPCA, commonly referred to as the CWA) governing the discharge of AEA-regulated materials. Addressing the issue of whether source, byproduct,

cleanup which assures protection of human health and the environment.). DOE's authorities under CERCLA's implementing regulations include taking all response actions at DOE sites, 40 C.F.R. §300.120(c)(1); and providing expertise in instances of radiological hazard emergencies, 40 C.F.R. § 300.175(b)(5). *See also* E.O. 12580, § 2(d).

²³ *See* E.O. 12580 § 2(d) (delegating certain CERCLA functions vested in President to DOE); 42 U.S.C. § 9621.

²⁴ *See* 42 U.S.C. § 9620(e)(4)(A); FFA at 35.

²⁵ S. Rep. No. 99-11 at 3 (1985); 131 Cong. Rec. S11563-02 (Sept. 17, 1985) (statement of Sen. Stafford).

²⁶ *See* 38 Fed. Reg. 1362, 1363 (Jan. 11, 1973); 38 Fed. Reg. 13528, 13529-30 (May 22, 1973).

²⁷ 40 C.F.R. § 122.2.

²⁸ *See* 426 U.S. 1, 4, 25 (1976).

and special nuclear materials are “pollutants” within the meaning of the FWPCA, the Court concluded that Congress had determined explicitly to interdict the authority of EPA to prescribe water pollution control standards for discharges of source, byproduct, and special nuclear materials regulated under the AEA and “that the [DOE and NRC] was to retain full authority to regulate the materials covered by the AEA, unaltered by the exercise of regulatory authority by any agency under the [CWA].”²⁹ The Court reasoned that “[t]o have included these materials under the [CWA] would have marked a significant alteration of the pervasive regulatory scheme embodied in the AEA,” and that “the EPA Administrator has acted in accordance with his statutory mandate in declining to regulate the discharge of such materials.”³⁰

II. B. CERCLA does not authorize EPA to establish CWA-based standards for AEA-regulated materials.

At the time CERCLA was enacted, EPA regulations excluded AEA-regulated materials from the CWA statutory term “pollutant” and *Train* had confirmed that statutory interpretation. Accordingly, Region 4’s use of CERCLA to impose CWA-based limits on AEA-regulated materials would be invalid as “in excess of [EPA’s] statutory jurisdiction, authority, [and] limitations.”³¹ To determine EPA’s jurisdictional bounds, its CERCLA authority “must be read in . . . context and with a view to its place in the overall statutory scheme” as “the meaning of one statute may be affected by other Acts, particularly where Congress has spoken . . . more specifically to the topic at hand.”³² CERCLA contains no express statutory provision, and Region 4 provides no legislative history or other support reflecting Congressional intent to repeal or amend the established AEA and CWA regulatory schemes, which specifically address the topic at hand, nor to authorize EPA’s jurisdictional assertion of CWA-based requirements under CERCLA that would otherwise be prohibited. As the Supreme Court has long held, it is a “cardinal rule . . . that repeals by implication are not favored,”³³ and “implied amendments are no more favored than implied repeals.”³⁴

While “agency determinations within the scope of delegated authority are entitled to deference, it is fundamental ‘that an agency may not bootstrap itself into an area in which it has no jurisdiction.’”³⁵ In this instance, Region 4 attempts, through expansion of its CERCLA regulatory authority, to “bootstrap” CWA-based standards onto AEA-regulated materials for which it has no jurisdiction. It does so relying on decades-old, EPA-issued guidance to EPA staff related to determining ARARs for the clean-up of radionuclides.³⁶ Nothing in the 1997 Guidance or elsewhere provides an independent legal basis for EPA to derive CWA-based

²⁹ *Id.* at 15.

³⁰ *Id.* at 24-25. The two facilities at issue in *Train* were a nuclear power reactor of the type now regulated by NRC and a defense facility, like ORR, operated for defense purposes.

³¹ 5 U.S.C. § 706(2)(C).

³² *FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 133 (2000).

³³ *Morton v. Mancari*, 417 U.S. 535, 549 (1974) (quoting *Posadas v. Nat’l City Bank*, U.S. 497, 503 (1936)).

³⁴ *Nat’l Ass’n of Home Builders v. Defenders of Wildlife*, 551 U.S. 644, 664 n.8 (2007); accord *Epic Sys. Corp. v. Lewis*, 138 S. Ct. 1612, 1624 (2018).

³⁵ *Fed. Maritime Comm’n v. Seatrain Lines, Inc.*, 411 U.S. 726, 745 (1973).

³⁶ See *Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination*, OSWER Dir 9200.4-18, Aug. 22, 1997 (1997 Guidance).

effluent limits for AEA-regulated materials. The 1997 Guidance merely “recognizes that federal ambient water quality criteria . . . or state water quality standards are potential ARARs for CERCLA discharges to surface water” and says nothing explicit regarding AEA-regulated materials.³⁷ Moreover the 1997 Guidance, itself, acknowledges that “it cannot impose legally-binding requirements on EPA, States, or the regulated community.”³⁸ Furthermore, Region 4 has failed to provide any examples where it has regulated the AEA-regulated materials in question under a CWA-based standard.

II. C. Region 4’s approach, if supported, would be an unauthorized executive amendment of the CWA’s definition of pollutant and contravene the APA by purporting to amend a legislative rule without notice and comment.

As recognized by the Supreme Court in *Train*, the CWA’s jurisdictional term “pollutant” excludes source, byproduct, and special nuclear materials. Were the Administrator to sanction the use of CWA-based effluent limits as ARARs governing the discharge of AEA-regulated materials, this would amount to an unlawful amendment of a statute by executive fiat.

Even if the term “pollutant” appeared solely in EPA’s regulations, use of CWA-based effluent limits would contravene the APA by altering a legislative rule without observing notice and comment procedures required by the APA at 5 U.S.C. § 553(b)(A). Since 1973, EPA’s regulations have consistently interpreted the CWA to exempt AEA-regulated materials.³⁹ “Each time the EPA has revised and repromulgated the CWA’s implementing regulations, the EPA has clearly stated that materials regulated under the AEA . . . are excluded from the CWA’s definition of ‘pollutant.’”⁴⁰ EPA’s current NPDES regulations, issued through the notice and comment process, have the “force and effect of law” and are a “legislative” rule.⁴¹ The APA mandates that agencies use the same procedure when they amend or repeal a rule as they used to issue the rule in the first instance.⁴² Here, pursuant to some unidentified CERCLA authority, Region 4 proposes to expand the reach of “pollutant,” without resort to the same APA notice and comment procedure that was necessary to establish the existing rule, and apply NPDES regulations and TN Water Quality Standards to AEA-regulated materials.

Of additional concern is the Regional Administrator’s acknowledgement that resolution of the ORR matter will inform resolution of similar matters across Region 4 – demonstrating the desire to apply its legislative rule region-wide.⁴³ If the Administrator endorses Region 4’s position, the

³⁷ *Id.* at 8.

³⁸ *Id.* at 2 and Attachment A.

³⁹ See, e.g., 38 Fed. Reg. 13528, 13529-30 (May, 22, 1973); 45 Fed. Reg. 33290, 33422 (May 19, 1980); 48 Fed. Reg. 14146, 14156 (Apr. 1, 1983).

⁴⁰ *Waste Action Project v. Dawn Min. Corp.*, 137 F. 3d 1426, 1430 (9th Cir. 1998).

⁴¹ See 5 U.S.C. § 551(4); *Chrysler Corp. v. Brown*, 441 U.S. 281, 297 (1979).

⁴² See 5 U.S.C. §§ 551(5), 553; *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009) (the APA “make[s] no distinction . . . between initial agency action and subsequent agency action undoing or revising that action”); *Shalala v. Guernsey Memorial Hosp.*, 514 U.S. 87, 100 (1995) (“APA rulemaking would . . . be required if [an Agency] adopted a new position inconsistent with any . . . existing regulations.”).

⁴³ See Region 4 Letter at 5 n.23 (“There is currently an informal dispute regarding waste water discharges at ETTP Zone 2, and EPA expects that the outcome of this dispute will inform the path forward for resolution at that site as well.”). See also *id.* at 9 n.45 (“At Paducah Gaseous Diffusion Plant (PDGP) DOE has identified the NRC

action will constitute a final, binding decision that would expand the scope of the CWA beyond EPA's congressionally-authorized jurisdiction and establish new, substantive requirements on DOE facilities contrary to the APA's notice and comment requirement.

II. D. 1. Even if Region 4 could properly rely on CWA-based effluent limits as ARARs, there are no CWA effluent limits that can be borrowed as an ARAR because none have been promulgated related to AEA-regulated materials.

