

## LEGACY CONTAMINATION ON THE OAK RIDGE RESERVATION: TAKE ACTION NOW

Nuclear work during the Manhattan Project resulted in contamination that still remains, decades later. For cleanup work to continue, the Department of Energy (DOE) proposed and the Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) approved a new landfill, the Environmental Management Disposal Facility (EMDF) on the Oak Ridge Reservation (ORR). Cleanup of legacy contamination is urgent and necessary. Sadly, the selected approach may result yet again in future generations having to deal with today's problems, as the discharge criteria for EMDF have not been set and may not even be subject to public input. This article summarizes the status and suggests actions the public can take to improve the outcome.

EMDF discharges will include materials such as iodine-129, strontium-90, uranium-235 and 236, technetium-99, and many others. For most radionuclides, appropriate removal technologies are available and are used elsewhere on the ORR; such technologies would significantly reduce concentrations in waters downstream, but no commitment is made to use these technologies to the fullest feasible extent. Instead, EPA argues that doing so is not required for this activity, citing among other justifications that Bear Creek is already significantly contaminated – much of it resulting from DOE's current nuclear landfill and previous shallow land disposal.

ORR was the home of numerous activities during the Manhattan Project to process materials for use in nuclear weapons. These activities resulted in contamination within the site, but also in contamination of surface waters and sediments outside of the Reservation, including, for example, Bear Creek and the Clinch River. For these reasons, in 1989 the site was placed on the National Priorities List (NPL) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLA (otherwise known as "Superfund") gives EPA the ability to intervene in managing land contaminated with high levels of hazardous materials. While the ORR is a Superfund site, it is a DOE federal facility where cleanup is funded by DOE. Hence, DOE is the lead agency.

Many of the areas in the ORR are poor candidates for radioactive waste disposal because of the steep slopes and because of carbonate rocks that can develop caves. Even the less problematic areas have high water tables and numerous small streams. Nevertheless, in 1999, DOE selected a site within the ORR for the construction of the Environmental Management Waste Management Facility (EMWMF) landfill to dispose of CERCLA cleanup wastes, including wastes associated with the demolition of highly contaminated buildings no longer in use at the ORR, particularly at the Oak Ridge National Laboratory (ORNL) and the Y-12 National Security Complex (Y-12). Because EMWMF accepts only waste related to cleanup operations, it is authorized under CERCLA and has not complied with some requirements that would apply to other landfills.

Several retired TDEC employees have pointed out the fact that EMWMF was approved before some critical information was available, which has led to significant problems.<sup>1</sup> For example, limited hydrogeology information led to groundwater intrusion into the facility buffer and liner, and adequate facilities to manage wastewater were not built because the need to treat large quantities of landfill wastewater was not anticipated. The EMWMF landfill, which began receiving wastes in 2002, is expected

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<sup>1</sup> <https://aforr.info/wp-content/uploads/2021/03/Radioactive-and-hazardous-waste-disposal.pdf> [accessed 12/26/2023].

to reach its disposal capacity in the late 2020s, and thus DOE initiated building the EMDF to dispose of additional building demolition and CERCLA cleanup wastes.

However, despite serious concerns with the operation of the existing landfill (EMWMF), the new landfill (EMDF) may not improve upon many of those issues. For example, when rainwater comes in contact with hazardous wastes that are not yet capped, the resulting contact water may contain mercury, polychlorinated biphenyls (PCBs), and radioactive waste (radionuclides). In 2016, TDEC initiated an informal dispute to DOE's Focused Feasibility Study (FFS), objecting, for example, to the way such contact water from EMWMF was being diluted with clean stormwater to reduce apparent radionuclide concentrations, rather than applying removal technologies. EPA Region 4 also initiated an informal dispute, stating that DOE's approach for wastewater discharges into Bear Creek violates CERCLA and Clean Water Act (CWA) requirements.

