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JUN 1 9 1997

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Dear Mr. Saric and Mr. Schneider:

TRANSMITTAL OF THE FINAL OPERABLE UNIT 3 INTEGRATED REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN

Reference: Letter from James A. Saric to Johnny W. Reising, "Approval of OU3 Integrated RD/RA Work Plan," dated June 11, 1997.

Letter from Thomas Schneider to Johnny W. Reising, "DOE FEMP Approval OU3 Integrated RD/RA Work Plan RTC," dated April 21, 1997.

The purpose of this letter is to transmit to the United States Environmental Protection Agency (U.S. EPA) and Ohio Environmental Protection Agency (OEPA) the final version of the Operable Unit 3 (OU3) Integrated Remedial Design/Remedial Action (RD/RA) Work Plan. The work plan incorporates all revisions made as a result of previous U.S. EPA and OEPA comments.

If you or your staff have any questions, please contact John Trygier at (513) 648-3154.

Sincerely,

Johnny Reising

Johnny W. Reising
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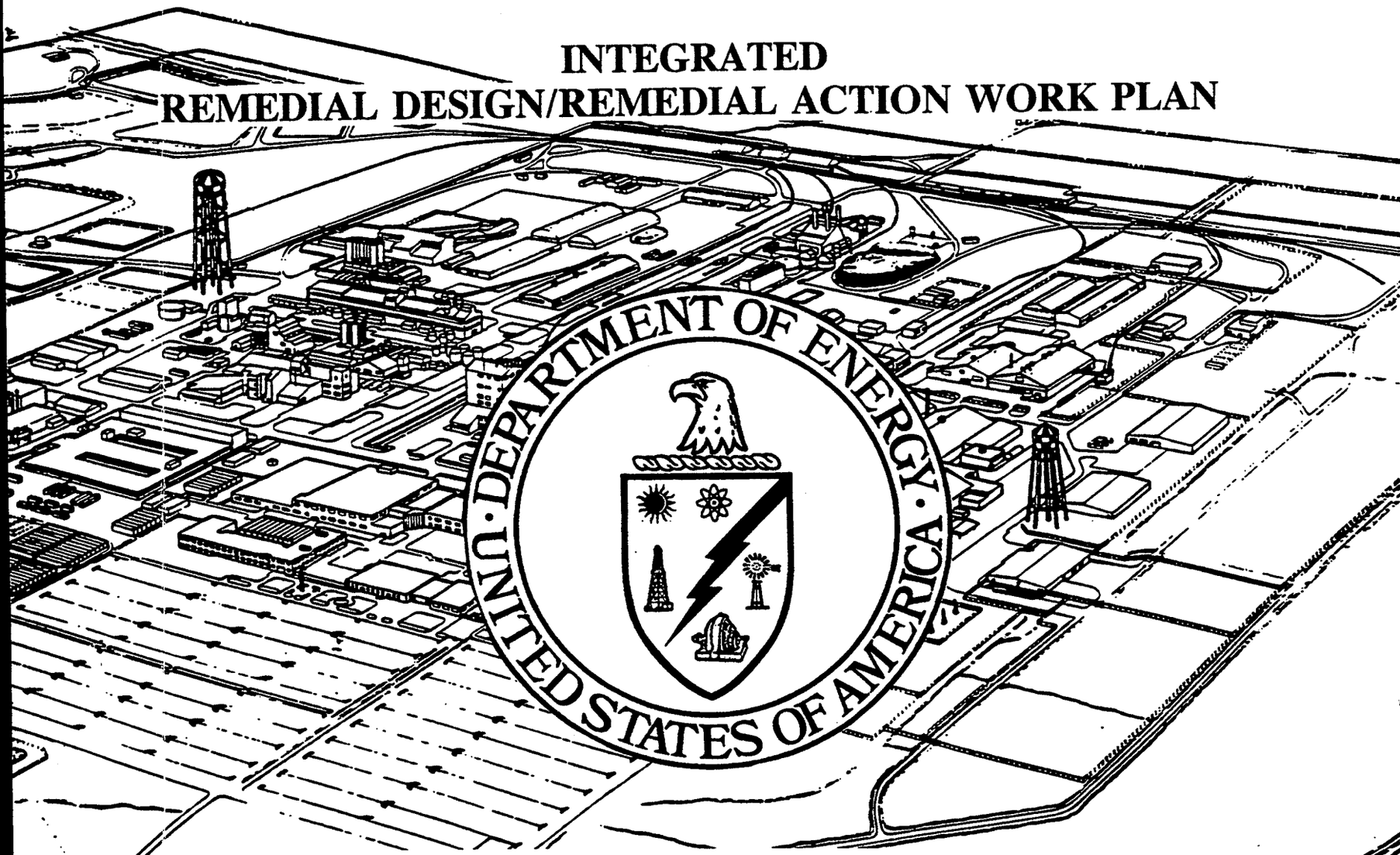
# OPERABLE UNIT 3

## INTEGRATED REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN




SECTIONS 1-7, APPENDICES A through F

MAY 1997

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

FINAL 3

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# OPERABLE UNIT 3

## INTEGRATED
## REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN

SECTIONS 1-7, APPENDICES A through F

MAY 1997

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**Acknowledgement**

The Operable Unit 3 Integrated Remedial Design/Remedial Action Work Plan was prepared with the support of several individuals representing a wide variety of expertise and organizations at the Fernald Environmental Managament Project. The major contributors to the development of this document are:

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**OPERABLE UNIT 3**
**INTEGRATED REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN**
**FINAL**
**MAY 1997**

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# NOTATION

## Abbreviations, Acronyms, and Initials

| | |
|---|---|
| ACA | Amended Consent Agreement |
| ACM | asbestos-containing material(s) |
| ACOE | United States Army Corps of Engineers |
| ALARA | as low as reasonably achievable |
| ARAR(s) | Applicable or Relevant and Appropriate Requirement(s) |
| ARP | Aquifer Restoration Project |
| AWWT | advanced wastewater treatment |
| BDN | biodenitrification |
| CAMU | Corrective Action Management Unit |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 |
| CFC | Certified for Construction |
| CFR | Code of Federal Regulations |
| COCs | contaminants of concern |
| CMU | concrete masonry unit |
| CPID | Closure Plan Information and Data |
| CQAP | Construction Quality Assurance Plan |
| CRP | Community Relations Plan |
| CWA | Clean Water Act of 1977, as amended |
| DCG | derived concentration guide |
| DEC | Design-Engineering-Construction [Team] |
| DF&O | Directors Findings and Orders |
| DOE | United States Department of Energy |
| DOE-FN | United States Department of Energy - Fernald Area Office |
| DOE-NV | United States Department of Energy - Nevada Office of Operations |
| EMP | Environmental Monitoring Plan |
| FEMP | Fernald Environmental Management Project |
| FERMCO | Fernald Environmental Restoration Management Corporation |
| FS | feasibility study |
| FY | fiscal year |
| HASP | health and safety plan |
| HEPA | high-efficiency particulate air [filter] |
| HVAC | heating, ventilating, and air conditioning |
| HWMU | Hazardous Waste Management Unit |
| HX(s) | heat exchanger(s) |
| IEMP | Integrated Environmental Monitoring Plan |
| IFB | invitation for bid |
| IMPP | Impacted Materials Placement Plan |
| IROD | Record of Decision for Interim Remedial Action |

| | |
|---|---|
| LARW | low activity radioactive waste |
| LDRs | Land Disposal Restrictions |
| LLW | low-level waste |
| MEF | material evaluation form |
| MSCC | Material Segregation and Containerization Criteria [form] |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NESHAPs | National Emissions Standards for Hazardous Air Pollutants |
| NORM | naturally occurring radioactive material |
| NPDES | National Pollutant Discharge Elimination System |
| NTP | Notice to Proceed |
| NTS | Nevada Test Site |
| O&M | operations and maintenance |
| OAC | Ohio Administrative Code |
| Ohio EPA | Ohio Environmental Protection Agency |
| OSDF | On-site Disposal Facility |
| OSWER | Office of Solid Waste Emergency Response |
| OU1 | Operable Unit 1 |
| OU2 | Operable Unit 2 |
| OU3 | Operable Unit 3 |
| OU4 | Operable Unit 4 |
| OU5 | Operable Unit 5 |
| PCB(s) | polychlorinated biphenyl(s) |
| PCDF | permitted commercial disposal facility |
| PPA | Pollution Prevention Act |
| PSHSP | project-specific health and safety plan |
| PSR | [OU3] Remedial Design Prioritization and Sequencing Report |
| PWID | project waste identification and disposition [form] |
| QA | quality assurance |
| QAP | Quality Assurance Plan |
| RCRA | Resource Conservation and Recovery Act |
| RD/RA | remedial design/remedial action |
| RFP | Request for Proposal |
| RI | remedial investigation |
| ROD | Record of Decision |
| RRP | Radiological Requirements Plan |
| SACD | Stipulated Amendment to the Consent Decree |
| SAP | Sampling and Analysis Plan |
| SARA | Superfund Amendments and Reauthorization Act of 1986 |
| SCEP | Soil Characterization and Excavation Project |
| SCQ | Sitewide CERCLA Quality Assurance Project Plan |
| SEP | Sitewide Excavation Plan |
| SOW | statement of work |
| STP | Site Treatment Plan |
| SWIFTS | site-wide waste information, forecasting, and tracking system |



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| | |
|---|---|
| TBCs | criteria to be considered |
| TCLP | Toxicity Characteristic Leachate Procedure |
| TOA | Task Order Agreement |
| TSCA | Toxic Substance Control Act of 1976, as amended |
| TSDF | treatment storage disposal facility |
| TSI | thermal systems insulation |
| UST | underground storage tank |
| U.S. EPA | United States Environmental Protection Agency |
| WAC | waste acceptance criteria |
| WCPP | Waste Certification Program Plan |
| WMP | Waste Management Plan |
| WM/PP | Waste Minimization and Pollution Prevention |
| WPA | [OU3 RI/FS] Work Plan Addendum |
| WWTS | wastewater treatment system |

**Units of Measure**

| | |
|---|---|
| cpm | counts per minute |
| CY | cubic yard(s) |
| dpm | disintegration(s) per minute |
| ft. | foot (feet) |
| $ft^2$ | square foot (feet) |
| gal | gallon(s) |
| Hr | hour |
| in. | inch |
| lb. | pound(s) |
| m | meter(s) |
| $m^3$ | cubic meter(s) |
| mg/L | milligram(s) per liter |
| mrem | millirem(s) |
| nCi/g | nanocurie(s) per gram |
| pCi | picocurie(s) |
| ppm | part(s) per million |

**Chemical Symbols**

| | |
|---|---|
| Tc | technetium |
| Th | thorium |
| U | uranium |

## GLOSSARY

**Administrative area -**
The area of the FEMP located outside of the radiologically controlled areas.

**Administrative controls -**
Ensure protection against hazards by management, procedures, record keeping, and assessments. Not intended to physically stop individuals or remove hazards.

**Amended water -**
Water which contains an additive that improves its penetration and adhesion properties.

**Asbestos abatement containment area -**
An enclosed area maintained under negative pressure to prevent or minimize the spread of asbestos fibers. Often a plastic enclosure with High Efficiency Particulate Air (HEPA)-filtered ventilation. Also referred to as asbestos abatement regulated area.

**Bid package -**
Documents which include the technical Statement of Work, legal, commercial, safety, environmental, and quality requirements of the work to provide guidance to potential bidders.

**Complex -**
A set of components grouped by location, scope of work required, and/or cost of dismantlement to be remediated under one or more design document(s).

**Component -**
The smallest physically distinct unit of OU3 that is considered separately in the development and implementation of this work plan including, but not limited to, buildings, pads, roads, piping/utilities, and ponds/basins.

**Container -**
A controlled configuration for temporary storage and/or transportation of materials; includes, but not limited to pallets, open and closed boxes, and dump trucks.

**Containment structure -**
A barrier constructed to prevent or minimize the spread of contamination during decontamination and dismantlement activities.

**Contamination area -**
Area where contamination levels are greater than the limits specified in Table 2-2 of the DOE Radiological Control Manual but less than 100 times those values.

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## GLOSSARY

**Controlled area -**

Any area, room, or enclosure, to which access is controlled to protect individuals from exposure to radiation and radioactive materials, or where radioactive materials may be present. The surface contamination levels are not to exceed the limits specified in Table 2-2 of the DOE Radiological Control Manual. Personnel exposure is not expected to exceed 100 mrem/year while working in a Controlled Area.

**Debris -**

Includes all material removed or generated from OU3 components (structures) during remediation (e.g., steel, miscellaneous metals, transite, concrete, etc.); term is synonymous with, and used interchangeably with, *material* in this work plan.

**DEC Team -**

An acronym for Design-Engineering-Construction Team, containing representatives from DOE, various FERMCO organizations, and the remedial design subcontractor responsible for the overall development of each design package.

**Design package -**

Detailed set of plans and specifications for implementation of the interim remedial action in manageable portions of the entire work scope. Refer to Section 4.1 for a more detailed description of a design package.

**Dynamic dismantlement -**

Consists of several methods of dismantling a structure in which structural material is allowed to free fall to the ground using either pull-down techniques, tripping, or implosion.

**Engineering controls -**

Eliminate hazards by mechanical means or by process design; apparatus and/or mechanisms which physically prevent entry, minimize hazards, or create some kind of barrier.

**Free-release -**

Unrestricted release of materials from DOE control to an uncontrolled environment. Materials must meet the release criteria established by Nuclear Regulatory Commission (NRC) regulation 1.86 and DOE Order 5400.5.

**Hazard Waste Management Unit (HWMU) -**

A contiguous area of land on or in which hazardous waste is placed or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area. Examples of hazardous waste management units include a surface impoundment, a waste pile, a land treatment area, a landfill cell, an incinerator, a tank and its associated piping and underlying containment system, and a container storage area.

## GLOSSARY

**Hold-up material -**

Includes material (both liquid and solid) within any process equipment or reservoir other than residuals which cling to the surfaces of the various pumps, piping, vessels, or other surfaces of equipment.

**Implementation Plan -**

Document which provides specific details on a decontamination and dismantlement and material management for each OU3 remediation project under the OU3 integrated remedial action. This document serves as the single remedial design deliverable to the regulatory agencies in lieu of multiple design deliverables.

**Integrated remedial action -**

The integration of remedial design and remedial action activities into one overall remediation program for OU3; performed pursuant to decisions made in the OU3 Record of Decision for Interim Remedial Action and in the OU3 Record of Decision for Final Remedial Action.

**Interval period -**

The period of time between the issuance of the OU3 Record of Decision for Interim Remedial Action and the execution of the OU3 integrated remedial action.

**Material -**

Includes all solids and liquids removed or generated from OU3 components (structures) during remediation (e.g., steel, transite, concrete); term is synonymous with, and used interchangeably with, *debris* in this work plan.

**Operable Unit -**

A distinct action that comprises an incremental step toward comprehensively addressing site problems. The five FEMP operable units, as defined by the Amended Consent Agreement (ACA), have been specified based on specific site problems. Each of the units are summarized as follows: OU1 - waste pits; OU2 - ash pile, sanitary landfill, and lime sludge ponds; OU3 - all buildings and associated facilities (roads, railroads, drummed waste, inventory, fences, telephone poles, electrical and sewage lines, etc.); OU4 - four large storage silos and associated facilities; OU5 -contaminated environmental media. Refer to section 2.1 for a more detailed description of each operable unit.

**Operation and maintenance -**

Activities performed by the FEMP workforce in support of OU3 decontamination and dismantlement projects and waste management.

**OU3 integrated remedial action -**

The combined RD/RA activities associated with actions authorized under the integration of the OU3 IROD and OU3 Final Action ROD.

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## GLOSSARY

**Primary material -**

The material generated as a result of dismantlement activities of a specific project, including the structure, associated equipment, and contents of the building.

**Process area -**

A distinct area within an OU3 component where a particular chemical process was conducted. Each process area is assumed to have uniform contaminant composition.

**Process knowledge -**

Information available about a process from documentation of past operations or information from individuals who participated in the operation. This information includes, but is not limited to, process chemistry, history of accidents/spills, maintenance chemicals/materials, and other uses of the process vessels or work space.

**Process-related -**

A term that metals, such as pipe and equipment, as belonging to OU3 Debris Category C (process-related metals), and thereby subjects that material to the specific handling and off-site disposal requirements specified in this work plan for that category of materials. All metals that are not pre-determined to be Category C, as is the case with most metals listed as Category B (inaccessible metals), will be subject to visible inspection in the field pursuant to Specification 01517 to determine if they exhibit "visible process residues." If a material exhibits visible process residues, that material will be classified as "process-related." With the exception of equipment identified as being contaminated with uranium having an enrichment over two percent, materials designated or classified as Category C may be decontaminated to the extent that they become Category B.

**Process residues -**

Material on the interior or exterior surfaces of debris, such as yellow-cake and green salt, that is not obvious and that if rubbed, would be easily removed. Stains, rust, corrosion, and flaking do not qualify as [visible] process material.

**Release cleaning -**

Removal or fixation of surface contamination to meet regulatory limits or to levels which have been determined to allow safe handling of materials. Typically refers to an activity performed by the remediation subcontractor for radiological and non-radiological contaminants prior to dismantlement. Generally synonymous with *surface decontamination*.

**Safe shutdown -**

Preparatory activities originally performed under the direction of Removal Action 12 that have been incorporated into the OU3 integrated remedial action as provided in the OU3 Final Action ROD. The safe shutdown

preparatory action provides planning, engineering, and program control for the proper characterization, removal and disposition of all uranium product and in-process hold-up materials, excess supplies, chemicals, and associated process equipment. The program also is intended to ensure the proper isolation of utilities for the majority of existing previously-operated, production-related equipment.

**Secondary waste -**

Waste other than primary waste associated with a remedial action generated as a result of occupying a jobsite, conducting decontamination and dismantlement activities, utilizing PPE, and demobilization activities.

**Structural debris -**

Material generated from the structural dismantlement of OU3 facilities; refers to load bearing structural members that are typically removed using dynamic dismantlement methods.

**Surface decontamination -**

The reduction or fixation of existing surface contamination levels to meet the limits that are stated in the applicable project Radiological Requirements Plan, thereby reducing direct exposure potential, as well as reducing available sources for air-borne or water-borne contamination. Generally synonymous with the subcontract term, *release cleaning*.

**Transite -**

Common construction material used as sheeting for walls and roofs for many OU3 components. It consists of a mixture of asbestos and cement.

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Section 1

# 1.0 INTRODUCTION

## 1.1 Purpose and Scope

The purpose of this remedial design/remedial action (RD/RA) work plan is to identify the activities required to implement both the interim and final remedial actions for *Operable Unit*[1] 3 (OU3) at the U.S. Department of Energy's (DOE) Fernald Environmental Management Project (FEMP) in Fernald, Ohio. Due to the close relationship between both interim and final remedial actions, it is necessary for project planning purposes to combine them into one integrated remedial action for OU3. Accordingly, this work plan has been prepared to serve as the vehicle that integrates the implementation strategies for both remedial actions. The OU3 *integrated remedial action* consists of the implementation of RD/RA activities required under the OU3 Record of Decision for Interim Remedial Action (IROD) (DOE 1994a), which primarily addresses the *surface decontamination* and dismantlement of OU3 structures, and the OU3 Record of Decision for Final Remedial Action ("OU3 Final Action ROD") (DOE 1996a), which primarily addresses the treatment and final disposition of OU3 materials. The integration of the OU3 interim and final remedial actions is provided for under the OU3 Final Action ROD and is necessary to ensure that there is continuity between both OU3 remedial actions so that the overall remedial action goals for OU3 are achieved. The overall goals of the OU3 integrated remedial action are to safely decontaminate and dismantle OU3 *components*, treat and dispose of the resulting OU3 materials in a timely, efficient, and cost-effective manner which ensures compliance with all Applicable or Relevant and Appropriate Requirements (ARARs), and be protective of human health and the environment.

The OU3 integrated remedial action is being implemented in accordance with the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), (hereinafter jointly referred to as "CERCLA"), and the Resource Conservation and Recovery Act (RCRA). The OU3 integrated remedial action is being implemented by the DOE, as the lead agency responsible for CERCLA activities at the FEMP.

The IROD, which was issued by DOE and the United States Environmental Protection Agency (U.S. EPA) on July 22, 1994, documents the decision to decontaminate and dismantle all OU3 structures and facilities, with the temporary storage and disposition of the resulting waste and *material* during the *interval period* between the implementation of the IROD and the OU3 Final Action ROD. On February 17, 1995, U.S. EPA approved the OU3 Remedial Design/Remedial Action Work Plan for Interim Remedial Action (DOE 1995a), which detailed the strategy for implementing those activities. The OU3 Final Action ROD, which was signed by the U.S. EPA on September 24, 1996, addresses the treatment and disposition of material resulting from decontamination and dismantlement of OU3 components. OU3 material assessments presented in the OU3 Remedial Investigation/Feasibility Study (RI/FS) Report (DOE 1996b), which serves as the basis for the selected remedy presented in the OU3 Final Action ROD, significantly affected the material management strategies and performance specifications previously presented in the OU3 RD/RA Work Plan for Interim Remedial Action. As a result, this work plan was prepared in a manner that updates and supersedes all previous strategies provided under the OU3 RD/RA Work Plan for Interim Remedial Action. Therefore, upon U.S. EPA approval, this document shall be the only RD/RA work plan that directs OU3 remedial design and remedial action.

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*Words that have been italicized are defined in the glossary.*

One of the key features of this work plan is the dissemination and presentation of certain key OU3 RI/FS data that are needed to implement material management strategies based on decisions made in the OU3 Final Action ROD. It is essential to know for the implementation of the material management strategies provided in this work plan that the OU3 RI/FS provided sufficient characterization data to identify specific OU3 materials as being one of the following: 1) potentially mixed wastes that will be treated and dispositioned off-site; 2) process-related waste that will be dispositioned off-site; 3) selected low-level wastes that have been administratively designated for off-site disposal; 4) potentially radiologically unrestricted or restricted materials for recycling, reuse, or disposal; and 5) materials that have been certified for on-site disposal.

The key OU3 RI/FS data needed for implementing material management strategies were evaluated during the preparation of this work plan so that the sources of those materials which are prohibited from on-site disposal are clearly identified. This initial evaluation is summarized in the discussion on material evaluation, which is a critical step during each project design. By using the initial evaluation summaries, project designers will readily be able to identify and mark specific OU3 materials according to predetermined treatment and/or disposition requirements.

## 1.2 Executive Summary: RD/RA Work Plan Approach

This RD/RA work plan provides the overall framework and strategy for performing remedial design and remedial action authorized under the Final Action ROD, which incorporated the decisions provided in the IROD. Table 1-1 provides a crosswalk that identifies how the key elements of the OU3 Final Action ROD and the requirements of the Amended Consent Agreement (ACA) (U.S. EPA 1991) have been met by this work plan.

A key element of the strategy for implementing the OU3 integrated remedial action is the utilization of individual *implementation plans* for each of the discrete above-grade decontamination and dismantlement projects. Implementation plans will provide project-specific remedial design information at a greater level of detail than is possible in this document. The implementation plan is the sole remedial design document to be submitted to the regulatory agencies in lieu of multiple design deliverables for each OU3 project. It is emphasized that many project-specific applications of the requirements/commitments of the OU3 Final Action ROD and ACA, as listed in Table 1-1, will be reported in the implementation plans.

The general approach of this work plan is as follows:

- summarize pertinent site and OU3 background information;
- summarize the purpose and scope of the OU3 integrated remedial action by summarizing key elements of the IROD and Final Action ROD;
- describe programmatic and action-specific strategies and requirements for design and implementation which are common to each OU3 project, including the requirements for integration and coordination with other site projects and programs;

## TABLE 1-1 RD/RA Work Plan Requirements Crosswalk

| Regulatory Commitments/Requirements | Primary Integrated RD/RA Work Plan Provisions* | Work Plan Reference |
|---|---|---|
| **OU3 FINAL ACTION ROD** | | |
| 1. Provides for unrestricted/release of materials, as economically feasible, for recycling, reuse, or disposal. | • Material evaluation process defined which identifies materials that may qualify for unrestricted and restricted release; | Section 3.3.1 |
| | • Primary strategies for restricted and unrestricted release of materials for recycle, reuse, and disposal, including certification program and recycling methodology; and | Section 3.3.6.1 |
| | • Certification Program for Release of Materials, including Material Release Policy and procedure for implementation. | Appendix C |
| 2. Permits treatment of materials to meet on-site disposal facility (OSDF) and/or off-site disposal facility waste acceptance criteria (WAC). | • Material evaluation process defined which identifies materials that potentially require treatment; and | Section 3.3.1 |
| | • Discusses treatment beyond in situ surface decontamination for restricted and unrestricted release, to meet Land Disposal Restrictions (as applicable), disposal facility WAC, and technology development. | Section 3.3.5 |
| 3. Requires off-site disposal of process residues, product materials, and process-related metals. | • Inventory removal procedures and disposition decisions from Removal Action 9 adopted and integrated into RD/RA strategies to address removal, treatment, and disposal of process residues and waste product materials; | Section 3.2.1 |
| | • Performance specification to segregate for off-site disposal materials exhibiting visible process residues that cannot be decontaminated; | Section 3.2.5 |
| | • Material evaluation process defined to identify process-related metals; and | Section 3.3.1 |
| | • Off-site disposal requirements for process-related metals. | Section 3.3.6.3 |
| 4. Requires off-site disposition of acid brick and concrete from specific locations and any other materials exceeding the OSDF WAC. | • Material evaluation process defined which identifies specific locations and volumes for potentially mixed waste acid brick, low-level waste acid brick, and certain technetium 99-contaminated concrete; and | Section 3.3.1 |
| | • Off-site disposal requirements for potentially mixed waste acid brick, low-level waste acid brick, and certain technetium 99-contaminated concrete. | Section 3.3.6.3 |
| 5. Permits disposal of remaining wastes in the OSDF. | • Material evaluation process defined which identifies materials determined by the OU3 RI/FS program that qualify for on-site disposal; and | Section 3.3.1 |
| | • Requirements for managing materials for on-site disposal. | Sections 3.3.2 and 3.3.6.2 |
| 6. Imposes administrative controls through deed restrictions and access controls. | • Incorporates by reference the Operable Unit 2 responsibility for implementing administrative controls through deed restrictions and access controls. | Section 3.4.3.2 |
| 7. Incorporates post-remediation activities that include long-term monitoring and maintenance of the OSDF and operation of a groundwater monitoring network to evaluate the performance of the OSDF. | • Incorporates by reference the Operable Unit 2 responsibility for implementing operation and maintenance actions for the OSDF. | Section 3.4.3.2 |
| 8. Incorporates the decisions provided in the IROD so as to provide for an integrated implementation of the respective decisions. | • Integrated RD/RA Work Plan incorporates purpose and scope of OU3 interim remedial action by retaining and updating key provisions from RD/RA Work Plan for Interim Remedial Action and the functions of the OU3 Remedial Design Prioritization and Sequencing Report (PSR) (DOE 1995b). | Complete Work Plan and Section 3.4.1 |





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## TABLE 1-1 RD/RA Work Plan Requirements Crosswalk

| Regulatory Commitments/Requirements | Primary Integrated RD/RA Work Plan Provisions* | Work Plan Reference |
|---|---|---|
| **OU3 FINAL ACTION ROD** | | |
| 9. Adopts the procedures and disposition decisions of Removal Action 9 to continue disposition of the products, residues, and nuclear materials generated during site operations. | • Integration of inventory removal functions into project implementation strategies; and<br>• Programmatic adoption of inventory removal program. | Section 3.2.1<br>Section 3.4.2 |
| 10. Adopts prior decisions made for management of Safe Shutdown (Removal Action 12), management of asbestos abatement (Removal Action 26), and management of debris (Removal Action 17). | • Integration of safe shutdown functions into project implementation strategies;<br>• Programmatic adoption of safe shutdown program;<br>• Integration of asbestos removal functions into project implementation strategies;<br>• Programmatic adoption of asbestos removal program;<br>• Integration of debris management concepts and strategies into overall material management strategies; and<br>• Programmatic adoption of debris management elements of Removal Action 17. | Section 3.2.2<br>Section 3.4.2<br>Section 3.2.4<br>Section 3.4.2<br>Section 3.3.2<br>Section 3.4.2 |
| **AMENDED CONSENT AGREEMENT** | | |
| 1. Sampling and Analysis Plan, including Quality Assurance Project Plans | • OU3 Integrated Remedial Action Sampling and Analysis Plan (SAP);<br>• Sitewide CERCLA Quality Assurance Plan (SCQ); and<br>• Construction Quality Assurance Plan (CQAP) criteria and example CQAP. | Appendix D<br>Reference only<br>Appendix F |
| 2. Health and Safety Plan | • OU3 Integrated Remedial Action Health and Safety Plan (HASP); and<br>• Project-Specific Health and Safety Plans (PSHSPs). | Appendix E<br>Reference only |
| 3. Plan for the Satisfaction of Permitting Requirements | • Strategies for Environmental air emissions monitoring, stormwater management, and decontamination (surface) water management. | Sections 3.6.2.1 through 3.6.2.3 |
| 4. Groundwater Monitoring Plan | • Groundwater monitoring is not anticipated; however, a strategy has been developed for any release events that would possibly require such action. | Section 3.6.2.4 |
| 5. Operation and Maintenance (O&M) Plan | • Technically, not applicable; applicable provisions previously included in the O&M Plan which was provided with the RD/RA Work Plan for Interim Remedial Action, were incorporated into the material management strategy. | Section 3.3 |
| 6. Schedule for the Implementation of the RD/RA Tasks | • Schedule previously provided under the OU3 PSR incorporated into Integrated RD/RA Work Plan. | Section 6.3 |
| 7. Schedule for Submittal of RD/RA Reports | • Schedule for RD reporting from PSR incorporated into Integrated RD/RA Work Plan; and<br>• Schedule for RA reporting dependent on project-specific implementation schedules. | Section 6.3<br>Sections 4.5 |

* Listed are primary provisions only; numerous other provisions in the work plan have been prepared in a manner that integrate the primary provisions or strategies (e.g., strategies for above-grade dismantlement, material segregation, and containerization have been developed to facilitate unrestricted/restricted release of materials).