Region 4's approach requires contortions to create AEA-regulated material-specific NPDES requirements and TN Water Quality Standards where they do not otherwise exist. They do not exist for good reason. EPA has not promulgated CWA-based effluent limits for AEA-regulated materials because AEA-regulated materials are beyond the CWA's jurisdictional reach.⁴⁴

CERCLA section 121(d) charges the agency selecting a remedy to identify and implement legally applicable or relevant and appropriate requirements. Relevant and appropriate requirements, as defined in CERCLA's implementing regulations at 40 C.F.R. § 300.5, means requirements that are "promulgated under federal environmental or state environmental or facility siting laws." Region 4 asserts that CWA NPDES technology-based regulations and TN Water Quality Standards are relevant and appropriate ARARs. However, Region 4 fails to identify any *promulgated* NPDES or TN Water Quality Standards-based effluent limits for AEA-regulated materials. Instead, Region 4 acknowledges that it would create surrogate limits for the AEA-regulated materials for purposes of the present dispute.⁴⁵ As such, the CWA-based effluent limits that Region 4 identifies as ARARs fail to meet the very definition of ARARs.

II. D. 2. Even if the proposed CWA-based effluent limits had been promulgated, the CWA-based standards upon which EPA seeks to rely do not qualify as ARARs under CERCLA and the factors outlined in CERCLA's implementing regulations.

Even assuming *arguendo* that Region 4 had authority under the CWA to regulate AEA materials and that promulgated effluent limits for AEA-regulated materials existed, section 121(d) of CERCLA requires an evaluation of potential ARARs to determine that they are "relevant and appropriate under the circumstances."⁴⁶ As explained in EPA's *CERCLA/Superfund Orientation*

100mrem/yr dose-based limit as an ARAR that would apply to discharges of radionuclides in wastewater and which EPA has stated is not protective. As a result, there is also a current FFA formal dispute at the PGDP facility.").

⁴⁴ EPA failed to list the CWA-based standards that Region 4 now asserts as ARARs in its 1989 ARAR guidance listing "[e]xisting EPA regulations that may be applicable or relevant and appropriate to CERCLA responses at radioactively contaminated sites." *CERCLA Compliance with Other Laws Manual: Part II. Clean Air Act and Other Environmental Statutes and State Requirements*, OSWER Directive 9234.1-02, Aug. 1989 (CERCLA Compliance with Other Laws Manual) at 5-4 – 5-10.

⁴⁵ See Region 4 Letter at 8. See also R4 Assumptions, Comments, and Recommendations document (draft), Oct. 24, 2018 (Region 4 Assumptions Document) (Appendix B) at 1, Table 1. (A copy of the Region 4 Assumptions Document is included as Appendix B.)

⁴⁶ 42 U.S.C. § 9621(d).

Manual, the procedure for determining whether a requirement is relevant and appropriate is a two-step process.⁴⁷ First the decisionmaker must determine relevance, whether the requirement “addresses problems or situations sufficiently similar to the circumstances of the proposed response action.”⁴⁸ Then the decisionmaker must determine appropriateness, whether the requirement would be “well-suited to the conditions of the site.”⁴⁹ A requirement must be both relevant and appropriate under the circumstances to be an ARAR.⁵⁰ The CERCLA implementing regulations establish eight factors that “shall be examined, where pertinent,” in evaluating the relevance and appropriateness of a potential ARAR.⁵¹

Region 4 dismisses as “not ‘pertinent’” those factors that most clearly expose its overreach and undermine its assertion that CWA-based ARARs are relevant and appropriate in the present matter.⁵² Specifically, Region 4 disregarded factors (vi) and (vii) concerning “the type of place regulated” and the “type . . . of facility regulated,” which are germane to this matter.⁵³ ORR is a DOE-controlled site with limited public access, and activities on the ORR, including the existing and proposed facilities, are subject to the requirements of DOE Directives, pursuant to DOE’s AEA authority. Region 4 also disregarded factor (v), whether there are “any . . . exemptions of the requirement and their availability under the circumstances.”⁵⁴ The CWA exempts AEA-regulated materials, therefore an exemption is available under the circumstances.

As to the other five factors, Region 4 fails to offer a sufficient examination of the factors or how they support its conclusion that CWA-based requirements specific to AEA-regulated materials are both addressing situations sufficiently similar and well-suited to the ORR site. Instead, Region 4 lists all the factors in a footnote and summarily concludes that CWA-based derived effluent limits are relevant and appropriate, because “(1) they address ‘point source’ discharges into surface water; (2) their purpose is to achieve the protection of surface waters; and (3) CERCLA also aims to address and prevent releases of hazardous substances . . . in order to ensure protection of human health and the environment.”⁵⁵ This recitation, if read in a way most favorable to Region 4, addresses only three of the eight factors and only considers the issue of relevance. Region 4 provides no support for a determination that the CWA-based ARARs are appropriate, nor could it credibly, given the CWA’s exemption of AEA-regulated materials and the conditions of the ORR. Under the circumstances of this matter, examination of Region 4’s proposed CWA-based requirements against the regulatory factors does not support a conclusion that they are relevant and appropriate.⁵⁶

⁴⁷ See *CERCLA/SUPERFUND Orientation Manual*, EPA/542/R-92/005, Oct. 1992 at XII-2.

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ See *id.* (emphasis in original).

⁵¹ 40 C.F.R. § 300.400(g)(2).

⁵² See Region 4 Letter at 6 n.29.

⁵³ 40 C.F.R. § 300.400(g)(2). See also Region 4 Letter at 6 n.29.

⁵⁴ *Id.*

⁵⁵ Region 4 Letter at 6.

⁵⁶ Even if the CWA-based effluent limits were determined to be ARARs, they should be waived in this matter. 42 U.S.C. § 9621(d)(4).

II. D. 3. Region 4's proposed CWA-based effluent limits are fundamentally flawed because the CWA process for establishing the TBELs and WQBELs that constitute the proposed CWA-based effluent limits has not been followed.

Region 4 proposes the creation of daily effluent limits based on NPDES regulations and TN Water Quality Standards requirements. Since the AEA-regulated materials at issue are exempt under the CWA, there are no promulgated “technology-based effluent limits” (TBELs) or “water quality-based effluent limits” (WQBELs) that Region 4 can rely on, so Region 4 attempts to create them for the present matter.⁵⁷ During formal dispute resolution proceedings, Region 4 provided a table containing its “preliminary effluent limitations” based on the more stringent of its TBEL- or WQBEL-derived effluent limits for AEA-regulated materials.⁵⁸ The table and Region 4’s associated assumptions are included as Appendix B. These limits were derived using the approach described in the Region 4 Letter, and DOE anticipates that these limits and their associated technology requirements, or something similar to them, would constitute Region 4’s proposed remedy.

TBELs

When creating TBELs on a case-by-case basis pursuant to section 402(a)(1) of the CWA, EPA must consider the factors set out in 40 C.F.R. § 125.3(c)(2) and 40 C.F.R. § 125.3(d)(3) which include: the appropriate technology, any unique factors, the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, the cost of achieving such effluent reduction, and non-water quality environmental impacts including energy requirements. The resulting case-by-case TBELs should reflect the best professional judgment (BPJ) of EPA by taking into account the same factors EPA has used in promulgating, through notice and comment rulemaking, over 50 national effluent guideline regulations.

In this matter, Region 4 did not in its letter or in Appendix B provide a transparent description of the basis for its BPJ, its derivation of the case-by-case effluent limits, or how the limits comply with the factors set forth in EPA’s regulations. Furthermore, Region 4 stated that “[a] better estimate of removal efficiencies should be determined based on a treatability study.”⁵⁹ The lack of promulgated TBELs for source, special nuclear, and byproduct materials, and Region 4’s failure to describe its compliance with statutory factors as well as its potential resort to undertaking a treatability study (which would impose schedule delays and costs on the cleanup mission) are further evidence of the impropriety of the CWA-based approach.

⁵⁷ Region 4 Letter at 7. The TBELs are derived from CWA § 301 NPDES permit requirements and the WQBELs are derived from TN Water Quality Standards at *Rules of the Tennessee Department of Environment and Conservation*, Chapter 0400-40-03.

⁵⁸ Region 4 Assumptions Document (Appendix B) at Table 1.

⁵⁹ Region 4 Assumptions Document (Appendix B) at 2, assumption 10. *See, e.g.*, 40 C.F.R. § 122.41(j); 40 C.F.R. Part 136.

WQBELs

In addition to creation of effluent limits based on TBELs, Region 4 created WQBELs based on TN Water Quality Standards. Tennessee's Water Quality Standards, promulgated in compliance with the CWA's procedural requirements for establishing such standards,⁶⁰ do not contain numerical limits for AEA-regulated materials.⁶¹ Therefore, as reflected in Appendix B, Region 4 attempts to establish an ambient water quality-based "equivalent." Region 4 fails to provide a legal basis for creating an ambient water quality-based "equivalent," and it fails to comply with the regulatory requirements at 40 C.F.R. § 122.44(d)(vi) for establishing a water quality-based effluent limit where a water quality criterion does not already exist for a pollutant.⁶² In order to establish a water quality-based effluent limit under 40 C.F.R. § 122.44(d)(vi), the permitting authority must use one or more of the following: a calculated numeric water quality criterion for the pollutant which the authority demonstrates will attain and maintain applicable requirements, which may be derived based on a proposed state criterion or state policy supplemented with other relevant information such as risk assessment data or exposure data; EPA's CWA § 304(a) water quality criteria; or an indicator parameter for the pollutant consistent with listed requirements.⁶³ According to Appendix B, Region 4 developed its water quality standard derived effluent limits using the CERCLA-based Preliminary Remediation Goals (PRG) calculator, with assumptions (not all of which are provided to DOE) that Region 4 says are consistent with EPA's *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*.⁶⁴ It is not apparent that this approach complies with the requirements of 40 C.F.R. § 122.44(d)(vi).

