Addendum: Applicable Information - EOI Nickel

Summary

The U.S. Department of Energy (DOE) has created an addendum to the Expression of Interest (EOI) for the Commercial Decontamination of Nickel with Radiological Surface Contamination to aid potential interested parties in the development of their Technical and Commercial Proposals. This addendum is a summary of applicable environmental regulatory requirements. Attached are excerpts from the Waste Acceptance Criteria (WAC) Implementation Plan (IP) and Final Record of Decision (ROD) for the Site-wide Waste Disposition Evaluation Project at the Portsmouth Gaseous Diffusion Plant (PORTS). Subsets of information have been extracted from the larger documents and displayed below to further facilitate an understanding of disposal possibilities for waste generated during decontamination operations at the PORTS site. The aforementioned documents, in their entirety, can be found on the DOE public information database.

Regulatory Requirements

Decontamination of nickel from the converters must be accomplished in compliance with applicable environmental laws, regulations, and permits. Decontamination or disposal activities occurring on-site needs to comply with Ohio Environmental Protection Agency (OEPA) approved regulatory agreements, RODs and work plans.

Regulatory agreements requirements

The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action (DFF&Os) contemplated recycling as part of OEPA's site-specific objectives in Finding ff. p 14 "…and through the dismantlement of all surplus equipment and structures, proper recycling of materials and disposal of all wastes…." Deactivation, dismantlement, demolition and removal of process equipment is included under the definition of "Decontamination and Decommissioning" p. 4 DFF&Os and thus is covered by the DFF&Os.

The June 30, 2015 ROD for the Site-Wide Waste Disposition Evaluation Project at PORTS discusses recycling in general and recycling of Nickel specifically as part of the selected remedy on p. 2-41. It states:

> ***Recycling and/or Reuse***
>
> *DOE is committed to the recycling and/or reuse of materials generated through D&D of the GDP Facilities, in compliance with ARARs. Prior to implementing recycling, DOE will evaluate and document the benefits (including disposal volume savings) against the additional costs of completing the action, implementing issues, and efforts with implementing associated policy issues. There can be costs associated with segregating and handling material, demonstrating the potentially recycled material is uncontaminated, or in decontaminating the material. DOE will evaluate the individual materials and regulatory waste types throughout implementation of D&D and recycle and/or reuse materials at DOE discretion. The final decision to recycle and/or reuse specific materials or discrete waste streams would be at the discretion of DOE, so long as the recycle and/or reuse materials fits the definition of D&D, does not require modification of any Ohio EPA-approved or -concurred with Submissions (e.g., Proposed Plan, Decision Document, Remedial Design, etc.), and is in compliance with all ARARs. If DOE's recycling proposal requires modification of any regulatory documents (e.g., Proposed Plan, Decision Document, Remedial Design, etc.), DOE will submit its proposed modification to Ohio EPA for concurrence/ approval, as applicable, and will allow for public comment, as applicable.*

Recycling and/or reuse of materials at PORTS also could require the use of a large-scale, complex, centralized chemical and/or thermal treatment process (e.g., nickel decontamination and metal melting). The evaluation of such a facility, including implementation of treatability studies, is part of this alternative. However, should DOE have a preference to implement a complex treatment system, a modification to the ROD or another decision document would be required. This alternative allows for the long-term storage of nickel or other potentially recyclable material that may be retrieved. Recycling the Nickel from the converters would not require modification of the DFF&Os.

Decontamination of the Nickel was contemplated in the DFF&Os and the ROD. If the Nickel decontamination occurs on-site at PORTS, by-products and waste could be disposed of in the OSWDF. The OSWDF is currently operational and located in the northeast corner of the PORTS property boundary. It is actively accepting other waste generated during the (D&D) and cleanup of PORTS in a safe and compliant manner. Any by-products or waste would need to meet all components of WAC to be disposed in the OSWDF. If the Nickel decontamination occurs off the PORTS site, by products and waste would need to be disposed of in a compliant landfill authorized to take such waste.

WAC Components:

The purpose of the WAC IP is to define the requirements and processes at PORTS to ensure that waste disposed in the OSWDF meets the approved WAC. This plan is applicable to waste generated at PORTS and destined for disposal at the OSWDF. To properly dispose of the contaminated debris generated from the decontamination of the Nickel, the WAC IP must be adhered to and verified by the waste acceptance organization (WAO). The scope of the WAC includes 7 components to establish criteria of waste disposition in the OSWDF.

Component 1: Prohibited Items

Component 2: Activity Criteria and Chemical Concentration Criteria

Component 3: Waste Evaluation and Characterization Standards

Component 4: Waste Physical Characteristic Standards

Component 5: Waste Packaging Standards

Component 6: Waste Safe Handling Standards

Component 7: Waste Transportation Standards

For the purpose of this EOI, the 7 components of the WAC are applicable to the disposal of the byproducts or waste from the Nickel recovery operations. The details of the WAC components can be found via attachment 1 of this addendum.

Attachment 1:

Pages 23-34. On-site Waste Disposal Facility (OSWDF) Waste Acceptance Criteria (WAC) Implementation Plan (IP) at the Portsmouth Gaseous Diffusion Plant, U.S. Department of Energy, Document No. DOE/PPPO/03- 0728&D3, April 2020.

Attachment 2:

Pages 2-30 -2-43. Final Record of Decision (ROD) Site-wide Waste Disposition Evaluation Project at the Portsmouth Gaseous Diffusion Plant, U.S. Department of Energy, Document No. DOE/PPPO/03-

0513&D2, June 2015.

WASTE ACCEPTANCE CRITERIA IMPLEMENTATION PLAN FOR THE ON-SITE WASTE DISPOSAL FACILITY AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO

U.S. Department of Energy
DOE/PPPO/03-0728&D3

April 2020

Prepared for
U.S. Department of Energy

Prepared by
Fluor-BWXT Portsmouth LLC, Under Contract DE-AC30-10CC40017
FBP-ER-OSDC-WD-PLN-0071, Revision 16

Table 3.2. WAC Component 1: Prohibited Items (Continued)

Prohibition/Exclusion	Rationale
Prohibitions (Component 1A) (continued)	
Waste must not contain or be capable of generating quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste.	*OAC* 3701:1-54-10(B)(5)
Prohibition on the acceptance of RCRA hazardous waste containing bulk or noncontainerized liquid hazardous waste or hazardous waste containing free liquids (whether or not sorbents have been added).	40 *CFR* 264.314(a) *OAC* 3745-27-19(E)(8)(b) and (h)(i) *OAC* 3745-57-14(A)(E)
Prohibition on the placement of bulk or noncontainerized liquid hazardous waste or free liquids contained in hazardous waste (whether or not sorbents have been added) in any CAMU except where placement of such wastes facilitates the remedy selected for the waste. (This prohibition applies to CAMU-eligible waste.)	40 *CFR* 264.552(a)(3) *OAC* 3745-57-72(A)(3)
Prohibitions (Component 1B)	
Off-PORTS generated waste.	A prohibition on the acceptance of waste from off-PORTS generating sources (excluding lab returns and treatability testing wastes and material currently stored on the Facility).
Compressors, Converters, and Coolers from X-326.	Components in-place within the X-326 Process Building as of April 15, 2010, the initial date of the DFF&O.
Enriched materials.	Containerized nuclear material inventories of uranium compounds exhibiting enrichments greater than 20 percent (excludes items such as miscellaneous parts, pipes, valves, empty containers, etc., with only residual contamination which were packaged for ease of handling and safety reasons).

CAMU = Corrective Action Management Unit
CFR = *Code of Federal Regulations*
DFF&O = *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DOE = U.S. Department of Energy
HLW = high-level waste
LDR = land disposal restriction
OAC = *Ohio Administrative Code*
PCB = polychlorinated biphenyl
PORTS = Portsmouth Gaseous Diffusion Plant
RCRA = Resource Conservation and Recovery Act of 1976, as amended
TCE = trichloroethene
TRU = transuranic

3.2.2 WAC Component 2: Activity Criteria and Chemical Concentration Criteria

WAC Component 2, as defined within the DFF&O, requires that any waste considered for on-site disposal be evaluated against activity and chemical concentration criteria. The activity and chemical concentration criteria were developed as part of the Waste Disposition RI/FS and approved as part of the Waste Disposition ROD. The activity and chemical concentration criteria established as part of the WAC are defined as the maximum permissible activity or concentration level for a given contaminant of concern (COC) that may be placed into the OSWDF so as to ensure the long-term protectiveness of the facility. The long-term protectiveness requirements for the OSWDF are defined by the approved ARARs listed in the Waste Disposition ROD and include demonstrating that the OSWDF, when filled with waste and capped, will meet the acceptable exposure levels for carcinogenic and systemic toxicants to the reasonably maximally exposed individual as established by federal statute for a period of 1,000 years, as defined by the implementing guidance to DOE Order 435.1. To define the activity and concentration criteria for each COC, numerical transport models were conservatively applied as a predictive tool to evaluate the movement, if any, of water and contaminants over a 1,000-year period or longer within the OSWDF and the underlying geologic formations to potential human and environmental receptors conservatively placed near the boundary of waste placement. This modeling took into consideration all observed and measured properties of the underlying formations, as well as the design features of the OSWDF, including the multilayered cover and liner systems.

On the basis of this modeling, it was determined that the protective features of the OSWDF and the underlying geology restrict the movement of the placed waste contaminants such that no measurable concentrations of any contaminant present in the waste will be detected above natural background levels at any location outside the OSWDF across the full 1,000-year performance period. On the basis of this modeling alone, no concentration- or activity-based limits are necessary to be imposed as part of the OSWDF WAC to meet any federal, state, or DOE Order-based regulation, standard, or guidance for the protection of human health or the environment related to the long-term performance of the OSWDF.

