UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

December 31, 2020

THE ADMINISTRATOR

Mr. John A. Mullis II
Oak Ridge Office of Environmental Management
Oak Ridge Reservation
U. S. Department of Energy
P.O. Box 2001
Oak Ridge, Tennessee 37831

Mr. David W. Salyers
Commissioner
Tennessee Department of Environment and Conservation
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Nashville, Tennessee 37243-0435

Dear Mr. Mullis and Commissioner Salyers:

This letter conveys my final decision resolving the dispute among the U.S. Environmental Protection Agency, the Tennessee Department of Environment and Conservation and the U.S. Department of Energy regarding the discharge to surface water of wastewaters generated during a response action under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, as amended, CERCLA at the Oak Ridge Reservation facility (also referred to herein as "Site") listed on the CERCLA National Priorities List.

As described in more detail below, while not legally applicable, regulations that establish water quality based effluent limitations under the *Clean Water Act* National Pollutant Discharge Elimination System program as well as Tennessee's NPDES regulations for establishing water quality-based effluent limitations, certain Tennessee Water Quality Standards regulations and certain Nuclear Regulatory Commission regulations for low-level radioactive waste disposal are relevant and appropriate requirements for purposes of establishing preliminary remediation goals in the disputed Focused Feasibility Study that is being prepared to evaluate remedial alternatives for addressing discharges containing radionuclides from two CERCLA on-site landfills at ORR.[1] This decision applies only to the regulations themselves, not to any implementing guidance

[1] The relevant and appropriate NRC regulations are found at 10 C.F.R. §§ 61.41 and 61.43. For the reasons described below, I have determined that the limits set forth in 10 C.F.R. Part 20 and CWA technology-based standards and anti-degradation policies, while potentially relevant, are not appropriate for addressing releases of radionuclides (which are not CWA pollutants) from landfills at ORR.

documents.[2] Of course, applicable or relevant and appropriate requirements are applicable or relevant and appropriate to the specific remedy that is selected so the final ARARs and final cleanup levels will be identified when the final remedy is selected and a Record of Decision is issued.[3]

Cleanup levels for discharges of carcinogens from a NPL site also cannot be less stringent than the CERCLA risk range.[4] For these CERCLA on-site landfills at ORR, I have determined that the PRGs at a minimum should reflect a risk level of 10^{-5}, based on the Tennessee General Water Quality Criteria regulations that are used to establish Ambient Water Quality Criteria to protect the designated uses established by Tennessee's Water Quality Standards regulations from pollutants that are carcinogens.[5] In applying the relevant and appropriate NRC regulations, the EPA supports the DOE's application of the "as low as reasonably achievable" approach within the relevant and appropriate NRC regulations to ensure that application of a NRC regulation also achieves a risk level no less stringent than 10^{-5}.

As the final decision-maker for a disputed remedy at a federal facility on the NPL, the EPA has the authority to interpret ARARs, including the applicability of any flexibility provided under an ARAR. The EPA will exercise the flexibility provided in the relevant and appropriate state and federal CWA NPDES regulations and the relevant and appropriate NRC regulations to consider site-specific information to evaluate exposure to radionuclides for the purpose of developing the PRGs for water discharged from CERCLA landfills to waterways at ORR to ensure that risk does not exceed the 10^{-5} level.[6]

In exercising those flexibilities, I have determined that at ORR, the EPA will *not* require use of default exposure assumptions from CWA guidance documents regarding fish consumption to develop PRGs, or any other default exposure assumptions that are in dispute, such as ingestion. Instead, the DOE will establish PRGs based on site-specific exposure information and will use that information both to develop CWA effluent discharge limits and to apportion the dose of radionuclides among various sources under the NRC regulations.

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[2] 40 C.F.R. § 300.430(f)(1)(i)(A) (compliance with ARARs "are threshold requirements that each alternative must meet in order to be eligible for selection"). Guidance cannot be considered binding applicable or relevant and appropriate requirements.

[3] 40 C.F.R. §§ 300.430(f)(ii)(B) and 300.430(c).

[4] For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response. 40 C.F.R. § 300.430(e)(2)(i)(A)(2). *See also* 55 Fed. Reg. 8666, 8717-8718 (Mar. 8, 1990).

[5] TDEC 0400-40-03-.03 *Recreation use* Paragraph (4)(j) fn(c) ("10^{-5} risk level is used for all carcinogenic pollutants"). AWQC are then translated into water quality-based effluent limits applicable to specific dischargers.

[6] *See, e.g.*, 40 C.F.R. § 122.44(d)(1)(vi)(A) (in the absence of a numeric criterion, authorizing establishment of effluent limits using other relevant information, which may include exposure data); 10 C.F.R § 61.41 (concentrations of radioactive material that may be released to the general environment in groundwater, surface water, air, soil, plants or animals must not result in an annual dose exceeding an equivalent of 25 mrem to the whole body of any member of the public with flexibility on apportionment of that dose among exposure pathways and requiring reasonable effort to maintain releases of radioactivity in effluents to the general environment as low as reasonably achievable); 10 C.F.R § 61.43 (releases of radioactivity in effluents from a land disposal facility are governed by § 61.41, not the limits set forth in Part 20, and every reasonable effort shall be made to maintain radiation exposures as low as is reasonably achievable).