Region 4's reliance on a statute that bars regulation of AEA-regulated materials and failure to follow the procedures of that statute produces unreasonable results. Region 4 has derived effluent limits in this case that are more stringent than EPA's promulgated drinking water standards, despite the fact that DOE's existing and proposed facilities do not discharge into a drinking water source.⁶⁵ The limits are also more stringent than NRC's promulgated effluent limits for NRC-licensed sites, meaning that DOE operations could be held to different standards than other facilities in Tennessee.⁶⁶ See Appendix A, Table 1.

⁶⁰ See 33 U.S.C. § 1313(c)(1)-(3); 40 C.F.R. §§ 131.6, 131.20. The term water quality standards includes designated uses for navigable waters and the water quality criteria (e.g. narrative or numerical pollutant limits) based on such uses. Tennessee's water quality standards have been approved by EPA and are subject to the same CWA jurisdictional bar that precludes regulation of AEA-regulated materials.

⁶¹ See *Rules of the Tennessee Department of Environment and Conservation*, Chapters 0400-40-03; 0400-40-04.

⁶² See Region 4 Assumptions Document (Appendix B) at 2, assumption 5.

⁶³ EPA has established recommended water quality criteria developed under CWA § 304 which assists states in developing their water quality standards, and EPA has published numerous EPA guidance documents that describe rigorous scientific processes for developing water quality criteria. See, e.g., *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, EPA, PB85-227049 (1985); *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*, EPA-822-B-00-004 (2000).

⁶⁴ See Region 4 Assumptions Document (Appendix B) at 2, assumption 5; Table 1 n.4.

⁶⁵ See 40 C.F.R. Part 141.

⁶⁶ NRC limits are not applicable to DOE sites, but are relevant as a point of comparison because NRC has promulgated dose limits for AEA-regulated materials. See 10 C.F.R. § 20.1302(b)(2)(i); 10 C.F.R. Part 20, Appendix B, Table 2. Under section 274 of the AEA, Tennessee, pursuant to an agreement with NRC, regulates AEA-regulated materials from NRC licensed facilities in Tennessee. Tennessee does so using standards identical to

Region 4's proposed ARARs fail to comply with the CWA, CERCLA, and the APA. While the ORR FFA and CERCLA section 120(e)(4)(A) empower the Administrator to select a remedial action if the parties are unable to reach agreement, that authority does not permit the Administrator to endorse Region 4's selection of a legally-unfounded remedy.⁶⁷

II. E. While EPA's CWA-based approach must fail, DOE's proposed remedy complies with CERCLA because it identifies ARARs and is protective of human health and the environment.

DOE's proposed remedy consists of implementation of DOE's Directives and identification of certain NRC-promulgated regulations as ARARs, consistent with CERCLA section 121(d).⁶⁸ DOE Directives, as discussed above in Section I. B., establish requirements applicable to the operations of the existing and proposed facilities, and the NRC promulgated regulations are relevant and appropriate under the circumstances as ARARs.

For this matter, NRC has three promulgated limits that are relevant and appropriate under the circumstances. First, NRC establishes an annual dose limit of 100 mrem for individual members of the public and requires doses to be as low as is reasonably achievable.⁶⁹ Second, the NRC rules include radionuclide-specific effluent limits that are equivalent to concentrations of a total effective annual dose of 50 mrem.⁷⁰ Finally, NRC requires the use of ALARA and establishes annual dose limits for a member of the public from releases of radioactive material in effluents from land disposal facilities (25 mrem whole body, 75 mrem thyroid, 25 mrem to any other organ).⁷¹ While these NRC requirements are not legally applicable to DOE because DOE is not licensed by the NRC, these promulgated limits are relevant and appropriate standards under the circumstances.⁷² Indeed, EPA has previously recognized that the "NRC's regulations are potential ARARs," and specifically identified 10 C.F.R. Parts 20 and 61.⁷³ Region 4 also has previously recognized the NRC standards as ARARs at DOE CERCLA sites, including the existing facility at ORR.⁷⁴

those of the NRC, which presumably Tennessee believes are adequately protective of human health and the environment. See <https://www.nrc.gov/about-nrc/state-tribal/agreement-states.html>.

⁶⁷ See 42 U.S.C. § 9613(j)(2) (Standard of review for selection of a response action is arbitrary and capricious or otherwise not in accordance with law.) See e.g., *Kelley v. EPA*, 15 F.3d 1100, 1107-08 (D.C. Cir. 1994); *United States v. Akzo Coatings of America, Inc.*, 949 F.2d 1409, 1429 (6th Cir. 1991). Remedy choices that contravene this standard will be invalidated. See e.g., *Matter of Bell Petroleum Servs., Inc.*, 3 F.3d 889, 905-06 (5th Cir. 1993) (invalidating EPA's requirement of an alternate water supply); *Emhart Indus., Inc. v. New England Container Co., Inc.*, 274 F.Supp.3d 30, 80-81 (D. Rhode Island 2017) (invalidating several EPA findings, including that source area groundwater was potential source of drinking water.).

⁶⁸ The relief sought by DOE is not dependent on any particular legal status that DOE's Directives may occupy under CERCLA.

⁶⁹ See 10 C.F.R. § 20.1301(a)(1).

⁷⁰ See 10 C.F.R. § 20.1302(b)(2)(i); 10 C.F.R. Part 20, Appendix B, Table 2.

⁷¹ 10 C.F.R. §§ 61.41, 61.43.

⁷² Unlike the proposed Region 4 CWA-based requirements, these NRC standards meet the CERCLA implementing regulation factors for identification of relevant and appropriate requirements found at 40 C.F.R. § 300.400(g)(2)(i)-(viii).

⁷³ *CERCLA Compliance with Other Laws Manual* at 5-11 – 5-12.

⁷⁴ See *Record of Decision for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act of 1980 Waste, Oak Ridge, Tennessee*, DOE/OR/01-1791&D3 (Nov. 1999) at 2-52, Table 2.5.

Implementation of DOE's Directives results in operations that are protective of human health and the environment and meet the NRC standards that DOE has identified as relevant and appropriate ARARs at ORR.⁷⁵ Specifically, using 2017 data as an example, the maximum radiation dose that a hypothetical member of the public could have received from DOE's ORR activities in 2017 was estimated to be 3 mrem, about 1% of the annual average dose (311 mrem) that a person in the United States receives from background radiation.⁷⁶ DOE calculated this 2017 estimated maximum radiation dose by conservatively assuming that the maximally exposed hypothetical member of the public would consume one deer, one turkey, and two geese harvested from ORR, eat 60 pounds per year of fish from ORR, drink 193 gallons per year of water from ORR, and use the shoreline for 60 hours per year as well as swim and boat on the ORR site.⁷⁷ This is a conservative calculation because the ORR is a secured site that is not available to members of the public for fishing or other recreational use, with the exception of a few days each year when turkey and deer hunting is authorized.

DOE's ORR 2017 performance is consistent with DOE's historical performance throughout Region 4.⁷⁸ Review of historical ASERs shows that, for at least the past ten years (2008-2017), the annual maximum radiation dose from all pathways and calculated based on the maximally exposed hypothetical member of the public at each site in Region 4 was less than 6 mrem, or less than 2% of the average natural background dose. See Appendix A, Table 2.

DOE rejects the assertion contained in the March 21, 2019 Regional Administrator's letter that DOE's Orders and NRC's promulgated regulations are not protective of human health and the environment.⁷⁹ DOE and NRC standards are protective of human health and the environment because they are consistent with or more protective than recommendations by authoritative scientific bodies on radiation protection to limit a member of the public's annual dose to 100 mrem.⁸⁰ Moreover, DOE requires a 25 mrem annual dose limit for the facilities at issue and also implements ALARA.⁸¹ As a result of these requirements, DOE's annual operations for at least the past ten years at each site in Region 4 have resulted in a potential annual dose of less than 6 mrem to the maximally exposed hypothetical member of the public. Thus, implementation of DOE Directives and compliance with identified NRC ARARs, including the use of ALARA, to manage risk results in operations that are protective of human health and the environment.⁸²

⁷⁵ See, e.g., *2018 Remediation Effectiveness Report for the U.S. Department of Energy Oak Ridge Reservation Oak Ridge, Tennessee* DOE/OR/01-2757&D2 (2018); *Fiscal Year 2018 Phased Construction Completion Report for the Oak Ridge Reservation Environmental Management Facility* DOE/OR/01-2760&D2 (2018).