Other considerations, not associated with the waste containment design features of the OSWDF and the hydrogeological properties of the formation underlying the OSWDF, were further evaluated under this component of the WAC and under other WAC components (i.e., Components 1 and 6). As a result of these further evaluations, limitations have been established on the quantities or concentrations of certain radiological and chemical constituents permissible for disposal in the OSWDF. It should be noted that DOE has also restricted specific waste streams regardless of activity, concentration, or quantity that are present at PORTS from being considered for on-site waste disposal. DOE and Ohio EPA have established the restriction on receipt of these specific waste streams into the OSWDF as enforceable requirements through the approval/concurrence, as applicable, of the Waste Disposition ROD or this WAC IP. Specifically, as further discussed above and in Section 3.2.6, DOE has elected to exclude from consideration for on-site disposal uranium residues removed and containerized from PGE during the building deactivation process, Uranium Management Center lots, containerized nuclear material product inventories, full cylinder inventories, bulk contaminated nickel barrier materials generated from converter segmentation, and large PGE (i.e., converters, compressors, and coolers) from the X-326 Process Building. Additionally, as identified in Section 3.2.6, DOE has defined within this plan to exclude from receipt at the OSWDF the bulk depleted uranium oxides generated by the depleted uranium hexafluoride (DUF_6) conversion facility at PORTS.

As a result of this decision by DOE to limit the D&D waste streams present at PORTS from being considered for on-site disposal, there is at least a five order of magnitude (100,000 times) safety factor for the quantities of radioactive elements that will be placed into the OSWDF and the quantity of radioactive elements that could be safely received into the facility while attaining all federal, state, and DOE Order-based requirements for the long-term protection of human health and the environment.

While not restricted by the required modeling conducted to assess attainment of the long-term effective requirements for the OSWDF, the measured maximum concentrations of contaminants present in PORTS groundwater, including VOCs, were used to develop a conservative characterization of OSWDF leachate for purposes of assessing the potential for this leachate to cause degradation of the HDPE geomembrane components of the liner system for the OSWDF. The HDPE geomembranes proposed for the OSWDF were shown in the OSWDF Geomembrane-Leachate Compatibility Study (DOE 2017) to be compatible with the chemicals that may be present in the worst-case OSWDF leachate, including VOCs (e.g., TCE) and PCBs. The concentrations of VOCs in the conservatively characterized OSWDF leachate are comparable to VOC concentrations often found in hazardous waste and mixed solid waste landfill leachates.

TCE is the most significant VOC in contaminated soil and groundwater found at PORTS. TCE was determined to be the only PHC present at PORTS based on available environmental and waste characterization data. This determination was based on the relative risk to human health presented by the concentrations and volume of TCE present at PORTS and upon its areal extent of contamination within the soil, groundwater, and closed landfills at the site. Recognizing the design features of the OSWDF and the relative impermeability of the underlying formation, it was determined that the primary objective of any alternate treatment standard for TCE would be based on the protection of the synthetic lining from degradation due to interaction with TCE at high concentrations. As a result, an alternate treatment standard of 5,000 ppm was established for TCE in soil to ensure that the liner HDPE materials will not be exposed to excessive concentrations of TCE, including free product that could be deleterious to the integrity of the synthetic lining materials. This standard was established as a maximum threshold criteria for the acceptance of any contaminated soil, debris, or other waste material into the OSWDF.

As previously discussed, uncharacterized wastes from the excavation of the pre-existing closed landfills, foundations, and other locations will be subject to field screening and potentially other characterization prior to transfer to the OSWDF to ensure that no other contaminants are present in concentrations and volume across warranting identification as a PHC. The CAMU Supplement to the Waste Disposition RI/FS outlines the approach for identifying additional PHCs for future uncharacterized waste streams, such as the existing landfills. Should a contaminant other than TCE qualify for classification as a PHC, DOE will confer with Ohio EPA relative to the establishment of an appropriate treatment standard for the contaminant.

Regardless of whether the concentration and volume of a detected contaminant exceeds the threshold for a PHC, it is the intent of DOE to preclude the acceptance of any concentrations of VOCs that could have deleterious impacts on the synthetic liners of the OSWDF. During the excavation process, field screening instruments such an organic vapor analyzers and/or flame ionization detectors will be used as necessary to detect locations where such conditions may be encountered. Should elevated concentrations potentially detrimental to the synthetic liner materials be encountered during excavation, the suspect organic-saturated soil or waste from the landfill or foundations will be set aside until it is further characterized and a determination is made as to whether the materials can be safely placed into the OSWDF. DOE will identify the approach to identifying any such contaminants in the Demolition Design plans and the Excavation RD/RA work plans for the excavation of building foundations and landfills and plumes.

While TCE is the only constituent with a numerical WAC, DOE implements internal procedures and protocols implemented by all waste generators to develop waste management plans that document waste stream characterization, sampling needs, and waste handling and disposal requirements.

Table 3.3 provides WAC Component 2, activity criteria and chemical concentration criteria, derived through the site-specific modeling conducted as part of the Waste Disposition RI/FS and approved as part of the Waste Disposition ROD. It should be noted that while the activity concentrations of radionuclides are not limited by the analytical WAC listed in Table 3.3, no high-level wastes (HLW) or transuranic (TRU) wastes are permitted for disposal in the OSWDF. HLW is defined as spent (used) nuclear reactor fuel when it is accepted for disposal or waste materials remaining after spent fuel is reprocessed. TRU waste is defined as waste containing more than 100 nCi of alpha-emitting transuranic isotopes per gram of waste with half-lives greater than 20 years. PORTS does not possess any inventories of HLW or TRU waste. It should also be noted that additional restrictions have been placed on the quantity and concentration of radionuclides acceptable for receipt into the OSWDF under WAC Component 6, Waste Safe Handling Standards, discussed in Section 3.2.6.

Table 3.3. WAC Component 2: Activity and Chemical Concentration Criteria

Waste Stream	Requirement
Hazardous waste-CAMU ineligible.	Treatment standards, arranged by hazardous waste code, are located in the "Treatment Standards for Hazardous Waste" table in *OAC* rule 3745-270-40.
Hazardous waste contaminated debris	Alternate treatment standards are located in *OAC* rule 3745-270-45.
Hazardous waste contaminated soil	Alternate treatment standards are located in *OAC* rule 3745-270-49.
CAMU-eligible hazardous waste.	TCE – 5,000 ppm.

CAMU = Corrective Action Management Unit
OAC = Ohio Administrative Code
TCE = trichloroethene

3.2.3 WAC Component 3: Waste Evaluation and Characterization Standards

As previously defined in Section 1.2, DOE will be submitting work plans, design plans, and completion reports that will identify the characterization, prohibited item segregation, and other actions planned and undertaken during the deactivation and/or demolition of facilities listed in Attachments G and H of the DFF&O or existing land disposal units or plume excavations to demonstrate compliance with the WAC IP requirements. These plans and reports will be submitted to Ohio EPA for review and approval/concurrence, as applicable. Consistent with Section XI of the DFF&O, collected characterization data will be made available to the Ohio EPA.

Within the Contractor organization, as part of the planning process to determine what, if any, additional characterization information that may be required to ensure WAC compliance, the first step in waste evaluation and characterization for on-site disposal is to identify the waste streams to be generated by any individual deactivation, demolition, and/or excavation projects. These waste streams will be documented in a project-specific generator's waste management plan. Wastes identified for on-site disposal in the generator's waste management plan must meet the requirements of WAC Component 3.

WAC Component 3 requires that the waste meets waste evaluation and characterization standards for the OSWDF. These standards define requirements for determining the waste type and compliance with WAC Components 1 and 2, including chemical analysis, visual inspection, and/or information which must be known to treat, store, or dispose of the waste in accordance with the ARARs derived from state solid and hazardous waste requirements, RCRA, TSCA, and DOE LLW requirements. Specifically, this provides documentation that the waste does not contain any prohibited items and meets the activity criteria, chemical concentration criteria, and safe handling criteria.

Every generator is responsible for characterizing waste intended for disposal at the OSWDF. The Waste Form Compliance Checklist is used to document that prohibited items have been removed. Analytical data or process knowledge may be used to demonstrate that waste meets the WAC. It should be noted that characterization information is not solely obtained from sampling and analysis. For example, process knowledge data may be obtained from review of Standard Operating Procedures or interviews with long-term workers, safety data sheets, product literature, product specifications, etc. which can provide data regarding what chemicals were used in a process and at what concentrations. This information can be used to derive the concentrations one would expect to be left behind in process residues.

For radionuclides, the generator must also document the basis of characterization, which may include but are not limited to, process knowledge, surveys, NDA, intrusive sampling and analysis, or a combination of these. The characterization documentation includes the basis used to confirm compliance with limits imposed on the quantity of radioactive materials in the waste to meet the nuclear safety requirements contained in WAC Component 6, Waste Safe Handling Standards. As discussed in Section 1.2, DOE will summarize to the Ohio EPA, either within the Project-specific Deactivation Completion reports or in separate correspondence for the identified seven former uranium processing facilities in Appendix H of the DFF&O, the efforts undertaken to identify and remove the necessary uranium compounds held up in the former processing systems to render the facility amenable to open air demolition and the generated debris safe for placement in the OSWDF. In addition to determining nuclide concentrations, the generators of radioactive waste are required to document their basis for demonstrating the waste does not meet or exceed the definition of TRU waste (i.e., containing 100 nCi/g or greater of alpha-emitting isotopes with an atomic number greater than 92). Waste generators are responsible for ensuring that waste is authorized for on-site disposal and meets the requirements of all WAC Components prior to transport of the waste to the OSWDF. The Waste Form Compliance Checklist is used to document this certification by the waste generator.