- detail the process of managing materials, from initial evaluation though disposition, including waste minimization and recycling strategies;
- identify the primary regulatory requirements and considerations necessary for performing the remedial activities;
- develop a framework document that prescribes the content of the project-specific implementation plans and remedial action reports; and
- OU3 regulatory submittals, remedial action scheduling, and enforceable milestones.

The implementation of the OU3 integrated remedial action is a multi-faceted project involving the decontamination and dismantlement of over 200 components in OU3 and the treatment, as needed, and disposition of all resulting materials. It is anticipated that the OU3 integrated remedial action will require nine years to complete, according to current baseline funding projections[2]. This work plan presents a summary of the methodology that was used to prioritize and schedule the decontamination and dismantlement projects that were identified for the OU3 interim remedial action. That methodology is also pertinent to the OU3 integrated remedial action since the additional activities governed by the Final Action ROD will be integrated into the individual RD and RA projects and documented in implementation plans. The results of the PSR are discussed in Section 2.5 and have been integrated into the scope of OU3 RD/RA activities as described in Sections 4.4 and 6.

This work plan has been prepared in compliance with the ACA, CERCLA, Superfund Remedial Design and Remedial Action Guidance (U.S. EPA 1986), the Stipulated Amendment to the Consent Decree (SACD) (State of Ohio, 1993), and the FEMP's DOE-CERCLA integrated project management process developed on November 9, 1993. Although Section XI of the ACA requires both a Remedial Design Work Plan and a Remedial Action Work Plan to be submitted, this work plan combines both requirements into one document in order to more efficiently utilize time, budget, and resources.

## 1.3 Work Plan Organization

This work plan is comprised of the main document (seven sections), a reference section, and six appendices. An outline and a brief description of the seven sections and appendices are provided below.

SECTION 1 - Introduction, provides the purpose and scope of the OU3 integrated remedial action, the work plan approach, and the work plan organization.

SECTION 2 - Background, provides pertinent background information essential to understanding the basis of the OU3 integrated remedial action, including summaries of the IROD, PSR, and Final Action ROD.

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*This projection does not include the decontamination and dismantlement of Operable Unit 5 treatment facilities, primarily the Advanced Wastewater Treatment Facility.*

SECTION 3 - Strategy for Implementing the OU3 Integrated Remedial Action, presents the programmatic and implementation strategies for the OU3 integrated remedial action, including the approach for implementation of individual projects, decontamination, dismantlement, material management, integration with other site activities, and environmental compliance.
SECTION 4 - RD/RA Planning and Execution, describes each of the programmatic tasks that will or have been performed to implement the OU3 integrated remedial action, including planning, scheduling, remedial design, and remedial action.

SECTION 5 - Community Relations, describes the community relations activities that will be performed throughout the OU3 integrated remedial action.

SECTION 6 - Schedule and Deliverables, identifies submittals to regulatory agencies, the OU3 remediation schedule, and remedial design submittals; and describes the strategy for submitting updated schedules.

SECTION 7 - Management, describes the overall management structure for performing the integrated remedial design and remedial action activities.

A reference section follows Section 7 which identifies references cited in the preceding sections.

Supplementing this work plan are support documents which provide basic requirements that may apply to decontamination, dismantlement, and material management. These documents are included in the following appendices:

Appendix A - Material Segregation and Containerization Criteria, consists of a standard listing of material segregation and containerization criteria for decontamination and dismantlement projects which were developed to ensure that material flow requirements identified in the OU3 RI/FS Report, OU3 Final Action ROD, and the OU2 Impacted Materials Placement Plan are met during the OU3 integrated remedial action.

Appendix B - Performance Specifications, provides a set of generic performance specifications that will be incorporated into individual engineering design packages for decontamination and dismantlement projects.

Appendix C - Certification Program for Release of Materials, consists of the Material Release Policy and the procedure developed to release materials for recycling, reuse, or disposal off-site.

Appendix D - Sampling and Analysis Plan, consists of the strategies and procedures established for providing sampling and analytical support during OU3 remediation. The SAP also contains appropriate references to the Sitewide CERCLA Quality Assurance document, also known as the SCQ, to fulfill the requirements of a quality assurance project plan for sampling and analysis.

Appendix E - Health and Safety Plan, consists of programmatic health and safety requirements that will be applied during projects implemented under the OU3 integrated remedial action; supports the development of project-specific health and safety plans.

Appendix F - Construction Quality Assurance Plan Criteria, consists of a presentation of the FEMP Quality Assurance (QA) Program and the QA criteria that must be applied to FEMP

activities, including the OU3 RD/RA process. This appendix also contains an attachment which demonstrates how these criteria have been applied during design to develop project-specific QA Plan criteria for incorporation into the subcontract document.

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Section 2

# 2.0 BACKGROUND

A summary of pertinent OU3 and FEMP background information is presented in this section. Extensive background information for OU3 may be found in the OU3 RI/FS Report, the OU3 RI/FS Work Plan Addendum (WPA) (DOE 1994b), and the 1995 Annual Site Environmental Report (DOE 1996c).

## 2.1 Site Overview

The FEMP is a DOE-owned, contractor-operated federal facility that produced high-purity uranium metal products for the DOE and its predecessor agencies, the Atomic Energy Commission and the Energy Research and Development Administration, during the period 1952 to 1989. Thorium was also processed, but on a smaller scale, and was stored on the site. Production activities ceased in 1989, and the production mission of the facility was formally ended in 1991. The FEMP was included on the CERCLA National Priorities List in 1989. The current mission of the site is environmental restoration in accordance with the requirements of CERCLA.

The ACA defines the terms and schedules for remediation of the FEMP. Under the ACA, the FEMP has been divided into five operable units, representing a logical grouping of facilities and/or like waste units and/or geographical orientation. These operable units and their selected remedies are described below, with the exception of OU3, which is described in more detail in Section 2.2.

Operable Unit 1 (OU1) covers approximately 38 acres and consists of on-site facilities that were used during uranium production for storage of low-level radioactive waste. OU1 contains Waste Pits 1 - 6, the Clearwell, the Burn Pit, berms, liners, and soils and perched water within its boundaries. Pursuant to the OU1 ROD which was signed by U.S. EPA on March 1, 1995, the selected remedy for OU1 involves excavating the waste pit material (along with any residual contaminated soils from beneath the pits), treating the waste materials through thermal drying (as necessary to remove free water to meet WAC of the disposal facility), and disposing of the treated waste at a permitted commercial disposal facility (PCDF). As a contingency, any waste that fails to meet the WAC of the PCDF due to radiological concentrations will be shipped to DOE's Nevada Test Site (NTS). Remaining OU1 contaminated soils will be removed and dispositioned in accordance with the selected remedy for production area soils as documented in the OU5 ROD.

Operable Unit 2 (OU2) consists of other waste units located on a one-acre tract at the northwest corner of the former Production Area, a 1.3 acre-tract directly to the west of the former Production Area, and a 16-acre tract in the southwest portion of the FEMP. Specifically, OU2 includes facilities and appurtenances used for the storage or disposal of solid wastes from the site operations, including the Active and Inactive Flyash Piles, South Field Disposal Area, North and South Lime Sludge Ponds, Solid Waste Landfill, soils and debris beneath and immediately surrounding the above solid waste areas encountered in the vicinity of the above-referenced solid waste areas during implementation of cleanup activities. Pursuant to the OU2 ROD, which was signed by the U.S. EPA on June 8, 1995, the selected remedy for OU2 involves the excavation of all material with contaminants of concern (COCs) above the established cleanup levels; material processing for size reduction and moisture control, if required; on-site disposal of materials in an engineered disposal facility with a

composite cap and liner system; and off-site disposal of the fraction of the excavated material that exceeds the WAC for the OSDF.

Operable Unit 3: (Described in Section 2.2.)

Operable Unit 4 (OU4) is a 5.8 acre area located on the western side of the FEMP and is comprised of the following facilities and associated environmental media: Silos 1 and 2 and their contents (K-65 residues, by-product material); Silo 3 and its contents (cold metal oxides, by-product material); Silo 4 (empty); K-65 decant sump tank and its contents; a radon treatment system; a portion of a concrete pipe trench and other concrete structures; an earthen berm surrounding Silos 1 and 2; soils beneath and immediately surrounding Silos 1, 2, 3, and 4; and perched groundwater encountered in the vicinity of the silos during the implementation of cleanup activities. Pursuant to the OU4 ROD, which was signed by the U.S. EPA on December 7, 1994, the selected remedy involves the removal and vitrification of waste inventories, off-site disposal of vitrified wastes, excavation of contaminated soil and placement of soil and oversized debris meeting the WAC in the OSDF, decontamination and demolition of silo structures and support facilities, and placement of rubble and debris in the OSDF.

Operable Unit (OU5) encompasses the environmental media within and beyond the FEMP property boundary that are contaminated by releases from the four source operable units. These media include groundwater, surface water, soils, sediments, air; vegetation, and wildlife throughout the FEMP and surrounding areas. Pursuant to the OU5 ROD, which was signed by the U.S. EPA on January 31, 1996, the selected remedy for OU5 includes the following key elements: excavation of soil, debris, sediment, and perched water zones containing concentrations of COCs above the final remediation levels; disposal of the excavated materials in the OSDF; restoration of the Great Miami Aquifer through pump and treat technologies to attain the final remediation levels, collection and treatment of storm water and process water generated through remedial activities and recovered contaminated groundwater to the extent necessary to ensure discharge limits are attained and final remediation levels for the receiving surface water systems are not exceeded; long-term groundwater monitoring; and continued ownership of the FEMP, or portions thereof, to the extent necessary to ensure the continued protection of human health and the environment.

## 2.2 Description of Operable Unit 3

OU3 is composed of associated production facilities, support facilities (including all above- and below-grade improvements), equipment, structures, utilities, drums, tanks, solid waste, waste product, thorium, effluent lines, K-65 transfer lines, wastewater treatment facilities, sewage treatment plant, fire training facilities, scrap metal piles, feed stocks, and the coal pile. OU3 does not include the soil and groundwater under the various components, but those media are potential pathways between sources of contamination within OU3 and receptors. The former Production Area occupies about 136 acres near the center of the FEMP site.

Table 2-1 provides a current list of the 233 components within OU3. The table lists the name of each component and its alpha-numeric designation. This list will be updated during OU3 remediation if any additional structures are constructed (e.g., temporary storage structures). Additionally, the list will be updated in project-specific remedial action reports as components are removed during OU3 remedial action.

## TABLE 2-1 OU3 Component Identification

| Component | Component Designation | Component | Component Designation |
|---|---|---|---|
| 1. Preparation Plant (i) | 1A | 45. Plant 8 Railroad Filter Bldg. | 8D |
| 2. Plant 1 Storage Shelter | 1B | 46. Drum Conveyor Shelter | 8E |
| 3. Plant 1 Ore Silos (a) | 1C | 47. Plant 8 Old Drum Washer | 8F |
| 4. Ore Refinery Plant | 2A | 48. Special Products Plant | 9A |
| 5. General/Refinery Sump Control Bldg. | 2B | 49. Plant 9 Sump Treatment Facility | 9B |
| 6. Bulk Lime Handling Bldg. | 2C | 50. Plant 9 Dust Collector | 9C |
| 7. Metal Dissolver Bldg. | 2D | 51. Plant 9 Substation | 9D |
| 8. NFS Storage and Pump House | 2E | 52. Plant 9 Cylinder Shed | 9E |
| 9. Cold Side Ore Conveyor | 2F | 53. Electrostatic Precipitator | 9F |
| 10. Hot Side Ore Conveyor | 2G | 54. Boiler Plant | 10A |
| 11. Conveyor Tunnel (from Plant 1) | 2H | 55. Boiler Plant Maintenance Bldg. | 10B |
| 12. Maintenance Bldg. | 3A | 56. Wet Salt Storage Bin | 10C |
| 13. Ozone Bldg. | 3B | 57. Contaminated Oil/Graphite Burn Pad | 10D |
| 14. NAR Control House | 3C | 58. Utility Heavy Equipment Bldg. | 10E |
| 15. NAR Towers | 3D | 59. Services Bldg. | 11 |
| 16. Hot Raffinate Bldg. | 3E | 60. Main Maintenance Bldg. | 12A |
| 17. Harshaw Digestion Fume Recovery | 3F | 61. Cylinder Storage Bldg. | 12B |
| 18. Refrigeration Bldg. | 3G | 62. Lumber Storage Bldg. | 12C |
| 19. Refinery Sump | 3H | 63. Maintenance Bldg. Warehouse | 12D |
| 20. Combined Raffinate Tanks | 3J | 64. Pilot Plant Wet Side | 13A |
| 21. Old Cooling Water Tower | 3K | 65. Pilot Plant Maintenance Bldg. | 13B |
| 22. Electrical Power Center Bldg. | 3L | 66. Sump Pump House | 13C |
| 23. Green Salt Plant (j) | 4A | 67. Pilot Plant Thorium Tank Farm | 13D |
| 24. Plant 4 Warehouse | 4B | 68. Administration Bldg. | 14A |
| 25. Plant 4 Maintenance Bldg. (b) | 4C | 69. Bldg. 14 EOC Generator Set | 14B |
| 26. Metals Production Plant | 5A | 70. Laboratory | 15A |
| 27. Plant 5 Ingot Pickling | 5B | 71. Laboratory Chemical Storage Bldg. | 15B |
| 28. Plant 5 Electrical Substation | 5C | 72. Main Electrical Station | 16A |
| 29. West Derby Breakout/Slag Milling | 5D | 73. Electrical Substation | 16B |
| 30. Plant 5 Filter Bldg. | 5E | 74. Electrical Panels & Transformer | 16C |
| 31. Plant 5 Covered Storage Pad | 5F | 75. Main Electrical Switch House | 16D |
| 32. Plant 5 Ingot Storage Shelter | 5G | 76. Main Electrical Transformers | 16E |
| 33. Metals Fabrication Plant | 6A | 77. Trailer Substation #1 | 16F |
| 34. Plant 6 Covered Storage Area | 6B | 78. Trailer Substation #2 | 16G |
| 35. Plant 6 Electrostatic Precipitator South | 6C | 79. 10-Plex North Substation | 16H |
| 36. Plant 6 Electrostatic Precipitator Central | 6D | 80. 10-Plex South Substation | 16J |
| 37. Plant 6 Electrostatic Precipitator North | 6E | 81. BDN Surge Lagoon | 18A |
| 38. Plant 6 Salt Oil Heat Treat Bldg. | 6F | 82. General Sump | 18B |
| 39. Plant 6 Sump Bldg. | 6G | 83. Coal Pile Runoff Basin | 18C |
| 40. Plant 7 (b) | 7A | 84. Biodenitrification Towers | 18D |
| 41. Plant 7 Overhead Crane (b) | 7B | 85. Storm Water Retention Basin | 18E |
| 42. Recovery Plant | 8A | 86. Clearwell Pump House | 18G |
| 43. Plant 8 Maintenance Bldg. | 8B | 87. BDN Effluent Treatment Facility | 18H |
| 44. Rotary Kiln/Drum Reconditioning | 8C | 88. Methanol Tank | 18J |

## TABLE 2-1 OU3 Component Identification (Cont'd)

| Component | Component Designation | Component | Component Designation |
|---|---|---|---|
| 89. Low Nitrate Tank (k) | 18K | 132. Skeet Range Building | 28F |
| 90. High Nitrate Tank (k) | 18L | 133. Guard Post NW of Bldg. 45 | 28G |
| 91. High Nitrate Storage Tank | 18M | 134. Chemical Warehouse | 30A |
| 92. Dissolved Oxygen Bldg. | 18P | 135. Drum Storage Warehouse (i) | 30B |
| 93. IAWWT Valve House | 18Q | 136. Old Ten Ton Scale | 30C |
| 94. Main Tank Farm | 19A | 137. Engine House/Garage | 31A |
| 95. Pilot Plant Ammonia Tank Farm | 19B | 138. Old Truck Scale | 31B |
| 96. Tank Farm Control House | 19C | 139. Magnesium Storage Bldg. | 32A |
| 97. Old North Tank Farm | 19D | 140. Bldg. 32 Covered Loading Dock | 32B |
| 98. Tank Farm Lime Slitter Bldg. | 19E | 141. Pilot Plant Annex | 37 |
| 99. Pump Station & Power Center | 20A | 142. Propane Storage | 38A |
| 100. Water Plant | 20B | 143. Cylinder Filling Station | 38B |
| 101. Cooling Towers | 20C | 144. Incinerator Bldg. | 39A |
| 102. Elevated Potable Storage Tank | 20D | 145. Waste Oil Decant Shelter | 39B |
| 103. Well House #1 | 20E | 146. Incinerator Sprinkler Riser House | 39C |
| 104. Well House #2 | 20F | 147. Sewage Treatment Plant Incinerator | 39D |
| 105. Well House #3 | 20G | 148. Rust Engineering Bldg. | 45A |
| 106. Process Water Storage Tank | 20H | 149. Utility Shed North of 45A | 45B |
| 107. Gas Meter Bldg. | 22A | 150. Heavy Equipment Bldg. | 46 |
| 108. Storm Sewer Lift Station | 22B | 151. Six to Four Reduction Facility #2 | 51 |
| 109. Truck Scale | 22C | 152. Health and Safety Bldg. | 53A |
| 110. Scale House & Weigh Scale | 22D | 153. In Vivo Bldg. | 53B |
| 111. Utility Trench to Pit Area | 22E | 154. Six to Four Reduction Facility #1 | 54A |
| 112. Meteorological Tower | 23 | 155. Pilot Plant Shelter | 54B |
| 113. Railroad Scale House | 24A | 156. Pilot Plant Dissociator Shelter | 54C |
| 114. Railroad Engine House | 24B | 157. Slag Recycling Bldg. | 55A |
| 115. Chlorination Bldg. | 25A | 158. Slag Recycling Pit/Elevator | 55B |
| 116. M.H.#175/Eff. Line/Sampling Bldg. | 25B | 159. CP Storage Warehouse | 56A |
| 117. Sewage Lift Station Bldg. | 25C | 160. Storage Shed (West) (i) | 56B |
| 118. U.V. Disinfection Bldg. | 25D | 161. Storage Shed (East) (i) | 56C |
| 119. Digester & Control Bldg. | 25E | 162. Quonset Hut #1 | 60 |
| 120. Sludge Drying Beds | 25F | 163. Quonset Hut #2 | 61 |
| 121. Primary Settling Basins | 25G | 164. Quonset Hut #3 | 62 |
| 122. Trickling Filters | 25H | 165. KC-2 Warehouse | 63 |
| 123. 10-Plex Sewage Lift Station | 25J | 166. Thorium Warehouse | 64 |
| 124. Pump House-HP Fire Protection | 26A | 167. (Old) Plant 5 Warehouse | 65 |
| 125. Elevated Water Storage Tank | 26B | 168. Drum Reconditioning Bldg. (i) | 66 |
| 126. Main Electrical Strainer House | 26C | 169. Plant 1 Thorium Warehouse (i) | 67 |
| 127. Security Bldg. | 28A | 170. Pilot Plant Warehouse | 68 |
| 128. Human Resources Bldg. | 28B | 171. Decontamination Bldg. | 69 |
| 129. Guard Post on South End of D St. (c) | 28C | 172. General In-Process Warehouse | 71 |
| 130. Guard Post on West End of 2nd St. | 28D | 173. Drum Storage Bldg. (i) | 72 |
| 131. Guard Post at T-81 | 28E | 174. Fire Brigade Training Center Bldg. (d) | 73A |

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## TABLE 2-1 OU3 Component Identification (Cont'd)

| Component | Component Designation | Component | Component Designation |
|---|---|---|---|
| 175. Fire Training Pond (d) | 73B | 205. Receiving/Incoming Materials Inspection | 82 |
| 176. Fire Training Tank (d) | 73C | 206. Clearwell Line | 88 |
| 177. Fire Training Burn Trough (d) | 73D | 207. Parking Lot | 89 |
| 178. Confined Space Training Tank (d) | 73E | 208. Railroad Tracks | G-01 |
| 179. Plant 2 East Pad | 74A | 209. Roads | G-02 |
| 180. Plant 2 West Pad | 74B | 210. Storm Sewer System | G-03 |
| 181. Plant 8 East Pad | 74C | 211. Utility Lines | G-04 |
| 182. Plant 8 West Pad | 74D | 212. Underground Storage Tanks | G-05 |
| 183. Plant 4 Pad | 74E | 213. Process Trailers | G-06 |
| 184. Plant 7 Pad | 74F | 214. Non-process Trailers | G-07 |
| 185. Plant 5 East Pad | 74G | 215. Pipe Bridges | G-08 |
| 186. Plant 5 South Pad | 74H | 216. Drums (Non-RCRA) (e) | G-09 |
| 187. Plant 6 Pads | 74J | 217. RCRA Drums (e) | G-10 |
| 188. Plant 9 Pad | 74K | 218. Inventory (f) | G-11 |
| 189. Bldg. 65 West Pad | 74L | 219. Mobile Containers (Sea-Land) (e) | G-12 |
| 190. Bldg. 64 East Pad & Railroad Dock | 74M | 220. Soil Piles | G-13 |
| 191. Bldg. 12 North Pad | 74N | 221. Rock Salt Pile | P-01 |
| 192. Decontamination Pad | 74P | 222. Sand Piles | P-02 |
| 193. Plant 8 Old Metal Dissolver Pad | 74Q | 223. Gravel Pile | P-03 |
| 194. Plant 8 North Pad | 74R | 224. Copper Metal Scrap Pile (g) | P-04 |
| 195. Bldg. 63 West Pad | 74S | 225. Coal Pile | P-05 |
| 196. Plant 1 Storage Pad | 74T | 226. Scrap Metal Pile (g) | P-06 |
| 197. Pilot Plant Pad | 74U | 227. Outside Equipment Storage Area | P-07 |
| 198. Laboratory Pad | 74V | 228. Tension Support Structure #1 (h) | TS-01 |
| 199. Bldg. 39A Pad | 74W | 229. Tension Support Structure #2 (h) | TS-02 |
| 200. Finished Products Warehouse (4A) | 77 | 230. Tension Support Structure #3 (h) | TS-03 |
| 201. D & D Building | 78 | 231. Tension Support Structure #4 | TS-04 |
| 202. Plant 6 Warehouse | 79 | 232. Tension Support Structure #5 | TS-05 |
| 203. Plant 8 Warehouse | 80 | 233. Tension Support Structure #6 | TS-06 |
| 204. Plant 9 Warehouse | 81 | | |

(a) removed as part of Removal No. 13 - Plant 1 Ore Silos
(b) removed as part of Removal No. 19 - Plant 7 Dismantling
(c) removed during *operation and maintenance* activities
(d) removed as part of Removal No. 28 - Contamination of the Fire Training Facility
(e) removed as part of Removal No. 9 - Removal of Waste Inventories
(f) removed as part of Removal No. 12 - Safe Shutdown
(g) removed as part of Removal No. 15 - Scrap Metal Piles
(h) removed as part of Removal No. 7 - Plant 1 Pad Continuing Release
(i) removed as part of Plant 1 Complex - Phase I Decontamination and Dismantlement Project
(j) removed as part of Building 4A Decontamination and Dismantlement Project
(k) removed as part of the High/Low Nitrate Tank Decontamination and Dismantlement Project

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The Ohio EPA and DOE have developed a strategy for remediating *Hazardous Waste Management Units* (HWMUs) allowed for under the RCRA and CERCLA which was formalized in a Director's Findings and Orders issued by the Ohio Environmental Protection Agency (Ohio EPA 1996). That integrated RCRA/CERCLA strategy, which is discussed in detail in Section 3.5.3 of this RD/RA work plan, focuses on above-grade remediation activities for twenty inactive HWMUs and seven active HWMUs through implementation of response actions under the CERCLA process. The remediation requirements for the units, including the storage, treatment, and disposal of the materials/wastes generated will be considered as ARARs for the CERCLA response action. The above-grade decontamination and dismantlement of the seven active HWMUs used for storage of hazardous wastes will be accomplished under CERCLA through the OU3 integrated remedial action. These HWMUs will continue to be maintained to support the OU3 integrated remedial action until they are no longer needed for hazardous and/or mixed waste storage, at which time they will become available for remediation. At- and below-grade HWMU closure activities will be performed as specified in the Site-Wide Excavation Plan (SEP) prepared for OU5 remediation.