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Default assumptions regarding fish consumption do not represent reasonable maximum exposure at ORR and do not appropriately take reasonably anticipated future land use into account. Other default exposure assumptions may present the same issues. It is longstanding EPA policy to consider reasonably anticipated future land use in conducting a baseline risk assessment.[7] For the purpose of the FFS, given that the state's most restrictive use designation for the receiving water (Bear Creek for the existing landfill) is recreational (including recreational fishing)[8] the individual with the potential maximum exposure to radionuclides in effluent from ORR landfills would be a recreational fisherman who fishes from Bear Creek, if the fish are contaminated by radionuclides. Reasonably anticipated future land use, and thus the location of this exposure, will depend on the DOE's land use designations.[9]

Although the DOE has fish tissue monitoring programs for Bear Creek for polychlorinated biphenyls, mercury and other metals, at present, the DOE has not evaluated the current level of radionuclides in the tissue of fish in Bear Creek or what that level may be if discharges are increased through construction of the new landfill. That fish tissue data (and assumptions based on expected discharges), as well as consumption data if radionuclides are found in fish tissue, are needed before site-specific information on fish consumption can be developed. Accordingly, this decision also provides direction on the collection of fish tissue data and, if needed, fish consumption data.

Background

The ORR Site covers nearly 35,000 acres within and adjacent to Oak Ridge, Tennessee. The EPA placed the site on the NPL in 1989, and the EPA, the DOE and the TDEC entered into a Federal Facility Agreement under CERCLA § 120(e)(2) in 1991 that governs the investigation and cleanup of the ORR Site. The site contains hundreds of contaminated areas, including old waste burial grounds, waste disposal areas and contaminated buildings located primarily in three separate large industrial areas: the Y-12 National Security Complex; the Oak Ridge National Laboratory; and the East Tennessee Technology Park (formerly known as K-25).

In order to facilitate cleanup of the ORR Site, the DOE constructed an on-site landfill, the Environmental Management Waste Management Facility at Y-12 under a 1999 CERCLA remedy

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[7] OSWER Directive No. 9355.7-04 Land Use in the CERCLA Remedy Selection Process, May 25, 1995, at 4; *see also* OSWER Directive No. 9355.7-19 Considering Reasonably Anticipated Future Land Use and Reducing Barriers to Reuse at EPA-lead Superfund Remedial Sites, Mar. 17, 2010, at 5.

[8] TDEC 0400-40-04, *Use Classifications for Surface Waters* (designating Bear Creek for fish and aquatic life, recreation, livestock watering and wildlife and irrigation uses). Bear Creek is not designated for use for water supply so drinking water use of Bear Creek is not reasonably anticipated.

[9] The DOE has designated parts of Bear Creek Valley for unrestricted and for recreational use. *See* Bear Creek Valley Phase I ROD (DOE 2000). The western half of Bear Creek Valley (Zone 1) is designated for unrestricted use. The eastern half of Bear Creek Valley, which includes the confluence of the receiving water for the Environmental Management Waste Management Facility outfall (NT-5) and Bear Creek (Zone 3) is currently designated for "controlled industrial" use. There is a one-mile buffer between Zones 1 and 3 that includes the proposed location of the outfall for the proposed Environmental Management Disposal Facility (Zone 2) that is currently designated for recreational use in the short-term and unrestricted use in the long-term. Unless the DOE decides to change its land use designations and thus change the reasonably anticipated future land use, the EPA will assume recreational fishing could occur in the parts of Bear Creek in Zones 1 and 2. Such a change could be memorialized in the context of the ROD for the new ORR landfill and enforced through the DOE's authority over its reserved federal lands.

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decision. That landfill is currently discharging wastewaters with hazardous substances into North Tributary-5, a small tributary of Bear Creek.[10] Due to the DOE's waste-production projections over the next decades, the DOE has proposed building another on-site landfill for CERCLA remediation wastes: the Environmental Management Disposal Facility, that also will discharge wastewaters into Bear Creek (and its tributaries), White Oak Creek at ORNL or Upper East Fork Poplar Creek at Y-12. In 2013, the DOE proposed to prepare an integrated focused feasibility study on the management of wastewaters from EMWMF and EMDF which was submitted to the EPA and the TDEC for review and approval consistent with the ORR FFA.

Summary of Issues in Dispute

In 2016, TDEC, followed by EPA Region 4, initiated an informal dispute pursuant to the ORR FFA regarding the establishment of PRGs for the development, consistent with the National Contingency Plan, of protective effluent discharge limits for radionuclides and *Clean Water Act* pollutants contained in contact wastewater from the landfills in the *Focused Feasibility Study for Water Management for Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee*. At issue here is the setting of PRGs for radionuclide discharges from the proposed landfill and the need to address such ongoing releases from an existing landfill. For the proposed landfill, final effluent limits will not be set until the Record of Decision is issued by the DOE and the EPA with the concurrence of the TDEC. For the existing landfill, the preliminary goals will inform effluent discharge limits that may be selected in a post-ROD modification to the EMWMF ROD that will govern future effluent discharges.[11]

EPA Region 4 initiated a formal dispute on the Draft FFS in August of 2018. EPA Region 4, the DOE and the TDEC were unable to reach a resolution through the dispute resolution process of the FFA. Accordingly, the Acting Region 4 Regional Administrator issued a decision in March 2019 that concluded that: (1) CERCLA is the appropriate cleanup authority and CERCLA § 120(e)(4) provides the EPA's final remedy selection authority at Federal Facility sites on the NPL; (2) wastewaters discharged from the EMWMF and the proposed EMDF must meet CERCLA § 121(d) threshold requirements for ensuring protectiveness of human health and the environment, including discharges of radionuclides; (3) such discharges must also comply with the other threshold requirement of attaining "applicable requirements" and/or "relevant and appropriate requirements" identified by the EPA; and (4) that, in this case, the EPA and Tennessee's CWA NPDES regulations, as well as Tennessee Water Quality Standards regulations establishing designated uses and criteria to protect those uses, are relevant and appropriate requirements to the development of PRGs for the on-site discharge to surface waters of radionuclides.