3.2.3.1 Identification of prohibited items

During the development of prohibited items for the OSWDF WAC, existing site information, as outlined below, was carefully evaluated. Once the potential site contaminants were identified, a complete evaluation of the formal regulatory prohibitions resulting from ARARs was conducted to finalize the list of prohibited items. The following site-specific information considered as part of this process included:

- Process Knowledge
  - Staff experience
  - Design drawings
  - Historical samples taken during plant operation
  - Former landfill waste streams, disposal limits, and operating history
  - Field in situ qualitative methods
  - Past studies, reports, and records/logs
  - Data from DOE sites that have generated waste from the D&D of processes or buildings similar to PORTS, such as the Oak Ridge Reservation.
- Analytical Sampling Results
  - Analytical characterization sampling results from samples of buildings, soils, and groundwater plume areas
  - PCB analysis of samples under TSCA
  - Compliance sampling under RCRA

- Monitoring results from Industrial Hygiene or Radiation Protection sampling
- Process equipment characterization.

- Field Characterization Sampling Results
  - Direct radiological measurements (Radiation Protection)
  - Smears to quantify surface radiological contamination
  - NDA measurements
  - Chemical field characterization techniques.

- Nuclear Material Control and Accountability Inventory
  - Hold-up inventory in six buildings (X-326, X-330, X-333, X-705, X-710, and XT-847)
  - Containerized uranium inventory at PORTS.

As described in Section 2.2, Mass Flow was used during the RI/FS to inventory the potential waste volumes resulting from D&D of the process buildings and other support buildings. During preparation of deactivation RD/RA work plans, Mass Flow inventories, along with process knowledge, existing data, and visual inspections, will be used in part to identify prohibited items present. The Process Buildings Deactivation RD/RA Work Plan, Comprehensive Process Buildings RD/RA Work Plan, General Facilities Deactivation RAWP, Project-specific Deactivation Completion reports, or Demolition Design plans will document the efforts undertaken to remove prohibited items from the facilities prior to or during the demolition process. The waste generator will provide certification to the WAO that all such prohibited items have been successfully removed prior to approval of a facility D&D waste stream for on-site disposal. The WAO will conduct building inspections focused on the removal of prohibited items, as well as provide oversight during the waste generation and loading processes to provide further assurance that no prohibited items remain in the waste intended for on-site disposal. Finally, the WAO will conduct observations within the OSWDF at the waste unloading location as a final check that no prohibited items were accepted into the OSWDF.

3.2.3.2 Characterization of radiological activity

As discussed in Section 3.2.2, fate and transport modeling indicated that the radioactive elements present in PORTS waste that DOE is planning for disposal in the OSWDF are five orders of magnitude lower than what could be safely permitted into the OSWDF and remain compliant with all federal, state, and DOE Order-based requirements for the long-term performance of the OSWDF and the protection of human health and the environment. While additional characterization would generally not be required on low concentration waste streams (such as the superstructure of buildings, foundations and transite panels), additional characterization will be necessary prior to on-site disposal for waste streams such as process piping to ensure compliance with the safe handling WAC requirements and with DOE Nuclear Safety regulations and orders. Additional radiological WAC requirements related to safe handling and disposal of waste are provided in Section 3.2.6.

3.2.3.3 Characterization of chemical concentrations

Fate and transport modeling indicated that the range of concentrations for most chemical contaminants present in PORTS waste are much lower than what can be placed into the OSWDF. The CAMU designation in the Waste Disposition ROD established an adjusted standard of 5,000 ppm for TCE. The 5,000 ppm concentration represents the final maximum TCE contamination in PORTS waste for receipt at the OSWDF based on the large amount of existing soil data collected under the Ohio Consent

Decree investigation efforts since the early 1990s for over 100 potential contaminants at PORTS, providing nearly 400,000 analytical results. CAMU-ineligible hazardous waste must meet the treatment standards provided in WAC Component 2. The limit of 5,000 ppm for TCE is an adjusted waste acceptance limits for soil and soil-like materials and waste materials, like those from the closed landfills and the plume soil. Process knowledge and historical soil sampling results will be used to identify TCE source areas and TCE plume soils. Based on the groundwater concentrations of TCE and the assumed soil/liquid partition coefficient of 10, the highest TCE concentrations in soil are expected to be less than 5,000 ppm. However, additional soil sampling (e.g., geoprobe samples) will be needed to confirm the TCE concentrations underneath the buildings and in limited areas within the plumes. Waste generating organizations will be responsible to demonstrate that waste identified for disposal in the OSWDF either meets waste acceptance limits for soil or has undergone the appropriate treatment and characterization to confirm compliance with the WAC for that waste. Additionally, as previously stated in Section 3.2.2, DOE will employ field screening techniques during the excavation of building foundations, landfills, and plumes to identify any soil or waste exceeding 5,000 ppm and to determine if any other contaminants are present in concentrations and volumes so as to trigger the thresholds for designation as a PHC or to be segregated from transfer to the OSWDF to mitigate potential impacts to the synthetic lining systems.

The following ARARs from the Waste Disposition ROD provide requirements for characterization of waste that must be met.

- Solid Waste (for CAMU-ineligible waste streams)
    - Determine if solid waste is hazardous or is excluded under 40 *Code of Federal Regulations* (*CFR)* 261.4 (*OAC* 3745-51-04), and
    - Determine if waste is listed as a hazardous waste in 40 *CFR* 261 (*OAC* 3745-51-30 through 3745-51-35), or
    - Determine whether the waste is identified in Subpart C of 40 *CFR* 261 (*OAC* 3745-51-20 through 3745-51-24), characterizing the waste by using prescribed testing methods or applying generator knowledge based on information regarding material or processes used.
- PCBs
    - Disposal records shall include the three-dimensional burial coordinates for PCBs and PCB items.
    - Any person must assume that a capacitor manufactured prior to July 2, 1979, whose PCB concentration is not established, contains > 500 ppm PCBs. If date of manufacture is unknown, any person must assume the capacitor contains > 500 ppm PCBs.

3.2.4 WAC Component 4: Waste Physical Characteristic Standards

WAC Component 4 is the waste physical characteristic standards approved in the OSWDF O&M Plan and associated IMPP. The IMPP establishes the operational requirements to receive, place, and compact impacted material in the OSWDF in a manner that will (1) be protective of the OSWDF liner system, leachate management system, and final cover system; (2) result in an OSWDF waste mass that is stable and does not undergo unacceptable levels of differential settlement; (3) result in the disposal of impacted material in a manner that prevents unacceptable worker exposure to health and safety hazards; and (4) achieve the long-term performance goals of the OSWDF. As described in Section 2.3 of this WAC IP, the IMPP classifies impacted materials as Types 1, 2, 3, 4, and 5 based on handling, placement, and compaction requirements. Placement requirements are provided for each type of waste as well as size and waste form restrictions. The Waste Physical Characteristics Standards WAC for the OSWDF finalized by the OSWDF O&M Plan are provided in Table 3.4.

Table 3.4. WAC Component 4: Waste Physical Characteristic Standards

Materials shall be segregated by waste type prior to delivery to the IMTA or OSWDF and shall meet the physical characteristic standards associated with the waste type.
Type 1 – Materials shall contain no hard agglomerations greater than 12 in. in the greatest dimension.
Type 1 – Type 1 material must be graded so as to permit compaction with standard construction equipment and measurement using the Standard Proctor test, in accordance with the IMPP.
Type 2 – Materials including, but not limited to general building rubble consisting of drywall; heating, ventilation, and air conditioning systems; electrical systems; plumbing systems; size-reduced compressors from X-330 and X-333; and minor equipment shall be sufficiently reduced in size to be gradable into a 21 in. ±3 in. lift by equipment similar to a Caterpillar D-8 bulldozer or equivalent.
Type 2 – The maximum length (and width) of irregularly shaped metals or other components of a building superstructure or finish component shall be 10 ft, with a maximum thickness of 18 in. Occasional large pieces of debris with these maximum dimensions may be accepted for placement as Type 2 material with prior authorization by the OSWDF Operations Manager (or his/her designee).
Type 2 – Piping and cylinders with a nominal diameter larger than 12 in., except the piping containing asbestos, shall be split in half lengthwise or crushed to reduce void space and shall have a maximum length of 10 ft. (Note: piping containing asbestos is Type 5).
Type 2 – Pressurized cylinders shall be visibly identifiable as empty and free of pressure (e.g., breached and clearly marked empty).
Type 2 - Whole, shredded, or sheared scrap tires may be placed as Type 2 waste as long as they meet the exception requirements of *OAC* 3745-27-19(E)(8)(g)(i)-(iv) and the size and void space limitations for Type 2 material.
Type 3 – Transite panels should be bundled with like sizes (e.g., one bundle would contain transite panels that are 4 ft wide by 4 ft long and stacked up to 4 ft high, while another bundle might consist of transite panels that are 4 ft wide by 12 ft long stacked up to 4 ft high).
Type 3 – Containerized waste shall have no more than 10 percent internal voids (i.e., at least 90 percent full) or shall be very small containers (e.g., ampules).
Type 3 – Intact (i.e., not split) tanks and cylinders with a maximum cross-sectional dimension of 4 ft may be placed as Type 3 impacted material if the internal void space is reduced in accordance with the IMPP Type 3 placement requirements.
Type 3 – Items must be suitable for having Type 1 material placed around and against them. The specific configuration of an item may make this difficult; in those cases, filling around and against these items may be augmented with materials approved by Nuclear Safety to assure that excessive voids will not exist. While these items are acceptable to be placed as Type 3, they should not be sent to the OSWDF without authorization from the OSWDF Operations Manager (or his/her designee).
Type 3 – The maximum cross-sectional dimension of an individual concrete member or other component of a building slab or substructure shall be 4 ft when the item is handled individually and is a regular rectangular shape having no concrete protrusions greater than 18 in.
Type 3 – PCB containers and PCB articles that must be placed in a manner that prevents damage to the container or article shall be clearly identified.
Type 3 – Containers holding free liquids cannot be placed in the OSWDF unless free-standing liquid has been removed and mixed with sorbent or solidified, or the container otherwise complies with *OAC* 3745-57-14. Sorbents used to treat free liquids must be nonbiodegradable.
Type 4 – Uncontaminated vegetative waste (e.g., waste from clearing, stripping, grubbing, mowing) shall not be placed in the OSWDF to the extent practicable. Vegetative waste disposed of in the OSWDF shall be included in Type 4 disposal volume tracking.

