



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Remediation - Oak Ridge
761 Emory Valley Road
Oak Ridge, Tennessee 37830

February 26, 2019

Mr. John Michael Japp
DOE FFA Project Manager
Oak Ridge Office of Environmental Management
U.S. Department of Energy
Post Office Box 2001
Oak Ridge, Tennessee 37831-8540

Re: High-level Cost Evaluation Questions: Follow-up to Tennessee Department of Environment and Conservation Request (November 29, 2018) for Backup Information Used in the Development of the Cost Estimates for the Comparison of Disposal Alternatives Associated with Oak Ridge Reservation CERCLA Waste Disposal

Dear Mr. Japp

The Tennessee Department of Environment and Conservation (TDEC) - Division of Remediation (DoR) offers the following questions to clarify the request in TDEC's letter dated November 29, 2018 (Attachment A). The U.S. Department of Energy (DOE) Oak Ridge Office of Environmental Management (OREM) requested this clarification during a project team meeting on January 10, 2019.

During the January 10, 2019 meeting, DOE stated that cost assumptions for the *Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal Oak Ridge, Tennessee* (DOE/OR/01-2535&D5) (RI/FS) were locked in FY2012. It is appropriate to evaluate the validity of several key cost assumptions from FY2012. To assist with this evaluation, please respond to the following questions by March 29, 2019.

1. The RI/FS assumes a 15% Contractor G&A and Fee for onsite disposal. The 2016 *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge Tennessee* (DOE/OR/01-2664&D2) includes a 36% DOE Prime Contractor G&A and Fee. What is the current Prime Contractor G&A and Fee?
2. The RI/FS includes Contractor G&A and Fee for onsite disposal cost and does not include Contractor G&A and Fee for offsite disposal fees and rail transportation. What is the current Contractor G&A and Fee for offsite disposal fees and rail transportation? Where are Contractor G&A and Fee included in the RI/FS offsite disposal analysis?
3. The RI/FS states that annual operations cost are taken from actual costs at Environmental Management Waste Management Facility (EMWMF), estimated at \$10.5 M per year. Adding 15% Contractor G&A and Fee to \$10,500,000 equates to \$12,075,000 annual operations cost

and multiplying by 22 years of operation gives the cost in RI/FS Table I-3, Element Number 2 for Base Operations. DOE's 2016 budget planning case included \$2,779,000 for ORR Landfill Operations and \$15,679,000 for EMWMF Operations. DOE's FY2016 appropriations breakdown includes \$19.4 M for EMWMF/Landfills. Please provide a breakdown of the FY2016 appropriations with sufficient detail to verify EMWMF operations cost, Contractor G&A and Fee, and other pertinent cost for EMWMF and Landfills included in the \$19.4 M total.

4. The RI/FS includes a 22-year operating period for EMDF with final capping and facility closure from 2045 through 2048. The FY2019 planning case includes an operating period of about 45 years with final cap construction from 2070 through 2074. The FY2019 planning case is a little outdated. (a) What FY is the current planning case? (b) When does the current DOE planning case show EMDF operations beginning and ending? (c) What years are specified for EMDF final capping/closure in the current DOE planning case?
5. The off-site disposal rate for debris, \$ 533.96 /cubic yard (c.y.), was based on a 2012 IDIQ contract quote that was based on a very small quantity (10,800 c.y.) DOE- Paducah negotiated an off-site disposal rate of \$ 424.00/c.y. Do you agree that if this rate were applied at Oak Ridge on 1.3 M c.y., it could result in reduction of offsite cost on the order of \$ 143 M? If not, please explain.
6. Please see the EMDF estimated radiological inventory – summary for project team discussions, November 11, 2016 (Attachment B). Please provide the radiological profiles, 95% UCLs, 90% volume upper concentrations, and other items referenced in the summary. If updated statistics are available, please also provide the updated statistics.
7. The D5 RI/FS (page 2-9) states that the *"UCL-95 uncertainty allowance is applied to future volumes. For purposes of this RI/FS analysis, it was conservatively assumed that volume uncertainty would result in increased rather than decreased need for landfill space. A straight 25% uncertainty on waste volumes is assumed in this document."* Please provide the current UCL-95 uncertainty evaluation and results for future waste volumes.

