**Project Name:** OR-Alpha 5 LMD-D&D-R

**Project Name (Expanded):** Oak Ridge ARRA Alpha 5 Building Legacy Waste Disposition [Characterization, disposition, and disposal of unattached radioactive and other wastes as a deactivation step prior to D&D]

**Project Type:** Building / Facility D&D Project Type

**Building Type:** B_Typ_2

**Project Type Detail:** Generic Radiological Facility(ies)-Extensive Loose Contamination

**Supplementary Reference Documents:**
- Alpha 5 Final 7-7-2009 (Alpha-5 LMD IGE Estimate)
- CORP_WBS_Description_DOE-ORO-ARRA

**Site Context:**
All ARRA Projects are specific EM projects developed and executed between 2008 and 2011 in response to the American Reinvestment and Recovery Act. These projects included 10 projects at the Y-12 facility at Oak Ridge at a total cost of over $220M. The projects exist within larger ongoing site operations and/or site closure projects, depend on those larger elements for site services and support, and typically include costs for those services as indirect costs.

The initial Y-12 mission included uranium separations during WWII, followed by ongoing machining and assembly of uranium weapons components. The current mission includes ongoing weapons disassembly and maintenance work. Major contaminants include uranium (various isotopes), mercury, beryllium, and organic constituents. The site consists of approximately 811 acres, spanning 2.5 miles, with more than 350 buildings that house some 6.5 million square feet of laboratory, machining, dismantlement, and research and development areas. There were numerous environmental releases but no major on-site legacy radioactive material burial grounds (the EMWMF and sanitary landfill are adjacent to the site). The ongoing weapons work requires high levels of security in some areas (Perimeter Security Zones, Protected Areas) of the facility. The prime contractor, currently Babcock and Wilcox, oversees and manages all environmental projects.

**ECAS Level 4/Parent Project Context:**
The ARRA project grouping constitutes the Parent Project grouping, since the Y-12 site is not a closure project. Y-12 EM projects that are not part of the ARRA program are not included.

The Y-12 ARRA projects are as follows:
- OR-Alpha 5 LMD-D&D-R
- OR-Beta 4 LMD-D&D-R
- OR-Biology Complex Buildings-D&D-R
- OR-Bldg 9206 Filter House-D&D-R
- OR-Bldg 9735 D&D-D&D-R
- OR-WEMA Storm Sewer-D&D-R
- OR-Y-12 Salvage Yard-WM-R
- OR-Y-12 Salvage Yard Soils-ER-R
- OR-EMWMF Expansion-WM-R
- OR-ORR Landfill Expansion-WM-R
**Project Name:** OR-Alpha 5 LMD-D&D-R

**D&D Facility Data:**

| Facilities: |
| --- | --- | --- |
| Building | Title | Area (SF) | In-Service Date |
| 9201-5 | Alpha 5 | 613,642 | 1946 |

**Construction Details:**
The 9201-5 Building is a large multi-story (up to 4-story in parts) structure, steel brace frame, and contains process and manufacturing equipment.

**Facility Use/ Processes causing contamination:**
The Alpha-5 (9201-5) building is approximately 613,000 square feet and was constructed in 1946 to house alpha-stage Calutrons for uranium enrichment. It is currently designated as a Nuclear Hazard Category 3 facility. In addition to uranium enrichment, past operations in the facility included column exchange (COLEX) enrichment operations, and various metallurgical and machining processes involving uranium and beryllium. Alpha-5 included beryllium areas, legacy material, and facility contamination which may involve enriched uranium, depleted uranium, and lithium.

**Contaminants of concern (including extent of contamination by major contaminant):**

<table>
<thead>
<tr>
<th>Building</th>
<th>Chemical Hazard</th>
<th>Location/Extent</th>
<th>Radiological Hazard</th>
<th>Location/Extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>9201-5</td>
<td>Mercury, asbestos, polychlorinated biphenyls (PCBs), beryllium</td>
<td>Large areas of mercury and beryllium contamination; equipment contaminated with PCBs; interior and exterior asbestos</td>
<td>Uranium and similar radionuclides</td>
<td>Significant areas from past activities</td>
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Legacy materials included items such as, but not limited to: non-process equipment, containers, tools, and miscellaneous contaminated office equipment. Legacy materials are defined as easily removable items that involve minimal reconfiguration efforts, e.g., unbolting, unplugging, wire cutting, or cold cutting. Since inactive buildings are often used as storage for materials from other areas, the materials often contain “orphaned” items from other buildings that may or may not have disposition problems. Legacy material identified by the National Nuclear Security Administration (NNSA) for current or future missions for salvaging was not part of this scope of work. Legacy materials determined to be either radiologically or chemically contaminated and waste required segregation, size reduction, compaction, and treatment, as necessary, to meet applicable disposal facility waste acceptance criteria (WAC). Initial estimates identified a volume of material of approximately 714,704 Cubic Feet.