Table 3.4. WAC Component 4: Waste Physical Characteristic Standards (Continued)

Type 4 – Decomposable materials (i.e., organic-based materials that produce methane gas upon decomposition) shall be sized such that they can be placed within a 1-ft-thick lift with minimal voids. The total quantity of Type 4 impacted material placed in the OSWDF shall be limited to 5,744 cy total and 479 cy per cell under a 12-cell configuration.
Type 5 – Asbestos-containing pipe with a nominal diameter of greater than 18 in. shall be split lengthwise or the internal void space filled prior to placement in the OSWDF.
Type 5 – Converters will be segmented. Each segmented converter shell shall be appropriately size-reduced to meet the WAC as Type 2, 3, or 5 waste, balancing the cost of size reduction, the risks to workers, and the efficiency of final waste placement.
Type 5 – Placement of Type 5 material not previously addressed in the IMPP (e.g., whole compressors, large containers) requires development of special placement and compaction requirements that are approved by the Architect-Engineer Contractor responsible for design of the OSWDF.

Source: DOE 2019a

IMPP = Impacted Material Placement Plan (DOE 2019b)
IMTA = Impacted Material Transfer Area
OAC = Ohio Administrative Code
OSWDF = On-site Waste Disposal Facility
PCB = polychlorinated biphenyl
WAC = waste acceptance criteria

The OSWDF Project will be responsible, with the independent oversight of the WAO, to track the ongoing and cumulative placement of Type 4 impacted materials within individual cells and in the overall OSWDF. OSWDF and WAO personnel will ensure that the quantity limits for Type 4 impacted materials are not exceeded.

3.2.5 WAC Component 5: Waste Packaging Standards

WAC Component 5 defines the minimum packaging requirements for waste acceptance and transfer to the OSWDF. The majority of the waste will be transported and disposed of as bulk waste in which the transport vehicle serves as the package or container. Packaging requirements are specified by U.S Department of Transportation (DOT), RCRA, and TSCA. Transfer of hazardous material to the OSWDF at PORTS will be performed in accordance with the ARARs and TBCs. The on-site transfer of waste to the OSWDF shall be performed in a manner that will provide a level of safety equivalent to that provided if transportation were conducted in accordance with DOT requirements, as discussed in Section 4 of the OSWDF O&M Plan.

Table 3.5 provides the Waste Packaging Standards WAC for the OSWDF as finalized in the OSWDF O&M Plan. It should be noted that containers disposed of in the OSWDF must comply with other WAC requirements (e.g., physical characteristic standards for void space and prohibited contents, such as liquids).

Quantities of regulated beryllium-containing waste will be generated during the deactivation and demolition of the PORTS facilities. Specific considerations for the health and safety of involved workers including OSWDF, WAO, Waste Management, and DOE and Ohio EPA oversight personnel will be addressed in project planning documentation including the Deactivation and/or Demolition RD/RA work plans, waste profiles, and in the project-specific waste management plans. These considerations will include any additional waste preparation, packaging, or transportation requirements in addition to any required changes in training requirements, medical monitoring, or placement controls.

Table 3.5. WAC Component 5: Waste Packaging Standards

Hazardous materials must be transferred to the OSWDF in a DOT–approved package, a DOT-equivalent package, or in accordance with DOT packaging equivalency requirements developed per DOE Order 460.1C requirements and approved by the Transportation Manager for the discrete waste stream.
All hazardous material transfers in roll-offs and open top truck beds shall be covered (e.g., tarped) unless otherwise approved by the Transportation Manager. This approval shall be documented, available for inspection, and utilized by the WAO to verify loads are in compliance and ready for transfer.
Tight fitting, leak resistant tailgates are required on all equipped truck beds, roll-off boxes, or other gate-equipped conveyances unless otherwise approved by the Transportation Manager. This approval shall be documented, available for inspection, and utilized by the WAO to verify loads are in compliance and ready for transfer.
PCB waste other than PCB bulk product or PCB remediation waste such as PCB articles, PCB items, and PCB equipment shall be containerized in accordance with 40 *CFR* 761.65(c)(6).
Containerized PCBs and PCB items at concentrations greater than or equal to 50 ppm will be labeled in accordance with 40 *CFR* 761.40(a)(1).
Regulated beryllium-containing waste and beryllium-contaminated equipment must be packaged and disposed of in sealed, impermeable bags, containers, or enclosures per 10 *CFR* 850.32(b).
Packages of regulated beryllium-containing waste and beryllium-contaminated equipment must be labeled with the following information in accordance with 10 *CFR* 850.38(b): "DANGER, CONTAMINATED WITH BERYLLIUM, DO NOT REMOVE DUST BY BLOWING OR SHAKING, CANCER AND LUNG DISEASE HAZARD."
Waste lacking long-term structural stability that has not otherwise been processed to provide structural stability must be placed in a disposal container or structure that provides stability after disposal.
Regulated asbestos-containing material shall be managed per 40 *CFR* 61.150(b)(1)-(3) and *OAC* 3745-20-05(A).
Regulated asbestos-containing containers shall be labeled in accordance with 40 *CFR* 61.150(b)(1)-(3) and *OAC* 3745-20-05(A).
Containerized waste shall be evaluated prior to containerization, provided with an appropriate vent, and marked if there is potential to generate gas pressure.
Containers shall be marked to indicate if waste requires continued management in containers and whether the container must remain intact during placement.

Source: DOE 2019a

CFR = Code of Federal Regulations
DOE = U.S. Department of Energy
DOT = U.S. Department of Transportation
OAC = Ohio Administrative Code
OSWDF = On-site Waste Disposal Facility
PCB = polychlorinated biphenyl
WAO = Waste Acceptance Organization

3.2.6 WAC Component 6: Waste Safe Handling Standards

WAC Component 6, Waste Safe Handling Standards, provides limitations on waste disposed in the OSWDF based on the safety basis established under 10 *CFR* 830, Subpart B, *Nuclear Safety Management*. The safety basis documents the hazard and accident analysis of a facility, determines the final nuclear hazard categorization for the facility, and establishes requirements for control and mitigation of nuclear hazards. The safety basis for the OSWDF and associated leachate treatment system is documented in the *Hazard Analysis for the Operations of the Portsmouth Gaseous Diffusion Plant X-780 On-Site Waste Disposal Facility and Interim Leachate Treatment Facility* (Hazard Analysis) (FBP 2017 [or the most recent revision]). The Hazard Analysis categorizes the OSWDF and the associated leachate treatment system as "Less than Category 3" nuclear facilities (also referred to as "radiological facilities").

The hazard category for a facility is determined by evaluation of the radiological inventory of the facility and associated hazards to workers, the public, or the environment that could result from a variety of significant accident scenarios (e.g., explosion, major fire, truck overturn, nuclear criticality, aircraft crash, high wind dispersion). A "Less than Category 3" determination means the radiological hazards of the facility are appropriately addressed by the requirements of 10 *CFR* 835, *Occupational Radiation Protection*.

The Hazard Analysis includes within its scope a Nuclear Criticality Safety (NCS) Determination for the OSWDF and associated leachate treatment system. To categorize each facility as a "radiological facility", fissile material placed in the OSWDF and generated leachate must be assured to remain subcritical during all phases of waste cell operations, including active waste disposal operations and inactive, postclosure periods. All waste streams designated for placement into the OSWDF containing fissile isotopes (uranium-235) must comply with the requirements of the NCS Determination for establishing criticality incredible. Based on the NCS Determination, the OSWDF Hazard Analysis provides mass (gram) limits for on-site disposal of fissile materials contained in individual wastes such as piping, tubing, and equipment that must be met to declare the item criticality incredible. Characterizing waste to obtain a criticality incredible determination is accomplished by waste generators following a process approved by NCS and includes use of process knowledge, NDA measurements, physical sampling, and visual inspection. The determination that waste meets nuclear criticality requirements for on-site disposal is documented in accordance with site NCS Program requirements. WAC established to maintain compliance with the facility safety basis are provided in Table 3.6. As previously stated, DOE will summarize to the Ohio EPA, either within the Deactivation Completion reports or in separate correspondence, the efforts taken to characterize the remaining inventories of radioactive materials in a given facility and the basis of their decision to reduce the hazard category of the facility to establish its acceptability for open air demolition and for the safe placement of the generated debris in the OSWDF.