On April 5, 2019, the DOE elevated the regional administrator's decision for resolution pursuant to the FFA and CERCLA § 120, and subsequently provided for my consideration formal letters and supplemental materials on June 21, 2019, August 26, 2019, October 18, 2019, April 9, 2020, and in February and March 2020. The TDEC submitted letters on April 5, 2019, in support

[10] No discharge limits were included in that Record of Decision. In 1999 neither the DOE nor the EPA anticipated the volume of wastewater that would be generated by the landfill, and wastewater was anticipated to be mostly leachate. The parties expected that leachate to be sent to the NPDES-permitted Central Neutralization Facility (off-site).

[11] Additional public comment may be necessary in order to meet the public participation requirements for both the current and proposed landfill. *See* 40 C.F.R. § 300.435(c)(2) and 40 C.F.R. § 300.430(f)(3)(ii).

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of the regional administrator's position, and responded to the DOE's position on April 18, 2019, and July 5, 2019.

In its elevation of this dispute, the DOE has articulated five overarching issues. First, the DOE raises concerns about the scope of the Region 4 position and how it would impact NRC and DOE implementation of *Atomic Energy Act*-authorized dose-based limits that are considered protective under NRC and DOE programs. Second, the DOE asserts that certain NRC regulations should be considered ARARs for this response action and DOE Orders should be considered. Third, the DOE challenges Region 4's process for identifying ARARs and asserts that the regional administrator's position violates the CWA and the *Administrative Procedure Act*. Fourth, the DOE has stated that there is limited potential for exposures to radionuclide contamination via ingestion of fish caught in the receiving stream due to several site-specific factors. And fifth, the DOE has raised concerns about the cost impact of the regional administrator's position.

As stated in letters sent in April and July 2019, the TDEC supported EPA Region 4's assertion that protective discharge limits for disposal of landfill wastewater should be consistent with CERCLA and established in the ROD for the EMDF. TDEC's Commissioner emphasized that any future on-site disposal facility should comply with the *Tennessee Water Quality Control Act* and state regulations as well as protect downstream surface water users who eat fish sourced from these waters. The TDEC agreed with the EPA that CWA NPDES regulations were appropriately identified as "relevant and appropriate" requirements under CERCLA and reiterated that the current and proposed landfills are CERCLA remedial actions and, therefore, wastewater effluent limits must protect human health and the environment and comply with NCP requirements.

Issue 1: Scope and Applicability of This Decision

CERCLA § 120(e) and Executive Order 12580 specify how remedies are selected under CERCLA at federal facility NPL sites. The legal analyses in this decision apply only to such sites. Those authorities do not apply to NRC or DOE mission-related activities that are not conducted under CERCLA.[12]

My decision is to require PRGs for effluent limits for discharges of radionuclides to be informed by risks associated with identified site-specific exposures. Accordingly, as a factual matter this decision is necessarily limited to ORR. It only addresses the establishment of protective PRGs to be used in the NCP's remedy selection process that will lead to setting final effluent limits in the ROD for the discharge of effluent that includes radionuclides from landfills constructed as CERCLA response actions at ORR, a site on the NPL.

[12] CERCLA controls the remedy selection for the release of hazardous substances at this site. Congress, in enacting CERCLA, included radionuclides as hazardous substances under CERCLA and specifically addressed AEA materials by choosing to exclude only a narrow subset of AEA materials from the CERCLA definition of "release." *See* 42 U.S.C. § 9620(a) and 42 U.S.C § 9601(22)(C) (definition of "release" that includes a qualified exclusion for releases of source, byproduct, or special nuclear material from a nuclear incident, as those terms are defined in the *Atomic Energy Act of 1954* [42 U.S.C. §§ 2011 *et seq.*], if the release is from a nuclear incident, subject to financial protection by the NRC, or from specific uranium tailings facilities, none of which are applicable here).

Thus, in response to the first issue raised by the DOE, this decision does not establish a precedent for setting effluent discharge limits to surface waters at other DOE NPL facilities and does not apply to DOE or NRC facilities outside the CERCLA context.

Issue 2: Whether certain NRC regulations should be considered relevant and appropriate requirements for the discharge of radionuclides from CERCLA landfills at ORR into surface water and whether certain DOE Orders should be considered.

According to Section 121(d) of CERCLA, with respect to any hazardous substance remaining on-site, remedial actions selected under the act must attain legally applicable or relevant and appropriate federal and more stringent state requirements, or ARARs. Such requirements are "cleanup standards, standards of control or other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance found at a CERCLA site;" or, in the case of relevant and appropriate requirements, that address problems sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site.[13]

The DOE has identified the NRC regulations at 10 C.F.R. § 61.41 and § 61.43 as "relevant and appropriate" requirements for low level radioactive waste disposal.[14] Based on the NCP factors discussed below, the EPA agrees that these regulations also may be relevant and appropriate requirements for the development of PRGs for the discharge of radionuclides in wastewater from EMWMF and from the EMDF.

In assessing whether a requirement is relevant and appropriate, the EPA evaluates the factors in paragraphs 40 C.F.R. § 300.400 (g)(2)(i) through (viii) of the NCP to the extent such factors are pertinent.[15] After careful consideration of the 40 C.F.R. § 300.400(g) factors, the EPA concludes that the NRC's regulations at 10 C.F.R. § 61.41 and § 61.43 are both relevant and appropriate to the discharge of radionuclides in waste water associated with these CERCLA actions because: (1) the purpose of the regulations is to achieve the protection of public health from exposure to radionuclides; (2) § 61.41 addresses all releases of radionuclides to all media, including surface water; (3) § 61.43 addresses releases of radioactivity in effluent from landfills, which is the CERCLA action at issue in the dispute and states that § 61.41 applies to such releases; (4) the substances regulated are CERCLA hazardous substances; and (5) like CERCLA the NRC

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[13] *See* 40 C.F.R. § 300.400(g). *See also* 40 C.F.R. § 300.5.

