

SECTION 01517**REMOVING/FIXING RADIOLOGICAL CONTAMINATION****PART I GENERAL****1.1 SCOPE**

- A. The scope of this Section is decontamination of dismantled equipment or the structure to a level that permits removal of the debris from a local containment or enclosure, or permits opening the building to the environment. This Section includes, but is not limited to:
1. Decontaminating low-level uranium and thorium contaminated equipment, materials, structural members, and/or buildings,
 2. Decontaminating enriched uranium contaminated equipment and materials,
 3. Decontaminating RCRA contaminated equipment and materials,
 4. Controlling and moving effluent produced during the removal and/or fixing of contamination, and
 5. Fixing contamination.
- B. Project Conditions
1. Process material (i.e., green salt, yellow cake, black oxide) has been removed from process equipment to the maximum extent practical by FDF prior to D&D activities. If process material is found during D&D activities, FDF shall be notified prior to disturbing the condition.
 2. See Section 01120 for requirements to establish an inspection area.
 3. Removing/fixing radiological contamination on multiple layers of transite roof panels is addressed in this Section; handling of transite panels is addressed in Section 07415.
 4. Hazardous Waste Management Units (HWMUs) shall be decontaminated pursuant to the specific conditions included in Part 6 of the IFB/RFP.
- C. FDF will perform all effluent sampling and analysis.

1.2 RELATED SECTIONS

- A. Section 01120 - Debris/Waste Handling Criteria
- B. Section 03315 - Concrete/Masonry Removal
- C. Section 05126 - Structural Steel Dismantlement
- D. Section 07415 - Transite Removal
- E. Section 15065 - Equipment/System Dismantlement
- F. Section 15067 - Ventilation and Containment

1.3 REFERENCE MATERIALS

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See Part 7 of the IFB/RFP Package for the following:

- A. Index of Drawings,
- B. Photographs,
- C. Drawings, and
- D. Safe Work Plan Requirements.

1.4 REFERENCES, CODES, AND STANDARDS

- A. United States Department of Energy (DOE):
 - 1. DOE Order 5400.5 Radiation Protection of the Public and the Environment
 - 2. DOE/EH-0256T Radiological Control Manual, April 1994
 - 3. DOE/EM-0142P Decommissioning Handbook, Chapter. 9, Mar. 1994
- B. 10CFR835 Occupation Radiation Protection

1.5 SUBMITTALS

- A. Before start of decontamination work, the Contractor shall submit for approval a Safe Work Plan in accordance with IFB/RFP, Part 7, Contractor Safe Work Plan Format Requirements, describing the system design for removing and/or fixing contamination. This includes the methods and equipment for: removing contamination; fixing contamination; and controlling, filtering, and transporting effluent produced during removal and/or fixing activities.
- B. Product Data: The Contractor shall submit manufacturer's technical information including the material to be used, its intended use, and its application instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

The Contractor shall deliver materials in original, new and unopened containers bearing the manufacturer's name, label, and the following information:

- A. Name or title of material,
- B. Manufacturer's stock number and date of manufacture,
- C. Manufacturer's Name,
- D. Application instructions, and
- E. Material Safety Data Sheets.

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PART II PRODUCTS

2.1 CONTRACTOR'S EQUIPMENT

- A. The Contractor shall supply all equipment required to remove and/or fix contamination.
- B. The Contractor shall supply all equipment required to control, filter, and move effluent produced during removal and/or encapsulation of contaminants.
 - 1. The filter system shall consist of a 20 micron pre-filter and a 5 micron filter to remove entrained particulate prior to effluent discharge to tankage.
 - 2. The Contractor shall construct all holding tank systems and secondary containment systems as specified in Article 3.1.D and 3.1.E of this Section.

2.2 MATERIALS

- A. Encapsulating coatings: If encapsulating coatings are employed, they shall be Carboline D3358 or approved equal. Manufacturers may include, but are not limited to: Tnemec Series 6 - Tnemec-Cryl, and products by Sherwin-Williams and International Protective Coatings.
- B. If non-strippable coatings are employed, they shall include Polymeric Barrier System (Bartlett), or a FDF-approved equal.
- C. Plastic sheeting: Where encapsulation by clear plastic sheet wrapping is allowed, the wrapping shall be a minimum of 6-mil reinforced polyethylene sheeting.

PART III EXECUTION

3.1 APPLICATION

- A. Requirements for managing non-process debris, process debris, and suspect process debris are described in Section 01120, Articles 3.2.A.1, 3.2.A.2, and 3.2.A.3, respectively.
- B. Requirements specific to debris decontamination and their removal from a building enclosure or local containment:
 - 1. Prior to removing debris from a building enclosure or local containment, all external surfaces shall be free of gross removable surface contamination and all openings of equipment and debris that are potentially contaminated internally with removable contamination shall be sealed. For large items such as ductwork, the Contractor may encapsulate all internal surfaces in lieu of sealing. Acceptable methods for removing surface contamination include, but are not limited to: hydro-blasting with a minimum of 1,000 psi, steam-cleaning, sponge blasting, CO₂ blasting, or other methods approved by FDF.
 - 2. Debris and equipment/systems shall be managed in accordance with Section 01120, Article 3.2.