In addition to establishing Waste Safe Handling Standards for compliance with the OSWDF safety basis, DOE is electing to prohibit certain waste streams and waste forms from disposal in the OSWDF. These prohibitions provide further confidence in the safety of waste placement and the post-closure care activities of the OSWDF. These prohibitions are also included in Table 3.6.

Table 3.6. WAC Component 6: Waste Safe Handling Standards

Requirement of OSWDF Safety Basis
Waste streams designated for placement into the OSWDF must be evaluated and authorized for disposal by the OSWDF Hazard Analysis.
Waste streams designated for placement into the OSWDF containing fissile isotopes (uranium-235) must comply with the requirements of the OSWDF Hazard Analysis and NCS Determination for establishing criticality incredible.
Prohibitions
Cylinders containing DUF_6 oxides or DUF_6 oxides removed from cylinders are prohibited from disposal in the OSWDF. This prohibition applies to DUF_6 cylinders and removed oxides disposed in bulk or in containers. Includes converted oxides resulting from the DUF_6 conversion operations. This prohibition does not include waste contaminated by contact with the depleted oxides such as contact waste, empty cylinders that have been size-reduced for placement, and lab sample returns.
Uranium residues removed and containerized from the process gas equipment and piping systems during the building deactivation process, regardless of enrichment, are prohibited from disposal in the OSWDF. This prohibition for disposal at the OSWDF also applies to the UMC lots and containerized nuclear material product inventories. This prohibition does not include contaminated contact waste, lab sample returns, and demolition waste such as contaminated equipment, piping, and building materials.
Barrier material from the X-330 and X-333 converters are prohibited from disposal in the OSWDF. This prohibition applies only to the contaminated nickel barrier materials that are removed during converter segmentation. The prohibition does not apply to lab sample returns, waste/spent personal protective equipment contaminated by contact with barrier material, or other components of the converters containing small quantities of barrier material following segmentation.

DUF_6 = depleted uranium hexafluoride
NCS = Nuclear Criticality Safety
OSWDF = On-site Waste Disposal Facility
UMC = Uranium Management Center

As previously identified in Section 3.2.5, quantities of regulated beryllium-containing waste will be generated during the deactivation and demolition of the PORTS facilities. Specific considerations for the health and safety of involved workers including OSWDF, WAO, Waste Management, and DOE and Ohio EPA oversight personnel will be addressed in project planning documentation, including the Deactivation and/or Demolition RD/RA work plans, waste profiles, and the project-specific generator waste management plans. These considerations will include any additional waste preparation, packaging, or transportation requirements in addition to any required changes in training requirements, medical monitoring, or placement controls.

3.2.7 WAC Component 7: Waste Transportation Standards

As described in Section 4 of the OSWDF O&M Plan, transfer of hazardous material to the OSWDF at PORTS is performed in compliance with DOE Order 460.1C and in a manner that provides a level of safety equivalent to that provided if transportation were conducted in accordance with DOT requirements. Waste packaging and conveyance requirements will be documented and approved by the D&D Contractor Transportation Manager based on the characteristics of the individual waste stream. Documentation of this evaluation and approval of the package and conveyance for a discrete waste stream will be included in the project documentation that accompanies the Waste Certification Package submitted by waste generators. The WAO verifies compliance with WAC Component 7 before the vehicle is released from the generating project. The Waste Transportation Standards WAC finalized in the OSWDF O&M Plan are provided in Table 3.7.

Table 3.7. WAC Component 7: Waste Transportation Standards

Waste transfer to the OSWDF will be conducted exclusively within the Department of Energy facility boundary and out of commerce. Public access will be restricted. If movement crosses a public road, then that crossing will be restricted by signals, lights, gates, or similar controls. The OSWDF Project and the D&D Contractor Transportation Department will verify and monitor compliance [49 *CFR* 171.1(4)].
Regulated asbestos-containing material that is transported and disposed of in bulk shall be handled in a manner that causes no visible emissions [*OAC* 3745-20-05(B)(2)].
Each motor vehicle used to transport waste materials to the OSWDF must, when transporting hazardous materials, be secured to prevent the cargo from leaking, spilling, blowing, or falling from the motor vehicle. The load must be contained, immobilized, or secured to prevent shifting upon or within the vehicle to the extent that the vehicle's maneuverability is not adversely affected. These requirements shall be documented, available for inspection, and utilized by the WAO to verify loads are in compliance and ready for transfer (49 *CFR* 393 Subpart I).
Waste transport vehicles must be equipped and operated to the standards for commercial motor vehicles per the Federal Motor Carrier Safety Regulations. The D&D Contractor Transportation Department will verify and monitor all motor vehicles used for transport to ensure compliance with this standard (49 *CFR* 393 Subpart I).
Radiation protection requirements established in 10 *CFR* 835 must be met prior to transfer of the waste stream. These requirements shall be documented, available for inspection, and utilized by the WAO to verify loads are in compliance and ready for transfer.
Waste streams will be evaluated to be compatible prior to loading and transfer to the OSWDF. Separation and segregation of hazardous materials will be evaluated by D&D Contractor Transportation per 49 *CFR* 177.848. These requirements shall be documented, available for inspection, and utilized by the WAO to verify loads are in compliance and ready for transfer.
Transfer of waste will be conducted in accordance with approved control measures (e.g., speed limits, weather restrictions, public accessibility) established for the waste streams. On-site transfer or movement conditions historically are less hazardous than those encountered in commerce. Deviations will be accomplished through approved equivalent levels of safety documents. When operations deviate from 49 *CFR* requirements, the equivalent safety requirements will be addressed in work packages, procedures, and other forms of peer reviewed written instructions available for inspection, and utilized by the WAO to verify loads are in compliance and ready for transfer.

Source: DOE 2019a

CFR = *Code of Federal Regulations*
D&D = decontamination and decommissioning
OAC = Ohio Administrative Code
OSWDF = On-site Waste Disposal Facility
WAO = Waste Acceptance Organization

RECORD OF DECISION
FOR THE
SITE-WIDE WASTE DISPOSITION
EVALUATION PROJECT
AT THE
PORTSMOUTH GASEOUS DIFFUSION PLANT,
PIKETON, OHIO

U.S. Department of Energy
DOE/PPPO/03-0513&D2

June 2015

Prepared for
U.S. Department of Energy

Prepared by
Fluor-B&W Portsmouth LLC, Under Contract DE-AC30-10CC40017
FBP-ER-RIFS-WD-RPT-0041, Revision 7

12. SELECTED REMEDY

This section discusses the rationale for the selected remedy, provides more details about the selected remedy, summarizes the estimated costs for the remedy, and, finally, discusses the expected outcome of implementing the remedy.

12.1 SUMMARY OF THE RATIONALE FOR THE SELECTED REMEDY

Based on all considerations, Alternative 2 is the selected alternative for dispositioning waste at PORTS. Based on information currently available, DOE has determined the selected alternative meets the threshold criteria and provides the best balance of tradeoffs with respect to balancing and modifying criteria. DOE has determined that the selected alternative satisfies the statutory requirements of CERCLA §121(b) to: (1) be protective of human health and the environment, (2) comply with ARARs or provide justification for a waiver, (3) be cost-effective, and (4) use permanent solutions and resource recovery technologies to the maximum extent practicable. The fifth CERCLA §121(b) criterion is to satisfy the preference for treatment as a principal element of the remedy. Treatment opportunities are limited under this alternative because most of the D&D waste (RC-1) has low levels of contamination but high volumes and because treatment is considered typically under the generating decision document. CERCLA guidance acknowledges that treating these types of waste streams may not be cost-effective. Under this remedy, waste treatment may be used in three cases:

- Centralized treatment such as size reduction and decontamination by physical or chemical (washing) processes to allow waste to meet an on-Site or off-Site WAC or recycling and/or reuse requirements. The location of a centralized treatment system can be anywhere on Site, including near the OSDC.

- Treatment of any DFF&O waste that may be conducted at an off-Site disposal facility prior to disposal. DOE will obtain the necessary approvals/authorizations, as applicable, and will meet all applicable requirements, including meeting the WAC, for the on-Site disposal of any DFF&O waste which is treated off-Site and returned to DOE for disposal in the OSDC/CAMU.

- Treatment of secondary wastes (those generated from OSDC operations), including wastewater and/or leachate, residual soil, and non-DFF&O contaminated fill with additional regulatory authorization/approval, as applicable (in compliance with ARARs and/or other regulatory requirements to meet the OSDC WAC).

12.2 DESCRIPTION OF THE SELECTED REMEDY

Alternative 2 includes the dispositioning of D&D waste (RC-1) in a newly constructed, engineered waste disposal facility (the OSDC) at PORTS. Anticipated wastes types will include construction and demolition debris, solid waste, LLW, RCRA waste, TSCA waste, and mixed wastes consisting of combinations of these waste types that meet the OSDC's WAC. Wastes not meeting the OSDC WAC will be transported to off-Site disposal facilities or be treated on Site to attain the WAC for the on-Site or off-Site disposal facility. Additionally, under Alternative 2, some D&D material will be recycled and/or reused. Liquid wastes, transuranic (TRU) wastes, high-level radiological waste, and spent nuclear fuel are not considered to be waste streams for disposal in the OSDC. (TRU waste is waste which has been contaminated with alpha-emitting transuranic radionuclides possessing half-lives greater than 20 years and in concentrations greater than 100 nCi/g. If the concentrations or the half-lives are below the limits, it is possible for waste to have transuranic elements but not be classified as TRU waste. Waste with transuranic constituents can be placed in the OSDC if not defined as TRU waste, as long as all other WAC components are met.)