## 2.3 Characterization of OU3

The characterization of OU3 was detailed in the OU3 RI/FS Report and was summarized in the OU3 Final Action ROD. This section provides an executive summary level discussion of OU3 contaminant characteristics that are significant to the strategies developed for the OU3 integrated remedial action. The OU3 RI/FS Report provides the data that were used not only to support the remedy selection process for the OU3 final remedial action but will also be used to support material disposition evaluation and requirements for environmental monitoring, system safety analysis, and occupational safety during remedial design projects under the OU3 integrated remedial action.

Characterization Methodology

The OU3 RI field characterization program employed a "hot spot" sampling methodology to gather radiological and chemical contamination data from the highest contaminated areas in each component *process area*. These data were used to conservatively estimate overall contamination (types and mass) and contaminated media masses, when coupled with the physical data (materials of construction, weights, and volumes) collected for major media within OU3. Based on chemical and radiological survey results, "hot spots" were selected as locations for collecting intrusive samples. Therefore, the characterization data collected for the RI was intended to represent maximum contaminant levels for sampled materials in process areas. These "hot spot" data then represented the worst case or conservative contaminant characteristics for each particular process area. These conservative results from the RI program supported the remedial alternative development and evaluation processes of the feasibility study, which in turn resulted in the selection of a remedy.

It was recognized during the OU3 RI/FS program that the numerous types or descriptions of material which were identified in OU3 components should be consolidated into ten distinct material categories to support potential treatment and disposition options. The ten material categories were based on similar or inherent physical characteristics or configuration. The list of material categories and associated material types are shown in Table 2-2.

## TABLE 2-2 OU3 Material Categories/Descriptions

| Category A Accessible Metals | Category B Inaccessible Metals | Category C Process-Related Metals | Category D Painted Light-Gauge Metals | Category E Concrete | Category F Brick | Category G Non-Regulated ACM | Category H Regulated ACM | Category I Miscellaneous Materials | Category J Product, Residues, and Special Materials |
|---|---|---|---|---|---|---|---|---|---|
| Structural and Miscellaneous Steel | Doors | Electrical Equipment | Ductwork | Asphalt | Acid Brick | Ceiling Demo. | Ductwork Insulation | PVC Conduit | Coal Pile |
| | Conduit/Wire/Cable Tray | HVAC Equipment | Lead Flashing | Slabs | | Feeder Cable | Piping Insulation | Basin Liners | Gravel Pile** |
| | Electrical Wiring and Fixtures | Material Handling Equipment | Louvers | Columns | | Fire Brick | Personal Protective Equipment | Fabric | Hazardous/Mixed Waste |
| | Electrical Transformers | Process Equipment | Metal Wall and Roof Panels | Beams | | Floor Tile | Copper Scrap Metal Pile | Drywall | Low-Level Legacy Waste |
| | Miscellaneous Electrical Items | Miscellaneous Equipment | | Foundations | | Transite Wall and Roof Panels | | Building Insulation | Marketable Nuclear Material |
| | Electrical Equipment | Process Piping | | Walls | | | | Miscellaneous Debris | Outside Equipment Storage Area |
| | HVAC Equipment | | | Masonry | | | | Personal Protective Equipment | Rock Salt Pile |
| | Material Handling Equipment | | | Clay Piping | | | | PVC Piping | Sand Piles* |
| | Process Equipment | | | | | | | Roofing Build-Up | Soil Piles* |
| | Miscellaneous Equipment | | | | | | | Process Trailers | Thorium Inventory |
| | Piping | | | | | | | Non-Process Trailers | Scrap Metal Pile |
| | | | | | | | | Windows | |
| | | | | | | | | Miscellaneous Wood | |

* Refers to soils and sand incidentally generated during above-grade dismantlement operations; to be managed under OU5 SEP.

** Only those specifically identified as OU3 components.

Sampling was performed during the field characterization program and analytical results were applied to all OU3 materials, either directly, where available, by material, component, process area, and depth, or indirectly, based on similarity between materials, location, and potential contamination. When results for a particular material were not available, contaminant types and levels from a representative location were assigned to that material. Volumes of materials having similar contaminants were calculated based on estimated material volumes for specific components, process areas, systems, and equipment using material-specific assumptions, surface area, density of material, and thickness of the contaminated layer. The analytical results for each material, component, process area, and depth were identified based on a conservative approach using maximum values. Table 2-3 provides a summary of the results as they relate to material and contaminant categories.

General Nature and Extent of Contamination

In total, OU3 is estimated to contain approximately 9.3 million cubic feet of material. A significant amount of the material associated with OU3 is the principal threat materials (listed as Category J: "Product, Residues, and Special Materials" in Table 2-3). The total unbulked volume of OU3 materials that are addressed by disposition strategies developed and presented in this work plan is the aforementioned total amount less the volume of Category J materials. Disposition strategies and procedures for Category J materials are already provided for under decisions and procedures developed for Removal Action 9, which have been adopted into the OU3 integrated remedial action. Section 3.4.2 of this work plan discusses how the decisions and procedures under Removal Action 9 have been integrated into the integrated OU3 remedial action. Therefore, the estimated net volume of materials to be dispositioned under the newly developed strategies of the OU3 integrated remedial action is equal to approximately 7.5 million unbulked cubic feet (approximately 377,000 tons).

Based on the results of the OU3 RI/FS process, the material categories presented in Table 2-2 were further subdivided into segregation categories based on regulatory status (mixed waste, polychlorinated biphenyl (PCB) waste, low-level waste, and below baseline) to evaluate treatment and disposal options. Table 2-3 provides a summary of data originally presented in the OU3 Proposed Plan for OU3 Final Remedial Action (DOE 1996d) showing the estimated volumes of OU3 materials by segregation category and contaminant category. The category, "below baseline" represents materials that have levels of contamination, either radiological or chemical, below a statistically estimated concentration that represents a background level for an analyte in a material based on OU3 RI/FS sampling data and literature values.

## 2.4 Summary of the OU3 Record of Decision for Interim Remedial Action

Although DOE maintains an active site maintenance program, the former uranium processing facilities are at or beyond their design life and in a state of advancing deterioration. These current conditions present an increasing probability of further releases of hazardous substances to the environment in the event of structural collapse or other failure mechanisms. For these reasons, DOE and U.S. EPA signed the IROD in July 1994. The IROD calls for the decontamination and dismantlement of all above- and below-ground improvements, including all buildings and support structures, to reduce any potential threat posed by these facilities. It also calls for the removal of equipment and machinery that have no identifiable role to support the site cleanup mission and removal of product, residues, and wastes. According to the IROD, the building debris and resultant waste would primarily be placed in interim storage until a final remedial decision is made, although some limited material disposition could occur.

**TABLE 2-3 Summary of OU3 Waste Volumes as Estimated by Category (in cubic feet)**

| OU3 Material Category | Potentially Hazardous/ Mixed Waste | Regulated PCBs (TSCA) | Low-Level Radioactive Waste | Below Baseline | Total |
|---|---|---|---|---|---|
| Accessible Metals | 0 | 0 | 63,400 | 0 | 63,400 |
| Inaccessible Metals | 0 | 14,900 | 1,730,000 | 0 | 1,740,000 |
| Process-Related Metals | 0 | 0 | 151,000 | 0 | 151,000 |
| Painted Light-Gauge Metals | 49 | 0 | 7,100 | 0 | 7,150 |
| Concrete | 0 | 0 | 541,000 | 4,160,000 | 4,700,000 |
| Brick | 5,280 | 0 | 15,400 | 0 | 20,700 |
| Non-Regulated Asbestos-Containing Materials | 0 | 0 | 71,300 | 0 | 71,300 |
| Regulated Asbestos-Containing Materials | 0 | 0 | 80,200 | 0 | 80,200 |
| Miscellaneous Materials | 0 | 0 | 163,000 | 541,000 | 704,000 |
| Product, Residues, and Special Materials | 56,000 | 0 | 1,670,000 | 105 | 1,730,000 |
| **Total (unbulked)** | **61,300** | **14,900** | **4,490,000** | **4,700,000** | **9,270,000** |

A summary of the key elements of the OU3 interim remedial action is presented below and has been illustrated in Figure 2-1.

- Decontamination of more than 200 buildings and structures in OU3 by removing loose contamination. This activity involves in situ gross decontamination of interior and exterior surfaces of above-grade structures prior to dismantlement to reduce direct exposure potential, as well as reduce available sources for airborne or water-borne contaminant migration. Methods to be employed depend on the contamination type, level of contamination found, and matrix on which it is found. Additional decontamination procedures would be implemented during dismantlement to remove previously inaccessible contamination.

- Dismantlement of the above-grade structures. Above-grade dismantlement includes the removal of asbestos, electrical equipment, piping, water lines, gas lines, tanks, heating, ventilation and air conditioning ductwork, and electrical lines. The last steps of the dismantling action would depend on the structure but would generally involve the removal of any air filtration apparatus and the removal of the roof, exterior walls, and structural members.

- Removal of foundations, storage pads, ponds, basins, underground utilities, and other at- and below-grade structures. Once an acceptable area has been cleared down to grade level, at- and below-grade remediation can begin. The at- and below-grade remediation will require coordinated efforts

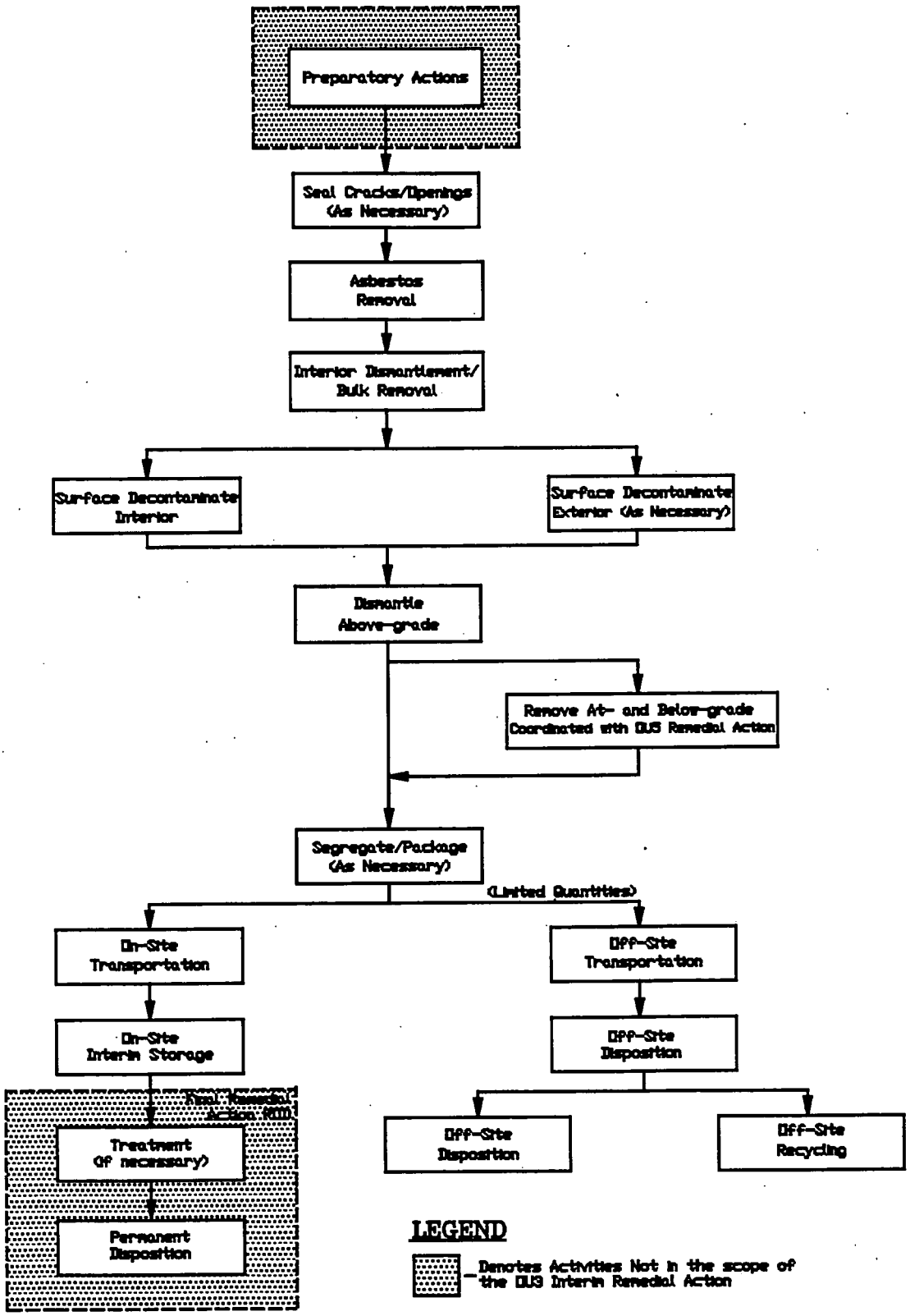


FIGURE 2-1 OU3 Interim Remedial Action Flowchart

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to coincide this activity with OU5 remedial actions involving soil excavation and possible groundwater remediation. OU3 and OU5 coordination will allow excavation of environmental media in a timely manner while minimizing the potential for infiltration of rainwater into contaminated soils.

- Use of existing facilities or construction and operation of new interim storage facilities in or near the former production area. Existing storage facilities will be used to the maximum extent practical for the temporary storage of materials. If existing storage space is not available, interim storage facilities will be designed and constructed in accordance with Removal Action 17 - Improved Storage of Soil and Debris, to store the material generated from the OU3 interim remedial action.

- Off-site disposal at the NTS of some non-recoverable or non-recyclable material generated by dismantlement. To prevent constraints on the decontamination and dismantlement action due to storage space limitations for the resulting construction debris, a limited quantity of wastes would be shipped off-site for disposition. A maximum of ten percent of all remediation wastes generated by implementing the interim remedial action would potentially be shipped off-site for disposition and recycling during the interval period. Non-recoverable and non-recyclable materials destined for off-site disposal would be containerized using strong-tight containers and shipped off-site for disposition at the NTS. The identification of the NTS does not preclude the use of other licensed disposal facilities.

- Off-site recycling of some recyclable material from dismantlement. Materials transported offsite will be recycled or reused to the maximum extent practicable. Opportunities for employing resource recovery, recycling, and waste minimization will be factored into the planning process for each remedial activity.

- Storage of the remaining material in interim storage facilities or existing facilities until treatment and disposition are selected in the OU3 final remedial action ROD. All materials resulting from the OU3 interim remedial action that cannot be recycled or disposed offsite will be stored on-site in interim storage facilities.

Before mobilization for decontamination and dismantlement within a facility, preparatory actions will have been completed. Removal actions - Removal of Waste Inventories (Removal Action 9) and Safe Shutdown (Removal Action 12) will have been completed for a facility prior to remediation of that facility.

The IROD also provided for measures to prevent or minimize environmental releases during the OU3 interim remedial action. To address concerns regarding a potential increase in airborne radionuclide concentrations above natural background levels, project-specific air monitoring may be conducted at potential receptor locations during OU3 cleanup activities. Significant exceedances of established project background levels would necessitate mitigative action. Groundwater and surface water monitoring will occur during decontamination, dismantlement, and interim storage activities. *Administrative controls* and *engineering controls* will be utilized

throughout the OU3 interim remedial action to minimize releases and to maintain a safe work environment.

## 2.5 Prioritization and Sequencing OU3 Remedial Action

Section XI.A of the ACA requires that the RD/RA Work Plan "include a schedule for implementation of the RD/RA tasks and submittal of RD/RA reports." The OU3 Remedial Design Prioritization and Sequencing Report was a deliverable to U.S. EPA, as specified by the OU3 RD/RA Work Plan for Interim Remedial Action, to fulfill this ACA requirement. The PSR provided a specific sequence and schedule for decontamination and dismantlement of the above-grade portions of all OU3 components. This schedule was then used in determining enforceable remedial design milestones, namely the submittal dates of project-specific implementation plans. At- and below-grade remediation of OU3 components will be integrated with soil remediation and will be sequenced and scheduled as part of the OU5 RD/RA process.

The base schedule given in the June 1995 PSR, which was founded on a (then) current understanding of future funding trends, spanned 31 years. However, with the development and acceptance of the "accelerated remediation scenario," which was incorporated into the DOE-FN FY-96 Baseline, the OU3 remediation schedule was accelerated to span only eleven years, assuming sufficient funding is granted by the U.S. Congress. The PSR base schedule and resulting implementation plan submittal dates were revised on July 24, 1996 as a result of the approved FY-96 Baseline. The PSR, as a document, is intended to be superseded by this work plan; the concepts and schedules that were presented in the PSR (and the July 1996 update) have been incorporated into this document and have been updated as necessary.

The PSR presented the overall framework that was used to determine the priority and sequence for remediating OU3 complexes (i.e., groupings of related structures that are further defined later in this section) and to develop a base remediation schedule and resulting implementation plan submittal dates. The more significant aspects of this approach are summarized below.

Using the concept of economies of scale, the expenses for a decontamination and dismantlement project can be reduced significantly by addressing multiple structures in a single project instead of remediating each structure as an individual project. The cost and time involved in the development, review, and submittal of contracts, work plans, health and safety plans, etc., are relatively independent of the number and sizes of structures within a project. Other expenditures, such as subcontractor training, establishing control zones, mobilization and demobilization of construction equipment and crews, and air monitoring are also relatively independent of the number and sizes of structures within a project. Therefore, the above-grade portions of individual components were combined into groups (called complexes) to reduce remediation costs.

The process of defining complexes, scheduling the complexes for dismantlement, and evaluating the impacts of that schedule on other FEMP operations was an iterative process. The interdependency of components, especially in terms of the generation and routing of FEMP utilities, forced the merging of several approaches to defining complexes.

The components were assembled into complexes based on many considerations, such as relative location of components to minimize impacts between dismantlement activities and the daily operations of the site. If possible, complexes were confined to a distinct area, such as

a city block, that could be safely partitioned into a construction zone without adversely affecting other projects or other site activities. Also, this approach greatly reduces the cost of many parts of the project (e.g., supervision, air monitoring, construction support facilities, etc.).

A second consideration for grouping components into complexes was the current and/or future use of the facility. For example, components that support the distribution of electricity across the FEMP were combined into the Electrical Station Complex, although these components are not all located together. Two advantages to grouping components based on their related use are that: 1) the components have a high probability of becoming available altogether; and 2) the components are likely to be constructed of the same types of materials, making design and dismantlement activities simpler and, therefore, cheaper.

The third major consideration that was factored into defining the complexes was the availability of the components for remediation. This was based on the anticipated time when the use of the component would either be eliminated or replaced. This is similar to the grouping of components based on current and/or future use, but allows the combination of two or more unrelated groupings into a complex. For example, the Elevated Potable Storage Tank (20D) was added into the East Warehouse Complex because the components in this complex would all be available around the same time, albeit for different reasons, and they are located together on the eastern boundary of the former Production Area.

After several iterations of the complex definitions, there were several components that could not be clearly grouped within a complex. Many of these components (e.g., pipe bridges, process trailers, etc.) are supportive of the operations within and around other components and are anticipated to be phased out rather than remediated all at once. Such components were originally placed in the Miscellaneous Complex with the understanding that they would be scheduled as part of other complexes rather than as a distinct remedial activity; however, with the exception of various general components such as railroad tracks (G-01), utility lines (G-04), process trailers (G-06), non-process trailers (G-07), and pipe bridges (G-08), this work plan updates the August 1996 complex definition list by assigning each of the Miscellaneous Complex components to the appropriate complexes. Further discussion of the August 1996 complex definition update is provided at the end of this section.

In addition to the current OU3 component identification list (Table 2-1), there are several structures that are either currently being constructed or are planned for future construction to support the remediation of other operable units. Since the OU3 IROD governs the dismantlement of all site structures, two additional complexes (i.e., OU1 complex and OU4 complex) were added to the July 24, 1996 revision to the PSR. There are also five above-grade components that are planned to be used to support OU5 groundwater remediation, and are hereinafter referred to as the OU5 Complex: High Nitrate Storage Tank (18M); Dissolved Oxygen Building (18P); IAWWT Valve House (18Q); Pilot Plant Ammonia Tank Farm (19B); and the Six to Four Reduction Facility #2 (51), which will be utilized as the new Advanced Wastewater Treatment (AWWT) facility. The remediation schedule for the OU5 Complex was not included in the PSR or the PSR update because the duration of OU5 remediation has not yet been determined. Since the period for OU5 soil and water remediation efforts will most likely extend significantly beyond that for OU3 remediation, planning and scheduling of OU5 long-term remediation facilities have been addressed in OU5's draft Sitewide Excavation Plan. Accordingly, the SEP includes discussion regarding the task of scheduling the dismantlement

of those five structures. Further discussion of the coordination and integration of OU3 and OU5 remedial actions is provided in Section 3.4.3.4.

At- and below-grade remedial activities involving OU3 components will be closely integrated with OU5 soil remediation in the former Production Area and Administration Area. Although impacts of at- and below-grade remediation were considered in the PSR, at- and below-grade remediation is contingent on RD/RA scheduling for OU5 and will be addressed in the SEP.

The development of the sequence for dismantlement of above-grade structures will be dismantled focused primarily on the need to clear an upgradient area to support OU5 soil remediation and also to accommodate the construction of the OSDF in accordance with OU2 RA scheduling. Surface water generally flows from north-to-south and the perched groundwater generally flows from east-to-west. Therefore, in order to avoid contamination of remediated soils, at- and below-grade dismantlement has more near-term priority in the northeast corner of the former Production Area. To support this, OU3 above-grade structures will be dismantled, to the extent possible, to integrate with OU5 contaminated soil excavation schedules. Also, dismantlement of structures with basements will require additional coordination with actions conducted by OU5 to ensure that effective stormwater management provisions are included in the design for those projects.

There are many component-specific constraints and considerations that were factored into determining the availability of the complexes for remediation. For example, many of the components have planned interim uses to support waste management operations, supply site utilities, or support the remediation of other operable units.

Table 2-4 gives the updated sequence for the remediation of the 23 above-grade complexes based on these constraints and considerations.

## TABLE 2-4 Complex Remediation Sequence

| Remediation Complex* | Components |
|---|---|
| Building 4A (completed) | 4A |
| Plant 1 Complex - Phase I (in progress) | 1A, 30B, 56B, 56C, 66, 67, 72 |
| High & Low Nitrate Tanks (completed) | 18K, 18L |
| Boiler Plant/Water Plant Complex | 10A, 10B, 10C, 10E, 20A, 20B, 20C, 20H, 24A |
| Thorium/Plant 9 Complex | 9A, 9B, 9C, 9D, 9E, 9F, 32A, 32B, 64, 65, 69, 78, 81 |
| Tank Farm Complex | 19A, 19C, 19D, 19E |
| Maintenance Complex | 12A, 12B, 12C, 12D, 24B, 38A, 38B |
| Plant 5 Complex | 4B, 5A, 5B, 5C, 5D, 5E, 5F, 5G, 55A, 55B |
| Plant 3 Complex | 3B, 3C, 3D, 3E, 3F, 3G, 3J, 3K, 39A, 39C |
| Sewage Treatment Plant Complex | 25A, 25B, 25C, 25D, 25E, 28F, 39D |
| Plant 6 Complex | 6A, 6B, 6C, 6D, 6E, 6F, 6G |
| East Warehouses Complex | 20D, 77, 79, 82 |
| Plant 2 Complex | 2A, 2D, 2E, 2F, 2G, 39B |
| Plant 8 Complex | 8A, 8B, 8C, 8D, 8E, 8F, 80 |
| Plant 1 Complex - Phase II | 1B, 30A, 56A, 60, 61, 62, 63, 71, TS-004, TS-005, TS-006 |
| General Sump Complex | 2B, 2C, 3A, 3H, 3L, 18B, 18D, 18H |
| Pilot Plant Complex | 13A, 13B, 13C, 13D, 37, 54A, 54B, 54C, 68 |
| Liquid Storage Complex | 18J, 20E, 20F, 20G, 22A, 22B, 22D, 26A, 26B, 28D, 45A, 45B |
| Administration Complex | 11, 14A, 14B, 16H, 16J, 23, 25J, 28E, 28A, 28B, 28G, 53A, 53B |
| Electrical Station Complex | 16A, 16B, 16C, 16D, 16E, 16F, 16G, 26C, 31A, 46 |
| Laboratory Complex | 15A, 15B |
| OU1 Complex | 18G; others to be determined |
| OU4 Complex | To be determined |
| OU5 Complex | 18M, 18P, 18Q, 19B, 51; others to be determined |

* This list of remediation complexes does not include a separate "Miscellaneous Complex" as shown in previous versions since the components previously listed in that complex were assigned to the appropriate complexes or, for G-coded components such as utility lines, process and non-process trailers, and pipe bridges, will be dismantled according to availability status or association with the nearest remediation complex.

A colored illustration of OU3 complexes are shown in Figure 2-2.

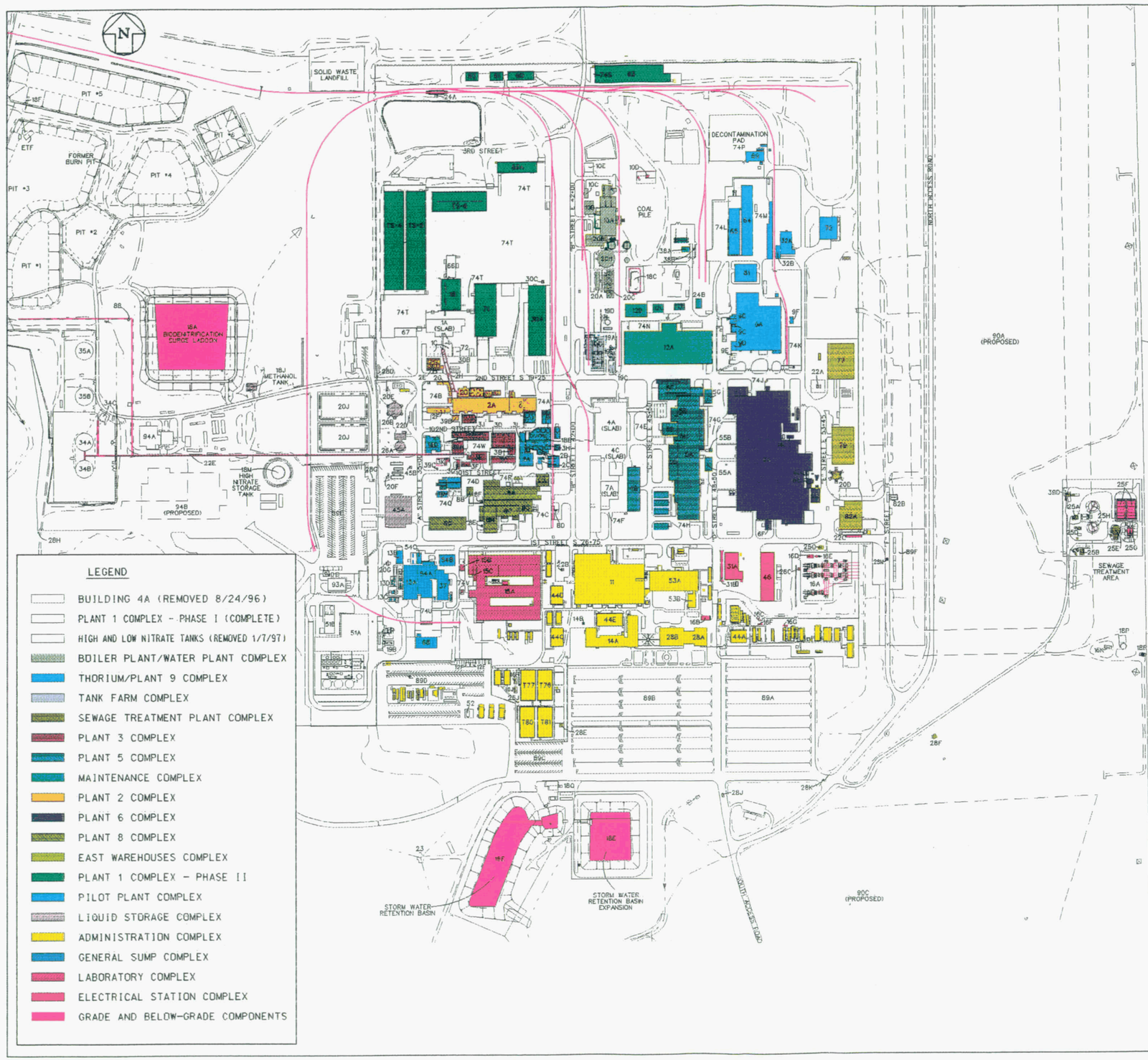
In addition to the prioritization and sequencing functions of the PSR, it also served as the mechanism for supplanting the OU3 Facility Utilization Report and for providing the regulatory agencies with any schedule updates. Sections 4.4 and 6 of this work plan incorporate those requirements into the OU3 integrated remedial action.

