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

OFFICE OF
SOLID WASTE AND
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APR - 4 2017

**MEMORANDUM**

**SUBJECT:** National Remedy Review Board Recommendations for the Oak Ridge Reservation, Environmental Management Disposal Facility and Wastewater Management for the Disposal of Comprehensive Environmental Response, Compensation and Liability Act Waste

**FROM:** Amy R. Legare, Chair
National Remedy Review Board

**TO:** Franklin E. Hill, Director
Superfund Division
U.S. Environmental Protection Agency Region 4

**Purpose**

The National Remedy Review Board (the Board) has completed its review of the proposed cleanup action for the Oak Ridge Reservation (the site), Environmental Management Disposal Facility (EMDF) and Wastewater Management for the Disposal of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Waste, in Oak Ridge, Tennessee. This memorandum documents the Board's advisory recommendations.

**Context for Board Review**

The U.S. Environmental Protection Agency (EPA) Administrator established the Board as one of the October 1995 Superfund Administrative Reforms to help control response costs and promote consistent and cost-effective remedy decisions. The Board furthers these goals by providing a cross-regional, management-level, "real time" review of high cost proposed response actions prior to their being issued for public comment. The Board reviews all proposed cleanup actions that exceed its cost-based review criteria.

The Board review is intended to help control remedy costs and to promote both consistent and cost-effective decisions. Consistent with the CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), in addition to being protective, all remedies are to be cost-effective.

The Board considers the nature of the site; risks posed by the site; regional, state, tribal and potentially responsible party opinions on proposed actions; the quality and reasonableness of the cost estimates; and any other relevant factors or program guidance in making our advisory recommendations. The overall goal of the review is to ensure sound decision making consistent with current law, regulations, and guidance.

Generally, the Board makes the advisory recommendations to the appropriate regional division director. Then, the region will include these recommendations in the administrative record for the site, typically before it issues the proposed cleanup plan for public comment. While the region is expected to give the Board's recommendations substantial weight, other important factors, such as subsequent public comment or technical analyses of response options, may influence the region's final remedy decision. The Board expects the regional division director to respond in writing to its recommendations within a reasonable period of time, noting in particular how the recommendations influenced the proposed cleanup decision, including any effect on the estimated cost of the action. Although the Board's recommendations are to be given substantial weight, the Board does not change the Agency's current delegations or alter the public's role in site decisions; the region has the final decision-making authority.

**Overview of the Proposed Action**

Disposal alternatives are being considered for managing future CERCLA waste generated by cleanup actions at the U.S. Department of Energy's (DOE) Oak Ridge Reservation (ORR) and associated sites. It is predicted that the existing on-site CERCLA waste disposal facility, referred to as the Environmental Management Waste Management Facility (EMWMF), will reach capacity before all estimated ORR cleanup waste has been generated and dispositioned. As such, the selection of a preferred alternative for CERCLA waste disposition post-EMWMF should be considered. CERCLA cleanup waste requiring disposal includes low-level radioactive waste (LLW), mixed waste, and certain classified waste. Mixed waste has components of radiological and other regulated waste, such as Resource Conservation and Recovery Act (RCRA) non-listed hazardous waste and/or Toxic Substances Control Act (TSCA) regulated waste.

The remedial alternatives analyzed as part of the feasibility study (FS) include: (1) no action alternative; (2) on-site disposal alternatives in a newly-constructed, engineered waste disposal facility on the ORR, referred to as the EMDF; (3) off-site disposal alternative; and (4) hybrid disposal alternative consisting of a combination of on-site and off-site disposal alternatives. A focused feasibility study evaluated alternatives for the management of landfill wastewater generated from the on-site disposal of CERCLA waste at the ORR EMWMF, as well as wastewater that will be generated from the CERCLA waste's future disposal. Currently, contact water from EMWMF is discharged to Bear Creek if it meets the discharge limits, which are based on the fish and aquatic life criterion maximum concentration ambient water quality criteria (AWQC). If the contact water does not meet the discharge limits, it is conditioned to meet the discharge limits, or transferred by tanker truck to the Process Water Treatment Complex (PWTC) at the Oak Ridge National Laboratory for treatment and disposal. The remedial alternatives evaluated to address landfill contact water from current EMWMF waste disposal operations and future waste disposal operations include: (1) No Action; (2) Managed Discharge/Treatment at EMWMF/proposed alternative; (3) Treatment at the PWTC at the Oak Ridge National laboratory; and (4) Treatment at Outfall 200 at the Y-12 National Security Complex. These alternatives will provide

both short-term and long-term solutions for the management of landfill wastewater generated during operation of the disposal facilities, as well as during post-closure.