[14] The *RI/FS for CERCLA Waste Disposal of ORR Waste Disposal* (DOE/OR/01-2535) was approved by the EPA Regional Administrator in Formal Dispute Resolution Agreement under the ORR FFA signed by Senior Executive Committee on December 7, 2017. Appendix E of that document identifies 10 C.F.R. § 61.41 and 10 C.F.R. § 61.43 as ARARs for an on-site landfill from which radionuclides are released to the environment.

[15] The eight factors are (i) the purpose of the requirement and the purpose of the CERCLA action; (ii) the medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site; (iii) the substances regulated by the requirement and the substances regulated at the CERCLA site; (iv) the actions or activities regulated by the requirement and the remedial action contemplated at the CERCLA site; (v) any variances, waivers or exemptions of the requirement and available for the circumstances at the CERCLA site; (vi) the type of place regulated and the type of place affected by the release or CERCLA action; (vii) the type and size of structure or facility regulated and the type and size of structure or facility affected by the release or contemplated by the CERCLA action; and (viii) any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resources at the CERCLA site.

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regulations aim to address and prevent releases of hazardous substances, pollutants and contaminants into the environment at unacceptable levels in order to ensure protection of human health.[16]

Under these regulations concentrations of radioactive material that may be released to the general environment in groundwater, surface water, air, soil, plants or animals must not result in an annual dose exceeding an equivalent of 25 mrem to the whole body of any member of the public with flexibility on apportionment of that dose among exposure pathways and requiring reasonable effort to maintain releases of radioactivity in effluents to the general environment as low as reasonably achievable. These NRC regulations have been identified as a relevant and appropriate requirement at DOE sites where the CERCLA remedial action was construction, operation and closure of an on-site low-level radioactive waste landfill.[17] The EPA has stated that the NRC dose-based limit of 25/75/25 millirems per year (mrem/yr) for radionuclide releases (all pathways) from a low-level radioactive waste disposal unit (i.e., landfill) [18] equates to roughly 10 mrem/yr effective dose equivalent, which the EPA has determined comports with CERCLA's generally accepted cancer risk range.[19]

The NRC dose-based limit of 25/75/25 mrem/yr for radionuclide releases from a low-level landfill such as the EMDF can be apportioned among the exposure pathways such as air, groundwater, soil, plants, animals and surface water considering fish consumption, and used in combination with the NRC process to reduce radiation dose known as ALARA, to result in radionuclide effluent concentrations that would be as stringent as the PRGs derived through application of CWA NPDES regulations for establishing water quality-based effluent limitations and Tennessee Water Quality Standards regulations, ensuring protectiveness of human health and the environment consistent with CERCLA and the NCP.[20]

I also have determined that NRC regulations at 10 C.F.R § 20.1301 (specifying a facility-wide 100 mrem/yr dose limit) and 10 C.F.R § 20.1302 (referencing Table 2 Effluent Concentrations of Appendix B to Part 20 based on a 50 mrem/yr dose limit) are relevant to the ORR landfills but are not appropriate for guiding remedy selection in the FSS. NRC's own

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[16] *CERCLA Compliance with Other Laws Manual, Interim Final, Part I,* OSWER Dir. 9234.1-01, EPA/540/G-89/006, August 1988, General Procedure for Determining if a Requirement is Relevant and Appropriate, p. 1-67.

[17] For example, see *ROD for Disposal of Oak Ridge Reservation CERCLA Waste Oak Ridge, TN, DOE/OR/Ol-l 791&D3* (Sept.1999), *Maxey Flats Nuclear Disposal, KY ROD*, EPA/ROD/R04-91/097 (Sept. 1991), and *U.S. DOE Hanford Environmental Restoration Disposal Facility Hanford Site Benton County, Washington* (Jan. 1995).

[18] 10 C.F.R. § 61.41 ("Concentrations of radioactive material which may be released to the general environment in ground water, surface water, air, soil, plants or animals must not result in an annual dose exceeding an equivalent of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable."). The NRC dose-based limit of 25/75/25 mrem/yr for radionuclide releases (all pathways) from a low-level radioactive waste disposal unit (i.e., landfill) is included in Appendix G of the Draft RI/FS for the EMDF, and the TN equivalent regulation [currently TDEC 0400-20-11-.16(2)] was included in the 1999 EMWMF ROD as a chemical-specific ARAR.

[19] *See Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination,* OSWER Dir. 9200.4-18, Aug. 22, 1997, Attachment B, *Analysis of what Radiation Dose Limit is Protective of Human Health at CERCLA Sites (Including Review of Dose Limits in NRC Decommissioning Rule)*, Aug. 22, 1997, p.2; *Radiation Risk Assessment at CERCLA Sites: Q & A*, Directive 9200.4-40, EPA 540-R-012-13, May 2014.

[20] A remedial action must comply with the most stringent requirement that is ARAR to ensure that all ARARs are attained. 55 Fed. Reg. at 8741.

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regulation at 10 C.F.R. § 61.43, which I have found to be relevant and appropriate, specifies that effluent from landfills containing radioactivity should be addressed under 10 C.F.R. § 61.41, not the standards for radiation protection set out in Part 20. Further, 10 C.F.R. § 61.41 is more stringent. I also have determined that there is no need to consider (under the "to be considered" category in 40 C.F.R. § 300.400(g)(3)) DOE Order 458.1 Radiation Protection of the Public and the Environment, Section 1.4(b) (specifying a facility-wide 100 mrem/yr dose limit) because 10 C.F.R. § 61.41 is more stringent and I have determined that it is relevant and appropriate. Finally, NRC's Part 20 regulations and DOE Order 458.1 are not appropriate to consider in the FFS because any PRG must be protective against at least a 10^{-5} level of risk to be as stringent as the requirements of the Tennessee water quality standards for carcinogens that I have determined are relevant and appropriate.[21]

Issue 3: Whether federal and state CWA regulations should be considered relevant and appropriate requirements for the discharge of radionuclides from CERCLA landfills at ORR into surface water.