Since the PSR was updated and submitted to the regulatory agencies in August 1996, the component listing for several complexes have been further revised; however, the overall schedule for completion of OU3 remedial action was not revised. The major revision to the complex listing was the assignment of all components previously defined for the Miscellaneous Complex, except the general components ("G" coded), to appropriate complexes. The general components (e.g., railroad tracks, roads, pipe bridges, non-process trailers), cannot be assigned to individual OU3 complexes as whole entities due to their extensive distribution throughout the FEMP and, as a result, are still discussed as the Miscellaneous Complex. Since the Miscellaneous Complex serves only to reserve the "general" components in somewhat of a queue for future dismantlement, the complex will not be scheduled individually for remediation. The Miscellaneous Complex has therefore been removed from the complex remediation sequence. All components that comprise the Miscellaneous Complex will be remediated under one of the defined complexes. The above-referenced Miscellaneous Complex reassignments include: components 16H, 16J, 23, 25J, 28E, and 28G being placed in the Administration Complex; 18G being placed in the OU1 Complex; and 28D being placed in the Liquid Storage Complex. Other complexes revised include: P-005 (coal pile) will be removed for reuse; and since 28C was previously removed under an independent O&M activity (in 1991), it was deleted from the list.

## 2.6 Summary of the OU3 Record of Decision for Final Remedial Action

The OU3 Record of Decision for Final Remedial Action identified the selected remedy as the "Selected Material Treatment, On-Property Disposal, and Off-Site Disposition" of material generated by the OU3 interim remedial action and OU3 removal actions. Specifically, the OU3 Final Action ROD states that the OU3 selected remedy consists of the following elements:

- Provides for unrestricted/restricted release of materials, as economically feasible, for recycling, reuse, or disposal;
- Permits treatment of materials to meet the on-site disposal facility and/or off-site disposal facility waste acceptance criteria;
- Requires off-site disposal of process residues, waste product materials, and process-related metals;
- Requires off-site disposition of acid brick and concrete from specific locations and any other materials exceeding the OSDF WAC;
- Permits disposal of remaining OU3 wastes in the OSDF;




## FEMP SITE IDENTIFICATION

TS-4 TENSION SUPPORT STRUCTURE #4
TS-5 TENSION SUPPORT STRUCTURE #5
TS-6 TENSION SUPPORT STRUCTURE #6
TS-8 ENVIRONMENTAL MONITORING EQUIP. STORAGE STRUCTURE
1A PREPARATION PLANT (REMOVED 2/22/97)
1B PLANT 1 STORAGE BLDG.
1C PLANT 1 ORE SILOS (REMOVED)
2A ORE REFINERY PLANT
2B GENERAL/REFINERY SUMP CONTROL BLDG.
2C BULK LIME HANDLING BLDG.
2D METAL DISSOLVER BLDG.
2E NFS STORAGE & PUMP HOUSE
2F COLD SIDE ORE CONVEYOR
2G HOT SIDE ORE CONVEYOR
2H CONVEYOR TUNNEL (FROM PLANT 1)
3A MAINTENANCE BLDG.
3B OZONE BLDG.
3C NAR CONTROL HOUSE
3D NAR TOWERS
3E HOT RAFFINATE BLDG.
3F HARSHAW SYSTEM
3G REFRIGERATION BLDG.
3H REFINERY SUMP
3J COMBINED RAFFINATE TANKS
3K OLD COOLING WATER TOWER
3L ELECTRICAL POWER CENTER BLDG.
4A GREEN SALT PLANT (REMOVED 8/24/96)
4B PLANT 4 WAREHOUSE
4C PLANT 4 MAINTENANCE BLDG. (REMOVED 8/25/94)
5A METALS PRODUCTION PLANT
5B PLANT 5 INGOT PICKLING
5C PLANT 5 ELECTRICAL SUBSTATION
5D WEST DERBY BREAKOUT/SLAG MILLING
5E PLANT 5 FILTER BLDG.
5F PLANT 5 COVERED STORAGE PAD
5G PLANT 5 INGOT STORAGE SHELTER
6A METALS FABRICATION PLANT
6B PLANT 6 COVERED STORAGE AREA
6C PLANT 6 ELECTROSTATIC PRECIPITATOR (SOUTH)
6D PLANT 6 ELECTROSTATIC PRECIPITATOR (CENTRAL)
6E PLANT 6 ELECTROSTATIC PRECIPITATOR (NORTH)
6F PLANT 6 SALT OIL HEAT TREAT BLDG.
6G PLANT 6 SUMP BLDG.
7A PLANT 7 (REMOVED 11/15/94)
7B PLANT 7 OVERHEAD CRANE (REMOVED)
8A RECOVERY PLANT
8B PLANT 8 MAINTENANCE BLDG.
8C ROTARY KILN/DRUM RECONDITIONING
8D PLANT 8 RAILROAD FILTER BLDG.
8E DRUM CONVEYOR SHELTER
8F PLANT 8 OLD DRUM WASHER
8G TRASH COMPACTOR AREA
8H SOIL WASHING
9A SPECIAL PRODUCTS PLANT
9B PLANT 9 SUMP TREATMENT FACILITY
9C PLANT 9 DUST COLLECTOR
9D PLANT 9 SUBSTATION
9E PLANT 9 CYLINDER SHED
9F PLANT 9 ELECTROSTATIC PRECIPITATOR
10A BOILER PLANT
10B BOILER PLANT MAINTENANCE BLDG.
10C WET SALT STORAGE BIN
10D CONTAMINATED OIL/GRAPHITE BURN PAD
10E UTILITIES HEAVY EQUIP. BLDG.
11 SERVICE BLDG.
12A MAIN MAINTENANCE BLDG.
12B CYLINDER STORAGE BLDG.
12C LUMBER STORAGE BLDG.
12D MAINTENANCE BLDG. WAREHOUSE
12E MAINTENANCE LABORER STORAGE BLDG.
12F MAINTENANCE LABORER STORAGE BLDG.
13A PILOT PLANT WET SIDE
13B PILOT PLANT MAINTENANCE BLDG.
13C SUMP PUMP HOUSE
13D PILOT PLANT THORIUM TANK FARM
14A ADMINISTRATION BLDG.
14B BLDG. 14 EDG GENERATOR SET
15A LABORATORY
15B LABORATORY CHEMICAL STORAGE BLDG.
15C LABORATORY GARAGE
16A MAIN ELECTRICAL STATION
16B ELECTRICAL SUBSTATION
16C ELECTRICAL PANELS & TRANSFORMER
16D MAIN ELECTRICAL SWITCH HOUSE
16E MAIN ELECTRICAL TRANSFORMERS
16F TRAILER SUBSTATION #1
16G TRAILER SUBSTATION #2
16H 10 PLEXS NORTH SUBSTATION
16J 10 PLEXS SOUTH SUBSTATION
16K DISSOLVED OXYGEN FACILITY SUBSTATION
18A BDN SURGE LAGOON
18B GENERAL SUMP
18C COAL PILE RUNOFF BASIN
18D BIODENITRIFICATION TOWERS
18E STORM WATER RETENTION BASINS
18F PIT #5 SLUICE GATE
18G CLEARWELL PUMP HOUSE
18H BDN EFFLUENT TREATMENT FACILITY
18J METHANOL TANK
18K LOW NITRATE TANK (REMOVED)
18L HIGH NITRATE TANK (REMOVED)
18M HIGH NITRATE STORAGE TANK
18N WASTE PIT AREA STORM WATER RUNOFF CONTROL
18P DISSOLVED OXYGEN BLDG.
18Q SOUTH PLUME INTERIM TREATMENT BLDG
18R OUTFALL LINE PIT
18S RECOVERY WELL SYSTEM CONTROL BLDG. (SOUTH OF WILLEY RD.)
18T PUEBLO WATER SUPPLY METER HOUSE (AT WILLEY RD.)
19A MAIN TANK FARM
19B PILOT PLANT AMMONIA TANK FARM
19C TANK FARM CONTROL HOUSE
19D OLD NORTH TANK FARM
19E TANK FARM LIME SLITTER BLDG.
20A PUMP STATION & POWER CENTER
20B WATER PLANT
20C COOLING TOWERS
20D ELEVATED POTABLE STORAGE TANK
20E WELL HOUSE #1
20F WELL HOUSE #2
20G WELL HOUSE #3
20H PROCESS WATER STORAGE TANK
20J LIME SLURRY PITS
22A GAS METER BLDG.
22B STORM SEWER LIFT STATION
22C TRUCK SCALE
22D SCALE HOUSE & WEIGH SCALE
22E UTILITY TRENCH TO PIT AREA
22F MAIN GAS METER (LOCATED AT WILLEY RD.)
23 METEOROLOGICAL TOWER
24A RAILROAD SCALE HOUSE
24B RAILROAD ENGINE HOUSE
25A CHLORINATION BLDG.
25B M.H. #176/EFF. LINE/SAMPLING BLDG
25C SEWAGE LIFT STATION BLDG.
25D U.V. DISINFECTION BLDG.
25E DIGESTER & CONTROL BLDG.
25F SLUDGE DRYING BEDS
25G PRIMARY SETTLING BASINS
25H TRICKLING FILTERS
25J 10 PLEXS SEWAGE LIFT STATION
26A PUMP HOUSE-HF FIRE PROTECTION
26B ELEVATED WATER STORAGE TANK
26C MAIN ELECTRICAL STRAINER HOUSE
28A SECURITY BLDG.
28B INDUSTRIAL RELATIONS BLDG.
28D GUARD POST ON WEST END OF "2ND" STR.
28E GUARD POST AT T81
28F SKEET RANGE BLDG.
28G GUARD POST NORTHWEST OF BLDG. 45
28H GUARD POST SOUTH OF K-65 AREA
28J SECURITY CHECKPOINT (SOUTH ACCESS ROAD)
28K SECURITY CHECKPOINT (EAST PARKING LOT)
28L GUARD POST (NORTH ACCESS ROAD)
28M GUARD POST ON "9TH" STREET (PROPOSED)
30A CHEMICAL WAREHOUSE
30B DRUM STORAGE WAREHOUSE
30C OLD TEN TON SCALE (REMOVED)
31A ENGINE HOUSE/GARAGE
31B OLD TRUCK SCALE
32A MAGNESIUM STORAGE BLDG.
32B BLDG. 32 COVERED LOADING DOCK
34A K-65 STORAGE TANK (NORTH)
34B K-65 STORAGE TANK (SOUTH)
34C RTS BLDG.
35A METAL OXIDE STORAGE TANK (NORTH)
35B METAL OXIDE STORAGE TANK (SOUTH)
37 PILOT PLANT ANNEX
39A PROPANE STORAGE
39B CYLINDER FILLING STATION
39A INCINERATOR BLDG.
39B WASTE OIL DECANT SHELTER
39C INCINERATOR SPRINKLER RISER HOUSE
39D SEWAGE TREATMENT PLANT INCINERATOR
44A TRAILER COMPLEX (6-PLEX)
44C TRAILER COMPLEX (7-PLEX S.)
44D TRAILER COMPLEX (7-PLEX N.)
44E TRAILER COMPLEX (10 PLEX)
45A CONSTRUCTION DIVISION BLDG.
45B UTILITY SHED EAST OF RUST TRAILERS
46 HEAVY EQUIPMENT BLDG.
51A ADVANCED WASTEWATER TREATMENT FACILITY (AWWTF)
51B SLURRY DEWATERING FACILITY
52 NITRAK BLDG.
53A HEALTH & SAFETY BLDG.
53B N1-WVC BLDG.
54A SIX TO FOUR REDUCTION FACILITY #1
54B PILOT PLANT WAREHOUSE
54C PILOT PLANT DESICCATOR SHELTER
55A SLAG RECYCLING BLDG.
55B SLAG RECYCLING PIT/ELEVATOR
56A CP STORAGE WAREHOUSE
56B STORAGE SHED (WEST) (REMOVED)
56C STORAGE SHED (EAST) (REMOVED)
60 QUONSET HUT #1
61 QUONSET HUT #2
62 QUONSET HUT #3
63 KC-2 WAREHOUSE
64 THORIUM WAREHOUSE
65 (OLD) PLANT 5 WAREHOUSE
66 DRUM RECONDITIONING BLDG.
67 PLANT 1 THORIUM WAREHOUSE
68 PILOT PLANT WAREHOUSE
69 DECONTAMINATION BLDG.
71 GENERAL IN-PROCESS WAREHOUSE
72 DRUM STORAGE BUILDING
73A FIRE BRIGADE TRAINING CENTER BLDG. (REMOVED 9/6/95)
73B FIRE TRAINING POND (REMOVED)
73C FIRE TRAINING TANK (REMOVED)
73D FIRE TRAINING BURN TROUGH (REMOVED)
73E CONFINED SPACE BURN TANK (REMOVED)
74A PLANT 2 EAST PAD
74B PLANT 2 WEST PAD
74C PLANT 8 EAST PAD
74D PLANT 8 WEST PAD
74E PLANT 4 PAD
74F PLANT 7 PAD
74G PLANT 5 EAST PAD
74H PLANT 5 SOUTH PAD
74J PLANT 6 PADS
74K PLANT 9 PAD
74L BUILDING 65 WEST PAD
74M BUILDING 64 EAST PAD & R.R. DOCK
74N BUILDING 12 NORTH PAD
74P DECONTAMINATION PAD
74Q PLANT 6 OLD METAL DISSOLVER PAD
74R PLANT 8 NORTH PAD
74S BUILDING 63 WEST PAD
74T PLANT 1 STORAGE PAD
74U PILOT PLANT PAD
74V LABORATORY PAD
74W INCINERATOR BLDG. PAD
77 FINISHED PRODUCTS WAREHOUSE (4A)
78 R & D BUILDING
79 PLANT 6 WAREHOUSE
80 PLANT 8 WAREHOUSE
81 PLANT 2 WAREHOUSE
82A RECEIVING/INCOMING MAT'LS. INSP.
82B FUEL LOADING/UNLOADING FACILITY
86 CLEARWELL LINE
89A SOUTHEAST PARKING LOT
89B MAIN PARKING LOT (SOUTH)
89C TACO PARKING LOT (SOUTH)
89D CONTRACTOR PARKING LOT (SOUTHWEST)
89E CONSTRUCTION PARKING LOT (WEST)
89F RIMIA PARKING LOT (EAST)
90A ON-SITE DISPOSAL FACILITY (PROPOSED)
90B SOUTH FIELD BORROW AREA (PROPOSED)
90C SOUTHEAST FIELD BORROW AREA (PROPOSED)
93A SOUTHWEST BOILER HOUSE
94A CRU 4 VITRIFICATION PILOT PLANT
94B CRU 4 FERNALD RESIDUES VITRIFICATION PLANT (FRVP) (PROP.)
176 CRU 1 & SAFE SHUTDOWN OFFICES
177 CRU 4 OFFICES
T80 CRU 5 OFFICES
T81 CRU 3 OFFICES

/USR/STEVE/FAIR/FAIR.DGN

FIGURE 2-2
MAP OF OU3 REMEDIATION COMPLEXES

- Imposes administrative controls through deed restrictions and access controls; and

- Incorporates (by reference) post-remediation activities that includes long-term monitoring and maintenance of the OSDF and operation of a groundwater monitoring network to evaluate the performance of the OSDF.

In addition to the selected remedy, the OU3 Final Action ROD also incorporated or adopted several programmatic elements that currently exist at the FEMP to provide a comprehensive, integrated remedial action for OU3. These programmatic elements include the following:

- Incorporates the decisions provided in the IROD so as to provide for an integrated implementation of the respective decisions;

- Adopts the procedures and disposition decisions of Removal Action 9 to continue disposition of the products, residues, and nuclear materials generated during site operations; and

- Adopts prior decisions made for management of Safe Shutdown (Removal Action 12), management of asbestos abatement (Removal Action 26), and management of debris (Removal Action 17).

The OU3 final remedial action addresses treatment and final disposition of the materials and wastes resulting from performance of the interim remedial action. Remedial planning for the OU3 interim remedial action allowed for future integration of the OU3 final remedial action in order to provide a unified remediation approach to OU3. Under the integrated remedy for OU3, all buildings and structures will be decontaminated, as needed, dismantled, and the resulting materials managed in accordance with the strategies laid out in this work plan. The materials will undergo treatment and disposition according to alternatives provided for under the OU3 Final Action ROD. However, the materials placed within the "Product, Residues, and Special Materials" category, with the exception of incidentally generated soils (see Table 2-2), will continue to be handled and dispositioned off-site under procedures and decisions of Removal Action 9, which were adopted by the OU3 Final Action ROD.

Most OU3 remediation materials contain low levels of contaminants and are therefore not considered a principal threat. For these materials, the remedial strategy calls for disposition through institutional and engineering controls via the OSDF. Those materials that exceed WAC for the OSDF would be packaged and transported to a PCDF such as the one near Clive, Utah or to the NTS in Nye County, Nevada. The respective WAC established for the OSDF and the off-site disposal facilities are protective of human health and the environment.

Under the selected remedy, most of the OU3 remediated materials will be permanently dispositioned in the OSDF, which will be designed and constructed in accordance with the ARARs identified in the OU2 ROD. As described in the OU2 ROD, the OSDF will feature a multi-layered composite cap system and a multilayered composite liner, which will include a leachate detection and collection system. The composite cap and liner system will be

designed to prevent contaminant migration to the air and surface water and to protect groundwater over a performance period range of 200 to 1,000 years.

Once the OSDF is available for receiving OU3 materials, placement of interim-stored materials into the OSDF will commence. The movement of remediation material from interim storage to the OSDF may take one to three years. Additionally, when the OSDF becomes available, remediation materials being generated by the ongoing dismantlement projects will be sent directly to the OSDF after they are generated.

The OU3 Final Action ROD provides for several alternatives to disposal that will be considered during each OU3 remedial design project. These alternatives — unrestricted recycling/reuse and restricted recycling — are consistent with current DOE policy and initiatives DOE complex-wide and will be considered for each material at the time of its intended generation.

Section

# 3.0 STRATEGY FOR IMPLEMENTING THE OU3 INTEGRATED REMEDIAL ACTION

Section 3 discusses the primary programmatic and engineering strategies that will be used to implement the OU3 integrated remedial action. Each of the strategies discussed herein will be applied to each above-grade OU3 remediation project, including decontamination and dismantlement and material management phases. Although general references have been made in various discussions in Section 3 to at- and below-grade remediation of OU3 components, the specific strategies for decontamination, dismantlement, and material management will be provided by the SEP, which will be prepared by the Soil Characterization and Excavation Project (SCEP) to implement certain remedial actions directed by the OU5 ROD.

The strategy for implementing the OU3 integrated remedial action encompasses the following elements which are described in Section 3 of this work plan:

- project implementation approach - describes the strategy for project planning and implementation;
- decontamination and dismantlement tasks - describes the overall approach to performing activities typically required for each decontamination and dismantlement project;
- materials management - describes the strategy for managing materials that result from decontamination and dismantlement, including handling, storage, treatment, recycling, reuse, release, and waste disposal;
- coordination of OU3 remedial actions with other site activities - describes the consideration and integration of other FEMP programs and activities with the OU3 remediation during the planning and implementation phases;
- compliance with ARARs - describes the plan for meeting the ACA stipulation that requires a plan for satisfying permitting requirements; and
- environmental monitoring - describes the requirements for monitoring air emissions, groundwater, and surface water during OU3 remediation.

## 3.1 Project Implementation Approach

This section briefly introduces the key aspects of the overall strategy for implementing the OU3 integrated remedial action, from planning through implementation, to facilitate a better understanding of the detailed field implementation strategies that follow in Sections 3.2 through 3.6. This overview also allows for better understanding of details regarding the remedial design process which follows in Sections 4.1, and the requirements for implementing decontamination and dismantlement subcontracting and material management tasks which are provided in Sections 4.2 and 4.3, respectively.

### 3.1.1 Scope of the OU3 Integrated Remedial Action

As stated in Section 2.1, the OU3 Final Action ROD incorporated the decisions provided in the IROD. Therefore, the scope of the OU3 integrated remedial action includes all planning, design, construction, and material management activities required to implement decontamination and dismantlement of OU3 components and disposition of materials. Although the scope of the OU3 integrated remedial action includes both above-grade and at-/below-grade decontamination, dismantlement, and material management, this work plan focuses only on the strategies necessary to accomplish the above-grade phase of OU3 remediation. At- and below-grade remediation strategies will be detailed in the SEP, which is being developed pursuant to the OU5 RD work plan. Figure 3-1 illustrates a general overview of the primary activities included in the OU3 integrated remedial action, including the interface needed for at-and below-grade remediation.

### 3.1.2 Integrated Remedial Action Program Planning

The OU3 integrated remedial action will be implemented through a two phased approach. The first phase includes the implementation of a series of above-grade decontamination and dismantlement projects that are developed and typically subcontracted by DOE's environmental management contractor to qualified construction/demolition firms with required technical expertise and resources. The second phase involves the management and disposition of materials that are generated from those projects in a manner that strives for direct or just-in-time disposition. In consideration of the need to decontaminate and dismantle over 200 components and effectively manage resulting materials, the implementation of the OU3 integrated remedial action has been subdivided into 23 above-grade projects of manageable scope, each composed of a complex, as discussed in Section 2.5. Each project will address the decontamination and dismantlement of components and the management and disposition of generated materials as discussed in this work plan. The methodology that was used for establishing the sequence and schedule for remediation of the 23 complexes is discussed in Section 2.5 and the result of applying that methodology is provided in Section 6.2.

### 3.1.3 Design Document Preparation

*Design packages* will be prepared to address both decontamination and dismantlement and material handling. A design package will be prepared for each complex and will consist of engineering design drawings, photographs and videos, specifications, cost estimate, and schedule. The design will be of sufficient detail for inclusion into an Invitation for Bid (IFB) or Request for Proposal (RFP) package suitable for distribution to qualified remediation contractors for bid/proposal development or for inclusion into a task order for subcontractors retained under a Site Support Contract or a Task Order Agreement (TOA). Project specifications will be performance-based, unless project-specific situations dictate descriptive specifications (e.g., specific decontamination methods to meet radiological handling requirements). For each design project, an implementation plan will be used to summarize remedial action details developed during design. As demonstrated with the implementation plans for the Building 4A and Plant 1 Complex - Phase I projects, these documents provided concise summaries of their respective designs in a format that parallels this work plan. The implementation plan will be the sole deliverable to regulatory agencies for each design project. Each of the remedial design tasks performed during a typical design project are identified in Section 4.1.

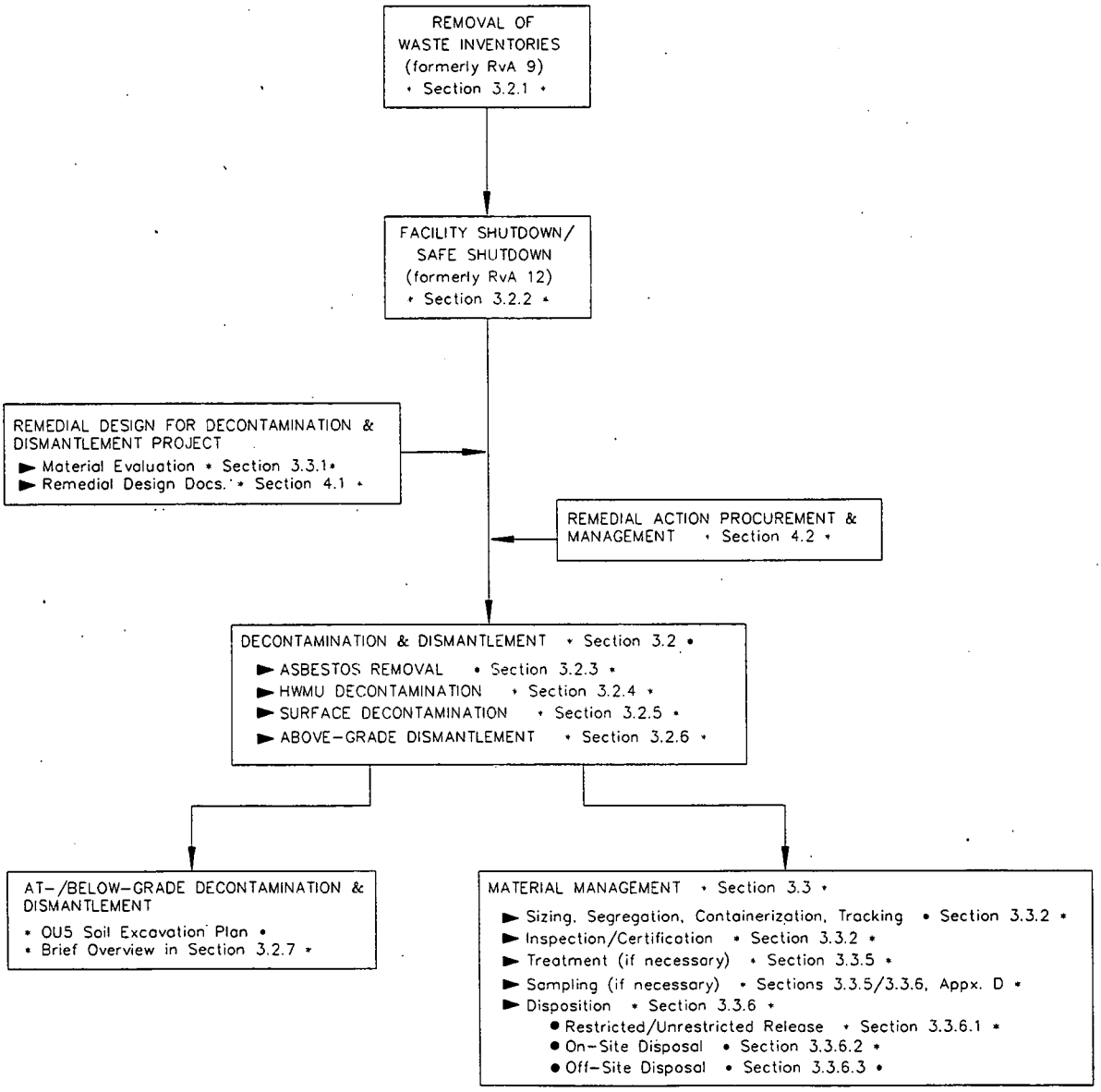



**FIGURE 3-1 Overview of the OU3 Integrated Remedial Action**

### 3.1.4 Remediation Subcontracting

The remedial action phase for each above-grade project may be awarded as one contract or as multiple contracts, depending on the complexity, type of work necessary to complete the project, and available funding. For example, during design it may be determined that it would be more cost effective to perform the project in phases, addressing only some of the components contained in a design package, or it may be more cost effective to subcontract specific types of work, such as asbestos abatement, under a separate contract.