**National Remedy Review Board Advisory Recommendations**

The Board reviewed the informational package describing this proposal and discussed related issues with Region 4 staff and management (Jeffery Crane and Richard Campbell) on July 26, 2016. Based on this review and discussion the Board offers the following comments:

**Waste Characterization**

It is unclear from the package submitted to the Board if the proposed disposal facility evaluated waste characteristics, remaining volumes, and prior site decisions made for purposes of amending a decision as opposed to creating onsite disposal capacity for decisions yet to be made. The Board recommends that this distinction be made clear in the action's decision document. Future remedies should not be predisposed to onsite disposal by this action.

The Board also recommends additional consideration be given to strategies that could minimize the overall airspace of the proposed waste disposal area. Waste acceptance criteria should include specification of parameters that minimize waste volumes and/or void spaces. Sequencing of demolition debris and contaminated soils response actions that would maximize the use of contaminated soils to fill voids would also help to minimize the size of the waste disposal area. Minimizing the footprint of the area necessary for waste disposal activities could result in a larger number of areas being suitable for use with less encroachment on currently non-impacted areas.

Finally, the Board recommends that the site's proposed plan include specific information, data and analysis of these issues so that the public has a meaningful opportunity to comment on the proposed approach for waste disposal.

**Human Health Risk**

The information presented to the Board indicated that the need to take action to address risks to human health and the environment at this site, in a manner consistent with CERCLA response authorities, are contained in previous site decision documents. However, specific information regarding the risks to human health and the environment warranting the use of CERCLA response authority to take this action was not included in either the package or the presentation. The Board recommends that the Region and DOE address this lack of specificity in one of several ways: (1) amend the pre-existing decision documents, which, presumably, already include data and analysis supporting a basis for taking a CERCLA response action, to include the new remedy; or (2) the Region and DOE include in this current decision document the data and analysis supporting a basis for taking a CERCLA action to protect human health and the environment (possibly using existing information developed for the original RODs). The Board recommends that the Region ensure that the decision documents for this site-specific response action clearly identify the basis for taking the action, including the present action requiring the construction of the new landfill(s).

The Region stated during the presentation that, for risk assessment time periods greater than 2,000 years, DOE's preference is to use high non-cancer risk and dose criteria (e.g., HI of 3 and dose limits of 500 mrem/yr). The Region indicated that it believes that DOE does not consider the extended time periods to

be part of the CERCLA risk assessment. The Board recommends that the decision documents clearly explain whether these post-2,000-year time frames are considered part of the CERCLA evaluation. If they are part of the CERCLA risk assessment, then they should be based on CERCLA protectiveness standards (e.g., $10^{-4}$ to $10^{-6}$ cancer risk range, HI of 1), or ARARs, not 500 mrem/yr). Consistent with EPA CERCLA guidance (e.g., OSWER Directive No. 9285.6-20, June 2014, *Radiation Risk Assessment at CERCLA Sites: Q&A,* which indicates that ARARs that are greater than 12 mrem/yr effective dose equivalent (EDE) are generally not considered sufficiently protective for developing cleanup levels under CERCLA at remedial sites), 500 mrem/yr would not be considered protective of human health for CERCLA cleanup purposes.

**Remedial Action Objectives**

The package provided to the Board included two RAOs for the waste disposal alternative. The Board notes that the second RAO mentions MCLs and groundwater as a drinking water resource, even though the information provided by the Region indicates that there is no groundwater contamination or remedial action being proposed as a part of this remedy decision to address groundwater. The Board recommends that the decision documents clearly explain the role of MCLs as a RAO for purposes of this cleanup and clarify that the scope of this remedial action would not include groundwater.