⁷⁶ Extensive environmental monitoring data, including thousands of samples and measurements of air, water, direct radiation, vegetation, fish, and wildlife, are collected at ORR annually to evaluate doses from all potential pathways. This total annual maximum hypothetical dose is based on 0.3 mrem from air pathways, 1 mrem from water pathways, and 2 mrem from consumption of wildlife harvested on ORR. *Oak Ridge Reservation Annual Site Environmental Report* (ORR ASER) (2017), at xxxiii, 7-17.

⁷⁷ See *id.* at 7-1, 7-17.

⁷⁸ Data for DOE's Oak Ridge Reservation, Savannah River Site, and Paducah Site are provided in Appendix A, Table 2.

⁷⁹ See Region 4 Letter at 9-10.

⁸⁰ See ICRP Publications 103 (2007) and 60 (1991); NCRP Report Nos. 180 (2018) and 116 (1993).

⁸¹ See DOE Order 458.1 at 4.b(1)(b); 4(d); 4.h(1)(a); 4.h(1)(c); Attachment 2.

⁸² DOE does not agree with EPA's non-binding guidance annual dose level of 12 mrem set forth in *Radiation Risk Assessment at CERCLA Sites: Q & A*, EPA 540-R-012-13, p. 28 (2014). As EPA's Scientific Advisory Board has

II. F. Because DOE's remedy identifies available and sufficiently protective ARARs, EPA lacks a statutory or regulatory basis for applying effluent limits based on the risk range of 10⁻⁴ to 10⁻⁶, but even if EPA were to apply the risk range, DOE's performance is within or more protective than the risk range.

Region 4 has taken the indefensible position that CWA-based limits should be ARARs and, seemingly aware of the weakness of this position, Region 4 alternatively asserts that the risk range must be used if the CWA-based limits are not ARARs.⁸³ But, use of the risk range is appropriate only "when ARARs are not available or are not sufficiently protective."⁸⁴ In this matter, ARARs are available and are sufficiently protective, so there is no statutory or regulatory basis for EPA to apply the risk range. Even if EPA were to apply the risk range, however, DOE's operations at the existing facility are more protective than or within the risk range of 10⁻⁴ to 10⁻⁶, based on highly conservative and reasonable risk assumptions.

Description of existing facility

DOE's existing landfill is an engineered facility that accepts low-level and hazardous wastes from CERCLA cleanup activities within ORR that meet waste acceptance criteria developed in accordance with agreements with state and federal regulators.⁸⁵ See Appendix A, Figure 3. Waste types that qualify for disposal include soil, solidified waste, building debris, scrap equipment, and secondary waste such as personal protective equipment.⁸⁶

Two types of water are discharged from DOE's existing landfill: leachate and contact water.⁸⁷ See Appendix A, Figure 4. Leachate is the water that has drained from the landfill materials and is collected through the leachate collection system and then sent by truck to the Oak Ridge National Laboratory process waste treatment complex. Leachate water is not discharged to Bear Creek and exists in a closed system.

Contact water comes in contact with waste but does not enter the leachate collection system. Instead, the contact water is routed to fenced-in holding ponds and tanks. DOE samples and analyzes the contact water in the holding ponds and tanks. If sampling results satisfy release evaluation standards, then the contact water is released to the sediment basin, where it eventually flows over a V-weir to Bear Creek North Tributary-5.⁸⁸ See Appendix A, Figures 4 and 7. In

noted, "[a]t radiation exposures in the range of natural background [i.e., up to 311 mrem], it is difficult to distinguish radiation-induced changes in risk from the baseline." *Advisory on Agency Draft White Paper Entitled "Modifying EPA Radiation Risk Models Based on BEIR VII,"* EPA-SAB-08-006 (2008), at 4. For purposes of this matter, however, resolution of the disagreement is not necessary because DOE's Region 4 operations are consistently below the non-binding guidance 12 mrem annual dose level.

⁸³ See Region 4 Letter at 7 n.31.

⁸⁴ 40 C.F.R. § 300.430(e)(2)(i)(A).

⁸⁵ See ORR ASER at 4-107.

⁸⁶ See *id.*

⁸⁷ Non-contact water (i.e., stormwater), or water that does not touch landfill waste, also occurs in areas around the landfill.

⁸⁸ Releases must comply with DOE Order 458.1, and DOE release evaluation standards are based on the total activity of all radionuclides. See DOE Order 458.1(4)(g).

FY 2017, DOE managed approximately 9.3 million gallons of contact water at the existing landfill.⁸⁹

Landfill wastewater generation is partially minimized through cover systems over those portions, or cells, of the landfill that are already filled with waste. This enhanced operational cover system consists of a clay layer covered by a polyethylene geo-synthetic liner layer, which directs water away from the waste thereby avoiding any potential contamination.

When the landfill is closed, the final cover, consisting of a multi-layered RCRA-compliant system that is approximately 11 feet thick, will be installed over all cells and prevent infiltration into the landfill.⁹⁰ After capping and closure of the landfill, contact water and leachate volumes will significantly decrease because infiltration will be virtually eliminated. One of the cap performance requirements is that it maintain design performance objectives for 1,000 years with minimal maintenance.⁹¹

Assumptions

Access

DOE assumes that the maximally exposed hypothetical member of the public is located at Bear Creek kilometer 4.5 because this is the closest publicly accessible point on Bear Creek. Areas upstream of Bear Creek kilometer 4.5 are restricted to the public and unauthorized entry to those areas, which are patrolled by security guards, is trespassing. See Appendix A, Figures 5, 6, and 8. Unauthorized entry at ORR can result in a fine or imprisonment or both, consistent with 10 C.F.R. Part 860, which was promulgated in accordance with the authority of section 229 of the AEA. As set forth in the ORR FFA, EPA and TDEC are permitted to access ORR at reasonable times previously arranged and coordinated, but even EPA's and TDEC's access is controlled.⁹²

There are limited opportunities for the public to lawfully access ORR. These include opportunities to take a 3-hour escorted bus tour of some ORR facilities, but these bus tours are of limited duration and scope, and do not present opportunities for members of the public to separate from the tour group or access the existing or proposed facilities.⁹³ On a few days during the year, access to ORR is provided for hunting. However, hunters are excluded from significant portions of ORR, including the areas around both the existing and the proposed facilities that are designated as "Safety/Security Zone (No Hunting)."⁹⁴ See Appendix A, Figure 9. Other public visitors to ORR could include, for example, researchers visiting the Oak Ridge National Laboratory.⁹⁵ In short, none of these public access opportunities lend themselves to fishing or recreational use upstream of Bear Creek kilometer 4.5, making Bear Creek kilometer 4.5 a reasonable location to assume public exposure.

⁸⁹ See ORR ASER at 4-107.

⁹⁰ See RI/FS at 6-84.

⁹¹ See *id.*

⁹² See FFA at 60-61.

⁹³ See <https://www.nps.gov/mapr/oakridge.htm>; <https://amse.org/bus-tours/>.

⁹⁴ See <https://web.ornl.gov/sci/rmal/hunts/deerhunts/>; <https://web.ornl.gov/sci/rmal/hunts/turkeyhunts/index.shtml>.

⁹⁵ See <https://www.ornl.gov/content/come-see-us>.

DOE assumes that facility operations will conservatively span 30 years before being closed, and as a result, a member of the public could potentially be exposed to risk through a water pathway from the facility for a maximum of approximately 30 years.⁹⁶

Fish availability assumption

DOE conservatively assumes, based on periodic fish collection and sampling, that Bear Creek kilometer 4.5 could support seven recreational users each catching and consuming 54 grams of fish per day for 45 days out of the year for 30 years.⁹⁷ There are no fish in the fenced-in contact water ponds and tanks that are inaccessible to the public, and DOE does not assume otherwise.

Bear Creek flow conditions assumption

DOE's calculations assume conditions of continuous discharge, which is conservative because discharges of water are intermittent throughout the operating year since contact water is only generated due to precipitation events. Thus, the actual potential exposure would be well below that calculated in DOE's exposure scenario.

Discharges from the V-weir at the sediment basin into Bear Creek North Tributary-5 generally combine with existing flow in Bear Creek before reaching the first point of public access at Bear Creek kilometer 4.5. DOE's exposure calculations apply a dilution factor of 126 to account for the fact that actual exposure by a recreational user can only occur at Bear Creek kilometer 4.5, which is where public access may occur. Such a factor would not be applied if recreational use at ORR was authorized; however, here, where ORR is a controlled DOE site and will continue to be controlled during the time when contact water is generated from the facilities, application of this factor is reasonable.

Existing facility performance

Based on DOE's annual data and using EPA's PRG calculator, the average discharges of AEA-regulated materials in the contact water have resulted in a potential excess lifetime cancer risk that is at least ten times (3×10^{-8}) more protective than EPA's risk range of 10^{-4} to 10^{-6} to the maximally exposed hypothetical member of the public located at Bear Creek kilometer 4.5.⁹⁸

⁹⁶ The operating life of either the existing or the proposed facility is consistent with the 30-year default exposure duration used by the PRG calculator, as this represents the residential occupancy rate (average time spent in a single locale) that is between the 90th percentile (26 years) and the 95th percentile (33 years) occupancy rates contained in EPA's *Exposure Factors Handbook*, EPA/600/R-09/052F (2011).