The IFB and RFP processes will be used as the primary methods for procuring remediation subcontractors; however, the TOA and Site Support Contract represent other methods for utilizing subcontractors for small scale decontamination and dismantlement tasks or projects. To convey the requirements to prospective subcontractors under the IFB/RFP processes, the technical scope and the administrative requirements of each contract will be assembled from the design drawings and specifications. Included in the IFB/RFP package, typically as an exhibit to the Statement of Work, is a pay item schedule/description which identifies each of the performance items in the contract. Although more programmatic in its presentation, Section 3.2 and certain activities described in Section 3.3 of this work plan cover each of the performance items included in the pay item schedule/description.

For certain work elements of the decontamination and dismantlement phase of remediation, it is more effective to use the services of FEMP construction support contractors rather than acquire the services through competitive bid contracting. The construction support contractors, contracted through a Site Support Contract or TOA for a specified period of time, provide trained labor on an hourly basis to perform assigned tasks. Some of the circumstances that favor use of the support contract include, but are not limited to the following:

- the work cannot be sufficiently defined for fixed-price contracting;
- the work is experimental or exploratory;
- the element of work is small and training fixed-price personnel is not cost effective;
- work is urgent or an emergency and cannot be supported by the IFB/RFP process; and
- a decontamination and dismantlement project can be expedited by front end work while the contract is being solicited.

The use of a construction support contractor for the decontamination and dismantlement of the High and Low Nitrate Tanks (Components 18K and 18L) is an example of the effective use of this contracting mechanism. The High and Low Nitrate Tanks, which had been originally scheduled for remediation in 2001 as part of the Liquid Storage Complex (see Section 2.5 for definition of this complex), were found by project managers for OU1 and OU2 remedial actions to be obstructions to their respective project implementation (specifically regarding necessary ground improvements). As a result of the need to expeditiously remove those storage tanks to meet OU1 and OU2 RA schedules, an implementation plan was prepared to address the remedial design documentation needed for decontamination and dismantlement of the two

components and a construction support contractor was tasked to perform that work. The remediation of the High and Low Nitrate Tanks has been completed.

### 3.1.5 Remediation Management

Remediation subcontracting and work oversight will be managed by DOE's environmental management contractor. Support activities such as health and safety compliance, environmental monitoring activities, and material management — consisting of handling (outside the construction work zone), storage, ex-situ decontamination, packaging, and transportation management — are currently performed by DOE's environmental management contractor. A detailed listing of remedial design and remedial action responsibilities is provided in Section 7.

## 3.2 Decontamination and Dismantlement Tasks

Decontamination and dismantlement of OU3 components constitute the first of the two primary phases of the OU3 integrated remedial action. The second phase, management of material or *debris*[1], is described in detail in Section 3.3. Decontamination and dismantlement activities have been divided into seven primary tasks for discussion in this work plan, each of which has specific implementation strategies that are detailed in the subsections to follow. The seven tasks are briefly introduced in the illustration shown in Figure 3-2. These tasks represent activities that would typically take place prior to and during actual decontamination and dismantlement, as applicable. Activities within these tasks will be implemented as required for each component and may not necessarily be implemented in sequential order (e.g., activities associated with more than one task could occur at the same time). It should be noted that any activity listed in the seven tasks may be performed under existing FEMP programs, using existing FEMP personnel, or through subcontractors.

Figure 3-3 supplements Figure 3-2 by illustrating the relative sequence of activities that occur prior to, during, and after a typical OU3 remediation project.

A key strategy for the implementation of above-grade decontamination, dismantlement, and material handling activities is the use of performance specifications to direct the remediation subcontractor in the performance of work which meets the remediation objectives provided in this work plan. Performance specifications differ from descriptive or detailed specifications in that the remediation work methods are not specified. The performance specifications state what is to be done, what regulations, codes, and standards apply, and identify any limitation on activities while leaving details of how to accomplish the task to the remediation subcontractor. This approach allows the remediation subcontractor to use past experience and existing equipment in the development of a competitive bid or proposal. By allowing maximum remediation subcontractor flexibility in remediation methods, costs will be minimized. The remediation subcontractor will be required to submit remediation subcontractor's work plans to FEMP Project Management for review and approval which will identify the subcontractor's proposed methods for performing various activities. Since above-grade decontamination and dismantlement projects involve use of performance specifications,

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[1] *As used in this section especially, the terms "material" and "debris" are synonymous and have been defined in the glossary.*

**PREPARATORY ACTION: INVENTORY REMOVAL**

Activities prior to the remediation of components; performed, as necessary, by FEMP personnel in accordance with decisions and procedures previously approved for Removal Action 9 and adopted into the OU3 integrated remedial action by the OU3 Final Action ROD.

- Removal of existing waste inventories from components and the treatment and disposal of those wastes
- Removal of miscellaneous stored waste materials (e.g., maintenance related materials)

**PREPARATORY ACTION: SAFE SHUTDOWN**

Activities prior to remediation of components; performed, as necessary and to a varying degree, by FEMP personnel (performed in accordance with existing approved Removal Action 12 documents).

- Remove salvageable equipment and other property (e.g., files, storage cabinets, shelves)
- Remove hold-up material
- Gross cleaning of component surfaces
- Isolate and de-energize utilities

**HWMU DECONTAMINATION**

As necessary, performance of decontamination activities needed to remove contamination from HWMUs in accordance with the DF&O and to RCRA/CERCLA Integrated Process as described in Section 3.5.3.

- At-/above-grade HWMU decontamination as described in Section 3.2.5.
- Specific management of washwaters/rinsewaters potentially containing RCRA listed constituents.

**FRIABLE ASBESTOS REMOVAL**

Removal of friable asbestos and related surface decontamination activities; performed as necessary, by either by FEMP personnel as a preparatory action or by the remediation subcontractor pursuant to the remediation statement of work adopted from Removal Action 26.

- Abatement of friable asbestos, such as thermal system insulation (TSI) on pipes and equipment using enclosure systems/glove bags
- In situ surface cleaning as necessary (dry and hydro-cleaning)
- Aggressive air sampling to release enclosure(s)

**SURFACE DECONTAMINATION**

In situ surface decontamination to remove loose, unfixed radiological and chemical contaminants (referred to as "release cleaning" in subcontract documents).

- High-efficiency particle air filter (HEPA) vacuuming of surfaces
- Hydro-cleaning
- Scabbling (e.g., to remove contamination such as technetium-99 from specified areas)
- Lock-down of remaining contaminants

**ABOVE-GRADE DISMANTLEMENT**

Material and structural dismantlement and removal of materials.

- Establishment of additional control measures
- Bulk removal operations, including electrical components, piping, construction debris, heating, ventilation, and air conditioning (HVAC) systems
- Removal of interior and exterior equipment
- Removal of interior and exterior transite
- Removal of structural steel and above-grade concrete
- Concrete Masonry Unit (CMU) secondary containment and pier removal
- Seal or cover at- and below-grade components

**AT- AND BELOW-GRADE DISMANTLEMENT**

Strategies for decontamination, dismantlement, and material handling for portions of OU3 components located at- or below-grade to be specified in OU5 RA documentation (SEP).

- Removal of slabs, foundations, at- and below-grade utilities, any below-grade storage tanks, roads, and railroads
- Below-grade HWMU remediation activities (e.g., sampling and excavation of soils underlying a removed HWMU)
- Size reduction and segregation

**FIGURE 3-2 Remedial Tasks Prior To/During Remedial Action**

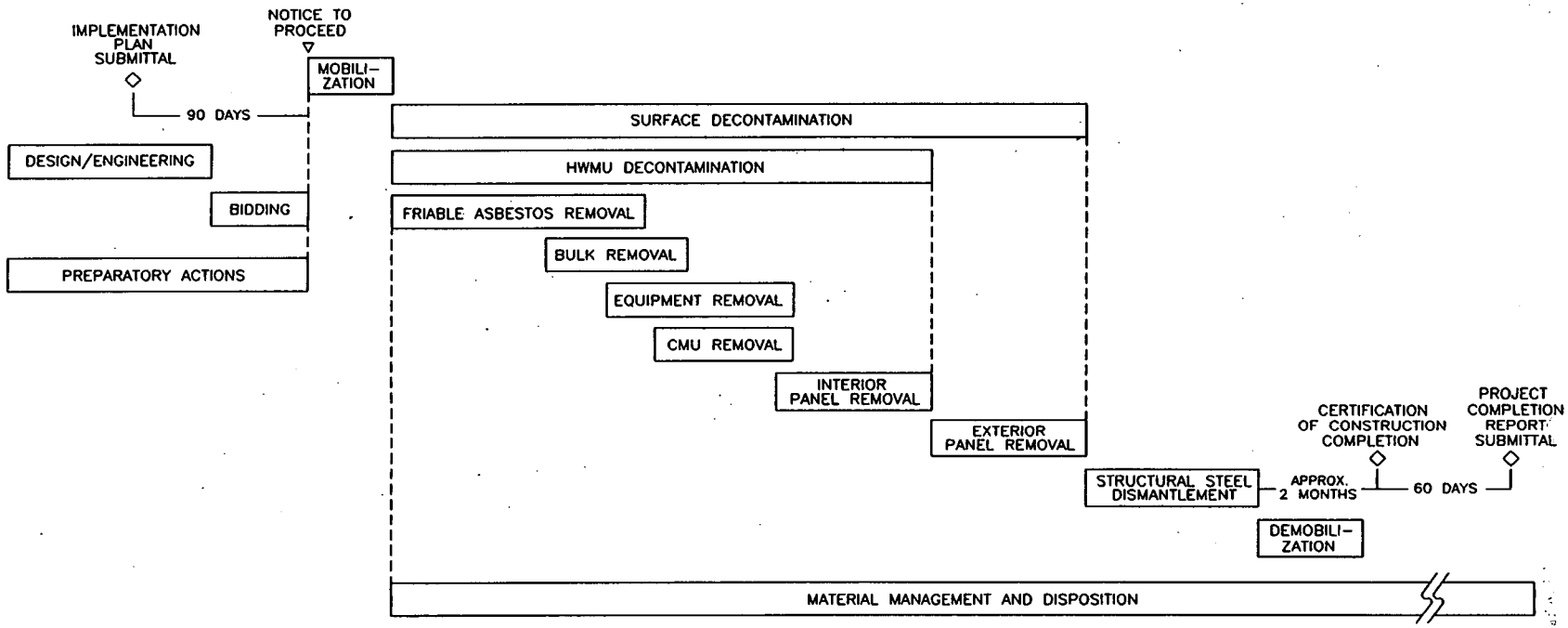


**FIGURE 3-3 Conceptual Sequence for Remediation of a Complex**

much of the project implementation details are proposed by the remediation subcontractor and approved by FEMP Project Management shortly before implementation.

Since essentially all of the OU3 remediation projects will involve the execution of similar activities, performance specifications for above-grade decontamination, dismantlement, and material handling have been standardized in a generic format and are included in Appendix B of this work plan. Each specification is numbered as shown in the table of contents and grouped according to related types of activities. Throughout the remainder of this work plan, performance specifications have been referenced as appropriate to the activity discussed (e.g., Specification 01517 for decontamination-related strategies). While also ensuring consistency among projects, these generic performance specifications may be modified according to the particular needs of a project. In some cases where certain activities, for which performance specifications have been prepared, are not performed during a project, then those specifications would not be included in that project design package.

Contaminant control measures that will be implemented during above-grade decontamination and dismantlement operations include both administrative and engineering controls. Such controls will be specified for each project in the respective performance specifications. Above-grade decontamination and dismantlement subcontracts will include within the statement of work any particular requirements for a project, by task, as well as the performance specifications that apply.

Administrative and engineering controls that will be used for a project are defined during the premobilization phase of an above-grade decontamination and dismantlement project and implemented during the mobilization phase. During the premobilization stage of a project, the subcontractor will be required to submit work plans and specify how certain conditions required in the specifications will be met. Conditions include requirements for administrative controls such as physical barriers, containments, air locks, decontamination water collection systems, fixatives, filtration, treatment equipment, sealants, wetting agents, proper cutting/breaking equipment, and other items that will increase safety and/or decrease the potential for airborne dust. Guidelines for the proposal and use of these controls are discussed throughout the performance specifications prepared for a project. For example, Specification 01517 discusses controls relative to the decontamination of structures, including decontamination, water collection, fixing contamination onto material surfaces, etc.; Specification 15067 discusses containment and ventilation requirements; and fugitive emission controls are discussed throughout the various sections of the specifications. Typical administrative controls likely to be employed include establishing control zones, contamination reduction zones, support zones, construction areas, access/egress corridors, personnel monitoring, air monitoring, and other items designed to increase safety and reduce the potential for the spread of contamination.

Other work plans required during subcontract premobilization will detail how the remediation subcontractor will control fugitive emissions (Specification 03315), protect adjacent facilities, provide storm water run-off protection, and control erosion (each stipulated by Specification 01515).

During the mobilization phase of an above-grade decontamination and dismantlement project, FEMP Project Management will establish a break room, clean room, and shower facilities. Specification 01515 then directs the remediation subcontractor to mobilize in preparation for the decontamination and dismantlement activities by establishing a material handling and

container queuing area, access and egress roadways to and from the job site, and the construction zone boundary. The proposed construction zone boundary to be delineated in the project design will be depicted in the project-specific implementation plan. The remediation subcontractor will also deliver equipment, materials, and office and storage trailers to the site as necessary to perform remediation activities. All equipment will be inspected by FEMP Project Management and surveyed to ensure that no contamination or items prohibited by the FEMP are brought on-site. A sign-in station will be established at the entrance to the job site for posting of permits and health and safety plans. Additional radiological control boundaries will be established prior to starting remediation activities in order to locate contaminated material staging areas as well as access and egress points to and from contaminated areas.

Throughout the remediation activities, the remediation subcontractor will be responsible for notifying DOE of conditions in the field that require environmental response. All conditions that necessitate a response will be dealt with immediately.

The tasks described in the following subsections represent typical activities performed during the decontamination and dismantlement phase for most components. Table 3-1 summarizes differences in the application of these activities for various types of components. Components are classified into five groups, including buildings, bulk material, storage pads/parking lots/railroads, piping/utilities/equipment, and ponds and basins. Buildings have been classified into five types according to their materials of construction.

### 3.2.1 Preparatory Action: Inventory Removal

Inventory removal will occur for each component before surface decontamination and dismantlement activities begin. These activities include removal of waste inventories and stored materials. Although Removal Action (RvA) 9 - Removal of Waste Inventories has been incorporated into the Final Action ROD, these activities will still be conducted in accordance with the procedures and disposition decisions previously established under the scope of that CERCLA response action. Under this preparatory action, existing material will be relocated from affected structures for proper treatment and/or dispositioning. Inventory removal tasks are applicable to the buildings and storage pads/parking lots/railroads component categories.

Since inventory removal will be performed on entire OU3 structures before above-grade decontamination and dismantlement, inventory removal during at- and below-grade remediation by the SCEP is not expected to be required.

### 3.2.2 Preparatory Action: Safe Shutdown

Safe shutdown refers to actions performed to place a facility in a controlled state ready for decontamination and dismantlement by a remediation subcontractor. Activities included within this task are removal of *hold-up material*, general cleaning of accessible interior surfaces, disconnection of utilities, and relocation of reusable equipment. Waste materials removed during safe shutdown will mostly fall into OU3 Debris Categories C - Process Related Metals or J - Product, Residues, and Special Materials, which are designated for off-site disposition under the OU3 Final Action ROD.

Whereas safe shutdown activities are applicable to facilities that housed process activities, where hold-up material or other process related wastes need to be removed prior to

## TABLE 3-1 Remedial Tasks for OU3 Components

| Component Groups | Preparatory Action: Inventory Removal | Preparatory Action: Safe Shutdown | HWMU Decontamination | Asbestos Removal | Surface Decontamination | Dismantlement Above-Grade | Dismantlement At-, and Below-Grade |
|---|---|---|---|---|---|---|---|
| 1. Buildings<br>TYPE A<br>Structural steel with *transite* siding and roofing | Removal of existing inventories from components; removal of miscellaneous stored material. | Isolation of electrical/ mechanical/civil utilities; general clearing/ cleaning of exterior work areas around building; inspection of equipment and process lines for hold-up material; and removal of hold-up material from equipment, process lines, and ductwork; and potential removal of equipment. | HWMU decontamination efforts; and coordination with the AWWT and Wastewater Project regarding handling of waters generated from the surface decontamination process. | Establishment of control measures associated with interior friable asbestos-containing material (ACM) removal; removal of interior friable ACM from components; and surface decontamination activities within asbestos abatement areas. | Establishment of control measures associated with surface decontamination; surface decontamination (biological, radiological, and chemical); and coordination with the AWWT and Wastewater Project regarding handling of waters generated from the surface decontamination process. | Establishment of additional control measures (construction zone, lay-down/staging, and turnover zone boundaries); removal of any remaining interior ductwork, piping, conduit, and equipment; removal of interior siding/roofing (transite or otherwise) and any wall/roof insulation, walls from the components within the subcontract; removal of exterior ducts, vents, and piping; removal of exterior siding/roofing (transite or otherwise and walls); dismantling of the structural members (steel, concrete, masonry, etc); and size reduction, segregation, and containerization of material/waste. | Establishment of additional control measures (construction zone, lay-down/staging, and turnover zone boundaries); preparation, stabilization, and removal of slabs, foundations, below-grade utilities, below-grade storage tanks, road, and railroads; removal of below-grade asbestos covered utilities (if applicable); size reduction, segregation, and containerization of material/waste; coordination with the SCEP regarding excavation of remaining soil, potential placement of backfill, and re-seeding the area. |
| TYPE B<br>Concrete Block with Built-up Roofing | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings, except no removal of interior or exterior siding (transite or otherwise). | Activities are the same as Type A Buildings. |
| TYPE C<br>Pre-engineered with metal siding and roofing | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type B Buildings. | Activities are the same as Type A Buildings. |
| TYPE D<br>Wood frame with metal siding and roofing | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Type B Buildings. | Activities are the same as Type A Buildings. |

## TABLE 3-1 Remedial Tasks for OU3 Components (Cont'd)

| Component Groups | Preparatory Action: Inventory Removal | Preparatory Action: Safe Shutdown | HWMU Decontamination | Asbestos Removal | Surface Decontamination | Dismantlement Above-Grade | Dismantlement At-, and Below-Grade |
|---|---|---|---|---|---|---|---|
| 1. Building (cont'd) | | | | | | | |
| TYPE E Tension Support Structures | Activities are the same as Type A Buildings. | Isolation of electrical/ mechanical/civil utilities and general clearing/cleaning of exterior work areas around building. | Activities are the same as Type A Buildings, if determined to be a HWMU. | N/A | N/A | Establishment of additional control measures (construction zone, lay-down/staging, and turnover zone boundaries); removal of PVC fabric/siding; dismantlement of framework and concrete anchors, and size reduction, segregation, containerization of material/waste. | Activities are the same as Type A Buildings. |
| 2. Bulk Material | N/A | N/A | N/A | N/A | N/A | Establishment of additional control measures (construction zone, lay-down/staging, and turnover zone boundaries) and size reduction, segregation, containerization of material/waste. | Coordination with the SCEP regarding excavation of remaining soil, potential placement of backfill, and re-seeding the area. |
| 3. Storage Pads/ Parking Lots/ Railroads | Removal of existing inventories from components; removal of miscellaneous stored material. | Isolation of electrical/ mechanical/civil utilities and potential removal of equipment. | Activities are the same as Type A Buildings, if determined to be a HWMU. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | In addition to activities listed for Bulk Material, removal of lighting, fencing, rails, and guard posts, and/or other above-grade elements. | Activities are the same as Type A Buildings. |
| 4. Piping/ Utilities/ Equipment (Above- and below-grade) | N/A | Activities are the same as Type A Buildings. | Same as Type A unless decontaminated during safe shutdown. | Activities are the same as Type A Buildings. | Activities are the same as Type A Buildings. | Activities are the same as Storage Pads/Parking Lots/Railroads (for above-grade elements). | Activities are the same as Type A Buildings. (for below-grade elements. |
| 5. Ponds and Basins (OU3 components only) | N/A | Isolation of electrical/ mechanical/civil utilities. | To be specified by SEP. Expect removal/ excavation and decontamination, if determined to be a HWMU | N/A | N/A | Establishment of additional control measures (construction zone, lay-down/staging, and turnover zone boundaries). | Removal of solids/liquids in component; SEP to provide strategy for excavation, backfill, and reseeding. |

dismantlement, other OU3 non-process facilities require a form of controlled shutdown prior to start of remediation. The controlled shutdown of non-process-related facilities is performed under an existing site maintenance program, referred to as "facility shutdown." Facility shutdown is performed under task orders which utilize FEMP personnel and existing site operation and maintenance procedures. For the sake of simplicity of titles, the activities performed under either safe shutdown or facility shutdown tasks will hereinafter in this work plan be referred to as only "safe shutdown".

OU3 complexes that require performance of safe shutdown activities prior to dismantlement include the Thorium/Plant 9 Complex, Pilot Plant Complex, Plant 5 Complex, Plant 2/3 Complex, Plant 6 Complex, and Plant 8 Complex. Safe shutdown activities were previously implemented as a separate CERCLA response action under Removal Action 12. Pursuant to the OU3 Final Action ROD, safe shutdown management decisions have been adopted by reference into the OU3 integrated remedial action. Safe shutdown activities become integrated into OU3 remediation by continuing to implement those activities as preparatory actions for selected facilities.

Hold-up material will be removed from equipment, auxiliary ductwork, and piping to reduce potential hazards from the work environment for the remediation subcontractor; to provide FEMP Health and Safety and Waste Management organizations with known starting conditions that are needed to develop the Safety Analysis, work permits, and Health and Safety Plan for remediation activities; and to aid in determining disposition options for the remediation materials. All systems will be inspected to ensure such material has been removed and any previously undetected material is located, quantified, and removed. Inspection techniques include visual inspection and non-destructive analysis/assay.

For process buildings, a general cleaning operation will be performed to remove gross levels of contamination and may include visible dust and loose debris (including pigeon remains) from building surfaces, walls, and floors. The purpose of this activity is to remove loose radiological contamination held within the dust as well as other hazards (e.g., biological and chemical), thereby reducing the potential personnel exposure during aggressive remediation activities. Building penetrations that allow animal access will be sealed to ensure no further intrusion from animals and to minimize the potential migration of loose contamination to the environment.

Utility isolation is one of the major actions performed during the Safe Shutdown/Facility Shutdown preparatory action. In addition, prior to performing any decontamination and dismantlement work, the subcontractor is required to conduct a survey in accordance with Specification 01515 to verify that all utilities are isolated. If the subcontractor determines that a utility has not been isolated, the subcontractor shall notify FEMP Project Management to complete the activity. Utilities such as steam, potable water, electrical power, fire protection systems, compressed air, communication systems, and radiation detection alarms will be de-energized and terminated at the equipment or at the building exterior to establish the known condition of each energy source within the remediation area. The fire alarm and radiation detection alarm systems will be re-routed and activated.

If the subcontractor installs temporary utilities to support its field activities, the installation of temporary utilities shall also be in accordance with Specification 01515 and the references identified therein.

Equipment that is not salvageable but is moved in order to access and remove salvageable equipment will remain in the building at this stage. Salvageable equipment will be segregated as it is removed according to material and contamination type and dispositioned in accordance with material management strategies discussed in Section 3.3 of this work plan.

Since safe shutdown activities will be performed on entire OU3 structures before above-grade decontamination and dismantlement, hold-up material removal during at- and below-grade remediation by the SCEP is not expected to be required.

### 3.2.3 HWMU Decontamination

Above-grade HWMU decontamination activities will be implemented for OU3 components that contain HWMUs to be closed under the integrated RCRA/CERCLA process discussed in Section 3.5.3. At- and below-grade HWMU decontamination requirements will be specified in the SEP. The integrated RCRA/CERCLA process is regulated by the DF&O which was issued by the Ohio EPA on June 6, 1996. Decontamination activities to be implemented under this process include in situ decontamination efforts to remove hazardous characteristic contamination from debris so that the debris may be dispositioned in the OSDF. Hazardous wastes stored in the HWMU will have been removed during the inventory removal task. Hold-up material would have been removed during safe shutdown.

HWMU decontamination requirements will be specified in the appropriate subcontract documents and the implementation plans for above-grade decontamination and dismantlement projects. For HWMUs that are associated with RCRA listed wastes (as identified in Section 3.5.3.3), implementation plans will specify the wash/rinsewater handling requirements. The HWMU decontamination outline provided in the implementation plans will provide the following information in summary form:

- HWMU description and characterization;
- waste characterization;
- description of surface cleaning requirements;
- sampling and analytical plans and procedures, if applicable, to verify removal of hazardous contaminant characteristics and to support rinseate/washwater treatment;
- health and safety issues; and
- waste storage and disposition plans.

Certification of the performance of each of these actions will be provided in the project completion report, which is discussed in Section 4.5.

### 3.2.4 Asbestos Removal

Activities include asbestos abatement for friable asbestos and some surface decontamination within *asbestos abatement containment areas*. By erecting individual asbestos abatement containment structures, the area that could potentially be affected by asbestos contamination

will be minimized. Asbestos removal activities are applicable to all component categories except for bulk material, ponds, and basins, and will be performed prior to structural dismantlement. Removal of friable asbestos will be performed either by FEMP workforces in accordance with the procedures that were established under Removal Action 26 - Asbestos Abatement, or by a qualified remediation subcontractor in accordance with performance specifications for that activity, which incorporate equally stringent asbestos removal requirements, and an approved asbestos abatement work plan prepared by the remediation subcontractor. In either case, asbestos will be removed in accordance with the National Emissions Standard for Hazardous Air Pollutants (NESHAPs) (40 CFR 61, Subpart M, Sections 145, 149, 150, and 153), and the Ohio Air Pollution Regulations (Ohio Administrative Code (OAC) 3745-20-02 through -05). For further clarification regarding the integration of asbestos abatement removal actions into this remedial action, please refer to Section 3.4.2. Specification 01516 stipulates the requirements that must be used for removal, transportation, and disposition of ACM. A summary of those requirements is provided below.