**Principal Threat Waste**

Information provided to the Board indicates the presence of large volumes of mercury in high concentrations, which are to be disposed of in the new unit. The Board notes that specifics of managing PTW (e.g., mercury waste) and/or LLW was not presented. The Board recommends that in its decision documents, the DOE and the Region more thoroughly explain how their reading of Agency guidance and their approach to treatment at this site are consistent with the statute and NCP. This explanation should address specifically how this approach is consistent with CERCLA § 121(b)(1)'s preference for treatment "to the maximum extent practicable;" CERCLA § 121(d)(1)'s requirements regarding protectiveness and applicable or relevant and appropriate requirements; 40 CFR § 300.430(a)(1)(iii)(A)'s expectation that "treatment [be used] to address the principal threats posed by a site, wherever practicable;" and 40 CFR § 300.430(f)(1)(ii)(E)'s preference for treatment "to the maximum extent practicable" while protecting human health and the environment, attaining applicable or relevant and appropriate (ARAR) standards identified in the decision documents, and providing "the best balance of trade-offs" among the NCP's five balancing criteria.

**Remedy Effectiveness**

Alternative Remedies - The information provided to the Board included a discussion of alternatives for both waste disposal (on-site and off-site) and for landfill wastewater management. The Board recommends that additional alternatives be developed and analyzed. Specifically, for waste disposal, the Board suggests development of a more detailed hybrid waste disposal alternative to address waste streams separately. This approach could allow for a smaller on-site landfill [e.g., Alternative 4: Hybrid Disposal Alternative Site 6(b)] while disposing of certain waste streams (e.g., PCBs) in approved existing off-site facilities (including those for certain radioactive wastes). This approach could also potentially avoid the need to evaluate a potential TSCA ARAR waiver.

Regarding wastewater management, the Board recommends evaluation of an alternative that would use pipeline/truck transport of wastewater to the existing treatment facility while a new treatment plant is built. This approach might also include building additional RCRA-compliant wastewater storage capacity (especially during and after storm events), thereby potentially avoiding the use of a "managed

discharge" approach. If a "managed discharge" approach is adopted, the Board recommends that the decision documents explain how it complies with ARARs.

The Board also notes that polymeric encapsulation (e.g., spray coating, drum macro-encapsulation in situ injections) have been evaluated by several DOE laboratories, (such as Oak Ridge National Laboratory, Brookhaven National Laboratory and Hanford) and used by commercial firms to treat radioactive waste. This technology also appears to be stable to alpha, beta or gamma radiation. The goal of such encapsulation is to reduce water contact with metals (such as Hg or radioactive elements) to reduce water transport. The Board recommends that these technologies, or equivalent technologies for reducing metal transport to groundwater prior to any landfilling of these materials, be considered and evaluated where appropriate.

Remedy Performance - The information presented to the Board did not identify a Regional preference for any of the three on-site EMDF disposal alternatives within the Bear Creek Valley. When selecting the preferred EMDF site, the Board recommends that consideration should be given to, at a minimum: (1) current and future land use documented in the stakeholder approved land use plan and institutional control implications, (2) a thorough understanding and consideration of hydrogeologic conditions that exist at each of the proposed EMDF sites, (3) the distance from the closest receptors, and (4) numerous siting requirements [TDEC 0400-20-11-.17(1)(b)-(k)] that are identified as relevant and appropriate requirements. For example, TDEC 0400-20-11-.17(1)(f), specifically states that upstream drainage areas must be minimized to decrease the amount of runoff that could erode or inundate waste disposal units.

Short-term Effectiveness - The package provided to the Board includes a discussion of short-term effectiveness of the on-site, off-site and hybrid alternatives. Included in that evaluation are risk estimates based on morbidity (non-fatal) and mortality (fatal) risks posed by transporting the waste on-site and off-site. These are risks arising from radiological exposure during routine and accident scenarios to the maximum exposed individual (MEI) and collective populations based on location/miles travelled. Truck and other industrial injuries/fatalities are not generally environmental risks that should be considered in a short-term effectiveness analysis, especially for common earthmoving/hauling alternatives such as these. While potential site-related accidents may be of concern, potential worker accidents are typically addressed through project health and safety plans. The Board acknowledges that DOE has indicated that such an evaluation could be appropriate as a part of a separate National Environmental Policy Act analysis of the activities, which could be presented outside of the CERCLA remedy selection process and its attendant nine criteria analysis. Therefore, the Board recommends that the short-term effectiveness section be re-written consistent with the NCP (e.g., 40 CFR 300.430(e)(9)(iii)(E) consideration of "effectiveness and reliability of mitigative measures during implementation") and OSWER Directive No. 9355.3-01, October 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*.