⁹⁷ EPA's *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*, EPA-822-B-00-004, p.4-24 (2000) recommends using a daily intake of fish over a lifetime as 17.5 g/day in exposure calculations.

⁹⁸ This calculation is based on a recreational user located at Bear Creek kilometer 4.5, consumption of 54 grams of filets per day for 45 days a year, a dilution factor of 126 to account for the fact that actual exposure by a recreational user can only occur at Bear Creek kilometer 4.5, a hazard index of 1, a fraction ingestion of 1, and a 30-year exposure duration. This calculation is based on the average concentrations of contact water measured in the contact water ponds at the existing facility from 2005-2018, and similar calculations are available in the *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation (FFS)*, DOE/OR/01-2664&D2, Appendix K (2017). See <https://doeic.science.energy.gov/uploads/F.0600.029.0700.pdf>.

Further, these calculations are supported by DOE's actual sampling of water at Bear Creek kilometer 4.5. DOE's sampling data at kilometer 4.5 show that actual measured values are also more protective (1.9×10^{-7}) than the risk range point of departure, and the water sampled at Bear Creek kilometer 4.5 also contains contributions from other existing sources that contribute to the overall risk, such as the Bear Creek burial grounds.

In light of the access controls at ORR, it is a reasonable maximum exposure assumption that the point of measurement is at kilometer 4.5. However, even adopting Region 4's unrealistically conservative assumption of measuring the potential risk at the point source of the contact water tanks and ponds, the actual performance of the existing facility demonstrates that the average discharges of AEA-regulated materials in the contact water result in a potential total risk of 1×10^{-6} . This calculation is based on EPA's own default adult incidental ingestion rate (0.071 L/day) occurring at the contact water tanks or ponds, despite the fact that accessing these ponds is trespassing, that the water tanks and ponds are fenced, and it is highly improbable that any individual would choose to recreate in a contact water tank or pond.⁹⁹ Fish ingestion is not incorporated, as there are no fish to catch and consume in the contact water tanks and ponds. Furthermore, after the facility cap is in place, no contact water will be created and the contact water tanks and ponds will be decommissioned.

Even assuming that fish ingestion could somehow occur at the end of the pipe, the average discharges of AEA-regulated materials in the contact water result in a potential excess lifetime cancer risk of 4×10^{-6} , which is still within the risk range of 10^{-4} to 10^{-6} .¹⁰⁰ Thus, even with the unreasonable assumption that fish ingestion occurs at the end of the pipe, DOE's operations are within the risk range.¹⁰¹

Proposed facility operations

At the proposed facility, DOE will apply its Directives system, including the required annual performance objective dose of 25 mrem and ALARA, and any waste disposed at the proposed facility must also meet the established waste acceptance criteria. DOE anticipates that the waste acceptance criteria for the proposed facility will be at least as stringent as the waste acceptance criteria at the existing facility. Since the concentration of radioactivity in the waste influences the discharges at the facility, DOE expects the discharges from the proposed facility to be at least as protective as those at the existing facility. Assuming that the actual performance of the proposed new facility resembles that of its operating predecessor and in light of DOE's

Data for the entire life of the existing facility is available through the Oak Ridge Environmental Information System (OREIS). See <http://www.unc.edu/oreis.html>. The resultant risk calculations are averages for a recreational user and not absolute values for discharge. DOE can provide more explanation of any calculations, upon request.

⁹⁹ See *EPA Exposure Factors Handbook*, EPA/600/R-18/259F, Chapter 3, p. 3-4 (2019). This calculation is based on FFS data, a recreational user accessing the fenced-in contact water tanks and ponds, no fish ingestion, adult incidental ingestion rate (0.071 L/day), no dilution factor, a hazard index of 1, a fraction ingestion of 1, and a 30-year exposure duration.

¹⁰⁰ This calculation is based on FFS data and the following assumptions: a recreational user accessing the fenced in contact water tanks and ponds, fish ingestion of 54 grams of filets per day for 45 days a year at the end of the pipe where no fish currently exist, adult incidental ingestion rate (0.071 L/day), no dilution factor, a hazard index of 1, a fraction ingestion of 1, and a 30-year exposure duration.

¹⁰¹ EPA action based on unjustified factual assumptions about fish populations have been invalidated as arbitrary and capricious or an abuse of discretion. See *Emhart*, 274 F.Supp.3d at 80-81.

performance throughout Region 4, it is reasonable to expect DOE's performance, consistent with the requirements in DOE Directives, will continue to be protective of human health and the environment and comply with the identified NRC ARARs.

Conclusion

The Department's ORR wastewater management at both the existing and the proposed facilities, in fact, has been and will be protective of human health and the environment and will comply with identified NRC ARARs. Region 4's approach would create an entirely new system for governance of source, byproduct, and special nuclear materials based upon faux authority that allegedly stems from CERCLA.

The Department requests:

- The Administrator to reject the use of CWA-based standards for AEA-regulated materials.
- The Administrator to recognize that both DOE and EPA are carrying out their respective regulatory responsibilities in this matter and, as such, contributions by DOE personnel should be entitled to collaborative candor and respect by their counterparts in EPA Region 4. As was indicated in our letter of June 21, 2019, this objective might be furthered by establishment of an MOU similar to that adopted by EPA with the NRC in which EPA deferred to NRC standards for radiation protection.
- The Administrator to select DOE's proposed remedy in this dispute and to encourage the use of reasonably conservative site-specific input assumptions with respect to implementing the remedy for AEA-regulated materials, such that DOE and EPA staff are not debating input assumptions that ultimately result in no measurable reduction in risk.
- The Administrator to provide guidance to EPA Region 4 commending application of the principles above in addressing matters involving the Department of Energy.



Bill Cooper
General Counsel

Attachments

APPENDIX A

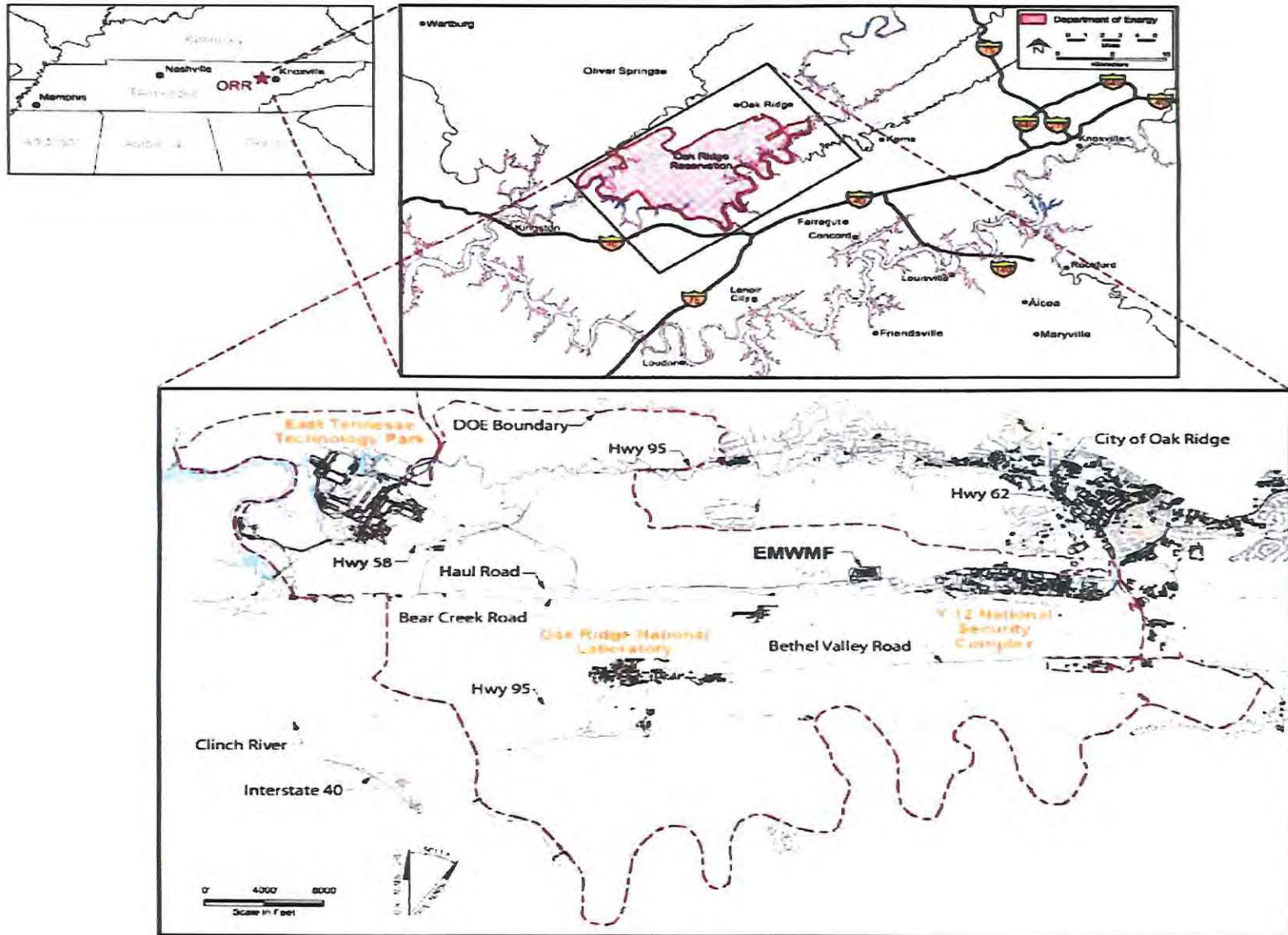


Figure 1. Location of Oak Ridge Reservation, Oak Ridge, Tennessee.