The design capacity of the OSDC is based on the D&D waste (RC-1) volumes anticipated and the amount of fill that is needed to successfully dispose of waste while minimizing future subsidence potential as well as consideration of the disposal needs of non-DFF&O waste (RC-2) from the cleanup of soils and groundwater that may be generated at PORTS. Such potential waste streams are associated with environmental media cleanup activities to be conducted under the Ohio Consent Decree and for which DOE might seek exemptions under Ohio laws and regulations to allow placement of such waste stream in the OSDC. Original estimates of D&D waste (RC-1) volumes projected over 1.1 million cy of waste being disposed on Site. Another 107,000 cy were estimated to be disposed off Site and another 110,000 cy of material projected to be recycled and/or reused. All of these volumes are estimates and actual volumes of waste disposed in the OSDC may differ from the estimated volumes. The original capacity estimated for the OSDC was 3.9 million cy in the RI/FS, but the selected remedy consists of the OSDC with a capacity of 5 million cy to factor in uncertainties in the underlying assumptions of the original capacity calculations. The land area impacted is the same for either volume. All WAC calculations were performed assuming a cell capacity of 5 million cy.

Three elements of disposal facility design are critical to ensuring adequate, long-term protection of human health and the environment: (1) design of the cell's waste containment features, (2) location of the cell, and (3) characteristics of the waste placed in the disposal cell (as set by the WAC). The major components of Alternative 2 are the following:

- OSDC containment feature design
- Site location selection
- Support facilities
- Predesign studies
- Site preparation and OSDC construction

- WAC
- OSDC operations (staging, waste disposal, and wastewater collection and treatment)
- Fill operations
- Treatment (as necessary for fill or as a centralized operation to support disposal and/or recycling/reuse)
- OSDC capping and support facility dismantlement
- Postoperations S&M, including monitoring
- Off-Site disposal and treatment (post-ROD remedial design/remedial action [RD/RA] work plans or other documents, as appropriate, will describe the need for any treatment necessary to meet applicable off-Site WAC for waste requiring off-Site disposal)
- Recycling and/or reuse.

Per the requirements of Table 1C of the DFF&O, an RD/RA work plan that addresses all aspects of the project and identifies subsequent documentation for phases of the project will be submitted for Ohio EPA review within 180 days of DOE receiving Ohio EPA concurrence/approval, as applicable, on the ROD, unless an alternate schedule is otherwise mutually agreed to in writing by the parties. However, should it become more appropriate, DOE may also consider submitting multiple RD/RA work plans, with the first one submitted within 180 days of DOE receiving Ohio EPA concurrence/approval, as applicable, on the ROD for those phases of work for which DOE is prepared to proceed. In the second case, where DOE will be submitting multiple RD/RA work plans, DOE will request an alternate schedule for submission of the RD/RA work plans. DOE proposes to submit RD/RA work plans for remaining phases of work within 90 days of DOE notifying Ohio EPA in writing that DOE is prepared to proceed with an activity; the aforementioned 90-day period for submitting any such RD/RA work plan will be a Milestone. Additionally, DOE will identify the RD/RA work plans projected to be submitted within the FY, the FY+1, and the FY+2 in the annual submittal required pursuant to Paragraph 20.b of the DFF&O. The various actions will be initiated for each phase of work by the dates established in the applicable RD/RA work plans.

The OSDC containment feature design
The OSDC will consist of an engineered disposal cell that meets the requirements of ARARs/TBCs in Appendix A, including requirements related to dispositioning of solid waste, RCRA hazardous wastes, TSCA wastes, and LLW. The OSDC design will include sufficient capacity to accept 5 million cy.
The design basis for the OSDC is to achieve the following:

- Effective protection of human health and the environment through waste isolation for 1,000 years
- Protection against animal and plant intrusion and minimization of the potential for human intrusion
- Reduction of potential for incremental settlement, total settlement, and slope failure under static and seismic conditions through proper design and waste placement techniques.

The OSDC design is the result of an iterative process involving development and review of the cell design in conjunction with evaluation of the anticipated waste streams and facility WAC development, which result in a facility that meets the performance objectives established in ARARs and TBCs.

The major components of the cell's containment features include the multilayer base liner, the final cover system, leachate collection and treatment system, and support facilities.

Site Location Selection
One of the primary criteria identified in the DFF&O for consideration of on-Site disposal is that it must be protective of human health and the environment. A properly designed OSDC is protective of human health and the environment because of the design of the impermeable cap and liner systems. Location selection can enhance the level of protectiveness for an OSDC. Sixteen study areas were initially evaluated in the RI/FS as potential locations for the OSDC and then narrowed down to four study areas for a more detailed evaluation. This detailed evaluation included an in-depth review of the various hydrogeologic conditions within the compliance time frame of 1,000 years or longer.

Based on the analysis conducted in the RI/FS, Study Areas C and D are more protective of human health and the environment than Study Areas A and B. Therefore, Study Areas A and B were eliminated from further consideration in the RI/FS. The underlying hydrogeologic conditions of Study Areas C and D consist of impermeable bedrock, which favors much longer travel times for contaminants if released from a disposal cell.

A key difference between the two locations remaining after the RI/FS is the areal extent of the competent bedrock for the OSDC. This areal extent at Study Area C is limited. An OSDC at Study Area D has a larger waste storage capacity than an OSDC at Study Area C. Based on the location and geological subsurface, it was estimated that the 5 million-cy capacity is available at Study Area D. Therefore, Study Area D is selected as the location for the OSDC.

Support Facilities
A support area and an exclusion area will be established within the fenced control area to provide an office area, employee facilities, parking, and security.

A waste staging area, called the IMTA, will serve as a temporary storage area for incoming waste. This area will be used to optimize waste placement in the OSDC. The IMTA will be graded so contact water will flow by gravity to a sump pump system and to the interim leachate treatment system. Ohio EPA's concurrence/approval, as applicable, with this ROD will designate the IMTA as a treatment and storage CAMU.

Waste transportation will likely begin using rail. There are railroads throughout PORTS that can be used to transport waste. To support rail shipments, loading and unloading facilities may be installed or improved both at the waste generation site and at the OSDC support facilities. Haul roads and other conveyance systems will be constructed to support waste transportation.

Water, electricity, telephone lines, sanitary waste facilities (septic system or collection tanks), and any other necessary utilities will be established at the OSDC area. Fences and gates will be installed to control access to portions of the area. Additional security measures will be used, as appropriate, to control access to classified material.

Existing and new groundwater monitoring wells will be used to monitor the quality of the underlying groundwater and potential pathways of leaks, where possible. Air monitoring equipment will be available for use during construction and operations.

Predesign studies
Predesign studies are planned to provide data necessary to support the basis of design for the OSDC at PORTS. These data are anticipated to be generated from a series of field and laboratory studies focused on the following: (1) physical and chemical characteristics of projected wastes; (2) natural and man-made materials used for facility construction; (3) compatibility of leachate with the man-made materials; (4) subgrade conditions of a location for the OSDC; (5) clay liner construction approach; and (6) waste placement and compaction approach. Physical and chemical characteristics of projected wastes and the subgrade conditions studies were conducted during implementation of the RI/FS work and the results were reported in the RI/FS. A remedial design site investigation on the PGE will be conducted to collect information to demonstrate WAC compliance. This, as well as additional studies, if needed, will be implemented under sampling and analysis plans submitted to Ohio EPA for review.

Site preparation and OSDC construction
Construction activities for the OSDC include site development, disposal cell base liner construction, construction of support facilities, and capping.

Site development actions will be performed to minimize environmental impacts, as required in the ARARs for site preparation included in Appendix A. Site clearing and grubbing will remove trees and other vegetation to provide sufficient open area for construction. To the extent practical, most clearing will occur during autumn or winter to protect the nests of migratory birds and bats during breeding season. The northern long-eared bat has been identified at the disposal location and is a federally-threatened species. Limitations on the timing of clearing will also protect against potential impacts to the northern long-eared bat.

The material removed from the area may be placed in the X-611B Sludge Lagoon to fill in the lagoon. It may also be stockpiled for other use such as for liner and cover construction, if needed. Appropriate construction practices will be used in all excavation and construction areas, including at any borrow areas, to control surface water runoff and minimize erosion and transport of sediment from exposed areas. Sediment detention basins could be used to protect against transport of sediment away from the area.

Waste acceptance criteria
The WAC consist of seven components, which are outlined in the DFF&O: (1) prohibited items resulting from ARARs or DOE decisions or agreements; (2) activity criteria and chemical concentration criteria (radiological levels and other contaminant levels); (3) waste evaluation and characterization standards (methods used in the field to verify waste can go into the OSDC); (4) waste physical characteristics standards (size and shape of items); (5) waste packaging standards; (6) waste safe handling standards; and (7) waste transportation standards. Several of the components (3 through 7) of the final WAC will require refinements after the final design is completed. Such refinements for these WAC components will be reviewed and approved by Ohio EPA in future OSDC-related regulatory documents as required by the DFF&O. The future OSDC regulatory documents would establish Ohio EPA-approved operational controls and field oversight for the OSDC, including measures to control dust emissions and leachate collection, treatment, and monitoring.

Waste must satisfy every component of the WAC before it is allowed to be disposed in the OSDC. The first component of the WAC is a series of prohibitions that forbid waste from being disposed in the OSDC unless associated requirements are met. WAC Component 1 is divided into two parts:

- WAC Component 1A: Formal regulatory prohibitions that result from ARARs
- WAC Component 1B: DOE-elected prohibitions that result from DOE operational decisions to make the disposal facility even more protective or easier to operate.