**D&D Project Execution**

**Site WBS Organization within the ECAS Project Scope:**
This scope of work for the Alpha-5 Legacy Material Disposition Project was to complete removal and disposition of all legacy materials in Building 9201-5 (Alpha-5) to prepare the facility for eventual deactivation and demolition (D&D) under the Integrated Facility Disposition Program (IFDP). The LMD and facility characterization was organized with the project management and waste characterization and management performed by B&W, the facility characterization performed by ORISE, and the hazardous material removal/asbestos abatement and facility demolition subcontracted. Preparation of DOT compliant shipping papers, logistical support for the placement and movement of waste containers and transportation of waste to approved
Project Name: OR-Alpha 5 LMD-D&D-R

Disposal outlets was performed by subcontractors with B&W Y-12 oversight.

Management: The scope was planned, managed, and executed as a single element. Project management included subcontract management, planning, project controls, technical coordination, quality and safety oversight, client and regulatory interface, and project closeout.

Regulatory: The project was performed in accordance with the requirements of the Federal Facility Agreement for the ORR and an Action Memorandum for Time-Critical Removal Action for Removal of Legacy Materials from Buildings 9201-5 and 9204-4, prepared by DOE-EM. This Action Memorandum combined the scope of this project with the scope of the Beta-4 Legacy Material Disposition Project, thereby permitting a shared and combined Waste Handling Plan (WHP). A WHP including a Sampling and Analysis Plan, as well as characterization, preparation of waste profiles, and any necessary sorting/segregation and/or size reduction prior to transportation to an approved disposal site were included in this work scope. Waste profiles, for waste to be disposed at the EMWMF, were developed and submitted to the EMWMF WAC Attainment Team for approval prior to disposal at the EMWMF. This project scope included preparation of a Removal Action Report (RmAR) for regulatory approval (Alpha-5 and Beta-4 legacy material disposition).

Physical Approach:
Alpha 5 material disposition included substantial characterization of legacy materials, safe packaging, removal and recycling, or disposal of all legacy materials from the entire building—process and non-process equipment, containers, tools, and miscellaneous office equipment. Important components of the scope of material disposition are responsible project management, quality assurance, compliance oversight, health and safety oversight, regulatory planning and documentation, sampling and analysis of potential contaminants, and coordination of waste shipments to approved disposal sites. Legacy materials/wastes were further characterized as necessary, treated if required, and prepared/packaged for disposal.

Alpha 5 is a four-story processing building whose challenges lay in organizing the material and equipment removal floor by floor. The fourth floor was emptied first, followed by the second floor, followed by the third and the first floors. Highlights of the legacy removal follow:

- First Floor—Special materials inventory and radiological characterization. Almost 500 samples were collected in preparation for shipping and loading.
- Second floor—A total of 89 loads of legacy material were shipped to the Y-12 sanitary landfill. Personnel removed a cumulative total of 1661 cubic meters of legacy material.
- Third floor—An existing online drum crusher accelerated packing and shipping.
- Fourth floor—A total of 5430 containers of legacy material were removed.

Radiologically contaminated waste that met the facility (WAC) was disposed at the EMWMF. Sanitary and construction/demolition waste was disposed at the Y-12 Landfills in accordance with that facility WAC. Some waste was shipped to an approved offsite facility for treatment and/or disposal. Radiological waste disposed of at an off-site facility went to Nevada Test Site (NTS). Liquid waste remained on-site for treatment.

Facility Characterization included characterization, sampling analysis and data review for the
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<td>Alpha-5 Building in preparation for later demolition.</td>
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**Technologies:** The contractor used standard manual packaging of B-25 and soft-sided bulk containers. Shredders and drum crushers were used to assist packaging.

**Activities self-performed:**
- All management and key technical positions along with a portion of the technical staff
- Waste characterization and management
- Used significant professional services contracted (i.e., seconded) labor inter-mixed with prime contractor staff

**Activities subcontracted:**
- Characterization of facility surfaces in preparation for D&D
- Waste treatment of mixed wastes (on-site and off-site)

**Issues that impacted the project:**
- None

**Scope Growth:**
No identified scope growth

**Notes Regarding Use of Data**
- None