In its elevation of the dispute, the DOE argues that, since AEA materials are excluded from the NPDES regulatory definition of "pollutant," there is no jurisdictional basis for the determination that the CWA regulations are relevant and appropriate to the discharge of these materials because those regulations are not "applicable" to AEA materials. The DOE posited that the EPA's proposal would violate the CWA and circumvent the APA by using the CWA to *regulate* discharges of AEA materials into surface waters without going through notice and comment rulemaking to change the NPDES regulatory definition of pollutant. That assertion is legally incorrect. First, the plain language of the NCP requires the EPA to consider "applicable ***or*** relevant and appropriate requirements" when identifying preliminary remediation goals, not applicable ***and*** relevant and appropriate requirements.[22] Second, a limitation on the EPA's authority to regulate under the CWA is not a limitation on the EPA's CERCLA authority to respond to releases of hazardous substances. As the lead agency for remedy implementation at ORR, the DOE is required by Section 120 of CERCLA and Executive Order 12580 to implement remedial actions that comply with ARARs in accordance with Section 121(d) of CERCLA.[23]

One issue before me is whether the CWA NPDES regulations and Tennessee Water Quality Standards, including narrative water quality criteria associated with the designated uses for Bear Creek under TDEC Water Quality Criteria regulations, are "relevant and appropriate" to discharges of wastewater containing radionuclides for purposes of the FFS.[24]

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[21] *See supra*, note 19.

[22] 40 C.F.R. § 300.430(e)(2)(i)(A). CERCLA § 121(d) (42 U.S.C. 9621(d)) reflects Congressional direction to the EPA (and the DOE) that in developing CERCLA remedial goals, the "remedial actions shall be ***relevant and appropriate*** under the circumstances" (emphasis added).

[23] *See also* ORR FFA Section III, Section XXI.F, and Section XVI.

[24] While the DOE does not appear to be challenging the "applicability" of these same CWA regulations to pollutants (e.g., mercury), certain requirements were inadvertently omitted from the FFS that may also be applicable to setting PRGs for the discharge of pollutants, and the FFS must be revised to include these omitted regulations. My staff will provide you shortly with a table that identifies the EPA and Tennessee CWA NPDES regulations applicable to CWA pollutants to be added to the existing ARARs/TBC tables in the Wastewater FFS.

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The state of Tennessee has adopted its own NPDES regulations and the EPA has authorized those regulations to apply in Tennessee. Under CERCLA Section 121(d), ARARs include federal environmental laws and promulgated regulations or state promulgated standards, requirements, criteria or limitations that are more stringent than the federal requirements.[25] Further, CERCLA Section 121(d)(2) specifies that water quality criteria established under Section 304 or 303 of the *Clean Water Act* are ARARs where such criteria are relevant and appropriate under the circumstances of the release or threatened release. CERCLA Section 121(d)(2) also specifies that "[i]n determining whether or not any water quality criteria under the *Clean Water Act* is relevant and appropriate under the circumstances of the release or threatened release, the President shall consider the designated or potential use of the surface or groundwater, the environmental media affected, the purposes for which such criteria were developed and the latest information available."

Accordingly, for purposes of establishing PRGs for the discharge of wastewater from ORR landfills, I find that the R4 Regional Administrator properly applied the NCP factors to determine that the Tennessee and the EPA NPDES regulations that pertain to water-quality based effluent limitations and the Tennessee Water Quality Standards regulations establishing designated uses and criteria to protect those uses are relevant and appropriate requirements to the discharge of radionuclides in wastewater from EMWMF and such future discharge from EMDF.[26] Water quality criteria also are relevant and appropriate under Section 121(d)(2) because (1) the state has designated Bear Creek for recreation uses; (2) these requirements address discharges into surface water; and (3) their purpose is to protect the designated use of the surface water from risks associated with hazardous substances. This decision means that under the relevant and appropriate Tennessee Water Quality Standards[27] established to protect waters designated for "*Recreation Use*" the AWQC for such surface waters must meet a 10^{-5} target risk level for all carcinogens (including radionuclides) and water quality based effluent limitations must ensure that such AWQC are not exceeded.[28]

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[25] 42 U.S.C. § 9621(d)(2)(A); CERCLA § 121(d)(2)(A).

[26] In assessing whether a requirement is relevant and appropriate, the EPA evaluates the factors in paragraphs 40 C.F.R. § 300.400(g)(2)(i) through (viii) of the NCP to the extent such factors are pertinent. The eight factors are (i) the purpose of the requirement and the purpose of the CERCLA action; (ii) the medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site; (iii) the substances regulated by the requirement and the substances found at the CERCLA site; (iv) the actions or activities regulated by the requirement and the remedial action contemplated at the CERCLA site; (v) any variances, waivers or exemptions of the requirement and their availability for the circumstances at the CERCLA site; (vi) the type of place regulated and the type of place affected by the release or CERCLA action; (vii) the type and size of structure or facility regulated and the type and size of structure or facility affected by the release or contemplated by the CERCLA action; and (viii) any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resources at the CERCLA site. In this circumstance, EPA Region 4 considered factors i-iv and viii to be pertinent to the evaluation of relevance and appropriateness for the CWA NPDES regulations evaluated by the EPA considering the scope of the response action.