Included in the operational prohibitions is the requirement that only waste generated at the PORTS be considered for disposal at the OSDC. The list of operational prohibitions is presented in Table 5, under WAC Component 1B.

Table 5. WAC for the OSDC

Prohibitions (Component 1A)	
Prohibition/Exclusions	**Rationale**
A prohibition on the acceptance of CAMU-ineligible RCRA hazardous waste that does not meet LDR treatment standards.	40 *CFR* 268.40(a) *OAC* 3745-270-40(A)
A prohibition on the acceptance of CAMU-ineligible RCRA hazardous debris and/or soil that does not meet Alternate Treatment Standards.	40 *CFR* 268.45(a) (for hazardous debris) 40 *CFR* 268.49(a) (for hazardous soil) *OAC* 3745-270-45(A) (for hazardous debris) *OAC* 3745-270-49(A) (for hazardous soil)
A prohibition on CAMU-eligible waste that does not meet the adjusted treatment standard (5,000 ppm) for the Principal Hazardous Constituent of TCE.	40 *CFR* 264.552(e)(4) *OAC* 3745-57-72(E)(4)
A prohibition on the acceptance of ignitable and reactive waste per RCRA.	40 *CFR* 264.312(b) *OAC* 3745-57-12(B)
A prohibition on the acceptance of TRU waste or HLW.	DOE Order 435.1 design constraints.
A prohibition on the acceptance of refrigeration equipment with remaining refrigerant per Ozone Standards.	40 *CFR* 82.154(b)
A prohibition on the placement of acid batteries.	40 *CFR* 273.31 *OAC* 3745-273-31
A prohibition on the placement of bulk used oils in liquid form.	40 *CFR* 279.81 *OAC* 3745-279-81
Prohibition on the disposal of PCB-contaminated electrical equipment (except capacitors) containing free-flowing liquids.	40 *CFR* 761.60(b)(4)
Prohibition on the disposal of PCB-contaminated articles containing free flowing liquids.	40 *CFR* 761.60(b)(6)(ii)
Prohibition on the disposal of PCB liquids drained from electrical equipment.	Must be disposed in an incinerator or high-efficiency boiler depending on concentration.
Waste must not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable.	*OAC* 3701:1-54-10(B)(6)
Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.	*OAC* 3701:1-54-10(B)(4)
Waste must not contain or be capable of generating quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste.	*OAC* 3701:1-54-10(B)(5)
Prohibition on the acceptance of RCRA hazardous waste containing bulk or noncontainerized liquid hazardous waste or hazardous waste containing free liquids (whether or not sorbents have been added).	40 *CFR* 264.314(a) *OAC* 3745-27-19(E)(8)(b) and (h)(i) *OAC* 3745-57-14(A)(E)

Table 5. WAC for the OSDC (Continued)

Prohibitions (Component 1A) (continued)	
Prohibition/Exclusions	**Rationale**
Prohibition on the placement of bulk or noncontainerized liquid hazardous waste or free liquids contained in hazardous waste (whether or not sorbents have been added) in any CAMU except where placement of such wastes facilitates the remedy selected for the waste. (This prohibition applies to CAMU eligible waste.)	40 *CFR* 264.552(a)(3) *OAC* 3745-57-72(A)(3)

Prohibited Waste Streams by Agreement (Component 1B)	
Waste Stream	**Description**
Off-PORTS generated waste.	A prohibition on the acceptance of waste from off-PORTS generating sources (excluding lab returns and treatability testing wastes and material currently stored on the Facility).
Compressors, Converters, and Coolers from X-326.	Components in-place within the X-326 Process Building as of April 15, 2010, the initial date of the DFF&O.
Enriched materials.	Containerized nuclear material inventories of uranium compounds exhibiting enrichments greater than 20 percent (excludes items such as miscellaneous parts, pipes, valves, empty containers etc., with only residual contamination which were packaged for ease of handling and safety reasons).

Activity and Chemical Concentration Criteria (Component 2)	
Waste Stream	**Requirement**
Hazardous waste-CAMU ineligible.	Treatment standards, arranged by hazardous waste code, are located in the "Treatment Standards for Hazardous Waste" table in *OAC* rule 3745-270-40.
Hazardous waste contaminated debris	Alternate treatment standards are located in *OAC* rule 3745-270-45.
Hazardous waste contaminated soil	Alternate treatment standards are located in *OAC* rule 3745-270-49.
CAMU-eligible hazardous waste.	TCE – 5,000 ppm.

Documents That Become Part of WAC Upon Approval (Components 3 through 7)	
Document[a]	**WAC Components Included (para. 5.mm)**
WAC Implementation Plan.	Prohibitions Activity Criteria and Chemical Concentration Criteria Waste Evaluation and Characterization Standards Waste Safe Handling Standards.
OSDC Operations Plan.	Waste Physical Characteristics Standards Waste Packaging Standards Waste Transportation Standards.

[a]The noted documents will become part of the enforceable WAC upon Ohio EPA review and concurrence/approval, as applicable.

CAMU = Corrective Action Management Unit
CFR = Code of Federal Regulations
DFF&O = *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DOE = U.S. Department of Energy
HLW = high-level waste
LDR = land disposal restrictions
OAC = Ohio Administrative Code
Ohio EPA = Ohio Environmental Protection Agency
OSDC = on-Site disposal cell
PCB = polychlorinated biphenyl
PORTS = Portsmouth Gaseous Diffusion Plant
RCRA = Resource Conservation and Recovery Act of 1976, as amended
TCE = trichloroethene
TRU = transuranic
WAC = waste acceptance criteria

WAC Component 2 requires that the waste be evaluated against activity and chemical concentration criteria as required by DFF&O. Wastes that do not meet these criteria are not allowed to be disposed in the OSDC unless further treatment following prescribed requirements is performed.

Fate and transport modeling was conducted to determine the potential migration of constituents of concern from the OSDC. The results of this modeling are presented in detail in Appendix I of the Waste Disposition RI/FS. This modeling creates a tool to forecast the movement of the contaminant in the waste into the environment and to potential future human and ecological receptors. This model mathematically mimics the influences that both the site geology and the engineering properties of the disposal facility would have on the movement of these contaminants for 1,000 years into the future. The results of this modeling provide upper bound numerical limits for the maximum activity and chemical concentrations that may be present in hypothetical wastes to ensure the long-term protection of the public and the environment. The results indicate that the activity and chemical concentrations actually present in PORTS waste are at least five orders of magnitude lower than what the model demonstrates could be placed into the disposal facility and remain protective. This conclusion is the result of the favorable geology found at the OSDC location along with the robust engineering design features of the disposal facility.

Any waste stream that is designated as RCRA hazardous waste must meet the treatment standards associated with the ARARs summarized in Table 5, WAC Component 2. Ohio EPA's concurrence/ approval, as applicable, with this ROD designates the OSDC as a treatment, storage, and disposal CAMU under *OAC* 3745-57-72(E)(4). This designation allows the establishment of treatment standards for CAMU-eligible wastes associated with implementing cleanup at PORTS. The standards take into consideration the protectiveness level of the OSDC. These treatment standards replace those treatment standards designated in *OAC* 3745-270-40, -45, and -49 for CAMU-eligible wastes. The designated treatment standards in *OAC* 3745-270-40, -45, and -49 will continue to apply to all non-CAMU-eligible RCRA hazardous wastes that are generated during Site cleanup. Based on the evaluation conducted at PORTS, the only Principal Hazardous Constituent (PHC) identified at this time is TCE. An adjusted treatment standard of 5,000 ppm has been set. Additional PHCs may be identified in the future pending any further required characterization (e.g., of landfills).

The other five components of the WAC deal specifically with the engineering features of the OSDC and will be modified as further design and operations plans of the OSDC are developed. Table 5 includes the two design and operations documents that will be developed after the ROD is signed and, upon Ohio EPA review and concurrence/approval, as applicable, would become enforceable. These documents will detail out the remaining WAC components defined in the DFF&O and will be reviewed and, as appropriate, approved by Ohio EPA before implementation of the selected remedy.

The identification of PHCs is currently based on an extensive environmental database at PORTS collected over the last 25 years with Ohio EPA oversight. Although there are additional data planned to be collected from environmental media at PORTS, it is very unlikely that a contaminant would be identified that meets the PHC definition that has not already been identified. However, although unlikely, if data collection efforts should identify other constituents that could be of sufficient significance to meet the definition of a PHC, the following steps will be used to assess the potential presence of a new PHC.

Based on the large amount of existing soil data collected since the early 1990s for over 100 potential contaminants at PORTS, only TCE is currently identified as a PHC. The current plan is to remove all segregatable RCRA-hazardous wastes, regardless if CAMU-eligible or CAMU-ineligible, from the buildings before they are demolished, leaving only solid and LLW for the next phase of D&D. Should a decision on the disposal location change and DOE elect to send RCRA-hazardous waste from building D&D that was planned for off-Site disposal to the CAMU, an evaluation for (1) its CAMU-eligibility; and (2) for new PHCs associated with that waste will also be conducted.

The existing landfills inside Perimeter Road are one of the key potential sources of contaminated fill (RC-3). Additional characterization specified in future plans will be conducted to support the excavation of the landfills and to determine WAC compliance of the material excavated. The new data and other information collected will be evaluated to determine CAMU eligibility as well as if there are additional PHCs in the landfill waste.