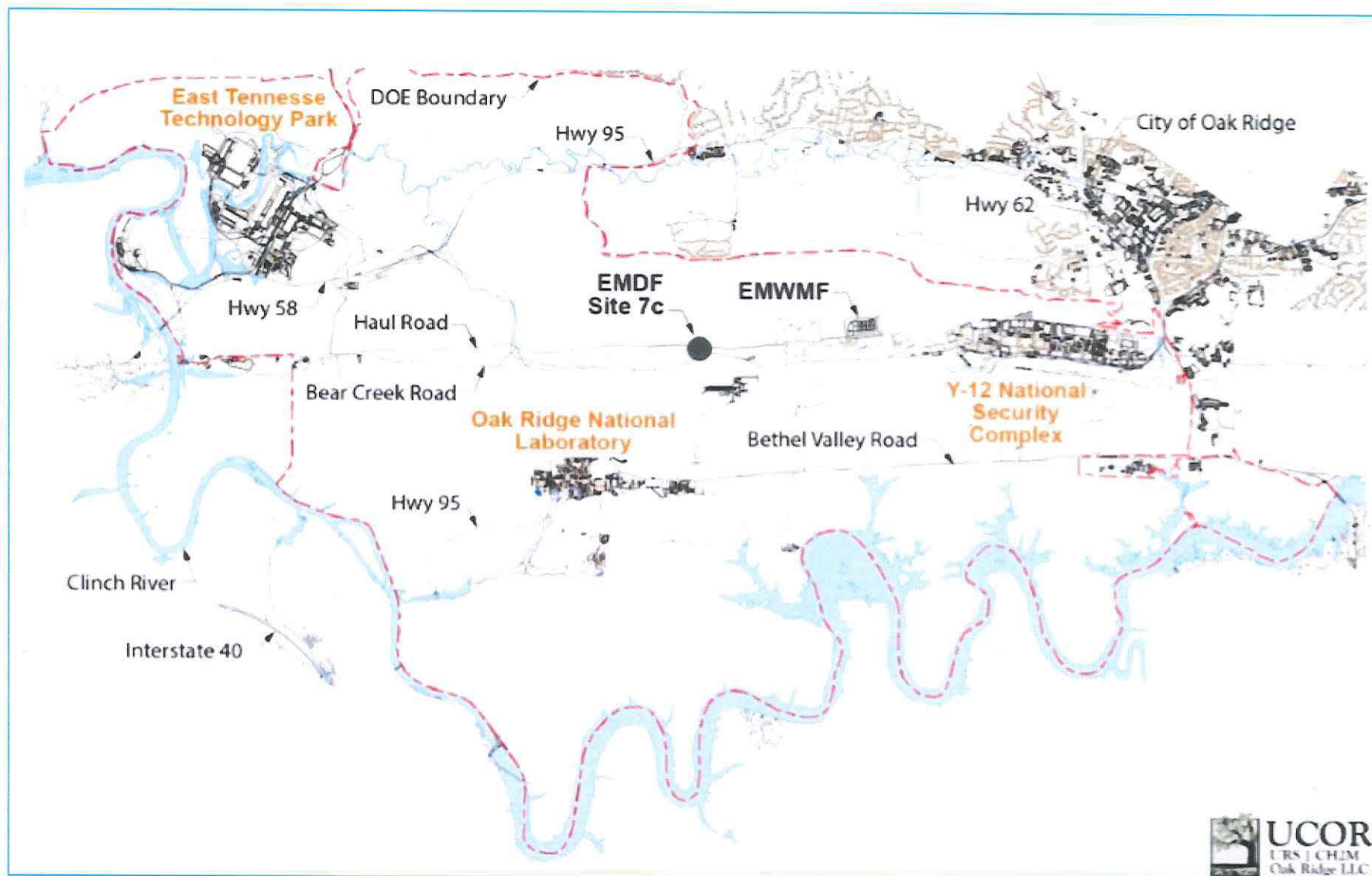


Figure 2. Location of the existing Environmental Management Waste Management Facility (EMWMF) and the proposed Environmental Management Disposal Facility (EMDF).

AEA-regulated Material	Region 4 Non-promulgated, Derived Daily Effluent Limits (CWA-based) (pCi/L) ¹		EPA Promulgated Drinking Water Standards (Maximum Contaminant Levels based on 4 mrem/yr for beta emitters) (pCi/L) ²	Promulgated NRC Effluent Limits (based on 50 mrem/yr) (pCi/L) ³
Iodine-129	0.196		1	200
Strontium-90	1.127		8	500
Technetium-99	22.23		900	60,000
Tritium	12,354		20,000	1,000,000
Uranium-233	19.12	Convert to uranium mass total: 5.4 µg/L	EPA Drinking Water Maximum Contaminant Level for uranium mass total: 30 µg/L	300
Uranium-234	19.4			300
Uranium-235	1.757			300
Uranium-236	1.757			300
Uranium-238	1.484			300

Table 1. Region 4's proposed daily effluent limits compared to promulgated standards.

Notes:

1. Region 4 Assumptions Document at Table 1. Note that for Iodine-129, Region 4 included 0.301 pCi/L in Table 1. However, DOE assumes that Region 4 meant to cite to the more stringent limit of 0.196 pCi/L that it had derived as a TBEL. Therefore, DOE has included the more stringent limit in this chart.
2. See 40 C.F.R. Part 141.
3. NRC limits are not applicable to DOE sites, but are relevant as a point of comparison because NRC has promulgated dose limits for AEA-regulated materials. See 10 C.F.R. § 20.1302(b)(2)(i); 10 C.F.R. Part 20, Appendix B, Table 2.



Figure 3. Aerial view of the existing landfill, the Environmental Management Waste Management Facility (EMWMF).

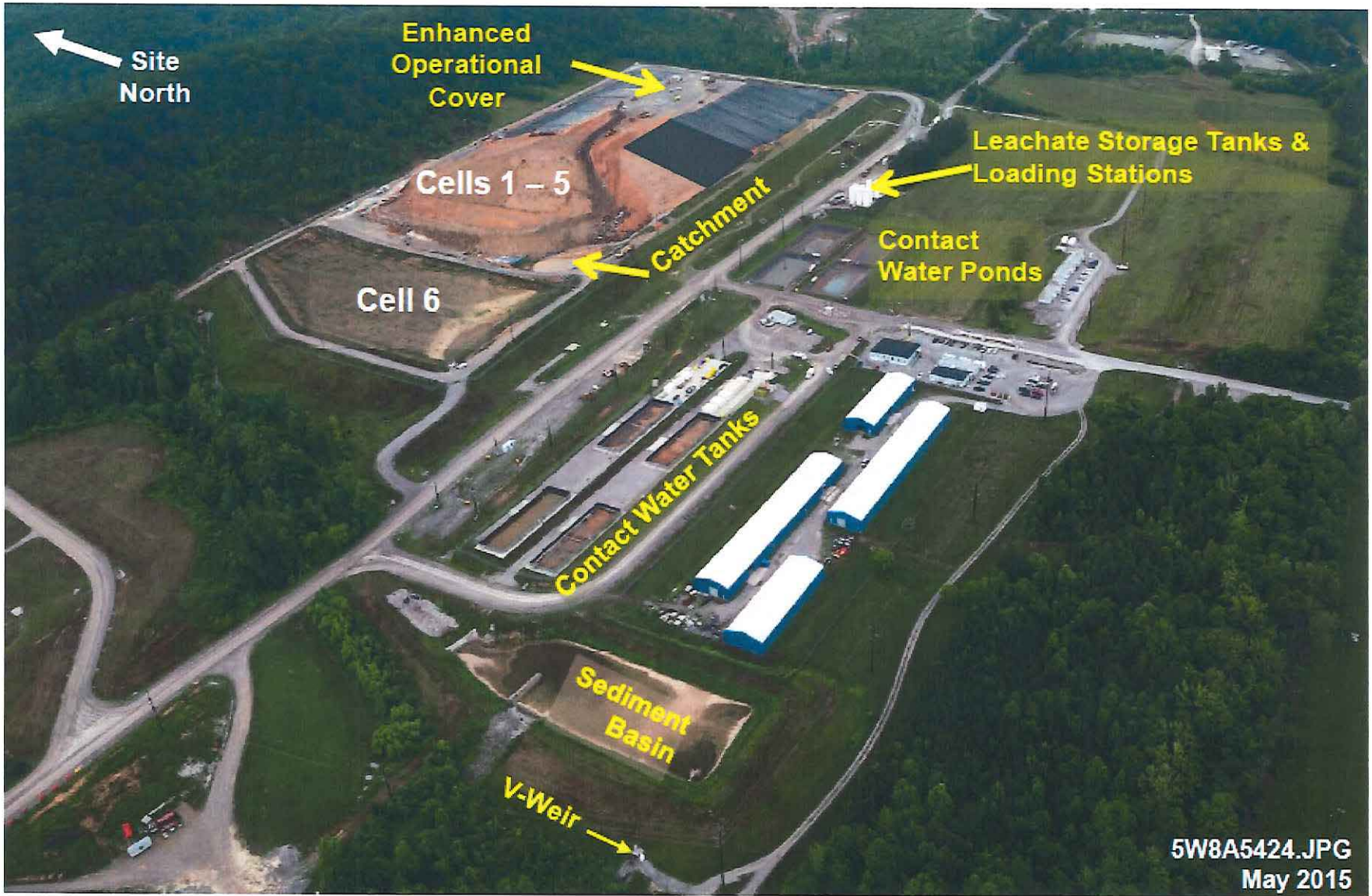


Figure 4. Aerial view of the existing landfill, the Environmental Management Waste Management Facility (EMWMF), with labels to identify contact water tanks and ponds, sediment basin, and V-weir.