Also, TDEC previously requested documentation required by EPA 540-R-00-002 titled *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study* for costs presented in the RI/FS. TDEC reiterates the request for this documentation and may, in the future, request answers to additional questions separately. Please provide the documentation required by this EPA guidance by March 29, 2019 separately from answers to the above listed questions.

Please direct any questions or comments regarding the contents of this letter to Brad Stephenson. You may reach him at the above address or by phone at (865) 220-6587.

Sincerely

A handwritten signature in black ink that reads "Randy C. Young" with a stylized arrow pointing to the right at the end of the signature.

Randy C. Young
FFA Manager

cc Connie Jones, EPA
Pat Halsey, DOE
Amy Fitzgerald, ORRCA
Shelley Kimel, SSAB
Ron Woody, ORRCA
Amanda Daugherty, ORRCA

ATTACHMENT A

EMDF estimated radiological inventory – summary for project team discussions, November 11, 2016

Volumes of radioactive waste soil and debris from more than 50 different facility disposition and environmental remediation projects are identified for disposal at the proposed EMDF. Estimating the radiological characteristics of these waste volumes from the limited characterization data available is the basic challenge in approximating the EMDF radiological inventory at facility closure. To develop an initial inventory estimate for the EMDF performance assessment, existing site and facility characterization data have been supplemented with selected EMWMF waste lot data.

To estimate the total EMDF radiological inventory at closure, existing volume estimates of waste to be disposed onsite for each CERCLA project are associated with one of seven low-level radioactive waste categories. The categories are differentiated in terms of waste origin (Y-12 vs ORNL), waste form (soil vs debris) and, for debris only, anticipated total activity concentration (refer to Table 1). Based on the CERCLA waste volume estimates presented in Appendix A of the EMDF D4 RIFS, the total volumes and percentages for each category (including the +25% volume uncertainty) are as follows:

Table 1: EMDF waste categories for estimated radiological inventory

EMDF CERCLA Waste Category	Volume (yd ³)	% of Total	Order-of-magnitude average total activity (pCi/g)
Y-12 Debris-Middle Activity Range	161,326	8.3%	10,000
Y-12 Debris-Lower Activity Range	796,618	40.9%	100
Y-12 Soil	452,323	23.2%	1,000
ORNL Debris-Upper Activity Range	194,544	10.0%	100,000
ORNL Debris-Middle Activity Range	124,833	6.4%	10,000
ORNL Debris-Lower Activity Range	63,770	3.3%	100
ORNL Soil	155,144	8.0%	10,000
TOTAL Volume = 1,948,556 yd³			

For each waste category, a generic radiological profile (activity concentrations for each radioisotope) was derived from a combination of: 1) the available characterization data specific to the projects in that category, and 2) selected EMWMF waste lot data for Y-12 and ORNL wastes. Application of specific EMWMF waste lots to the CERCLA project waste in a particular category is determined in general by the waste origin, form, and total activity level (for debris), and based upon project-specific facility characteristics and process knowledge. This approach captures the general radiological contamination differences between Y-12 and ORNL and provides an approximate division of the debris waste into more contaminated and less contaminated volume fractions. The activity-based differentiation of the five debris waste categories provides a minimum factor of ten difference in average total activity concentration among categories at each site (rightmost column of Table 1)

To account for uncertainty in characterization data, radiological profiles based on expected concentration values and on UCL-95 values (95th percentiles) have been developed for use in the EMDF Performance Assessment. Decay corrections based on the interval between year of the waste lot documentation or characterization data report and the anticipated year of closure (2047) are included in the radiological profiles. The total volume of all projects within a given category is assumed to contain the radioisotopes and activity concentrations in the corresponding radiological profile. Category-specific inventories are based on these volumes and concentrations, given an assumed waste bulk density for soil (2450 lb/yd³) and debris (1700 lb/yd³), and the total EMDF inventory (in curies) is obtained by summing the seven resulting category-specific inventories.