The preferred method for removing ACM on piping is to remove the pipe and ACM as a single unit. A glove bag will be placed around the pipe cut location and the ACM will be removed to allow for a pipe cut without disturbing adjacent ACM. The preferred method for cutting the pipe includes using reciprocating saws, portable band saws, or mechanical shears. This method requires the use of secondary containment and the use of air cleaning units.

A typical procedure to be followed for non-pipe insulation, or where the glove-bag method is not practical for pipe insulation, is as follows:

1) isolate the work area;

2) install a containment barrier, which includes covering the walls, ceiling, and floor with polyethylene sheeting;

3) install air cleaning units in the containment area;

4) wet the ACM with an *amended water* solution;

5) remove the ACM by cutting it into manageable sections;

6) after completing all removal work, surfaces from which ACM have been removed shall be wet brushed or cleaned by an equivalent method to remove all visible ACM residue;

7) wet-clean all work area surfaces to remove all visible ACM;

8) apply encapsulant to all surfaces in work area;

9) perform asbestos clearance testing to release the area; and

10) perform additional wipe-downs or apply a second application of encapsulant if the fiber count is elevated.

Support activities to be performed early in this task include establishing control zones, support zones, access/egress corridors, and construction areas for abatement. Also included will be

the installation of containment and airlock facilities for asbestos abatement and associated decontamination efforts. Temporary showers and change rooms will be installed at the airlocks of asbestos abatement containment areas in a configuration that is in compliance with asbestos regulations and DOE policies.

In some cases, the whole building undergoing asbestos abatement will be turned into a *containment structure*. All containment structures will be air tight with ventilation provided so containment is under negative pressure and sufficient air exchanges take place to prevent fugitive emissions. Items such as sumps, dikes, and shoveling pads (for shoveling adsorbents) for removing and containing decontamination water and solutions will be installed as part of the containment. If the entire building is to be used as a containment, all cracks, joints, gaps, and other openings will be sealed shut to prevent spread of contamination during remediation. Directions to remediation subcontractors regarding ventilation and local containment is provided in Specification 15067.

Friable asbestos removal activities will take place prior to other decontamination efforts in the asbestos abatement containment area. Typical removal procedures include saturating ACM with an amended water solution; removing ACM in manageable sections without throwing or dropping material wrapping; removing all visible residue with a wet brush or sponge or equivalent method; and containerizing ACM contained within two layers of 6-mil polyethylene sheeting secured with tape and labels. After friable asbestos is removed, decontamination will include removal of other loose contaminants in the asbestos abatement containment area. Areas adjacent to asbestos abatement containment areas will be decontaminated such that the abated areas are not re-contaminated. Specification 01516 specifies the requirements for the Subcontractor's asbestos abatement plan, which will be subject to DOE approval, including specific procedures for asbestos removal, cleaning, and clearance.

The remediation subcontract Statement of Work will require demonstration of adequate asbestos abatement consistent with industry standards. An aggressive air test will be required to determine clearance for asbestos removal actions. This test involves operating air monitors inside and outside the structure while applying forced air from leaf blowers to interior surfaces of the building to demonstrate that less than 0.01 fibers per cubic centimeter (f/cc) is present, as analyzed by phase contrast microscopy. This test will likely be performed in a manner that does not disturb other decontamination operations located adjacent to the abatement area.

### 3.2.5 Surface Decontamination

The provisions of this section pertain primarily to above-grade decontamination and dismantlement projects; the SEP will identify how the SCEP will address decontamination requirements for OU3 components located at- and below-grade.

Surface decontamination, also referred to as *release cleaning*, consists of the process of removing loose contamination to the greatest extent practicable from all buildings, structures, containments, equipment, and exposed interior surfaces in situ per the requirements of Specifications 01516, 01517, and the Radiological Requirements Plan (RRP) prior to removing the exterior shell and exposing interior surfaces. "Release," as used in the term release cleaning, refers to the removal of materials from a building containment where certain contamination criteria must be met prior to removal and exposure to the environment. Surface decontamination, which is typically a task that is assigned to a remediation subcontractor, also entails the collection and containerization of all residual dust, particles, debris, and rubble

remaining from the removal of bulk materials, equipment, masonry, steel, and other appurtenances. Surface decontamination also specifically includes the process of scabbling concrete pursuant to Specification 01518, if that method is chosen, to remove specific volumes of concrete for off-site disposal as required by the OU3 Final Action ROD. Verification of adequate surface decontamination includes inspection of the top of structural beams, columns, window frames, door headers, and any other surfaces where residues might have accumulated.

The extent of surface decontamination will be determined on a project-specific basis. Any special surface decontamination requirements, beyond the general criteria discussed in this section, will be discussed in the project implementation plans. The extent of decontamination required is primarily going to be based on the radiological levels present on equipment or material surfaces but, as noted above, is also based on a OU3 Final Action ROD requirement which requires the removal of the top inch of concrete from three process areas and the top half inch of concrete from a fourth process area. The most recent radiological survey data will be provided to the remediation subcontractor to provide an initial basis for proposing decontamination methods. For a number of OU3 components, such as many areas within the Boiler Plant/Water Plant Complex, surface decontamination may not be required.

When required, surface decontamination will typically only involve the in situ removal of loose surface contamination per the requirements of the project specifications and RRP. Surface decontamination may also occur ex situ, i.e., at a location outside containment, if necessary. Such additional or ex situ decontamination is, for the purposes of this work plan, considered material treatment and is discussed further in Section 3.3.5.

Surface decontamination performed during this stage of remediation goes beyond the general surface cleaning activities performed during the preparatory action — safe shutdown by using more aggressive methods to remove both fixed (if desired) and removable contamination as needed to achieve decontamination conditions stipulated by Specification 01517 and the conditions provided under the title of "Release Cleaning" in the subcontract Statement of Work, which are highlighted below. Decontamination method(s) will be proposed by the remediation subcontractor and evaluated by DOE. Specification 01517 and the RRP provides direction to the remediation subcontractor regarding any performance standards and other conditions that must be met. Beyond removal of surface contamination to prescribed levels, this specification also allows for fixing or lock-down of contamination to prevent releases during handling and disposition activities. Once the cleaning and/or lock-down has been completed and the subcontractor has completed a visual inspection of the building, then clearance testing, including aggressive air testing for asbestos abatement areas, shall be performed to determine the effectiveness of the cleaning. As stated in the subcontract Statement of Work, the test must meet the conditions of the Removable Test, which is described in the RRP. The Removable Test requires that randomly located surface tests be performed by the FEMP radiological personnel to determine if the subcontractor has exceeded the radiological control limits referenced by Specification 01517. If either or both of these tests fail, then the subcontractor will be required to perform additional cleaning until these levels are met.

The selection of a particular decontamination method is contingent upon many factors. Based on a review of available and proven decontamination methods, those recommended or determined to be potentially applicable to the various material types in OU3 have been identified in Table 3-2, entitled "Decontamination and Dismantlement Methodology Matrix."

X = RECOMMENDED METHODS
O = OPTIONAL METHODS

| TECHNIQUES AND METHODS → | INITIAL DECONTAMINATION | | | | | | | | | | HEPA VENTILATION SYSTEMS | | | | DISMANTLEMENT & SIZE REDUCTION | | | | | | | | | | | | | | | | | | | MATERIAL HANDLING EQUIPMENT | | | | | | | | | | PACKAGING METHODS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MATERIALS ↓ | SURFACE HEPA VACUUM | SURFACE WIPE DOWN | HAND OR AUTOMATED BRUSHING | VACUUM GRIT / SHOT BLASTING | VACUUM SCABBLING / SCARIFYING | HIGH PRESSURE / LOW VOLUME WATER WASHING | CHEMICAL FOAMS / GELS / PASTES | FIXATIVE | INTERIOR FLUSHING | | ENTIRE BUILDING / FLOOR | LOCAL CONTAINMENT STRUCTURE | LOCAL WITHOUT CONTAINMENT | | ONE PIECE REMOVAL (FOR "SMALL" ITEMS) | MANUAL DISASSEMBLY | OXYGEN CUTTING | ABRASIVE SAWING | IMPACT HAMMERING / RAMMING | SHEAR CUTTING / NIBBLING | GRABBLER / MASSSIVE SHEARING | ABRASIVE WATER JET CUTTING | PLASMA ARC CUTTING | SHREDDING / BALING / COMPACTING | CONTROL EXPLOSIVE CUTTING | CONCRETE TORCH | CIRCULAR (MECHANICAL) CUTTING | WRECKING BALLS / SLABS | DEMOLITION COMPOUNDS | DIAMOND WIRE CUTTING | HACKSAW / GUILLOTINE SAW | PAVING CUTTING / CHIP HAMMERING | BACKHOE MOUNTED RAM | WALL AND FLOOR SAWING | | MANUAL HOIST (CHAIN/ELEC.) | SCISSOR LIFT / MAN LIFT | CHERRY PICKER / BOOM TRUCK | FORK LIFT / HAND STACKER | CRANE (FIXED BOOM) | ELEVATOR (PERSON/EQUIPMENT HOIST) | FLATBED TRUCK | LOADER / BACKHOE | MOBILE CONVEYORS | OVERHEAD CRANES | | STORAGE CONTAINER | DISPOSAL CONTAINER | SEAL EXPOSED OPENINGS | PLASTIC WRAP / BAGS | BUNDLED / BANDED | |
| **PROCESS EQUIPMENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TANKS (SHOP FABRICATED) | X | | | O | | X | O | X | X | | O | O | | | X | X | | O | | O | | O | | | | | X | | | | | | | | | X | | O | | | | X | | O | | | | X | O | | |
| TANKS (FIELD FABRICATED) | | | | O | | X | O | X | X | | O | O | | | O | O | | | | | | O | | | | | X | | | | | | | | | | | O | X | X | | X | | | | | | O | O | X | |
| PROCESS VESSELS (SOLIDS) | X | O | | O | | X | O | X | X | | O | O | | | X | X | | | | | | O | | | | | X | | | | | | | | | O | | O | O | | | X | | | O | | | X | O | | |
| PROCESS VESSELS (LIQUIDS) | | | | | | X | O | X | X | | O | O | | | X | X | | O | | | | O | | | | | X | | | | O | | | | | O | | O | X | | | X | | | O | | | X | O | | |
| FURNACES (ELECTRIC) | X | O | | | | X | O | X | | | O | | O | | X | X | O | | | | | O | | | | | O | | | | O | | | | | O | | O | O | | | X | | | O | | | X | O | | |
| (1) DNP. FURNACES (GAS FIRED) | X | O | | O | | X | O | X | | | O | | O | | O | X | O | O | | | | O | O | | | | O | | | | | | | | | O | | O | O | | | X | | | O | | | X | O | | |
| CRUSHERS, MILLS (SIZE REDUCTION) | X | | | O | O | X | O | X | | | O | | O | | O | X | O | O | | | | O | O | | | | O | | | | O | | | | | O | | O | O | | | X | | | O | | O | X | X | | |
| LATHES/SAWS/MACHINING | O | X | | | | X | O | X | | | O | O | O | | O | X | O | | | | | O | | | | | X | | | | | | | | | O | | O | O | | | X | | | O | | O | O | X | | |
| PUMPS | | | | | | X | | X | X | | O | O | O | | X | X | O | | | | | | O | | | | X | | | | | | | | | O | O | | | | | X | | X | O | O | O | O | | | |
| AGITATORS/DRIVES | | | | | | X | | X | | | O | O | O | | X | X | O | | | | | | | | | | O | | | | O | | | | | X | O | O | | | | X | | X | O | O | | | O | | |
| INSTRUMENTATION | O | | | O | | | O | X | | | O | O | O | | O | X | | O | | | | | O | O | | | O | | | | | | | | | O | O | | | X | X | X | | X | | O | X | | O | | |
| PIPING | X | | | X | | O | | X | X | | O | O | O | | O | X | X | O | | O | | O | X | | | | O | | | | O | | | | | X | O | X | | | | X | | X | O | O | O | X | | X | |
| VALVES/FITTINGS | O | | | | | X | O | X | X | | O | | O | | X | X | O | O | | | | | O | | | | O | | | | | | | | | X | O | O | X | | X | X | | | | | | X | | O | | |
| ACM PIPE INSULATION | X | | | | | | | | | | O | X | | | O | X | | | | | | | | O | | | | | | | | | | | | | | | | | | | | | | O | X | | X | | |
| MISCELLANEOUS PROCESS EQUIPMENT | O | O | | O | | X | O | O | X | | O | | O | | X | X | O | O | | | | | O | | | | O | | | | O | | | | | O | O | O | X | | O | X | | O | O | | O | X | X | X | | |
| ROTARY KILN | O | | | O | | X | X | O | | | | O | O | | O | O | | | | | | | | | | | O | | | | O | | | | | O | | O | O | | | | | | O | | | | X | X | | |
| (2) HX(S), MX(S) | X | | | | | X | O | X | X | | | O | O | | O | O | O | O | | | | | | | | | X | | | | | | | | | X | | | X | | | | | | O | | | | | X | | |
| **HVAC EQUIPMENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DUST COLLECTOR HOUSINGS | X | | | O | | X | O | X | X | | O | X | O | | | X | O | O | | O | | | O | | | | O | | | | O | | | | | O | O | X | | | | X | | O | O | | X | O | X | O | | |
| VENTILATION FANS/BLOWERS | X | | | | | X | O | X | X | | O | X | O | | O | X | O | | | | | | O | O | | | O | | | | O | | | | | | | X | | | | X | | X | O | | X | O | X | O | | |
| STEAM UNIT HEATERS | X | | | | | X | O | X | | | | X | O | | X | X | O | | | | | | | O | | | O | | | | O | | | | | | X | X | | O | | X | | X | | | O | X | | O | | |
| AIR SUPPLY OUTLETS | X | | | O | | X | O | X | X | | O | X | O | | X | X | O | O | | | | | | O | | | O | | | | O | | | | | | X | O | O | | O | X | | O | | | O | X | | | | |
| DUCT | X | | | O | | X | O | X | X | | O | X | O | | O | O | X | O | | O | | | O | O | | | O | | | | O | | | | | X | O | X | O | | | X | | | | | O | X | O | | | |
| **ELECTRICAL EQUIPMENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SUBSTATIONS | X | X | | | | | O | X | | | O | O | O | | | X | | | | O | | | | | | | O | | | | | | | | | O | O | X | | O | | X | | O | | | O | X | | O | | |
| MOTOR CONTROL CENTERS | X | X | | | | | O | X | | | O | O | O | | X | X | O | | | O | | | | O | | | O | | | | O | | | | | O | O | X | O | | O | X | | O | O | | O | X | | O | | |
| CIRCUIT BREAKERS/SAFETY SWITCHESS | X | X | | | | | O | X | | | O | O | O | | X | X | | | | | | | | O | | | O | | | | | | | | | O | O | | X | | X | X | | O | | | | X | | O | | |
| CONTROL PANELS/PANEL BOARDS | X | X | | | | | O | X | | | O | O | O | | X | X | | | | O | | | | | | | O | | | | | | | | | O | O | | X | | O | X | | O | O | | X | O | | O | | |
| MOTORS / GENERATORS | X | O | | | | | O | X | | | O | O | O | | X | X | | | | | | | | | | | | | | | | | | | | X | O | | O | O | O | X | | O | O | | | X | | O | | |
| LIGHTING | X | | | | | | | | | | O | O | O | | X | X | | | | | | | | O | | | | | | | O | | | | | | | | | | | | | | | | | X | | O | | |
| CONDUIT / WIRE / GROUND | X | | | | | | O | O | | | O | O | O | | O | O | | | | | | | | O | | | | | | | O | | | | | | | | | | | | | O | | O | X | | O | X | |
| TRANSFORMERS | X | X | | | | | O | X | | | O | O | O | | X | X | | | | | | | | | | | | | | | | | | | | O | O | X | | | O | X | | | | | | X | | O | | |
| GENERATOR DRIVE UNITS | X | O | | | | X | O | X | | | | O | | | X | X | | | | | | | | | | | O | | | | | | | | | X | O | X | | O | | X | | | O | | | | | O | | |
| CAPACITOR | X | X | | | | | O | X | | | | O | O | | X | X | | | | | | | | | | | O | | | | | | | | | | O | X | | | O | X | | | | | | X | | O | | |

FOOTNOTES: (1) DENITRIFICATION POTS
(2) HX(S) = HEAT EXCHANGERS, MX(S) = MIXTURE EXTRACTORS / SETTLERS

**TABLE 3-2 Decontamination and Dismantlement Methodology Matrix**

| TECHNIQUES AND METHODS → | INITIAL DECONTAMINATION | | | | | | | | | HEPA VENTILATION SYSTEMS | | | | DISMANTLEMENT & SIZE REDUCTION | | | | | | | | | | | | | | | | | | | | MATERIAL HANDLING EQUIPMENT | | | | | | | | | | PACKAGING METHODS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X = RECOMMENDED METHODS<br>O = OPTIONAL METHODS<br>MATERIALS ↓ | SURFACE HEPA VACUUM | SURFACE WIPE DOWN | HAND OR AUTOMATED BRUSHING | VACUUM GRIT / SHOT BLASTING | VACUUM SCABBLING / SCARIFYING | HIGH PRESSURE / LOW VOLUME WATER WASHING | CHEMICAL FOAMS / GELS / PASTES | FIXATIVE | INTERIOR FLUSHING | ENTIRE BUILDING / FLOOR | LOCAL CONTAINMENT STRUCTURE | LOCAL WITHOUT CONTAINMENT | | ONE PIECE REMOVAL (FOR "SMALL" ITEMS) | MANUAL DISASSEMBLY | OXYGEN CUTTING | ABRASIVE SAWING | IMPACT HAMMERING / RAMMING | SHEAR CUTTING / NIBBLING | GRABBLER / MASSIVE SHEARING | ABRASIVE WATER JET CUTTING | PLASMA ARC CUTTING | SHREDDING / BALING / COMPACTING | CONTROL EXPLOSIVE CUTTING | CONCRETE TORCH | CIRCULAR (MECHANICAL) CUTTING | WRECKING BALLS / SLABS | DEMOLITION COMPOUNDS | DIAMOND WIRE CUTTING | HACKSAW / GUILLOTINE SAW | PAYING CUTTING / CHIP HAMMERING | BACKHOE MOUNTED RAM | WALL AND FLOOR SAWING | | MANUAL HOIST (CHAIN/ELEC.) | SCISSOR LIFT / MAN LIFT | CHERRY PICKER / BOOM TRUCK | FORK LIFT / HAND STACKER | CRANE (FIXED BOOM) | ELEVATOR (PERSON/EQUIPMENT HOIST) | FLATBED TRUCK | LOADER / BACKHOE | MOBILE CONVEYORS | OVERHEAD CRANES | | STORAGE CONTAINER | DISPOSAL CONTAINER | SEAL EXPOSED OPENINGS | PLASTIC WRAP / BAGS | BUNDLED / BANDED | |
| **MATERIAL HANDLING EQUIP** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CRANES/HOISTS | X | O | | O | | X | O | X | | O | O | O | | X | X | O | | | | | | O | | | | O | | | | | | | | O | O | X | O | O | | X | | | | | X | | O | X | |
| CONVEYORS (GENERAL) | X | O | | O | | X | O | X | | O | O | O | | X | X | O | | | | | | O | | | | O | | | | O | | | | O | O | X | O | O | O | X | | | | O | X | X | O | | | |
| ELEVATORS | X | O | | | | X | O | X | | O | O | O | | X | X | O | | | O | | | O | | | | O | | | | | | | | | O | X | O | X | | X | | | | X | O | | O | | | |
| BUCKET ELEVATORS | X | | | | | X | O | X | | O | O | O | | X | X | O | | | | | | O | | | | O | | | | O | | | | O | O | X | | O | | X | | | | O | X | X | O | | | |
| HOPPERS | X | O | | O | | X | O | X | | O | O | O | | O | X | O | O | | O | O | | O | | | | O | | | | O | | | | | | X | | X | | X | | | | | | X | O | | | |
| SCREENS | X | | | O | | X | O | X | | O | O | O | | O | X | O | | | | | | | | | | | | | | O | | | | | | | | | | X | | | O | | X | | O | | | |
| DRUM DUMPERS | | | | | | X | O | X | | | O | O | | O | X | | | | | | | | | | | | | | | | | | | O | O | | O | | | | | | | | X | O | | | |
| **BUILDING COMPONENTS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STRUCTURAL STEEL | X | | | O | | X | O | X | | | | X | | | O | X | O | | | O | O | O | | O | | O | X | | | | | | | | X | O | O | X | | X | | | | O | | | | X | |
| MISCELLANEOUS STEEL | X | | | O | | X | O | X | | O | | X | | O | O | X | O | | | O | O | O | | O | | | X | | | O | | | | O | X | X | O | O | | X | | O | | O | O | | | X | |
| STEEL FLOOR PLATE | X | | | O | | X | O | X | | O | O | X | | | O | O | X | | O | | O | O | | O | | | X | | | O | | | | O | O | X | O | O | | X | | | | O | | | | X | |
| METAL SHEETING | X | | | O | | X | O | X | | | O | O | | | X | O | O | | O | | | O | O | | | | O | | | O | | | | | X | | O | X | | X | | O | | O | O | | | X | |
| DOORS/WINDOWS/LOUVERS | X | | | | | X | | | | | O | O | | X | X | O | O | | O | | | O | O | | | | | | | | | | | O | O | | X | | X | X | | | | O | X | | | O | |
| LEAD FLASHING | O | | | | | O | O | O | | | O | | | X | X | | | | | | | | | | | | | | | | | | | O | | | | | | | | | | | X | | | | |
| INTERIOR TRANSITE PANELS | X | | | | | X | O | X | | O | X | O | | | X | | | | | | O | | | | | O | | | | | | | | | O | X | O | X | | X | | | | X | | | | | |
| EXTERIOR TRANSITE PANELS | X | | | | | X | O | X | | | X | O | | | X | | | | | | | | | | | O | | | | | | | | | O | O | O | X | | X | | | | X | | | | | |
| WALL INSULATION | | | | | | X | X | X | | O | X | | | | X | | | | | | | | O | | | | | | | | | | | O | O | | O | | | X | | | | | X | | X | | |
| LIGHTGAGE METAL FRAMING | X | | | | | X | O | X | | O | | O | | | O | X | O | | O | O | | | O | | | O | | | | | | | | O | O | O | X | | | X | | | | O | X | | | O | |
| MASONRY WALLS | X | | | | | X | X | X | | O | O | O | | | | | X | X | | | O | | | | | O | | | | | | | | | | | | | | X | X | | | | | X | | | | |
| WOOD FRAMING | O | | | | | | X | | | O | | O | | | O | | X | | O | | | | O | | | | | | | | | | | O | O | | O | | | X | | | | | | X | | | | |
| PRECAST CONCRETE SLABS | | | | O | X | X | O | X | | O | O | O | | | X | | X | | | | O | | | | O | X | O | O | O | O | O | X | O | | | O | O | O | X | | X | O | | | X | | | | X | |
| CONCRETE ABOVE-GRADE | | | | O | X | X | O | X | | O | O | O | | | | | X | O | | | O | | | | O | X | O | O | O | O | O | X | O | | O | O | O | O | X | | X | O | | | X | | | | | |
| CONCRETE GRADE SLABS | | | | O | X | X | O | X | | | X | O | | | | | O | X | | | O | | | | O | X | O | O | O | O | O | X | O | | | | | O | O | | X | X | | | O | X | | | | |
| CHEMICAL RESISTANT BRICK | | | | O | | X | O | O | | | X | O | | | | | O | X | | | | | | | | | | | | O | | X | | | | | O | | | X | X | | | | X | | | | |
| MISCELLANEOUS DEBRIS | X | | | | | | | | | O | O | O | | O | X | O | O | O | O | | | | O | | | | | | | | | | | | O | | O | | | X | | | | | X | | O | | |
| CONCRETE STAIRS | X | | | | | X | O | X | | | O | O | | | | | | | | | | | | | O | X | X | O | O | O | X | O | X | | O | O | O | | | X | | | | X | | | | | |
| STEEL GRATING STAIRS | X | | | | | X | O | X | | | O | O | | | X | O | O | | | O | O | | | O | | | | | | | | | | | | | | | | | | | | X | | | | O | |
| STEEL GRATING CATWALKS | X | | | | | X | O | X | | | O | O | | | X | O | O | | | O | O | | | O | | O | | | | | | | | | | | | | | | | | | X | | | | | |
| EMERGENCY STEEL LADDERS | X | | | | | X | O | X | | | O | O | | | X | O | O | | | O | O | | | O | | O | | | | | | | | | | | | | | | | | | X | | | | | |
| ROOFING ( ORGANICS,POLYURETHANE, CONCRETE,TRANSITE ) | X | | | | | X | O | X | | | X | O | | | X | | | | | | | | | | | O | | | | | | | | | O | O | O | X | | X | | | | X | | | | | |

FOOTNOTES: (1) DENITRIFICATION POTS

(2) HX(S) = HEAT EXCHANGERS, MX(S) = MIXTURE EXTRACTORS / SETTLERS

**TABLE 3-2 Decontamination and Dismantlement Methodology Matrix (Cont'd)**

The table of methodologies and technologies distinguishes between those that are recommended (i.e., proven and preferable for this remedial activity) by identifying those with an "X" and those that are optional, identified with an "O", based on an initial evaluation of their safety and efficiency in meeting performance-based design specifications. For decontamination and surface concrete removal methods, the remediation subcontractor will be required, pursuant to Specification 01517 and 01518, respectively, to demonstrate that the method(s) proposed will be effective. The effectiveness of any approved method will be verified on a continual basis through oversight through the life of the project. Surface decontamination activities apply to all materials that do not meet the conditions and limits identified in Specification 01517. Specifically, the conditions that must be exhibited by equipment and other materials prior to their removal from a local containment or enclosure are specified under Specification 01517. This provision of the specification states (paraphrased) the following:

> To remove equipment or debris out of a local containment or enclosure or prior to loading into containers, or to containerize outside of an enclosure, or prior to moving to the inspection area, surfaces shall be free of visible *process residues* and dry as determined by the Construction Engineer/Construction Coordinator. The definition of visible process residues (green salt, yellow cake, etc.) is material on the interior or exterior surfaces of debris that is obvious and that if rubbed, would be easily removed. Stains, rust, corrosion, and flaking do NOT qualify as visible process material. If an item fails visual inspection, the items shall be deemed a [OU3 Debris] Category C (Process Related Metals) item and shall either be encapsulated or wrapped in accordance with Specification 01120. Rust, corrosion, and flaking will be considered for contamination control purposes. All equipment, material, and debris are still considered to be radiologically contaminated.

This specification further refers the remediation subcontractor to the project-specific RRP for specific radiological limits on structural surfaces prior to removing exterior siding and structural dismantlement. The RRP, which is a DOE document prepared during remedial design, is discussed further in Section 4.1.1. Although each above-grade project implemented under the OU3 integrated remedial action will generate a project-specific RRP having special conditions particular to the components being remediated, typical decontamination limits for release cleaning and removal of material from a *Contamination Area* have been established and are listed below. It should be noted that the release limits that allow removal of material from a Contamination Area are the same as the limits for removing material from a *Controlled Area*, as discussed in the radiological protection procedure provided in Appendix C — Certification Program for Release of Materials (see Section 3.3.6.1 for further discussion of restricted and unrestricted release of materials from the FEMP). The limits for release of materials from a Contamination Area were established based on several factors including worker protection, levels reasonably expected to be achieved using aggressive decontamination practices, regulatory limits, etc., and are subject to periodic revision.