The four steps that have been used and will be used in the future to identify PHCs in CAMU-eligible waste at PORTS are described below. The PHCs are those constituents that may require treatment prior to disposal in a CAMU.

1) First, a contaminant must be a hazardous constituent defined under *OAC* 3745-270 that would be subject to treatment standards for an as-generated waste. If a contaminant is not defined as a hazardous constituent, it is not a PHC.

2) Second, the maximum contaminant level present is compared to a risk-based screening level equating to a 1×10^{-3} ELCR through ingestion or inhalation (or a hazard quotient of 10 for non-carcinogenic compounds) for the potential future outdoor industrial user of PORTS in soil. The necessary values can be found in the most current PORTS Risk Methods Document that is available at the time of evaluation. (This document is updated semiannually.) If that PHC threshold value is not exceeded, the contaminant is not a PHC.

3) Third, if the maximum value does exceed the PHC threshold value, either a qualitative or quantitative risk evaluation is done to conclude if the contaminant will cause an ELCR of 1×10^{-3} or a hazard quotient of 10 across an investigative area.

4) And finally, when risks to human health and the environment posed by the potential migration of constituents in wastes to groundwater are substantially higher than cleanup levels or goals at the site, these constituents may be designated as PHCs. Current concentrations of groundwater are used in this analysis instead of modeled results because typically the contaminants in the primary waste have been in the environment a sufficient amount of time that migration to groundwater has occurred if it were going to occur. The major contaminant in groundwater at PORTS is TCE.

Should additional PHCs be identified in the future, appropriate treatment levels will be set and those levels will be added to the WAC through modification of the WAC Implementation Plan after concurrence/approval, as applicable, by Ohio EPA.

OSDC operations
Any waste destined for the OSDC will be adequately characterized, processed, inspected, and certified as meeting the OSDC WAC. In general, the operations phase will consist of bulk waste pickup at the generating locations by using trucks. The trucks will transport the waste to the OSDC along temporary haul roads. Large items and containers will be transported to the OSDC via flatbed trailer and offloaded, as appropriate. Waste transportation across the Site may begin using rail and rail shipments could continue throughout the project, where appropriate.

An IMTA that meets ARARs will provide temporary storage capacity to allow optimization of DFF&O waste placement. Shear attachments or cutting equipment may be provided at the IMTA to assist in size reducing waste to reach the disposal requirements. Depending on the need, a centralized decontamination operation may be implemented at the IMTA or another suitable location.

Dust will be controlled, and noise and air quality will be monitored in accordance with ARARs and environmental compliance plans. Groundwater and surface water monitoring will also occur (as described further below under Postoperations S&M).

Fill operations
Sufficient fill will be needed to meet the placement requirements for the DFF&O waste requiring fill (RC-1, EC-2), as well as additional waste requiring fill (RC-3, EC-2) anticipated to be encountered during the generation of fill from contaminated borrow areas. Fill is used to minimize void spaces, which lessens the potential for future waste subsidence. Waste subsidence could impact the long-term effectiveness of the final cap, so subsidence of the waste is to be avoided. Fill will be obtained from on-PORTS and/or off-PORTS sources.

Select landfills (RC-3) and soil associated with contaminated groundwater areas (RC-2) are potential fill sources that could produce large quantities of fill. The use of non-DFF&O contaminated soil as fill (RC-2, RC-3) as opposed to clean fill potentially will benefit the government in several ways. The use of contaminated fill from areas of groundwater contamination may lower costs of remediating the groundwater and soils in the future, may expedite reaching Ohio Consent Decree cleanup levels, and could remove the need for long-term reliance on maintaining landfill caps, significantly lowering the long-term maintenance costs. It is assumed that the clean cap/overburden would be excavated and set aside to support postcleanup backfill requirements.

Should non-D&D contaminated soil under landfills (RC-2, RC-3) be used for fill at the OSDC, it should be noted that an estimated 223,000 cy of waste requiring fill (RC-3, EC-2) might be generated in the process of exhuming the landfills that overlie the contaminated soil. The presence of this waste (RC-3, EC-2) within these select existing landfills will create the need for additional fill to support OSDC placement. In general, it is assumed that the clean cap/overburden from the select existing landfills will be excavated and set aside to support postcleanup backfill requirements. Use of fill described in this ROD will be protective so long as the fill meets the WAC.

Treatment
There are several types of treatment authorized under this ROD. There is the potential that some of the contaminated fill or associated waste requiring fill (RC-2, RC-3) that is excavated cannot be disposed in the OSDC without treatment. Additional regulatory authorization/approval, as applicable, will be required for excavation and treatment, as necessary, of non-DFF&O contaminated soil as fill in the OSDC. On-Site Treatment and/or off-Site treatment and disposal of this material, including dewatering, are included in this alternative, as appropriate.

Treatment of other OSDC secondary wastes, such as contact wastewater or leachate, will be conducted to meet ARARs or the WAC, as appropriate.

If a centralized treatment facility is deemed appropriate to support a Site-wide treatment or recycle and/or reuse initiative, such a facility will be a component of the selected remedy.

Finally, off-Site treatment at a disposal facility is part of the selected remedy as discussed with off-Site disposal.

OSDC capping and support facility dismantlement
The final capping will occur shortly after portions of the OSDC are filled to capacity. Other final activities will include installation of the permanent leachate treatment systems (including both the active

system and a potential passive system), removal of the interim leachate treatment system and other support facilities no longer needed, and site restoration. Restoration could include removal of the sediment ponds, replacement of wetlands (if necessary), and grading and seeding of the disturbed areas outside the disposal cell to restore vegetation. Once support facilities are removed, the material from that removal will be disposed in the last cell before its cover is completed. The DFF&O requires submittal of a Draft Closure Plan, Completion of Remedial Action Report, and Closure Certification Report pursuant to the DFF&O subject to Ohio EPA review and concurrence/approval, as applicable.

Postoperations S&M
During development of the support facilities, monitoring of the disposal facility and its environs will begin as soon as monitoring facilities are installed. Historic information and results from preoperation monitoring will be used to develop a baseline for comparison with postoperation monitoring results.

Surveillance and active maintenance, and long-term monitoring will occur after the OSDC is capped. The postoperations activities and associated reporting requirements will be conducted in accordance with approved, facility-specific S&M and monitoring plans and will meet all ARARs.

In accordance with ARARs and following the DFF&O, an Environmental Covenant for the OSDC will be put into place to prohibit residential and industrial use of the OSDC, construction of any facility that could damage the cover, or installation of groundwater extraction wells (for purposes other than monitoring). This Environmental Covenant for the OSDC will also identify other administrative controls necessary to protect the public and the integrity of the disposal cell and will be referenced in a future deed, which will be filed with the appropriate local governmental authority.

Long-term media monitoring (groundwater, surface water, and if needed, air) will be performed to detect potential releases from the disposal cell, both during operations and after closure. Groundwater wells located upgradient and downgradient of the disposal cell will be sampled to monitor indicator radiological and non-radiological contaminant concentrations and determine whether there have been contaminant releases from the disposal cell. Continued monitoring will support 5-year reviews under the DFF&O (40 *CFR* 300.430 [f][4][V]). The surface water downstream from the disposal cell will be monitored to determine whether contaminant levels have changed over time. Surface water monitoring will be conducted during operation of the facility and through postoperations care in support of 5-year DFF&O reviews. The list of monitoring constituents, sampling media, locations, frequency, and action levels will be defined in a monitoring plan, which will be one of the design deliverables for the OSDC. This plan will be reviewed and concurred with by Ohio EPA.

Off-Site disposal
Alternative 2 includes off-Site disposal of some D&D waste (RC-1). For PORTS actions that transfer wastes off Site, permits are required at the receiving facility. Also, waste removed from the PORTS Facility must be disposed or treated at a disposal facility operating in compliance with the procedures for planning and implementing off-Site response actions, as outlined in 40 *CFR* 300.440 (EPA "off-site" policy). Treatment at the disposal facility may be needed prior to disposal.

In order to support rail shipments to a commercial facility, waste will need to be conveyed from the generator location to an on-Site rail siding. Improvements to a rail yard, if needed, are included in this decision.

Shipments to the disposal facilities will be by trucks or rail.

- No contingency costs are added to the on-Site disposal alternative cost estimate.

- No costs for long-term storage and eventual dispositioning of any wastes not meeting the WAC for on-Site or off-Site disposal facilities are included.

- The costs and schedule are dependent on the funding allocated. As the schedule increases for Alternative 2, the total capital costs of the alternative increases because there are routine costs that are required to operate the OSDC, regardless of how much waste is disposed.

The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual cost, excluding impacts to costs from schedule delays. Should significant delays to the project occur, the costs will increase beyond the +50 percent accuracy required by the DFF&O. An evaluation of cost increases caused by schedule delays conducted during the FS showed that a triple increase in the schedule would still result in Alternative 2 being less expensive than Alternative 3.

12.4 EXPECTED OUTCOMES OF THE SELECTED REMEDY

The RAOs will be met by implementing the selected remedy. Disposal of D&D waste (RC-1) will remove a potential source of human health and ecological risk by minimizing the chance of exposure to contaminants in the waste. After completion of this remedy, there will be no unacceptable risk from exposure to this waste and its associated contamination.

Implementation of the selected remedy could have some short-term impacts on the local environment. However, through careful timing of tree clearing, through contaminant migration controls in place during construction and operation, through mitigation plans to preserve archaeological resources, and through wetland and stream mitigation efforts, any impacts on the long-term condition of PORTS following completion of the remedy will be minimized.