[27] TDEC 0400-40-03-.02(1). Tennessee water quality standards consist of the *General Water Quality Criteria* and the *Antidegradation Statement* found in Chapter 0400-40-03, and the *Use Classifications for Surface Waters* found in Chapter 0400-40-04. *See also* TDEC 0400-40-03-.05(6). *Interpretation of Criteria.*

[28] TDEC 0400-40-03-.03 *Recreation use* Paragraph (4)(j) ("The waters shall not contain toxic substances, whether alone or in combination with other substances, that will render the waters unsafe or unsuitable for water contact activities including the capture and subsequent consumption of fish and shellfish, or will propose toxic conditions that will adversely affect man, animal, aquatic life, or wildlife.") and fn(c) (10^{-5} risk level is used for all carcinogenic pollutants.").

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The determination that certain state water quality standards regulations are ARARs is not novel or precedent-setting. State water quality standards and the EPA and/or the state CWA NPDES requirements have been identified as relevant and appropriate requirements for the cleanup under CERCLA of radionuclide-contaminated wastewaters at other Superfund sites.[29]

For the reasons discussed under Issue 4, below, I also have determined that the disputed default exposure assumptions, particularly those regarding fish consumption, in CWA guidance documents should not be used to develop PRGs fo r effluent limits for discharges from ORR landfills.

Further, I have determined that the regional administrator erred in determining that technology-based effluent limitations under the EPA and Tennessee regulations are relevant and appropriate to discharges of radionuclides from ORR landfills. Technology-based effluent limitations are potential ARARs when applicable.[30] However, in exercising the EPA's discretion to identify relevant and appropriate requirements,[31] and through my evaluation of the NCP's eight factors, I have determined that technology-based effluent limitations are not appropriate requirements to apply to a discharge of radionuclides from this CERCLA site.

Factor 1 requires consideration of "[the purpose of the requirement and the purpose of the CERCLA action." 40 C.F.R. § 300.400(g)(2)(i). The CWA is a regulatory statute and includes a goal of eliminating the discharge of pollutants.[32] Technology-based standards for toxic pollutants under the CWA are based on best available technology economically achievable which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants.[33] In contrast, CERCLA is a remedial statute which provides the President broad, discretionary authority to take response actions to reduce risks to human health and the environment. It does not include a goal of eliminating all exposure to hazardous substances or eliminating all risk.[34] As demonstrated by the statutory definition of a CERCLA remedy (which includes actions "to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment"[35]) CERCLA's purpose is not aligned with the purpose of the CWA's technology-

[29] For example, the *Rocky Flats Plant, Operable Unit 4 ROD, CO*, EPA/ROD/R08-92/064 (Apr. 1992) included CWA ARARs. Because Rocky Flats Plant surface waters had been designated by Colorado for drinking water and aquatic life protection, the more stringent of MCLs or the Water Quality Control Commissions standards were identified as chemical-specific ARARs for radionuclides, p. 4-4 to 4-6. The *Maxey Flats Nuclear Disposal, KY ROD*, EPA/ROD/R04-91/097 (Sept. 1991) identified Kentucky Surface Water Quality Standards regulations including specific limits for radionuclides as ARARs. The *ROD Amendment West Lake Landfill Site (OU-1) Bridgeton, Missouri* (Sept. 2018) identified Missouri Water Quality Standards and Effluent Limit regulations as ARARs including for discharges of radionuclides.

[30] Technology-based standards generally will be ARARs for the discharge of CWA pollutants.

[31] NCP preamble, 55 Fed. Reg. at 8726 ("EPA has discretion to determine whether any, all, or only a portion of a requirement is relevant and appropriate….").

[32] CWA section 101(a)(1).

[33] CWA section 301(b)(2).

[34] NCP Preamble, 55 Fed. Reg. at 8752.

[35] CERCLA section 101(24).

based standards so consideration of Factor 1 does not support identification of CWA technology-based standards as relevant and appropriate here.[36]

Factor 3 requires consideration of "the substances regulated by the requirement and the substances found at the CERCLA site." 40 C.F.R. § 300.400(g)(2)(iii). The hazardous substances in dispute here are radionuclide materials regulated under the *Atomic Energy Act of 1954* (42 U.S.C. § 2011). These materials are excluded from the CWA regulatory definition of pollutants regulated under the CWA (40 C.F.R. §122.2). Accordingly, consideration of Factor 3 does not support identification of CWA technology-based standards as relevant and appropriate here.

Factor 5 requires consideration of "any variances, waivers or exemptions of the requirement and their availability for the circumstances at the CERCLA site." 40 C.F.R. § 300.400(g)(2)(v). As noted above, the hazardous substances at issue in this dispute are exempted from the CWA. Accordingly, consideration of factor 5 does not support identification of CWA technology-based standards as relevant and appropriate here.

Based on the consideration of factors 1, 3 and 5 described above, I also have determined that, for radionuclides only, Tennessee's antidegradation policy is not relevant or appropriate to apply to the CERCLA remedy for discharges of radionuclides from the ORR landfills. Bear Creek is currently impaired due to PCBs and mercury and is not an outstanding natural resource water. And, as provided in this decision, no discharges from an ORR landfill subject to CERCLA will impair water quality. Accordingly, the antidegradation policy is neither relevant nor appropriate to discharges of radionuclides. Of course, it remains legally applicable to discharges of CWA pollutants, such as mercury.

My decision that CWA technology-based standards and antidegradation policies do not apply to discharges of radionuclides from landfills at ORR does not reverse any existing policy or precedent. I am not aware of any CERCLA record of decision that applies these requirements as applicable or relevant and appropriate to the discharge of radioactive materials regulated under the *Atomic Energy Act of 1954*, as amended (42 U.S.C. §2011) that are afforded a CWA regulatory exemption from the definition of pollutants (40 C.F.R. §122.2). I decline to make a new policy and set a new precedent on this point at ORR.