When the issues between DOE and EPA were not resolved through this informal dispute, EPA issued a formal dispute in August 2018, and released a decision letter in 2019 (the "RA Decision").<sup>2</sup> Specifically, this RA Decision states that wastewater discharges should comply with CWA requirements and that technology-based and water quality-based effluent limitation regulations and Tennessee water quality standards are relevant and appropriate requirements. The RA Decision further states that the CWA requires application of the best available technology economically achievable.

DOE elevated the formal dispute to EPA Administrator Andrew Wheeler in 2019, who issued his final decision (Wheeler Decision)<sup>3</sup> in 2020, in which he disagrees with the RA Decision. Therefore, based on this decision, on September 30, 2022, officials from DOE and TDEC, and EPA Administrator Michael Regan, signed a Record of Decision (ROD) that authorizes discharge from EMDF to surface water with less stringent requirements than the RA Decision would have imposed, defers setting discharge criteria for radionuclides to a future Federal Facility Agreement document, and sets discharge criteria for mercury and PCBs that violate CWA requirements.

Charles Openchowski, a retired senior attorney in the Office of General Counsel of the U.S. EPA, describes this move as follows: "the Wheeler Decision [...] and the EMDF ROD are arbitrary and capricious, do not comply with and are not 'in accordance with' CERCLA requirements, are inconsistent with and not 'in accordance with' a number of provisions in the NCP,<sup>4</sup> and deviate materially from numerous long-standing national EPA guidance documents without providing any reasoned explanations and scientifically credible supporting data for such deviations."

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<sup>2</sup> Letter from Mary S. Walker, Acting Regional Administrator, U.S. EPA Region 4, to the Manager of the DOE Oak Ridge Office of Environmental Management, and to the Commissioner of TDEC, March 21, 2019. [https://www.tn.gov/content/dam/tn/environment/remediation/documents/orr/emdf-docs/rem\\_emdf-ffs-formal-dispute-epa\\_03-21-2019.pdf](https://www.tn.gov/content/dam/tn/environment/remediation/documents/orr/emdf-docs/rem_emdf-ffs-formal-dispute-epa_03-21-2019.pdf) [accessed 12/29/2023].

<sup>3</sup> EPA Administrator Andrew R. Wheeler's December 31, 2020, final decision letter to Mr. John A. Mullis II (DOE) and Commissioner David W. Salyers (Tennessee Department of Environment and Conservation or TDEC) resolving the dispute regarding the Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee.

<sup>4</sup> NCP refers to the National Oil and Hazardous Substances Pollution Contingency Plan, part of the Code of Federal Regulations (CFR) Title 40 (Protection of the Environment), Chapter I (Environmental Protection Agency), Subchapter J (Superfund, Emergency Planning, and Community Right-to-Know Programs).

Charles Openchowski published his detailed analysis of the Wheeler Decision shortcomings in the journal *Environmental Law Reporter* (Vol. 53, Issue 3 (March 2023), pp. 10188-10211). The paper leads with the following questions:

“Should radionuclides get less stringent cleanup than other equally harmful pollutants like mercury and polychlorinated biphenyls? Should Bear Creek and its downstream waters, which run through the facility, get less protection than other streams designated for recreational use? Should recreational fishermen using Bear Creek and its downstream waters be exposed to greater risk? And should DOE get a better deal than other polluters?”

The following paragraphs summarize the arguments made by Charles Openchowski.

#### Radionuclides should not get less stringent cleanup

The Wheeler Decision relies on the CWA permitting regulations’ definition of “pollutant” that includes “radioactive materials (except those regulated under the Atomic Energy Act of 1954, [...]).” This provides a carve-out for radionuclides – however, the definition applies only to three parts of one chapter of 40 CFR, and not to other, similarly relevant portions. Also, while this carve-out may result in certain requirements not being “applicable,” EPA policy is that the most stringent “applicable requirements or relevant and appropriate requirements” (ARARs) must be used in the remedy selection process.