The RRP prepared for a recent decontamination and dismantlement subcontract specified the following removable contamination limits for release of materials from a project:

- For unrestricted [free-]release of items from a Contamination Area, the following loose contamination limits apply: 200 dpm/100 $cm^2$ alpha (for all materials exposed or potentially exposed to Th-232 contamination) or

1,000 dpm/100 $cm^2$ alpha (uranium contamination). The most restrictive limit will apply if the material originated in an area containing multiple isotopes.

- For total (fixed plus removable) contamination limits (used to define Fixed Contamination Areas and to determine whether an item may be released without restriction): 3,000 dpm/100 $cm^2$ (maximum per 100 $cm^2$) and 1,000 dpm/100 $cm^2$ (average per square meter) alpha (for all materials exposed or potentially exposed to Th-232 contamination) or 15,000 dpm/100 $cm^2$ (maximum per 100 $cm^2$) and 5,000 dpm/100 $cm^2$ (average per square meter) alpha (for uranium contamination). The most restrictive limit will apply if area from which the material came contains multiple isotopes.

The surface decontamination task is expected to generate small quantities of *secondary wastes*, consisting mainly of wash/rinse water and residues when high pressure washing methods are used. Collected water could potentially be filtered and recycled, which would reduce the volume of wastewater to be treated. Section 3.3.3 of this plan discusses the management of these types of secondary wastes. Specification 01517 also provides direction to the remediation subcontractor on limiting the amount of secondary waste generated and on methods for handling wastewater (rinseate/effluent). This specification identifies particular requirements for collection and management of wastewaters and sludges from washing enriched equipment/material that fall into the following categories:

- for enrichments greater than one percent and less than or equal to 1.25 percent, containerize in effluent storage tanks of no greater than 175 gallon capacity;

- for enrichments greater than 1.25 percent and less than or equal to 2 percent, containerize in effluent storage tanks of no greater than 30 gallon capacity;

- for sludges generated from washing enriched equipment (of less than 2 percent enrichment), stored in 55-gallon drums and space at least two feet apart; and

- segregation of washing operations and effluents based on enrichment and type (uranium: a) $\leq$ 1.0%, b) $\geq$ 1.0% $\leq$ 1.25%, c) $>$ 1.25% $\leq$ 2.0%, and thorium).

Equipment/material that has greater than two percent enrichment will not be decontaminated but will rather be removed and containerized as an OU3 Debris Category C (Process-Related Metal).

Although discussed further in Section 3.3.1, there are four process areas within OU3 structures that require removal of approximately one inch of concrete to minimize the technetium-99 content of debris being placed in the OSDF. Removal of concrete from these areas will be governed by Specification 01518 - Surface Removal of Concrete. Scabbling is a possible choice for this treatment.

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It should be noted that the preferred sequence for performing most of the surface decontamination activities for structural materials will take place after interior dismantlement and bulk removal operations have been completed, but before exterior dismantlement.

### 3.2.6 Above-Grade Dismantlement

This task includes removal of materials or debris, including any additional decontamination of previously inaccessible surfaces from above-grade portions of structures. During this task, associated work such as establishing work zones, materials segregation, size reduction, staging, containerization, construction equipment decontamination, personnel decontamination, and containerizing the secondary wastes generated by decontamination and dismantlement activities. Dismantlement activities are applicable to all component categories identified in Table 3-1, except for ponds and basins; and to a much lesser extent, bulk materials; storage pads; parking lots, and railroads; piping; and utilities/equipment.

The typical steps for structural dismantlement, which would be presented in a subcontract for decontamination and dismantlement project, are described below in the sequence that is shown below:

1) Bulk Removal - removal of electrical, piping, construction debris, and HVAC systems - also referred to as "demolition debris" (Specification 15066);

2) Interior and Exterior Equipment Removal - removal of equipment by cutting and containerizing (Specification 15065);

3) Interior Panel Removal - removal of interior transite and metal panels, including batt insulation, and proper placement for temporary storage and handling (Specification 07415);

4) CMU Removal - cutting and containerization of interior concrete walls, cinderblock, secondary containment shielding walls, and piers (Specification 03315), and scabbling of isolated concrete surfaces (Specification 01520);

5) Clearance Testing - surface decontamination of interior building surfaces to meet clearance criteria specified in Specification 01517 and the RRP (note: surface decontamination of materials prior to this step may also be required, as needed, to meet specified clearance criteria);

6) Exterior Panel Removal - removal of exterior transite or metal panels, including roof and wall panels, windows, doors, gutters, downspouts, vents, stacks, etc., also referred to as shell removal (Specification 07415);

7) Removal of Remaining Equipment - removal of larger types of equipment utilizing the opened structure for rigging and maneuvering (Specifications 15065 for equipment removal, and 14955 for lifting and rigging); and

8) Structural Steel Removal - dismantle and remove structural steel using methods in approved subcontractor dismantlement plan, including sizing and segregation (Specification 05126).

Material sizing, segregation, containerization are applicable to each of the dismantlement steps listed above. Requirements for those material management activities are discussed in Section 3.3.2 and, for remediation subcontractors, are included as specifications in the subcontract.

Upon satisfactory completion of these dismantlement steps, subcontractor demobilization would begin. Demobilization includes slab cleaning and any temporary preparations that may be needed, removal of construction barriers, controls, temporary utilities, and equipment.

A more detailed discussion of the above-grade dismantlement tasks, which were not already discussed (e.g., asbestos removal and clearance, or decontamination), are described below and are cross-referenced with the appropriate section of the applicable performance specification.

As noted in Section 3.1.3, an implementation plan will be prepared for each design project. The implementation plan will report on any project-specific requirements or restrictions regarding dismantlement tasks that would be identified during the design for each component included in the project, such as estimated volumes and material types; however, the general task/subtask descriptions below will not be repeated.

**Bulk Removal**

Prior to breaching any system, the remediation subcontractor and FEMP Project Management will verify that all the systems are de-energized.

All piping, valves, electrical components, conduit, wire, cable trays, construction debris, and HVAC systems will be removed and reduced in size for loading into containers. During removal of piping, pumps, and HVAC ductwork, internal surfaces will be visually inspected to ensure the absence of free liquids or solid materials. If free liquids or solid materials are found, an evaluation will be initiated by the FEMP Project Manager to determine the requirements for material handling and removal (Specification 15066). The evaluation will identify the contents and requirements for containerizing, storage, and disposal. Openings of non-process piping shall be sealed following the verification inspection and removed from the immediate area. If the item fails inspection, it shall be considered to be "process piping" and disposed appropriately.

Methods such as reciprocating saws, portable band saws, and shears are the preferred methods for bulk removal. Methods that volatilize the paint and contamination can be used, provided that additional safety and health requirements for worker protection are met. These methods include the use of respiratory protection and portable air cleaning units. Periodic radiological surveys will be performed to ensure that the potential for airborne radioactivity is minimized and to reduce the potential for cross-contamination. Surface wiping or vacuuming may be required to minimize transferrable contamination.

**Equipment Removal**

Equipment within a structure will be identified and classified according to sized-based criteria described in the subcontract. Any equipment that is also classified according to the contaminant-based criteria, which identifies it as being process-related, will have to be handled

according to special requirements as discussed in Section 3.3.2.2. As equipment is removed, the internal building surfaces and floor area previously covered by the equipment will be visually inspected to ensure the absence of free liquids or solids. If these materials are found, an evaluation will be initiated by FEMP Project Management to determine the appropriate removal and handling requirements for the material (Specification 15065).

Based on the equipment to be removed and the requirements for removal as specified by Specification 15065, the subcontractor will be required to submit for approval a detailed work plan including the sequence, methods of removal and dismantlement, equipment required, catalog cut sheets, drawings and method and materials to control possible generation of airborne contaminants from cutting operations, etc. (Specification 15065).

Staging of removed equipment and size reduction will occur within the designated construction area. Certain equipment may be classified as more than one type due to variances in size or weight. The size-based classification of equipment uses the five categories listed below.

**Type RA Equipment**: Equipment that is small enough to be handled by one or two individuals (without lifting devices) as it is loaded into a container or onto a skid. Removal of this type of equipment involves the use of hand tools, both manual and powered, or an oxy-acetylene torch to disconnect or cut equipment from its location and hand-carry it to a container or skid.

**Type RB Equipment**: Equipment that, in its whole state, is small enough to fit in a container but requires a fork-lift or other mechanical means to handle. The objective of this removal is to disconnect the equipment and remove it intact to the extent practicable. This equipment will be disconnected from mounts by the use of hand tools or an oxy-acetylene torch.

**Type RC Equipment**: Equipment that should be disassembled for placement into a container. The objective of this removal is to dismantle large, bulky equipment in manageable sections that can be handled and contained safely. This equipment will be disconnected from its mounts by the use of hand tools or an oxy-acetylene torch. The equipment will be further sized when required using oxy-acetylene torches, shears, and mechanical cutting or disassembling at assembly joints.

**Type RD Equipment**: Equipment that must be removed from the building in one piece. This equipment will be removed by unbolting, cutting, or any other means necessary. This equipment will be disconnected from mountings by use of hand tools, both manual and powered, or by use of mechanical cutting or shearing. This activity will take place when convenient and if the equipment can be proven to be stable and secure. If the equipment cannot remain stable and secure after removal from its mountings, then it shall be disconnected when prepared for removal from the building.

**Type RE Equipment**: Equipment that will be removed for salvage or beneficial re-use. The equipment will be removed by FEMP labor forces and transported intact or in sub-assembles and turned over to FEMP Project Management. Type RE equipment will be specifically identified for staging in a separate turnover location.

The steps required for removal of RE equipment, which must take place prior to opening the building (containment) include:

1. Remove all process piping, ducts, conduit and any other appurtenances from the equipment;

2. Disassemble equipment in place to the extent necessary so that it will fit into a container when removed from the building; and

3. Perform visual inspection for contamination before removal of exterior equipment. The presence of visual contamination will require further decontamination and/or the use of encapsulant, enclosures and/or air cleaning units to control potential airborne emissions.

When the building is opened, the equipment will be placed into a container inside the building, if possible, or removed from the building and placed into a container for off-site transport. Depending on the size and configuration of the equipment, a rigging plan may be necessary prior to removal.

**Interior Panel Removal**

**Transite Panel Removal:** Prior to removing interior transite panels, a coating of amended water will be applied to prevent any loose fibers from migrating. A screw gun is the preferred method for removing the panel fasteners. If the fasteners cannot be removed with a screw gun, then the area around the fastener will be sprayed with a fixative allowing the fastener to be pried out. Prior to any fixation, Specification 07415 requires the remediation subcontractor to demonstrate the proposed method to be utilized. After the screw is pried out, the fixative will be reapplied. If a broken panel is encountered, then the area around the break will be sprayed with amended water and the fragmented pieces will be encapsulated with fixative. HEPA vacuums will be available to collect any loose material. Any batt insulation behind the panels will be removed and bagged. As the insulation is removed, a visual inspection and a radiological survey will be performed on the newly exposed surfaces. Indications of friable asbestos will require gathering the loose material and locking the remaining fibers in place. If radiological survey results indicate the need to perform decontamination or lock-down of the areas to levels consistent with surrounding building surfaces, then these activities will be performed. Fasteners and molding that hold the panels and insulation in place will be removed as well.

**Interior Metal Panel Removal:** Screw guns are also the preferred method for removing metal panel fasteners. Optional methods of drilling or prying the fastener out may also be used to remove the panels. As the panels are removed, a radiological survey will be performed on the newly exposed surfaces to ensure contamination levels are within the established guidelines. Surface decontamination may be performed to reduce contamination levels as required.

**CMU Secondary Containment and Pier Removal**

CMU walls, secondary containments, and above-grade concrete platforms (piers) will be removed down to the elevation of the base slabs. Specification 03315 requires the remediation subcontractor to develop a concrete removal work plan that contains, in part, a method and sequence for dismantlement and methods for control of fugitive emissions. Pursuant to Specification 03315,,interior concrete/CMU walls shall be removed using non-explosive methods prior to opening the shell of the structure. CMU projections will be sealed and remain intact until structural dismantlement. Prior to structural dismantlement, water spray will be administered to minimize fugitive emissions.

**Exterior Panel Removal**

**Transite Panel Removal:** Specification 07415 specifies that the subcontractor shall maintain the integrity of the exterior of the building until the transite and insulation has been removed and encapsulant or surfactant has been applied to the interior surface of exterior panels. Prior to removing the transite panels a coating of amended water will be applied to prevent any loose fibers from migrating. As with interior panels, a screw gun is the preferred method for removing the panel fasteners. If the fasteners cannot be removed with a screw gun, the area around the fastener will be sprayed with a fixative, thus allowing the fastener to be pried out. As with interior transite, prior to any fixation, Specification 07415 requires the remediation subcontractor to demonstrate the proposed method to be utilized. After the screw is pried out, the fixative will be reapplied. If a broken panel is encountered, the area surrounding the break will be sprayed with amended water and the fragmented pieces will be encapsulated with a fixative. HEPA vacuums will be available to collect any loose material. A wall climbing device is the preferred method for removing the wall panels thus allowing the panels to be removed and stacked on the wall climber for transport to the ground level. Lead fasteners and sheeting (sills, moldings, etc.) encountered during transite panel removal will be removed and handled as potentially mixed waste.

**Exterior Metal Panel Removal:** Screw guns are also the preferred method for removing the metal panel fasteners on exterior metal panels. Optional methods of drilling out the fastener or prying the fastener out may also be used to remove the panels. As the panels are removed, a radiological survey will be performed on the newly exposed surfaces to ensure contamination levels are with the established guidelines. Louvers, gutters, downspouts, and flashing will be removed as they are encountered. Lead-containing materials will be removed and handled as potentially mixed waste.

**Structural Steel Removal**

In order to prepare the component for structural steel removal, all remaining items, such as non-load bearing steel members, windows and frames, doors, gutters and down spouts, will be removed using hand tools and oxy-acetylene torches. As these items are removed, the exposed component surfaces have the potential of holding debris and contamination. These areas will be visually inspected to determine if these surfaces meet the decontamination requirements by Specification 01517. Additional decontamination such as applying fixatives or coatings to surfaces may be performed as necessary at this stage to meet material release limits discussed in the previous section.

Use of shape charges and tripping techniques are potentially acceptable *dynamic dismantlement* techniques for certain components that have greater health and safety risks and significantly greater costs when compared to shearing sections in place for removal. Hydraulic shears or oxy-acetylene torches will be used to reduce the size of the structural steel frame. Any preferred or restrictive dismantlement techniques for components, as defined during design, will be presented in the project-specific implementation plan. If necessary, the area surrounding the structure will be sprayed with amended water to reduce fugitive dust emissions prior to and during structural dismantlement.

The remediation subcontractor will be required, pursuant to Specification 05126, to specify in a structural steel removal work plan the following methods:

- detailed sequence of dismantlement, including equipment;

- methods for contamination control, including fugitive emissions during size reduction;
- methods of cutting, including equipment to be used;
- protection of lay-down and cutting areas from contamination by lead paint chips and for controlling airborne radioactivity;
- methods and materials to be used for cutting lead painted steel; and
- calculations to verify structural integrity of partially dismantled structure, as applicable.

Material size reduction requirements will be specified in the remediation subcontract Statement of Work and in the performance specifications under Specification 05126. If the method of cutting material proposed by the subcontractor is not compatible with requirements specified by a recycling subcontract, for materials designated for that disposition, appropriate modifications will be made to the subcontractor's work plan. It should be emphasized that recycling of materials will be evaluated on a project-specific basis during design and that material dismantlement and sizing requirements will be developed to ensure that materials are properly prepared for recycling, if that option is selected. In the event that recycling is found to be an acceptable disposition option during project implementation, the subcontract would be revised through appropriate change documents to ensure recyclability.

If controlled explosive methods are used, Specification 05126 further states that a detailed work plan will be needed to satisfy the following requirements:

- methods and materials to be used;
- means to protect adjacent structures and equipment, material, and underground utilities from damage, including protection from projectiles;
- methods and materials to control fugitive emissions;
- contingency plan for detonation failure;
- proof of permit, issued by the Bureau of Alcohol, Tobacco, and Firearms to use explosives; and
- evidence of previous work experience using controlled explosives to take down multi-story structures near other structures within the last five years.

If controlled explosive methods are used on buildings that are constructed of precast columns and roof beams, a separate detailed work plan containing elements similar to those listed above will be required.

Specification 05126 provides direction to the subcontractor in several other ways relative to the removal of structural steel: it reemphasizes the subcontractor's responsibility for avoiding damage to adjacent structures, material, and equipment during dismantlement activities; and

specifies that lead-based paint chips and debris, released during structural steel dismantlement, shall be collected and managed in accordance with Specification 01120.

The last activity that occurs during above-grade dismantlement is management of the base slab during the demobilization stage. In most cases, the base slabs will remain in place during above-grade dismantlement unless there is a specific need to remove it along with the above-grade components. If left in place for eventual dismantlement by the SCEP, the base slab will be prepared in a manner that prevents or mitigates release of residual contamination that would remain exposed to the environment until the at- and below-grade dismantlement task. Specification 01515 addresses requirements for preparation of the base slab during demobilization. Specifically, all openings in the slab will be filled with granular material and grout to provide a flat uniform surface thus minimizing the chance for water accumulation and migration, and potential personnel hazards. All wire and cable will be cut away at grade from the conduit embedded in the concrete. Conduit and other slab obstructions will be cut away to grade level, plugged, and covered with grout to grade level.

### 3.2.7 At- and Below-Grade Dismantlement

At- and below-grade dismantlement activities address those portions of components that are included in the ACA definition of OU3 which are located at- or below-grade. OU3 has deferred the planning and performance of this activity to the RD/RA process developed for the SCEP, unless otherwise specified in the OU3 project implementation plans. Further details of the integration of the two projects are discussed in Section 3.4.3.4. The discussion that follows is a general strategy anticipated for at- and below-grade dismantlement.

At- and below-grade dismantlement includes removal of floor slabs, foundation walls, footings, underground tanks, underground utilities, underground asbestos and piping, roads and railroads, material in ponds and basins, and other at- and below-grade items and associated impacted material management activities. The soils and debris that are excavated during these activities will be handled and managed in accordance with the SEP; however, the substantive requirements developed in this work plan for material evaluation, treatment, and disposition of materials — ultimately pursuant to decisions made in the OU3 Final Remedial Action ROD — will be met. Ponds and basins will be remediated under RA provisions developed for the Aquifer Restoration Project. Some of the activities that may take place under an OU3 remediation subcontract prior to SCEP soil excavation activities include the removal of slabs, underground piping, utility poles, pavement, and railroads. Otherwise, the sequence for OU3 at- and below-grade removals will be dependent on the soil remediation schedule established by the SCEP. At- and below-grade dismantlement activities are applicable to all component categories identified in Table 3-1.

Minimization of airborne dust and protection of worker safety are primary environmental and health concerns for this task, as well. Concrete dismantlement will typically produce airborne dust; however, this can be minimized by wetting the concrete during dismantlement activities. Specific dust abatement measures for at- and below-grade dismantlement will be addressed in the SEP.

Removal of utilities includes removing all water lines, sewer lines, conduit banks, underground conduit, direct buried wire, process pipelines, steam lines, underground tanks, underground asbestos insulation, and other remaining utilities at- or below-grade. Portions of above-grade utilities such as pipe rack footings, and power poles may also be removed during this task.

Underground steam lines, and possibly some process lines, may be insulated with asbestos insulation. Experience has shown that the asbestos insulation will likely be friable and mixed into the adjacent soils. The asbestos insulation will be removed in accordance with procedures proposed by the remediation subcontractor and approved by DOE, and any asbestos contaminated soils will be managed in accordance with the requirements of the SEP and in accordance with the OU2 Impacted Materials Placement Plan (IMPP) (Draft, DOE 1996e) for disposal in the OSDF.

Any remaining underground storage tanks (USTs) would be removed during this task. They will be removed in accordance with federal and state UST rules and regulations as a minimum, and with the additional constraints required by the type(s) of contaminated soil that may be around the tank.

### 3.3 Material Management Tasks

The strategies that have been developed for managing materials during the OU3 integrated remedial action are based on actions necessary to adhere to the treatment and disposition decisions stated in the OU3 Final Action ROD. As stated in the OU3 Final Action ROD, the key elements of the selected remedy that directly relate to material management consist of the following:

- Provides for unrestricted/restricted release of materials, as economically feasible, for recycling, reuse, or disposal;
- Permits treatment of materials to meet the OSDF and/or off-site disposal facility WAC;
- Requires off-site disposal of process residues, waste product materials, and process-related metals;
- Requires off-site disposition of acid brick and concrete from specific locations and any other materials exceeding the OSDF WAC; and
- Permits disposal of remaining OU3 wastes in the OSDF.

As stated in Section 1, Section 3.3 includes the key OU3 RI/FS data needed for implementing material management strategies in accordance with decisions made in the OU3 Final Action ROD. These data were compiled and presented in Section 3.3.1, in table and text form, to clearly identify those specific OU3 materials that require treatment and off-site disposal. This summary information will be used to facilitate the remedial design material evaluation process without having to research the OU3 RI/FS database for each project.

The material evaluation summary provided in Section 3.3.1 allows project managers for both above-grade and below-grade projects to easily identify those materials that have been characterized as being: 1) potentially mixed wastes that will be treated and dispositioned off-site; 2) process-related waste that will be dispositioned off-site; 3) specific low-level wastes that have been administratively designated for off-site disposal; 4) potentially radiologically unrestricted materials for recycling, reuse, or disposal; and 5) certified for on-site disposal.

Based on the findings from the OU3 RI/FS, Table 3-3 was developed for the OU3 Final Action ROD to represent assumptions made in the OU3 RI/FS Report about most likely disposition routes for the OU3 materials. Note that product, residues, and special materials (OU3 Debris Category J) are not included in this table, since the previous decisions allowing disposition of those materials were made through the decisions and procedures adopted into the OU3 integrated remedial action from Removal Action 9. Based on the material disposition routes (options) established in the OU3 Final Action ROD, strategies for achieving them have been developed and are presented in this section.

**TABLE 3-3 Estimated Material Disposition Quantities (in cubic feet)**

| OU3 Material Category | On-Property Disposal | Unrestricted Release | Off-Site Disposal | Total |
|---|---|---|---|---|
| Accessible Metals | 62,600 | 835 | 0 | 63,400 |
| Inaccessible Metals | 1,740,000 | 0 | 0 | 1,740,000 |
| Process-Related Metals | 0 | 0 | 151,000 | 151,000 |
| Painted, Light-Gauge Metals | 7,150 | 0 | 0 | 7,150 |
| Concrete | 4,700,000 | 0 | 2,400 | 4,700,000 |
| Brick | 0 | 0 | 20,700 | 20,700 |
| Non-Regulated ACM | 71,300 | 0 | 0 | 71,300 |
| Regulated ACM | 80,200 | 0 | 0 | 80,200 |
| Miscellaneous Materials | 396,000 | 308,000 | 0 | 704,000 |
| Total | 7,060,000 | 309,000 | 174,000 | 7,540,000 |

The overall strategy for material management during the OU3 integrated remedial action includes the following:

- evaluate the OU3 materials to be generated during decontamination and dismantlement projects during the respective remedial design efforts, and if necessary, during remedial action, to determine the appropriate disposition routes as allowed in the OU3 Final Action ROD;
- identify the waste minimization requirements during project design and incorporate them into project specifications;
- segregate and store materials temporarily, if needed, during decontamination and dismantlement;
- maximize the disposition of materials under recycling/reuse arrangements, provide for unrestricted release disposal to the extent practicable, provide for limited off-site disposal as needed, and transport and disposition the remaining materials in the OSDF.
- treat specific waste streams to allow for on-site or off-site disposal, and for recycling/reuse; and

- treat washwaters, as needed, and dispose as required during decontamination and dismantlement projects.

### 3.3.1 Material Evaluation

The remedial design effort for each above-grade OU3 remedial action project will include an evaluation of the materials to be generated in order to determine handling, treatment, and disposition requirements. Remedial planning performed under the SCEP for at- and below-grade remediation will also include a similar evaluation of OU3 materials which identifies those OU3 materials that may have particular handling concerns; however, based on an initial evaluation of OU3 materials that will remain after above-grade decontamination and dismantlement, it is anticipated that most OU3 materials will not require special handling, treatment, or off-site disposal. Below-grade materials such as sump transfer lines may be considered process-related and would require special handling and off-site disposal.

The primary objective of material evaluation is to ensure that OU3 materials are clearly identified, handled, and containerized (if required) according to project specifications to treat and dispose of OU3 materials as provided in the OU3 Final Action ROD. In support of the development of treatment and disposition decisions for the OU3 Final Action ROD, materials were characterized and evaluated during the OU3 RI/FS. It is also recognized that the results from that evaluation will be readily usable during remedial design to complete most of the documentation needed for material handling, containerization, and disposition; however, some further evaluation will have to be performed in the field to differentiate between process and non-process metals based on the "visual process residue" standard which was discussed in Section 3.2.5. Additional confirmatory or verification sampling may be necessary for certain waste streams that are destined for off-site disposal or release based on off-site WAC. Procedures adopted by reference from Removal Action 9 will be used to characterize and manage OU3 materials classified as "unknowns" since such material would fall under "product, residues, and special materials (Category J)." The OU3 RD/RA SAP contained in Appendix D of this work plan addresses the potential application of sampling and analysis during the OU3 RD/RA process to support the attainment of off-site disposal WAC, restricted or unrestricted release of materials from the FEMP, treatment and disposition of decontamination washwater, environmental monitoring, and treatment of mixed wastes.

During project design, data from the OU3 RI/FS Report and SWIFTS database will be reviewed to identify OU3 materials to be generated during each OU3 decontamination and dismantlement project, estimate their volumes and weights, and classify them as either a specific material type per one of the OU3 debris categories (Categories A - J, as described in Section 2.3) or as a material having a certain description (e.g., equipment or pipe) that will be further evaluated in the field during remediation to determine its OU3 debris category designation. The classification of materials for each component during design according to a specific debris category is necessary to supply the remediation subcontractor, via project specifications, with the material segregation requirements necessitated by decisions made in the OU3 Final Action ROD. FEMP Project Management will also use this information to estimate the number of various containers and configuration of stockpiles needed for a project.

Based on the characterization data and analysis contained in the OU3 RI/FS Report and the decisions made per the OU3 Final Action ROD, the authorization for on-site disposal of the materials listed for on-property disposal, referenced in Table 3-3, has been made. Materials will be field-certified by OU3 for OSDF disposal using a manifest (further discussion of OSDF disposal is provided in Section 3.3.6.2). The OU3 Final Action ROD provides that if all acid

brick, process-related metals, process residues, product materials, and 2,400 cubic feet of concrete from specific locations (containing the highest levels of Tc-99) are dispositioned off-site, then all remaining OU3 materials could be dispositioned in the OSDF provided that the OSDF WAC are met. The OU3 Final Action ROD also imposes the requirement that potentially mixed wastes may be disposed in the OSDF provided that those materials are treated to meet OSDF WAC and that the TCLP criteria of the LDRs are met.