Figure 5. Fenced contact water ponds at the Environmental Management Waste Management Facility (EMWMF).



Figure 6. Fenced contact water tanks at the Environmental Management Waste Management Facility (EMWMF).



Figure 7. Environmental Management Waste Management Facility (EMWMF) V-weir.



Figure 8. Signage on Bear Creek Road adjacent to Bear Creek kilometer 4.5.

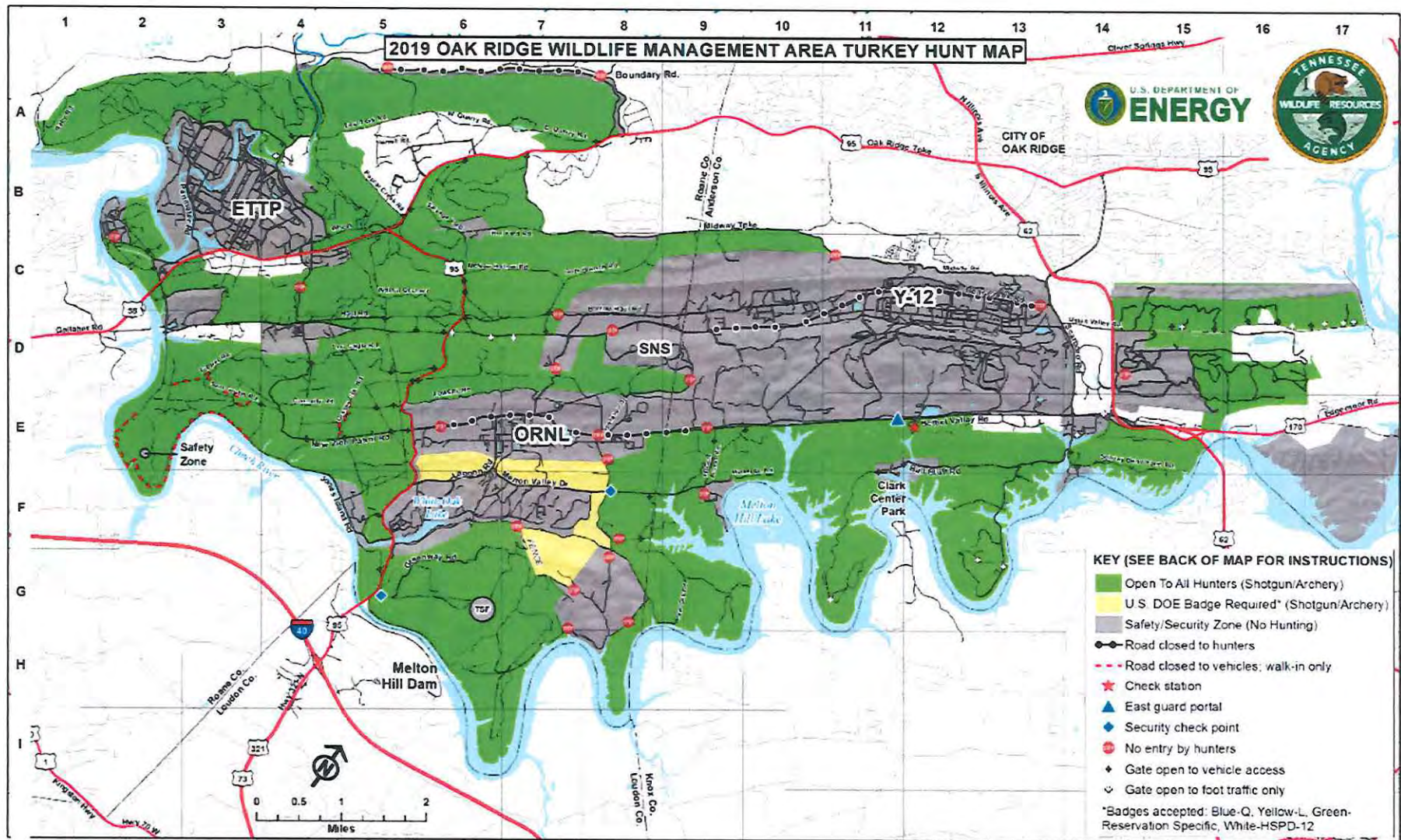


Figure 9. 2019 Oak Ridge Wildlife Management Area Turkey Hunt Map. Proposed and existing facilities are located in greyed “Safety/Security Zone (No Hunting).”

DOE site in EPA Region 4	Exposure pathway	10 year dose averages¹ (2008-2017) (mrem/year)	Percentage of individual background dose (based on 311 mrem average annual background dose)
Oak Ridge Reservation	All pathways	3.4 (average)	<1.1%
		3-5 (range)	<1% -1.6%
	Water related	0.99 (average)	0.30%
Savannah River Site	All pathways	0.18 (average)	0.06%
		0.11-0.26 (range)	0.04% - 0.08%
	Water related	0.14 (average)	0.05%
Paducah Site	All pathways	1.8 (average)	0.60%
		0.2-5.4 (range)	0.07% - 1.7%
	Water related	0.2 (average)	0.07%

Table 2. Summary data of annual dose estimates for the maximally exposed hypothetical member of the public for DOE sites in EPA Region 4 (2008-2017).

Notes:

1. Data from Annual Site Environmental Reports available at <https://doeic.science.energy.gov/ASER/>; <https://www.srs.gov/general/pubs/ERsum/index.html>; and <https://www.energy.gov/pppo/downloads/paducah-annual-site-environmental-reports>. Dose estimates are conservative and overestimate doses from the DOE sites.

APPENDIX B

(Copy of EPA Region 4's Assumptions Document)

EPA R4 Assumptions, Comments, and Recommendations for Discharge of
Wastewaters from
DOE's Environmental Management Waste Facility (EMWF) and Proposed Environmental Management Disposal
Facility (EMDF) at the Oak Ridge Reservation

The preliminary effluent limitations are in Table 1, below, and are based on the most stringent of the Water Quality Standard (i.e., ambient water quality criteria based effluent limit (WQBEL) or estimated technology-based effluent limit (TBEL). The following are assumptions and comments used in the derivation of values and limits:

1. The EMWF landfill contains radioactive, hazardous, and mixed waste from various cleanup projects.¹ It is assumed the proposed EMDF will contain similar wastes and generate wastewaters similar to that of EMWMF. Wastewaters generated from landfill operations include contaminated contact water from within the landfill, leachate and storm water.
2. The wastewater will be discharged to a tributary to Bear Creek (Waterbody ID: TN06010207026_0600). Bear Creek has a 7Q10 of 0.078 cubic feet per sec (cfs), and its Use Classifications under TDEC Chapter 0400-40-04-.09 are: Recreation (REC), Fish and Wildlife (F&W), Irrigation, and Livestock Watering.^{2,3} Impairments include mercury and Polychlorinated biphenyls and are attributed to legacy pollutants from CERCLA sites at Oak Ridge.⁴
3. It is assumed at the 7Q10 for the tributary to Bear Creek is 0.0 cfs. Therefore, there is no assimilative capacity. Under TDEC Chapter 0400-40-04-.09 the designated uses are the same as those for Bear Creek.
4. The discharge flow is assumed to be intermittent. Therefore, only daily maximum effluent values were calculated based on the reported maximum values of chemicals and radionuclides provided in DOE's D2 FFS.⁵ This information lacks key data regarding the number of samples taken, the type of samples obtained, and the location of the sampling¹ Note, a more accurate estimation of daily maximum values can be calculated knowing the actual number of samples taken for each parameter using *EPA's Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001 PB91-127415, dated March 1991.
5. The DOE's list of contaminants of concern (COC) used for this preliminary assess is limited. For each COC that is a pollutant, the most stringent TDEC Aquatic Water Quality Criteria (AWQC) applicable to Bear Creek was used.³ For radionuclides, EPA derived an ambient water quality criteria equivalent using the Superfund PRG calculator with assumptions consistent with EPA's Office of Water's document, *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*.¹⁰ The data show that the following pollutants and contaminants either already exceed, or are close to exceeding, the most stringent AWQC for the Bear Creek to protect human health (e.g., water + organism): Arsenic, Copper, Mercury, Strontium-90, Tritium, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Aldrin, beta-BHC, Iodine 129, Uranium 233, Uranium 234, Uranium 235, Uranium-236, and Uranium-238.
6. Effluent limitation recommendations for an expanded list of COC's list will need to be completed.
7. The concentrations of contaminants for the combined storm water, contact water, and leachate wastewater are based on DOE data.⁵ Effluent flowrates were also based on values in this document. There is no information regarding the analytical methods used or the location or types of samples obtained (i.e., grab or composite). It is recommended EPA-approved methods in 40 CFR Part 136, appendix A be used.