In addition, the Wheeler Decision determined that “CERCLA’s purpose is not aligned with the purpose of the CWA’s technology-based standards” and thus even if technologies are available to reduce pollution, they don’t need to be applied. This contradicts CERCLA’s §121 that states that “Remedial actions in which treatment which permanently and significantly reduces the volume [...] of the [...] pollutants [...] are to be preferred over remedial actions not involving such treatment.”

#### The fact that Bear Creek is already polluted should not be used as justification for further pollution

According to EPA, under the CWA, once a water body’s existing uses have been established, an antidegradation program “must protect existing uses by maintaining the water quality necessary to support those uses.”<sup>5</sup> According to TDEC, Bear Creek is classified for recreation (e.g., fishing and fish consumption).<sup>6</sup> However, the Wheeler Decision states that “Tennessee’s anti-degradation 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.” In other words, *because* Bear Creek is already polluted, the Wheeler Decision argues that further pollution should be allowed. However, EPA’s guidance applies to existing uses of all surface waters (Tier 1) not just for outstanding natural resource waters (Tier 3).

#### Recreational fishermen using Bear Creek and its downstream waters should not be exposed to greater risk

The Wheeler Decision allows EMDF to ignore the standard assumptions that EPA uses under the CWA to determine the public’s exposure to contaminants from surface waters through fish consumption. EPA’s

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<sup>5</sup> U.S. EPA, Key Concepts Module 4: Antidegradation. <https://19january2017snapshot.epa.gov/wqs-tech/key-concepts-module-4-antidegradation.html> [accessed 12/26/2023].

<sup>6</sup> Letter from Randy Young, FFA Manager, TDEC, to John Japp, FFA Manager, DOE, Oct. 24, 2017. <https://www.documentcloud.org/documents/6005653-TDEC-Letter-Oak-Ridge-Pollution> [accessed 12/26/2023].

long-standing, national guidance for exposure from fish consumption uses a lifetime exposure of 70 years: “the goal of water quality criteria for human health is to protect people from exposure to pollutants through fish and water over a lifetime to protect the general population.”<sup>7</sup> Burger and Campbell (2008)<sup>8</sup> report that people who ate the fish they caught in Watts Bar and Poplar Creek (into which Bear Creek flows) ate an average of 37 g/day. To calculate exposure, EPA uses the national fish consumption rate of 22 g/day (with higher values for the southern states).<sup>9</sup> However, as the use of these assumptions is not required for EMDF, the ROD introduces a fish consumption rate of only 17.5 g/day and an exposure duration of 26 years. The latter duration corresponds to the estimated 26-year operational period of EMDF. Reducing the exposure duration from 70 years to 26 years allows a nearly threefold increase in the level of discharged radionuclides and implies that after the 26 years the local population will be eating fish from perfectly clean waters.

#### Technologies are available and achievable to control the discharge

The 2019 RA Decision set a remediation goal of 0.196 picocuries per liter (pCi/L) for iodine-129. Based on the Wheeler Decision, the EMDF ROD increased that number by a factor of 50. Similar changes were made for strontium-90 and technetium-99 (increasing the target by a factor of more than 40) and uranium-235 and uranium-236 (increasing by more than a factor of 250). All these radionuclides have half-lives in excess of hundreds of thousands of years, meaning that radiation resulting from this contamination will remain for generations to come. However, treatment approaches exist for removing radiological constituents prior to discharge, and DOE is already using ion exchange resin technology for this purpose at the ORR and elsewhere. Nevertheless, the Wheeler Decision allows DOE to rely on dilution rather than removal in this case.