Issue 4: Whether site-specific factors are relevant to an evaluation of the potential for exposures to radionuclides via ingestion of fish caught in the receiving stream.

The DOE has asserted that site-specific factors are relevant to an evaluation of the potential for exposure to radionuclides via ingestion. I agree. Thus, I have determined that the process for identifying the PRGs will *not* use default exposure assumptions from CWA guidance documents to determine exposures to radionuclides discharged from landfills at ORR, particularly through fish consumption. These default exposure assumptions do not take into account the site-specific

[36] In contrast, as noted above, CERCLA's objective of protecting human health and the environment is aligned with the objectives of CWA water-quality standards, which I have determined are relevant and appropriate to establishing effluent limits for discharges of radionuclides from ORR landfills. Further, under the CWA's regulatory regime, more stringent limitations must be adopted if the application of a technology-based standard fails to meet water-quality standards. CWA Section 301(b)(1)(C).

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risks associated with the reasonably anticipated future land uses at ORR. Reasonably anticipated future land use can be considered when determining the baseline risk. At ORR there is a significant risk that default exposure assumptions could lead to the establishment of effluent limitations in a final remedy that are not closely tied to addressing substantial danger to present or future public health or welfare or the environment and thus may not result in a cost-effective remedy.[37]

Instead of using disputed default assumptions regarding exposures, particularly through fish consumption, the DOE, in applying the relevant and appropriate state and federal CWA regulations and NRC regulations, will establish PRGs for effluent discharge limitations based on site-specific exposure information. This approach is consistent with the NCP.[38] Further, nothing in the federal and state CWA regulations and NRC regulations that I have determined are relevant and appropriate precludes consideration of site-specific exposure information. Under 40 C.F.R. § 122.44(d)(vi), "[w]here a State has not established a water quality criterion for a specific chemical pollutant … the permitting authority *must* establish effluent limits using one or more of the following options: (A) *Establish effluent limits using a calculated numeric water quality criterion* for the pollutant which the permitting authority demonstrates *will attain* and maintain applicable *narrative water quality criteria* and will *fully protect the designated use*, such criterion *may be* derived using … an explicit State policy or regulation interpreting its narrative water quality criterion, *supplemented with other relevant information . . . risk assessment data, exposure data* … and current EPA criteria documents." (Emphasis added).

Tennessee has no explicit state policy interpreting Tennessee's narrative water quality criterion for *recreation* use.[39] Per the NCP, there may be consideration of other pertinent information in developing PRGs which could include a study to determine exposure and risk. Similarly, in apportioning the dose of radiation among exposure pathways and using reasonable efforts to maintain releases of radioactivity in effluents to the general environment as low as reasonably achievable under NRC regulations, nothing precludes the EPA or the DOE from taking site-specific exposure and risk into account.

The existing landfill, EMWMF, is currently discharging wastewaters with hazardous substances into North Tributary-5, a small tributary of Bear Creek. The proposed wastewater discharge locations for the new landfill, EMDF, are Bear Creek and its tributaries, White Oak Creek at ORNL or Upper East Fork Poplar Creek at Y-12. While the location of the proposed landfill has not been selected, the DOE's Proposed Plan calls for it to be located near the existing

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[37] Under Section 121 of CERCLA, all remedies must protect human health and the environment, be permanent to the maximum extent practicable and be cost-effective.

[38] *See* 40 C.F.R. § 300.430(e)(2)(i) ("Initially, preliminary remediation goals are developed based on readily available information, such as chemical-specific ARARs or other reliable information. Preliminary remediation goals should be modified, as necessary, as more information becomes available during the RI/FS…. Remediation goals shall establish acceptable exposure levels that are protective of human health and the environment and shall be developed by considering the following: (A) Applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws, if available, and the following factors:… (5) Other pertinent information.") (emphasis added).

[39] TDEC Rule 0400-04-03.03(4)(j) ("The waters shall not contain toxic substances, whether alone or in combination with other substances, that will render the waters unsafe or unsuitable for water contact activities including the capture and subsequent consumption of fish and shellfish, or will pose toxic conditions that will adversely affect man, animal, aquatic life, or wildlife. Human health criteria have been derived to protect the consumer from consumption of contaminated fish and water….").

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landfill where it may also discharge wastewaters into Bear Creek or its tributaries. For the purpose of the FFS, given that the most restrictive use designation for these receiving waters is recreational (including recreational fishing)[40] the individual with the potential for reasonable maximum exposure to radionuclides in effluent from ORR landfills would be a recreational fisherman who fishes at a location downstream from the discharge. Radionuclides bioaccumulate so the fact that only small minnows exist at NT-5 does not mean exposure cannot occur.[41] The exact location of this point of reasonable maximum exposure will be determined based on where recreational fishing occurs or is reasonably anticipated to occur based on reasonably anticipated future land use, considering the DOE's land use designations.[42]

Fish are present in Bear Creek and the DOE has fish tissue monitoring programs for Bear Creek for PCBs, mercury and other metals. However, at present, the DOE has not evaluated the current level of radionuclides in the tissue of fish in Bear Creek or what that level may be if discharges are increased through construction of the new landfill. That fish tissue data (and assumptions based on expected discharges), as well as consumption data if radionuclides are found in fish tissue, are needed before site-specific exposures can be estimated. The DOE may conduct such a study (or studies), scoped in consultation with the TDEC and the EPA and finalize it as a primary document in accordance with the ORR FFA.[43]

Once the PRGs are established applying relevant and appropriate requirements in a manner that considers site-specific risks, they shall be used to derive the specific final effluent limitations that are identified in the ROD for the discharge of radionuclides from the EMWMF and the future discharge from the EMDF in a manner consistent with the NCP and in compliance with the most stringent of the EPA and Tennessee CWA regulations and the NRC regulations that I have determined are relevant and appropriate. While the point of exposure to radionuclides used for identifying risk and setting appropriate effluent limits may be downstream of the discharge point (which has not yet been determined), the point of compliance for meeting the final effluent limits must be at the point of discharge.[44]

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[40] TDEC 0400-40-04 (designating Bear Creek for fish and aquatic life, recreation, livestock watering and wildlife and irrigation uses).