8. According to the CWA Section 402, operators with point source discharges of storm water which are combined with process wastewater (process wastewater is water that comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, waste product, or wastewater) must complete and submit Form 2F, Form 1, and Form 2C (EPA Form 3510-2C). Compositing samples taken during the first 20 minutes of a storm event (e.g., "first flush") are reported and used to derive appropriate effluent limitations for an NPDES permit.⁶ Note, there is no information regarding if the samples were taken during the "first flush" of a storm event, which is typically when the highest loadings are expected to occur. There is also no information on the type of sample taken or the sampling location. Both could have a bearing on the sampling values. It is recommended that DOE submit the information that is required in NPDES Permit Application form 2F in order to ensure sampling is done correctly.
9. The proposed discharge from EMDF, in combination with that from EMEF, of combined storm water, contact water plus leachate would be a new discharge to the tributary to Bear Creek. Under the CWA, this would trigger an antidegradation determination to be completed by TDEC.
10. The technology-based effluent limits (TBELs) are based on the combination of using granulated activated carbon (GAC) and ion exchange. These technologies are expected to remove 93-98% of the most radionuclides and non-rad pollutants.⁷ Note, the estimations assuming 93% removal for all pollutants is very gross. A better estimate of removal efficiencies should be determined based on a treatability study for a combination of ion exchange, GAC, reverse osmosis (RO) and possibly other treatments as well.
11. Granulated Activated Carbon will remove organics, most metals and ion exchange will remove cyanide; however, the removal efficiencies may not be as high as 93%. 50% removal was assumed for cyanide based upon best professional judgement. Reverse Osmosis is expected to remove ammonia, and neither ion exchange, GAC or RO is expected to remove tritium ("heavy water"). The removal efficiencies for ammonia and tritium, as well as dissolved oxygen and pH, were set at 0%.
12. CWA regulations at 40 CFR 122.26(a)(9)(i)(C) and (D) allow for effluent limitations for storm water discharge on a case-by-case basis if the discharge will violate an applicable WQS.⁸
13. The background concentration for all pollutants was assumed to be 0.0, and all aquatic water quality-equivalent concentrations for radionuclides were derived based on EPA's Preliminary Remediation Goals (PRG) calculator consistent with EPA's Office of Water Methodology.^{9,10}

Table 1. Estimated Effluent Values for the Discharge of Combined Stormwater, Contact Water, and Leachate to a Bear Creek Tributary

DOE Reported List of Contaminants of Concern	DOE reported estimated max. effluent value for leachate + landfill runoff ^{1,2}	Most stringent TN AWQC (acute) for non-rad or AWQC-equivalent ^{3,4}	TDEC Use Classification Basis ^{3,5}	Estimated eff. conc assuming 93% removal efficiency (TBEL, daily maximum concentration)	Daily Maximum Effluent Value: More stringent of TBEL or AWQC
Arsenic, ug/L	5	5.6	Rec; water & organism (W&O)	0.35	0.35
Cadmium, ug/L	1	2	F&W	0.07	0.07
Total Chromium, ug/L	308	NA		21.56	21.56
Chromium VI, ug/L	250	16	F&W	17.5	16
Copper, ug/L	12.8	13	F&W	0.896	0.896
Lead, ug/L	3.63	65	F&W	0.2541	0.254
Mercury, ug/L	0.13	0.05 ⁶	Rec; W&O	0.0091	0.0091
Nickel, ug/L	34.2	470	F&W	2.394	2.39
Uranium, ug/L	15	NA	NA	1.05	1.05
Cyanide, ug/L	5	22	F&W	2.5	2.5
4,4' _DDD ug/L	0.1	0.0031	Rec; W&O	0.007	0.0031
4-4' _DDE, ug/L	0.1	0.0022	Rec; W&O	0.007	0.0022
4-4'-DDT, ug/L	0.1	0.0022	Rec; W&O	0.007	0.0022
Aldrin, ug/L	0.1	0.00049	Rec; W&O	0.007	0.00049
beta-BHC, ug/L	0.1	0.091	Rec; W&O	0.007	0.007
Dieldrin, ug/L	1	0.00052	Rec; W&O	0.07	0.00052
Iodine-129, pCi/L	2.8	0.301	PRG cal.	0.196	0.301
Strontium-90, pCi/L	16.1	8.91	PRG cal.	1.127	1.127
Tech-99, pCi/L	3580	22.23	PRG cal.	250.6	22.23
Tritium, pCi/L	31900	12354	PRG cal.	31900	12,354
Uranium-233, pCi/L	385	19.12	PRG cal.	26.95	19.12
Uranium-234, pCi/L	385	19.40	PRG cal.	26.95	19.4
Uranium-235, pCi/L	25.1	19.63	PRG cal.	1.757	1.757
Uranium-236, pCi/L	25.1	20.6	PRG cal.	1.757	1.757
Uranium-238, pCi/L	21.2	21.39	PRG cal.	1.484	1.484
Dissolved Oxygen, mg/L	10.5	5.0 (min)	PRG cal.	10.5	5.0 minimum
pH, standard units	9.16	6-9	PRG cal.	9.16	6-9
Ammonia as N, mg/L	0.159	0.2	PRG cal.	0.159	0.159
Footnotes					
1 DOE Fiscal Year 2018 Phased Construction Completion Report for the Oak Ridge Reservation Environmental Management Waste Management Facility, DOE/OR/01-2760&D1 dated March 2018, Table 21 on page 61.					
2 DOE Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, dated 2016, DOE/OR/01-2664&D2, Table 2 on pg 12.					
3 TN Water Quality Criteria retrieved from https://publications.tnsosfiles.com/rules/0400/0400-40/0400-40-03.20150406.pdf .					

4 Radionuclide AQWCs are based on and EPA's Preliminary Remediation Goals calculator in accordance with EPA <i>Office of Water Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health</i> , EPA-822-B-00-004. PRG calculator was retrieved from https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search Bioaccumulation factors and slope factors based on fish ingestion= 22 g/d & an exposure duration =70 years.
5 Use of radionuclides AWQC-equivalent values based on TN Water Quality Criteria rules 0400-40-03-.03(3)(m) and 0400-40-03-.03(3)(g).
6 Due to possible application of narrative requirements in TDEC Anti-degradation statement [Chapter 0400-40-03-.06(2)(a)] related to additional loading of pollutants in waters that are impaired, the effluent for mercury could be established below a water quality based effluent limit in order to prevent further degradation of the receiving water.

References

- ¹ *Fiscal Year 2018 Phased Construction Completion Report for the Oak Ridge Reservation Environmental Management Waste Management Facility*, DOE/OR/01-2760&DI, dated 3/7/18.
- ² *USGS StreamStats Report*. Retrieved from <https://streamstats.usgs.gov/ss/>
- ³ Under TDEC General Water Criteria at Chapter 0400-40-03-.02(5), where waters are classified for more than one use, the most stringent applies.
- ⁴ 2016 Water Quality Assessment Report for Bear Creek. Retrieved from https://iaspub.epa.gov/tmdl_waters10/attains_waterbody.control?p_au_id=TN06010207026_0600&p_cycle=2016&p_report_type=A
- ⁵ *DOE Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation*, DOE/OR/01-2664&D2 (dated 4/14/2015).
- ⁶ *Instructions – Form 2F Application for Permit to Discharge Storm Water Associated with Industrial Activity*. Retrieved from <https://www3.epa.gov/npdes/pubs/3510-2F.pdf> For on-site CERCLA response actions, permits and regulatory approvals by the issuing agency are not required per CERCLA Section 121(e)(1). However, in order to determine proper effluent limits for stormwater, the DOE should provide the information that otherwise would be required in the Form and/or a permit application.
- ⁷ EPA Treatability Database. Retrieved from <https://oaspub.epa.gov/tdb/pages/general/about.do>
- ⁸ EPA's Residual Designation Authority. Retrieved from <https://www.epa.gov/npdes/epas-residual-designation-authority>
- ⁹ EPA's Preliminary Remediation Goals calculator. Retrieved from <https://epa-prgs.ornl.gov/radionuclides/>
- ¹⁰ *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*, EPA-822-B-00-004 (dated October 2000).