#### The public needs to be given a meaningful opportunity to comment

Federal law states that the selection of a remedial action is a two-step process: first, the preferred alternative must be presented to the public for review and comment; and second, the public comments must be reviewed and the state must be consulted to determine if the proposed approach is the most appropriate (40 CFR §300.430(f)(1)(ii)). The EMDF ROD inappropriately states that “no additional comment is required” because the public has been given the opportunity to comment on earlier information. This includes the 2018 proposed plan, which states “The Administrative Record for the management and discharge of this wastewater is not yet complete.”<sup>10</sup> One can hardly assume that asking the public to comment on something that is not yet complete is a meaningful way of including public

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<sup>7</sup> Human Health Ambient Water Quality Criteria and Fish Consumption Rates: Frequently Asked Questions. <https://www.epa.gov/sites/default/files/2015-12/documents/hh-fish-consumption-fags.pdf> [accessed 12/26/2023].

<sup>8</sup> Burger J and KR Campbell. 2008. Fishing and consumption patterns of anglers adjacent to the Oak Ridge Reservation, Tennessee: higher income anglers ate more fish and are more at risk. *Journal of Risk Research*, 11:3, 335-350.

<sup>9</sup> U.S. EPA, Estimated Fish Consumption Rates for the U.S. Population and Selected Subpopulations (NHANES 2003-2010): Final Report (2014) (EPA-820-R-14-002), Table 9b <https://www.epa.gov/sites/default/files/2015-01/documents/fish-consumption-rates-2014.pdf> [accessed 12/26/2023].

<sup>10</sup> DOE, Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste, September 2018 (DOE/OR/01-2695&D2/R1), <https://doeic.science.energy.gov/uploads/A.0100.030.2596.pdf> [accessed 12/26/2023].

input. DOE also released fact sheets and accompanying materials, which, however, did not contain an analysis of a full range of alternatives, a complete and accurate list of all available ARARs, or a description of available treatment technologies. As Charles Openchowski puts it, “There has been no proposed plan, detailed or otherwise, discussing the wastewater effluent discharge limits for the EMWMF or EMDF landfills in a manner that would allow for informed, meaningful public comment.”

### **Actions the public can take to improve the outcome**

Today, the ORR is a valuable resource for scientific research and technology development, conservation, education, and recreation, and supports local and regional economies. The large buffer areas initially established for security now protect public health and provide habitat for numerous wildlife species including 26 state-listed threatened and endangered plants and 20 federally and state-listed animal species, as well as seven State Natural Areas. Those areas open to the public provide diverse recreation including hiking, biking, viewing wildlife, boating, fishing, and swimming.

What can you do to protect the environment in and around the ORR? The proper cleanup of legacy contamination at the ORR affects East Tennessee as well as cleanup of other Superfund sites. Precedents set on the ORR will have far-reaching implications. Therefore, it is important to let DOE, EPA, and TDEC know that the public wants proper cleanup of the contamination from the Manhattan Project. This cleanup requires that information about the waste acceptance and discharge criteria, model assumptions, and model projections under increased rainfall for the EMDF be publicly available.

To express your concerns, please contact the agencies responsible for the cleanup decisions:

- DOE Oak Ridge Operations, P.O. Box 2001, Oak Ridge, TN 37831 or OakRidgeEM@orem.doe.gov
- EPA Administrator Michael S. Regan, 1200 Pennsylvania Avenue NW, Washington, D.C. 20004 or Regan.Michael@epa.gov
- TDEC Commissioner David Salyers: David.Salyers@tn.gov

Environmental groups that have followed this situation and are urging appropriate cleanup include the Southern Environmental Law Center, Advocates for the Oak Ridge Reservation,<sup>11</sup> Tennessee Chapter of the Sierra Club, Tennessee Citizens for Wilderness Planning, and Foundation for Global Sustainability.<sup>12</sup> Let’s work together to make Tennessee an even better place to live, work, play and raise a family.

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<sup>11</sup> The website of the Advocates for the Oak Ridge Reservation provides additional background information at <https://aforr.info/hazardous-waste-landfill-emdf/> [accessed 1/1/2024].

<sup>12</sup> See the online journal of the Foundation for Global Sustainability, the Hellbender Press, at <https://hellbenderpress.org/tag/emdf> [accessed 1/3/2024].