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3. Thorium-contaminated items cannot be released from the building enclosure or local containment areas unless they meet thorium-specific release limits (as referenced in Part 8 of the IFB/RFP). Items taken from these areas shall be either decontaminated, wrapped and brought directly to containers labeled as containing thorium-contaminated items (not for re-packaging), or containerized prior to removal from the enclosure as determined by the Contractor.
 4. Equipment/systems identified by FDF as being contaminated with uranium with an enrichment over 2 percent will be removed, wrapped, and containerized by the Contractor for disposition as contaminated material without decontamination. These items shall not be allowed to get wet.
- C. Requirements Specific to Decontamination of Structures and Outdoor Process Tanks/Pipes:
1. Structures:

Prior to opening the structures that require decontamination to the environment by removing the exterior siding or structural dismantlement, as specified in the Pay Item Schedule of Part 6 of the IFB/RFP, the Contractor shall remove and/or fix radiological contamination on all surfaces within the facility until the detected radioactivity levels are below the criteria as defined in Part 8 of the IFB/RFP. FDF will perform a radiological release survey to ensure the radioactivity criteria are met.
 2. Transite Roof Panels:

Exterior panels shall be removed in a manner that minimizes the possibility of loose contamination becoming airborne (visible) when the panel is removed. A HEPA vacuum shall be used to remove any loose contamination which may be exposed when the exterior panel is removed (e.g., the under side of the outer panel and the upper surface of the lower roof panel). After the roof panels have been vacuumed, the newly exposed surfaces shall be encapsulated to fix any contamination which remains. Vacuumed residues shall be handled as in accordance with the Waste Management Plan (Debris Category J).
 3. Outdoor Process Tanks and Pipe:
 - a. Prior to demolition of outdoor process (or suspect process) tanks, surfaces (interior and exterior) shall be decontaminated to meet the radiological release levels for outdoor process tanks contained in Part 8 of the IFB/RFP. If outdoor tanks do not meet the contamination limits in Part 8 of the IFB/RFP, they shall be demolished within a containment, either constructed or existing, in accordance with Section 15067 unless one of the following methods are implemented:
 1. Encapsulate and mechanically cut (e.g., shear, saw, etc.):

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Prior to tank demolition, the interior of the tank shall be empty and fully encapsulated. During tank demolition, the work area shall be misted with water to minimize release of airborne contamination.

2. Torch or other "hot cutting" methods:

The Contractor shall propose methods that minimize "hot cutting" (e.g., oxy/gas and oxy/acetylene torch cutting). If approved by FDF, "hot cutting" of surfaces that exceed 25,000 dpm/100cm² beta-gamma total contamination shall be performed within containment per Section 15067. Hot cutting of tank surfaces may be considered by FDF as a proposed method of dismantlement for tanks and pipe located outside of containment, provided HEPA filtered ventilation is maintained and/or point-of-cut ventilation can be provided such that fugitive emissions are captured and project boundary airborne radioactivity levels are maintained according to limits specified in Part 8 of the IFB/RFP. The ventilation/containment requirements of Section 15067 apply.

3. Hot cutting may be performed on contaminated surfaces less than 25,000 dpm/100cm² beta-gamma total contamination with local HEPA ventilation.

- b. Only exterior decontamination applies to process pipe, per Article 3.1.B.1; interior decontamination is not applicable. Internal surfaces of process piping are assumed to exceed both the removable and total contamination limits for uncontained demolition. However, demolition of process piping that is located outside of the building structures may be performed outside of containment if the methods of cutting inherently minimize fugitive emissions. Process piping must be sealed immediately after cutting.

4. Acceptable methods for removing surface contamination on structures and outdoor tanks/pipes include, but are not limited to: hydro-blasting with a minimum of 1,000 psi, steam-cleaning, sponge blasting, CO₂ blasting, or other FDF-approved method.
5. Encapsulation of contaminants is required if contamination levels specified in Part 8 of the IFB/RFP have not been met and decontamination has been attempted at least once. FDF shall be notified prior to encapsulation to allow for inspection for visible process residues. Acceptable methods for encapsulating contamination, which is not readily removed by the above-identified methods include, but are not limited to, encapsulating coatings, non-strippable coatings as referenced in Article 2.2, and wrapping in reinforced sheeting and sealed prior to movement to prevent migration of potential contaminants. The Contractor shall take precautions to prevent the breaching of encapsulating coatings applied to equipment or structure. If an encapsulating coating is breached after application, during activities leading up to but not including structural demolition, the Contractor must take action to reseal the breached areas.
6. If stabilizer or non-strippable coatings are used as fixatives, they will meet the requirements of this specification (see Article 2.2).
7. Down posting of thorium contaminated areas requires that contamination levels meet the thorium-specific release limits of Section 01519.
8. If hydro-blasting or steam cleaning is employed, the Contractor shall:

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- a. Seal floor cracks/seams, openings, and building cracks using sealants to protect the environment from migration of contaminants.
 - b. Contain effluents to the building interior/outdoor tank containment system and subsequently to collection systems.
9. The Contractor may utilize any existing building floor sumps for effluent collection, as long as system capacity for sludge and/or liquid does not exceed limitations determined from enriched levels as stated in Article 3.1.D.
 10. The Contractor shall take precautions to prevent the spread of contamination from other more-contaminated areas of the facility to less contaminated areas.
 11. Acceptable methods for decontamination of Hazardous Waste management Units (HWMUs) to meet RCRA/CERCLA closure Ohio Environmental Protection Agency guidance are hydro-blasting or steam cleaning with a minimum of 1,000 psi, unless otherwise stated in Part 6 of the IFB/RFP for that particular component.
- D. Rinseate/Effluent Handling:
1. The Contractor shall collect all waste and effluent generated while removing and/or fixing contamination. Effluent and sludge shall be containerized in accordance with the requirements listed in Articles 3.1.D and 3.1.E of this Section.
 2. For rinseate/effluent generated from decontamination of a structure containing uranium and/or thorium contamination or from decontamination washwater generated from contact with outdoor pads with process tanks and pipes, the Contractor shall supply all effluent collection equipment (e.g., pumps, secondary containment) except tanks, which will be supplied by FDF. Effluent tanks require secondary containment with a minimum of 10 percent of the combined capacity of the effluent tanks housed and not less than the volume of one full tank, whichever is greater.
 3. Enriched Equipment/Material (if listed in Part 6 of the IFB/RFP): In addition to effluent tanks, the washing of enriched equipment/material requires the use of smaller tanks to permit safe quantities to be maintained (for nuclear criticality safety purposes). There are no mass restrictions for rinseates or sludges with a U-235 enrichment less than 1 percent.
 - a. For enrichments greater than 1 percent and less than or equal to 1.25 percent, the Contractor shall supply effluent storage tanks of no greater than 175 gallon capacity, in numbers sufficient to permit 15 calendar days storage without impact to Contractor operations.
 - b. For enrichments greater than 1.25 percent and less than or equal to 2 percent (no equipment/material over 2 percent enrichment is to be decontaminated, see Article 3.1.B.3), the Contractor shall supply effluent storage tanks no greater than 30 gallon capacity, in numbers sufficient to permit 15 calendar days storage without impact to Contractor operations.

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- c. The Contractor shall store sludge, resulting from enriched equipment/material cleaning, in 55-gallon drums. Filled drums may be stored no closer than 2 feet apart.
 - d. Should equipment be discovered with uranium enrichment greater than 1 percent then equipment/material washing operations and effluents shall be maintained separate, based on enrichment and type, by the following: 1) uranium less than or equal to 1 percent enrichment; 2) uranium greater to 1 percent enrichment but less than or equal to 1.25 percent enrichment; 3) uranium greater than 1.25 percent enrichment but less than or equal to 2 percent enrichment; and 4) thorium. Wash systems can be maintained separate by campaign or by physically separate systems.
4. Approval to commingle the effluents and sludges is required from FDF. Approval to transfer effluents to large effluent tanks is required from FDF.
 5. ~~Upon approval from FDF, the Contractor shall empty the contents of the effluent storage tanks and transport the effluent to the FEMP Advanced Wastewater Treatment Facility.~~ The Contractor shall notify FDF when the effluent tanks are filled. FDF will sample, empty the tanks, and transport the effluent to the FEMP Advanced Wastewater Treatment Facility. The Contractor shall keep additional tanks in reserve as the tank(s) will be out of commission until the sample results are received and water dispositioned. The Contractor shall allow six weeks for this process. [DCN NO. 1763-015]
 6. Effluent generated from the decontamination and/or rinsing of HWMUs shall be collected and temporarily stored separately from general, non-HWMU effluent. FDF will notify the Contractor when commingling of HWMU and non-HWMU effluent may occur.
 7. The Contractor shall supply storage tanks and secondary containment with a minimum liquid effluent storage capacity to allow 20 days storage without impacting the Contractor operations [DCN NO. 1763-002].
- E. Sludge Drumming

Sludge limits for individual drums from enriched cleaning operations are restricted to 104 grams of U-235 per 55-gallon drum. (Note: The weight is limited due to Department of Transportation and/or the maximum allowable weight of the drum.)

END OF SECTION