Only a relatively small fraction of the total waste volume is expected to be highly contaminated. For each radioisotope, the seven waste category volumes are cumulated in order of increasing UCL-95 concentration to identify an upper bound for a large fraction of the total volume (the concentration of approximately 90% of the total volume is expected to be less than this bounding value, called the 90% volume upper concentration). The distribution of waste volume among the seven categories is such that for most radioisotopes the second or third highest of the seven UCL-95 concentration values provides a good upper bound for ≥90% of the total volume. For two radioisotopes, Ni-59 and Ra-226, an additional assumption for the distribution of activity concentration over the volume of the highest concentration waste category was required to estimate the 90% volume upper concentration.

ATTACHMENT A

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ATTACHMENT B



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Remediation - Oak Ridge
761 Emory Valley Road
Oak Ridge, Tennessee 37830

November 29, 2018

Mr. John Michael Japp
DOE FFA Project Manager
Oak Ridge Office of Environmental Management
U.S. Department of Energy
Post Office Box 2001
Oak Ridge, TN 37831

Dear Mr. Japp

Tennessee Department of Environment and Conservation Request for Backup Information Used in the Development of the Cost Estimates for the Comparison of Disposal Alternatives Associated with Oak Ridge Reservation CERCLA Waste Disposal

The Tennessee Department of Environment and Conservation (TDEC), Division of Remediation Oak Ridge Office (DoR-ORO), requests the subject information in accordance with Section XXIX of the Federal Facility Agreement (FFA) for the Oak Ridge Reservation. Questions and concerns have been raised prior to and during the EMDF public comment period about the DOE-estimated cost differentials between onsite and offsite disposal options. For example, in correspondence dated September 4, 2018, the City of Oak Ridge's Environmental Quality Advisory Board identified several concerns regarding the information DOE provided in the cost estimates.

Therefore, TDEC requests all information used in the development of the cost estimates presented in Appendix I of the most recent draft of the *Remedial Investigation/Feasibility Study for the Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal (DOE/OR/01-2535&D5)*, including but not limited to assumptions, spreadsheets, and formulas. This information is being requested under authority of Tenn. Code Ann. Section 68-212-206(a)(4) and is supported by the waiver of sovereign immunity related to state CERCLA-type laws at Section 42 USC Section 9620 (a)(4). Furthermore, Section 6.1 of EPA's *Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (EPA 540-R-00-002) describes the inclusion of the Detailed Cost Backup:

ATTACHMENT B

Mr. John Michael Japp
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Detailed cost backup for remedial alternative cost estimates should be provided in an appendix to the FS report. This material can include cost calculation sheets, quantity calculation sheets, records of communication for vendor quotes, and conceptual design calculations. If cost estimating software is used to estimate all or part of the costs for remedial alternatives, input/output from these software applications should be provided as part of the detailed backup.

For each cost element or sub-element, a standard worksheet can be used to document the calculation of the total unit cost as shown in Exhibit 6-1 for the example of an SVE extraction well. This type of cost worksheet, together with quantity calculation sheets and other supporting information, can be used to trace each cost shown in the cost summary of an alternative to its underlying assumptions.

Based on our exchange of e-mails on this same issue, TDEC understands there are varying levels of detail in Appendix I. However, Section 3.2.1 does not provide full detail on costs and underlying calculations. Subsection 3.2.2.1, for example, does not provide dimensions for purchase of construction materials that are included in subsection 3.2.2.5. Yet, neither of these subsections provides the full basis for construction costs including labor and the calculations to get to the numbers presented in Table I-3 across all alternatives and for all elements. While DOE notes in email correspondence that Appendix I presents the basis and assumptions for offsite disposal cost estimates, TDEC requests all calculations supporting Table I-3, especially the onsite costs. TDEC is requesting information necessary to allow stakeholders to understand the cost estimates presented in the summary tables of the project record.

Questions or comments concerning the contents of this letter should be directed to Mike Higgins at (865) 220-6595.

Sincerely



Randy C. Young, FFA Manager

xc Connie Jones, EPA
 Pat Halsey, DOE
 Jon Richards, EPA
 Amy Fitzgerald, ORCCA
 Shelley Kimel, SSAB
 Ron Woody, ORRCA
 Traci Cofer, ORRCA