[41] See RI/FS Risk Assessment Work Plan Addendum, Fernald Environmental Management Project, Fernald, Ohio (June 1992), at 5.3.1 (including ingestion of fish as an exposure pathway and noting the presence of minnows in Paddy's Run on the site and shad, drum and carp in the Great Miami River near the site).

[42] The DOE has designated parts of Bear Creek Valley for unrestricted and for recreational use. See Bear Creek Valley Phase I ROD (DOE 2000). The western half of Bear Creek Valley (Zone 1) is designated for unrestricted use. The easter half of Bear Creek Valley, which includes the confluence of the receiving water for the Environmental Management Waste Management Facility outfall (NT5) and Bear Creek (Zone 3) is currently designated for "controlled industrial" use. There is a one-mile buffer between Zones 1 and 3 that includes the proposed location of the outfall for the proposed Environmental Management Disposal Facility (Zone 2) that is currently designated for recreational use in the short-term and unrestricted use in the long-term. Unless the DOE decides to change its land-use designations and thus change the reasonably anticipated land uses, the EPA will assume recreational fishing could occur in the parts of Bear Creek in Zones 1 and 2. Such a change could be memorialized in the context of the ROD for the new ORR landfill and enforced through the DOE's authority over its reserved federal lands.

[43] Predicting radionuclide levels in fish tissue may also require data on radionuclide levels in the sediments and the water column.

[44] 55 Fed. Reg at 8713 ("For surface waters, the selected levels should be attained at the point or points where the release enters the surface waters.").

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Issue 5: Cost implications of identifying the CWA as an ARAR.

The EPA understands and appreciates the DOE's concerns regarding the issue of cost in remedial actions. CERCLA §121(b) includes cost effectiveness as a factor to be taken into account during the remedy selection process. Consistent with the NCP, cost estimates are developed for each of the remedial alternatives at the FS stage (which is the current stage of this dispute) in order to conduct a comparative analysis that informs the remedy selection decision process.[45] To the extent sufficient information is available, the costs of construction and any long-term costs to operate and maintain the alternatives are considered in developing these estimates.[46] The estimated cost of wastewater treatment will depend in large part on the specific effluent discharge limits that must be met in order for the remedy to be protective. These effluent discharge limits are dependent on the establishment of PRGs. However, since the initial PRGs and effluent limits for discharges of radionuclides have not been determined, reliable cost information is not yet available. The estimated cost of treating wastewater with radionuclides will also depend on the concentrations of radionuclides in the various wastewaters generated by landfill operations, and the volume of the discharge as managed by the DOE. In summary, once initial PRGs and effluent discharge limits are developed, the cost considerations can be evaluated by the agencies in a manner that is consistent with the NCP.

Summary of Major Findings

Based on the foregoing analysis and the record that has led to this decision, the following is a summary of my findings, discussed in more detail above:

1) This decision applies only to ORR.
2) NRC regulations at 10 C.F.R. § 61.41 and 10 C.F.R. § 61.43 are relevant and appropriate for purposes of developing PRGs in the ORR FFS for effluent limits for radionuclide-contaminated wastewater discharges from the EMWMF and EMDF.
3) The EPA and Tennessee's NPDES regulations relating to water quality based effluent limitations and Tennessee Water Quality Standards regulations establishing designated uses and criteria to protect those uses (including the risk level of 10^{-5} for AWQC) are relevant and appropriate requirements for purposes of developing PRGs in the ORR FFS for radionuclide-contaminated wastewater discharges from the EMWMF and EMDF.
4) Site-specific factors shall be used to evaluate the potential for exposure to radionuclides via ingestion of fish and flexibility exists in the relevant and appropriate federal and state CWA regulations as well as the relevant and appropriate NRC regulations to consider site-specific exposure.
5) Consideration of site-specific factors will require site-specific information, including conducting a fish study to assess radionuclides in fish tissue and other media in Bear Creek, and evaluate fish consumption, exposure and risk assessment data, to help inform the development of PRGs for radionuclides at this site.

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[45] *Id.* at 8712 ("The primary objective of the FS is to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the waste management options can be presented to a decision-maker and an appropriate remedy selected.").
[46] 40 C.F.R. § 300.430(e)(7)(iii).

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6) The consideration of cost estimates associated with PRGs is preliminary, but remedial alternatives in the revised FFS will need to include estimates to meet any final effluent limits to perform a meaningful comparative analysis. Consideration of cost will be weighed by the agencies later in the remedy selection process.

In accordance with Section XXVI.J of the FFA, the DOE is directed to incorporate this resolution and final determination into and to revise the FFS as necessary to conform with this decision. It is my expectation that fish tissue studies and development of PRGs for effluent limitations for radionuclides will occur in parallel with Region 4's review of the draft ROD to continue progress on the remedial actions for establishing additional landfill capacity at ORR.

I appreciate your efforts in identifying and discussing your concerns. The EPA looks forward to working closely with both the DOE and the state of Tennessee as we move this project forward.

Sincerely,

Andrew R. Wheeler

cc: Susan Parker Bodine
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