**Applicable or Relevant and Appropriate Requirements**

Based on the information provided to the Board, the waste disposal options would rely in part on a waiver of a portion of the TSCA ARARs (i.e. regulations requiring 50' between bottom of landfill and ground water). The Board notes that, consistent with national program guidance, complying with this location-specific ARAR does not necessarily lead to ensuring protectiveness of human health as

required by CERCLA.[1] From both a general statutory perspective, as well as a regulatory one [under 40 CFR 761.61(c)], TSCA uses a "no unreasonable risk" standard. As a legal matter under established TSCA case law, the "no unreasonable risk" standard is based on cost-benefit analysis; however, CERCLA, under section 121, requires a health-based standard that ensures protectiveness of human health (i.e., per NCP and Agency guidance, $10^{-4}$ to $10^{-6}$ for cancer risks and an HI no greater than 1) and that does not use cost-benefit analysis. As such, the Board recommends the site's CERCLA decision documents and supporting administrative record demonstrate that construction of the new landfill would be protective of human health and the environment, as required by CERCLA (e.g., explain why the 50' buffer is not needed at this site considering rainfall, hydrogeology, etc).

The package identified Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.16(2) Low Level Waste performance objective as an ARAR. The dose limits for this standard are to ensure that an annual dose to any member of the public does not exceed 25 millirem (mrem) to whole body, 75 mrem to the thyroid and 25 mrem to any organ (25/75/25). The Region indicated that, since these dose based requirements are above the upper bound of the risk range, risk-based evaluations will be used instead (e.g., discharge standards, waste acceptance criteria modeling). This determination was based on EPA statements in OWSER Directive No. 9200.4-18, August 1997, *Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination* and OSWER Directive No. 9285.6-20, June 2014, *Radiation Risk Assessment at CERCLA Sites: Q&A* that ARARs that are greater than 12 mrem/yr effective dose equivalent (EDE) are generally not considered sufficiently protective for developing cleanup levels under CERCLA at remedial sites. During discussions with the NRRB, the Region indicated that this standard is likely to not be an ARAR. The Board would like to point out that the statements in OSWER Directives 9200.4-18 and 9285.6-20 are based on effective dose equivalent (EDE) standards and not previous whole body and organ dose limits like the 25/75/25 that EPA considers to correspond to 10 mrem/yr EDE. Also, under OSWER Directive No. 9200.4-23, August 1997, *Clarification of the role of Applicable or Relevant and Appropriate Requirements in Establishing Preliminary Radiation Goals under CERCLA*, regions should consult with Headquarters when considering going beyond an ARAR unless a prior determination has been made by Headquarters that a particular ARAR should not generally be used to establish preliminary remediation goals at CERCLA sites. The Board recommends that the Region determine whether the TDEC standard is an ARAR. If it is an ARAR, and the Region is considering that it is not sufficiently protective, then it should consult with Headquarters per OSWER Directive No. 9200.4-23.

Information provided to the Board indicates the presence of large volumes of mercury in high concentrations that are to be disposed of in the new unit. The Board notes that specifics of managing the mercury waste, which is a RCRA hazardous waste, were not presented. The Board recommends that this operable unit's decision documents should explain the basis for the mercury acceptance criteria (as well as other RCRA hazardous wastes), how those acceptance criteria ensure protectiveness of human health and the environment, and how disposal of the mercury waste complies with the RCRA Land Disposal Restrictions ARAR.

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[1] 55 Fed. Reg. at pp. 8701, 8709, 8712; 1997 OSWER Directive 9200.4-23, *Clarification of the Role of Applicable or Relevant and Appropriate Requirements in Establishing Preliminary Remediation Goals Under CERCLA.*

**Conclusion**

We commend the Region's collaborative efforts in working with the Board and stakeholder groups at this site. We request that a draft response to these recommendations and the draft proposed plan be forwarded to the Board chair in the Office of Superfund Remediation and Technology Innovation's Site Assessment and Remedy Decisions (SARD) branch for review. The SARD branch will work with your staff, Federal Facilities Restoration and Reuse Office and the Board to resolve any remaining issues prior to your release of the record of decision. This memo will be posted to the Board's website (https://www.epa.gov/superfund/national-remedy-review-board-nrrb) 30 calendar days of my signature. Once your response is final and made part of the site's administrative record your response will also be posted on the Board's website.

Thank you for your support and the support of your managers and staff in preparing for this review. Please call me at (703) 347-0124 should you have any questions.

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