The bases for the OU3 Final Action ROD material disposition requirements stated above ultimately stems from the OSDF WAC developed through OU2 and OU5 FS modeling and the administrative decisions to dispose of heavily contaminated materials — namely process residues, product residues, product materials, and process-related materials — off-site. The one chemical-specific WAC established through that FS modeling effort limits the mass of Tc-99 in OU3 materials for OSDF disposal to 105 grams (specific details on the development of this WAC are provided in Appendix G of the OU3 RI/FS Report). The total amount of Tc-99 in OU3 materials was conservatively estimated during the OU3 RI/FS process to be approximately 127 grams. In order to not exceed this 105-gram limit for the OSDF, those materials that have the highest amounts of Tc-99 will be packaged and transported to NTS or an off-site PCDF. Because of the removal of this material from the site, the actual amount of Tc-99 that will be placed in the OSDF will be well below the WAC.

Process-related metals, acid brick, product, residues, and special materials generally have high concentrations of several contaminants, and, as a consequence of the administrative decisions noted above, these materials will not be placed in the OSDF. The result of these decisions, combined with the off-site disposal of certain concrete containing elevated levels of Tc-99, is that the amount of Tc-99 that will be placed in the OSDF is conservatively estimated to be well below the 105 gram WAC. The Tc-99 source term of OU3 materials considered for on-site disposal is approximately 116 grams. Of all materials contributing to the Tc-99 source term, the most significant contributor is concrete (and concrete-like materials) with a total of less than 102 grams. In order to further reduce the amount of Tc-99 going into the OSDF, it was decided in the OU3 Final Action ROD that the top inch of three particular process areas, which have the most Tc-99 contamination, would be removed and dispositioned off-site. The three process areas include the Enriched Uranium Casting Area in Plant 9; the Uranium Machining Area in Plant 9; and the Muffle Furnace Area in Plant 8. Additionally, due to inherent chemical and radiological contamination in the Pilot Plant, the top half-inch of concrete in the Southern Extraction Area will also be removed. The removal and off-site disposition of the specific volume of concrete from these four process areas will reduce the total amount of Tc-99 going into the OSDF to less than an estimated 59 grams, which is about 44 percent below the 105-gram allowable mass limit.

On the basis of a conservative estimation approach, when the concrete most contaminated with Tc-99 along with other materials identified above are excluded from the OSDF, the remaining OU3 materials meet the OSDF contaminant-based WAC. Such an evaluation was performed by OSDF design engineers during the preparation of the OU2 FS. Therefore, since OU3 materials that are regulatorily and administratively prohibited from on-site disposal will be dispositioned off-site, no additional characterization of OU3 materials will be required for materials destined for on-site disposal. Although sampling and analysis typically will not be required for OSDF disposal, all OU3 materials will require a visual inspection or verification during dismantlement to ensure that the OSDF prohibition of process-related metals and residues is met. To execute this regulatory requirement, the visual inspection requirement stipulated in Specification 01517 will be used to segregate materials accordingly. Materials

that fail the visual inspection will be classified as process-related and be managed for off-site disposition.

By initially identifying the OU3 materials prohibited from OSDF disposal in this work plan, the main focus of a certification process is to properly segregate the materials during dismantlement and adequately track the materials to their respective dispositions. The segregation strategy and tracking system for debris were developed for the amended Removal Action 17 Work Plan revisions (DOE 1996f) and are discussed in Section 3.3.2.2. This segregation strategy and tracking system provides cradle-to-grave management of materials to ensure proper handling, treatment, and disposition according to the decisions of the OU3 Final Action ROD and determinations made during the project design.

The data gathered during the OU3 RI/FS are also sufficient to qualify materials for disposition off-site; however, further material characterization may be necessary to fulfill the license requirements of the off-site disposal facility to certify acceptability. Table 3-4, which is based on Table 5-5 from the OU3 RI/FS Report, expands on Table 3-3 (both of which are summaries of the extensive OU3 material database) by providing a projected disposition summary based on both segregation and OU3 debris categories. The categorization of materials by contaminant classification is also essential to ensuring that segregation is designed according to disposition decisions made in the OU3 Final Action ROD. The only differences between Table 3-4 in this work plan and Table 5-5 of the OU3 RI/FS Report are the revision of the projected disposition of the estimated 50 cubic feet of treated mixed waste (lead flashing) from on-property disposal to off-site disposal due to current capacity for on-site treatment, and the updating of the volume estimate for Category A - Accessible Metals projected under Unrestricted Release. Off-site disposal of treated mixed wastes is not required, however.

It should be noted that the projected disposition summary shown in Table 3-4 was based on evaluations performed prior to implementation of any recycling or reuse alternatives under the recently developed site guidance document entitled: "Decision Methodology for Fernald Scrap Metal Disposition Alternatives," (DOE 1996g) (hereinafter referred to as the "Disposition Methodology"). The disposition methodology, which is discussed further in Section 3.3.6, was developed to support DOE's commitment stated in the OU3 Final Action ROD to continuously reevaluate disposition alternatives, with particular focus on recycling and reuse options, at the FEMP. The disposition methodology will be applied on a case-by-case basis (i.e., during design for each project) throughout the remediation of OU3, which could result in the actual disposition pathways for OU3 materials being significantly different than those projected in Table 3-4. Although the disposition methodology is currently targeted for recycling/reuse of accessible metals (OU3 Debris Category A), it will also be applied to other potentially recyclable/reusable waste streams when the potential for recycling those materials seems economically feasible and reasonably possible. Results of the project recycling/reuse evaluation will be reported in the project implementation plans for review and comment by the regulators.

Material evaluation to be performed during OU3 above-grade project designs include the process of completing several forms of documentation that are used to: 1) identify materials according to a particular waste stream that is recognizable to the accepting disposal/recycling facility; 2) identify assigned disposition pathways; and 3) specify size reduction and containerization or stockpiling requirements for materials. Of particular importance for the evaluation and proper management of OU3 materials is the designation of six specific types of materials that need special handling and disposition:

**TABLE 3-4 Projected Distribution of OU3 Debris by Segregation and Material Categories[1]**

| Disposition | Segregation Category | Material Category/Description | Unbulked Volume ($ft^3$) |
|---|---|---|---|
| On Property Disposal | PCB Waste[2] | B - Inaccessible Metals | 14,900 |
| | Low-Level Waste | A - Accessible Metals | 62,600 |
| | | B - Inaccessible Metals | 1,730,000 |
| | | D - Painted Light Gauge Metals | 7,100 |
| | | E - Concrete | 541,000 |
| | | G - Non-Regulated ACM | 71,300 |
| | | H - Regulated ACM | 80,200 |
| | | I - Miscellaneous Materials | 201,000 |
| | At or Below Baseline | E - Concrete | 4,160,000 |
| | | I - Miscellaneous Materials | 195,000 |
| Off-Site Disposal | Mixed Waste | D - Painted Light Gauge Metal[3] | 50 |
| | | F - Brick | 5,240 |
| | Low-Level Waste | C - Process Related Metals | 151,000 |
| | | E - Concrete | 2,400 |
| | | F - Brick | 15,400 |
| Unrestricted Release | At or Below Baseline | A - Accessible Metals[4] | 835 |
| | | I - Miscellaneous Materials | 308,000 |

(1) Category J materials not included.
(2) Does not include liquid PCB waste contained within inaccessible metals; PCB oils to be removed during preparatory action prior to dismantlement; disposal of other untreated, non-liquid PCB wastes is dependent on OSDF meeting TSCA chemical waste landfill requirements and siting criteria.
(3) Only consists of lead sheeting. Requires treatment to meet Land Disposal Restrictions (LDRs) prior to disposal.
(4) This volume estimate accounts only for Accessible Metals located in the Administration Area of the FEMP, which is a non-radiologically controlled area. This estimate does not preclude qualification of other Accessible Metals that are located in Controlled Areas from unrestricted release.

1) Approximately 2,400 cubic feet of scabbled concrete (Category E) from the top inch of the Enriched Uranium Casting Area in Plant 9, the Uranium Machining Area in Plant 9, and the Muffle Furnace Area in Plant 8, and from the top-half inch in the Southern Extraction Area in the Pilot Plant — to be packaged and dispositioned off-site.

2) Approximately 5,237 cubic feet of acid brick (Category F), considered to be potentially mixed waste, from the components listed in Table 3-5, which will be treated to meet LDRs and dispositioned off-site.

3) Approximately 15,400 cubic feet of acid brick (Category F) having low-level waste characteristics, from components other than those listed in Table 3-5, which will be dispositioned off-site.

4) Approximately 50 cubic feet of lead flashing (Category D), considered to be potentially mixed waste from components listed in Table 3-6, which will be treated for disposal on-site or off-site or recycled. Note: lead sheeting is currently projected for off-site treatment and disposition but may be disposed of on-site if treated to meet the TCLP criteria of the LDR standards, as stated in the OU3 Final Action ROD.

## TABLE 3-5 Volumes of Acid Brick Considered Potentially Mixed Waste

| Component Name | Component Number | Process Area Name (and Number) | Weight (tons) | Unbulked Volume ($ft^3$) |
|---|---|---|---|---|
| Ore Refinery Plant | 2A | Denitration (4) | 42 | 600 |
| Metal Dissolver Building | 2D | West Metal Dissolution (2) | 10 | 159 |
| Metal Dissolver Building | 2D | Charcoal Treatment (3) | 10 | 159 |
| Metals Fabrication Plant | 6A | Chip Briquetting (3) | 20 | 333 |
| Metals Fabrication Plant | 6A | Old Water Treatment (6) | 40 | 752 |
| Metals Fabrication Plant | 6A | Pickling Area (7) | 120 | 1,797 |
| Special Products Plant | 9A | Zirnlo Decladding (3) | 90 | 1,333 |
| Special Products Plant | 9A | Heat Treating (5) | 0.3 | 4 |
| Special Products Plant | 9A | Briquetting (7) | 10 | 100 |
| **Total** | | | **342** | **5,237** |

## TABLE 3-6 Components Containing Lead Flashing Considered Potentially Mixed Waste

| Component Name | Component Number | Weight (tons) | Unbulked Volume ($ft^3$) |
|---|---|---|---|
| Preparation Plant | 1A | 0.45 | 1.27 |
| Ore Refinery Plant | 2A | 3.99 | 11.24 |
| General/Refinery Sump Control Building | 2B | 0.1 | 0.28 |
| Refrigeration Building | 3G | 0.2 | 0.56 |
| Green Salt Plant | 4A | 4.69 | 13.2 |
| Plant 4 Maintenance Building | 4C | 0.2 | 0.56 |
| Metals Production Plant | 5A | 1.05 | 2.96 |
| Recovery Plant | 8A | 1.35 | 3.80 |
| Special Products Plant | 9A | 1 | 2.82 |
| Plant 9 Sump Treatment Facility | 9B | 0.05 | 0.14 |
| Plant 9 Electrical Substation | 9D | 0.05 | 0.14 |
| Boiler Plant | 10A | 0.75 | 2.11 |
| Service Building | 11 | 0.15 | 0.42 |
| Pilot Plant Wet Side | 13A | 0.25 | 0.70 |
| Electrical Substation | 16B | 0.45 | 1.27 |
| Pump Station and Power Center | 20A | 0.05 | 0.14 |
| Water Plant Building | 20B | 0.03 | 0.07 |
| Well House 1 | 20E | 0.01 | 0.04 |
| Well House 2 | 20F | 0.01 | 0.04 |
| Well House 3 | 20G | 0.01 | 0.04 |
| Chemical Warehouse | 30A | 0.5 | 1.41 |
| Six to Four Reduction Facility #1 | 54A | 0.55 | 1.55 |
| Thorium Warehouse | 64 | 0.95 | 2.68 |
| Plant 5 Warehouse | 65 | 0.63 | 1.76 |
| Pilot Plant Warehouse | 68 | 0.08 | 0.21 |
| **Total** | | **17.55** | **49.43** |

5) Approximately 151,000 cubic feet of process related metals (Category C) from former process facilities, which will be dispositioned off-site (note: volume estimate is subject to change based on field "visible process residues" inspection performed during dismantlement).

Materials that are listed in Table 3-4 as Low-Level Waste (LLW) and At- and Below-Baseline qualify to be placed in the OSDF, and those materials that are listed as "Accessible Metals" and "Miscellaneous Metals" qualify for either OSDF disposal or unrestricted release.

It may be noted that Table 3-4 identified PCB Waste as a segregation subcategory and that the footnote for that listing indicates that those materials would not contain PCB oils. Removal of PCB contaminated oils will be performed under a PCB removal program which has operated much like the Safe Shutdown program as a FEMP maintenance-related preparatory action. The PCB removal program operates under its own work plan and procedures.

The principal documentation to be prepared during the remedial design material evaluation process for above-grade decontamination and dismantlement projects include the following:

- Material Evaluation Form (MEF) - The document that identifies OU3 materials according to a unique FEMP "material profile". A completed MEF establishes a material profile that identifies requirements for managing materials that match the profile. For material identified as Categories A through I, MEFs have been developed based on the criteria necessary to fulfill the WAC for the identified OU3 debris category disposition options (Table 3-4). For material that does not meet one of the profile MEFs or is considered Category J, an existing site MEF will be used or a new MEF will be developed following site procedure EW-0001, "Initiating Waste Characterization Activities Using the Material Evaluation Form".

- Project Waste Identification and Disposition (PWID) Form - The form utilized for planning and disposition of excess soil, debris, and waste from a project. This form identifies all material that will be generated during a project and will determine how the material will be managed. It is prepared during remedial design to pre-qualify material based on new and existing data and MEFs, for future containerization, segregation, and disposition.

- Material Segregation and Containerization Criteria (MSCC) Form - The form utilized to document the OU3 debris category that a particular material stream falls under, the stage of a project when that material would typically be generated, the type of container or stockpiling to be used, and the size restrictions for each type of material that is generated. The MSCC utilizes the material segregation categories and information contained in the PWID as a basis for determining the containerization and other management of the material. A current example of the MSCC form is shown in Appendix A of this work plan.

To successfully implement the OU3 material management strategies generated from above-grade dismantlement operations, site procedure EW-0006, "Management of Debris" will be followed to perform the following activities:

- estimation of the quantities of all excess materials anticipated from the project;
- completion of a PWID form in order to properly characterize and estimate quantities of all material for current and future disposition;
- verification that all MEFs are properly established for the materials before the disposition options are considered;
- completion of the MSCC to select the appropriate category and containers for materials; and
- ensure that waste minimization concepts are incorporated by participation of waste management experts on the Design-Engineering-Construction (DEC) Team.

During the OU3 project planning and design stages, material that will be generated during above-grade decontamination and dismantlement is evaluated to determine the appropriate handling and disposition activities required. Information obtained as a result of forecasted estimates of the building contents, project site walk-down inspections, and site drawings will be used to prepare the PWID form. The preparation of the PWID requires that the OU3 RI/FS data (briefly summarized in this section), process knowledge of facility operations, any other existing characterization data for the project area materials, and all applicable MEFs be reviewed to record applicable information needed for form completion. If an MEF does not exist for a material stream identified on the PWID form, a contaminant assessment must be performed. All material is identified as the debris category provided in the PWID. However due to specific material handling requirements, a debris category could be subdivided for a particular project to ensure that like materials having similar contamination concerns are handled together. An example of such special handling is when certain thorium-contaminated materials are managed separately from uranium-contaminated materials.

The MSCC is prepared during OU3 project design to guide the remediation subcontractor as well as FEMP Project Management and Quality Assurance personnel in proper sizing, segregation, and containerization of materials to facilitate disposition. Use of the MSCC during the Building 4A and Plant 1 - Phase I Complex decontamination and dismantlement projects has proven to be a useful and effective implementation document.

### 3.3.2 Management of Primary Materials

The overall description of materials to be generated during the OU3 remedial action encompasses not only debris, which was discussed throughout the preceding sections, but materials generated as a result of remediation activities — referred to as secondary wastes. Secondary wastes consist mainly of wastewaters and other decontamination materials. Therefore, for discussion purposes in this work plan, the materials that originate in OU3 components prior to remediation are referred to as "primary materials." It is necessary to discuss these materials separately since there are strategy differences between the two types.

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Section 3.3.2 covers the strategy for primary materials while Section 3.3.3 covers secondary wastes.

Management of primary material refers size reduction, segregation, containerization, tracking, and storage or staging. The strategies for treatment and disposition are dealt with separately in Sections 3.3.5 and 3.3.6, respectively.

As discussed in Section 3.2.7, at- and below-grade dismantlement planning by OU3 has been integrated with SCEP remedial action planning. The integrated approach includes utilizing one subcontractor to excavate subgrade debris and soil from the former Production Area. Since it is currently expected that all at- and below-grade debris are going to be dispositioned in the OSDF as they are generated, management of those debris would not necessarily follow all of the OU3 strategies outlined in this section (e.g., interim storage, staging). The approach for managing at- and below-grade OU3 debris will be defined in the SCEP, consistent with OU3 material management objectives, and be presented in the SEP. Should OU3 materials be identified with which special handling and off-site disposal are required, then OU3 material management strategies provided in this section would apply.

#### 3.3.2.1 Size Reduction

Ultimately the size reduction requirements are determined by the WAC from the disposal or treatment facilities, or by the specifications provided in a recycling/reuse contract. Although material size requirements will be ascertained during project design and specified in the remediation subcontract SOW, size criteria for known or prospective disposal facilities have been identified and/or discussed in Section 3.3.6 as applicable WAC for OU3 materials. Material destined for off-site disposal or treatment will also have to meet size requirements specified for designated shipping containers and any additional size requirements stipulated by the WAC of a receiving facility. Materials destined for the OSDF will have to meet the size reduction requirements identified for debris in the OU2 IMPP for the OSDF. Materials destined for off-site recycling or reuse will be sized according to specifications provided in the recycling/reuse contract that is in effect or may be in effect for a particular project.

Size reduction will be performed during dismantlement activities; however, secondary size reduction may be required in limited cases to meet additional criteria identified after project completion. Typically, size reduction will occur inside a closed building prior to removal if possible. For larger items such as oversized equipment and structural steel, sizing will occur after the exterior siding is removed. Once materials have been properly sized according to MSCC specifications, they may be placed in the appropriate containers or stockpile (provided that release levels discussed in Section 3.2.5 have been met).

#### 3.3.2.2 Segregation, Containerization, and Tracking

As discussed in the OU3 RI/FS Report, material segregation is based on how materials were used or impacted by processes that occurred during production at the FEMP. Based on the results shown in the OU3 RI/FS Report and decisions provided in the OU3 Final Action ROD, OU3 segregation categories have been defined and are presented in Table 3-4.

During the construction phase of an above-grade decontamination and dismantlement project, materials will be segregated according to the OU3 debris categories identified on the MSCC. This process of segregation according to categories or subcategories identified during OU3

project design and documented in the MSCC is the implementation of the staging/storage strategy for debris which was originally described in the amended Removal Action 17 Work Plan.

For those inaccessible metals that are defined by a certain description (e.g., equipment or pipe) rather than as a debris category, further evaluation in the field will occur to determine its OU3 debris category designation. After decontamination efforts are made, the material will be visually inspected for any remaining process residues. This inspection will determine whether the material will be segregated as inaccessible metal (Category B) or process-related metal (Category C).

To ensure that process-related metals are segregated properly, all of the Category C materials, including equipment that processed greater than 2 percent enriched uranium, will be distinguished as such in the field (e.g., physically marked with paint) prior to the construction phase, since these items typically will not be deemed suitable for decontamination. This marking procedure not only designates certain materials according to off-site disposition requirements, but also provides an administrative control measure to eliminate the possibility of generating washwaters that could possibly result in criticality conditions.

After material is decontaminated, if required, and removed, the material will be inspected by FEMP Project Management personnel to ensure that applicable size requirements are met. Following these quality assurance measures, the material can be containerized or staged in bulk and transported from a work area.

The segregation strategy for OU3 debris generally allows for materials which share the same debris category designations to be containerized together. The exceptions to this strategy are with some Category J items (mixed wastes, filter residues, etc.), Category E - portions of surface concrete removed for off-site disposal, Category F - mixed waste acid brick, and Category D - lead flashing. Each loaded container will then be independently verified for material acceptability before the ownership of the container is transferred from the subcontractor to the FEMP workforce.

Only containers with materials destined for off-site shipment or treatment will be tracked according to the FEMP lot marking system specified in procedure RM-0005, "FEMP Lot Marking And Color Coding System." This marking system will be used to identify the contents for inventory control, support the tracking of materials from its generation to its final disposition, and provide the documentation needed to determine attainment of material acceptance criteria. All other above-grade material generated during OU3 remedial action will be tracked following procedure EW-0006. The tracking system defined by procedure EW-0006 was developed to manage materials identified by OU3 debris categories that were destined for the OSDF, regardless of storage configuration. The procedure for tracking identifies that a "Debris Transport Routing Sheet" will be utilized by field personnel to accompany each container or stockpile that is filled. The routing sheet directs the transport of the debris to either interim storage (container staging or interim debris pile) or directly to the OSDF and provides the necessary waste certification.

All information pertaining to the tracking of above-grade material will be entered into the FEMP Sitewide Waste Information, Forecasting and Tracking System (SWIFTS) database. The SWIFTS database is a computerized system that was designed to allow for tracking of all wastes from project generation to disposition location. SWIFTS tracks containerized and

uncontainerized (bulk) waste from its point of origin to its final disposition, whether off-site shipment or burial in the OSDF. Waste in interim storage awaiting final disposition is tracked according to the originating project, current location, characterization status, debris type, and quantity of material, etc. Debris is currently tracked by the weight of the material while soil and soil-type wastes are tracked by volume. Reports using SWIFTS may be produced on demand to summarize the material management status for each of the projects or any variety of status reports using the input data for materials generated to date.

Integration of material tracking between OUs is mainly a concern between OU3 and OU5, specifically the SCEP, since OU3 will continue to maintain material tracking despite the fact that SCEP will perform at- and below-grade dismantlement and debris management. SWIFTS will remain an important tool for the integration of debris management between OU3 and the SCEP; however, the SCEP is developing a similar tracking system that is designed for its needs but also is compatible with OU3 debris tracking elements. By being compatible with the SCEP tracking system, SWIFTS will be able to provide reports that include at- and below-grade debris management.

3.3.2.3 Staging/Interim Storage

Planning is essential during project design to arrange for the appropriate staging and storage needs (containers, lay-down areas, queue areas, etc.). Following the completion of the material evaluation (identification, quantity estimation, characterization, and container assignment documentation), several staging/storage planning options will be assessed. The OU3 integrated remedial action adopts the principal strategy, previously established under Removal Action 17, for using best available storage configurations for OU3 debris until disposition can be arranged. It should be noted that the strategies developed for Removal Action 17, which were adopted into the OU3 integrated remedial action, not only address management of debris from OU3 but also establish the basic requirements for managing debris from other Ous that would require interim storage/staging. Requirements that are central to all debris which will be managed under the strategies adopted from Removal Action 17 are reduction and potential fixation of contaminants that will be stockpiled, containerization of materials that do not meet release criteria, control of potential contaminant release, and the integrated management of remediation materials using the Integrated Debris-Waste-Soil Model (discussed in later in this section). Although project-specific storage/staging determinations will be made during design, the overall strategy established for segregation and storage of OU3 materials is provided in the text that follows.

Staging refers to the temporary, short-term placement of materials prior to disposition. The three instances of staging that will occur during the OU3 integrated remedial action are: 1) when materials are placed in a staging or queuing area within a construction boundary; 2) when materials are placed in an area designated for off-site packaging and shipment; and 3) when materials are placed in an area adjacent to the OSDF for disposal. Details regarding material staging will be identified during project design and reported in project-specific above-grade implementation plans.

Interim storage is defined as the placement of bulk or containerized materials in an established storage area or facility for a period of time beyond what is needed for direct disposition (i.e., without interim storage). Interim storage of above-grade debris is ultimately based on the final disposition determination made for OU3 materials and will follow the generalized strategy discussed in this work plan. These strategies will be applied to each project during design,

documented in the project-specific MSCC, and any project-specific applications summarized in the implementation plan.

The interim storage strategies for materials generated during above-grade dismantlement allows storage in either containers or bulk piles. This strategy provides that all interim stored materials will be managed consistent with the criteria developed in site procedure EW-0006. Table 3-7 summarizes the general storage configuration projected for each OU3 debris category. It is emphasized that Table 3-7 shows the typical approach for interim storage of materials predominantly represented in each material category and that materials exhibiting characteristics such as hazardous or mixed waste or special management requirements (e.g., Tc-99 contaminated concrete removed prior to facility dismantlement) would be containerized separately.

OU3 materials designated for off-site disposal (identified earlier in this section) will be segregated and packaged for off-site disposition and then placed in the appropriate storage/staging area which has been designated for off-site disposition.

Debris containing listed RCRA constituents at levels acceptable for on-site disposal will be containerized and staged as acceptable for on-site disposal under the Corrective Action Management Unit (CAMU) concepts as applied to the FEMP. Similarly, characteristic RCRA constituents will be containerized and stored consistent with RCRA requirements for eventual disposal off-site. Treatment requirements to allow disposition of RCRA materials will be determined during design and reported in the appropriate project implementation plans.

**TABLE 3-7 Debris Segregation Approach**

| Debris Category | | Storage Configuration[1] | Disposition |
|---|---|---|---|
| A | Accessible Metals | Stockpile | On-Property |
| B | Inaccessible Metals | Stockpile | On-Property |
| C | Process-Related Metals | Containerize | Off-Site |
| D | Painted Light-Gauge Metals | Stockpile | On-Property |
| E | Concrete[2] | Stockpile | On-Property |
| F | Acid Brick | Containerize | Off-Site |
| G | Non-Regulated ACM[3] | Containerize[3] | On-Property |
| H | Regulated ACM | Containerize | On-Property |
| I | Miscellaneous Materials[4] | Containerize | On-Property |

Notes:
1. Typical approach for storage of materials that predominately makeup that category; common exceptions noted below. Residues and special materials within Category J (see Table 2-2) would be containerized and managed according to procedures adopted from Removal Action 9.
2. Does not include portions removed containing elevated Tc-99 identified in Section 3.1.1 for off-site disposal.
3. Transite to be handled separate from other Non-Regulated ACM. Transite to be band-wrapped to pallets.
4. Miscellaneous Materials can be containerized with other Non-Regulated ACM Materials, except palletized transite; railroad ties may be bulk stored.

As identified in Table 3-7, the majority of materials (by volume) projected for on-site disposal may be staged/stored in bulk stockpiles to permit the most effective handling of these media. In cases where bulk staging/storage is chosen during a project design, the debris will be managed in a manner that prevents or minimizes airborne emissions and controls stormwater runoff. Staging/storage will be done in a manner that minimizes double handling of material, minimizes costs by maximizing container use, and minimizes labor associated with maintenance.

The decontamination activities that occur under the Safe Shutdown preparatory action and the decontamination/dismantlement process include removal of residues, vacuuming loose media, washing of component surfaces and equipment, and removal of certain Tc-99-containing concrete to reduce radiological contamination to levels that will not impact human health or the environment (refer to Section 3.2.5 for the discussion of how these limits are established). By limiting contamination to such levels, the interim storage of debris may be managed more flexibly and in various configurations.

Certain debris may be staged in stockpiles including: accessible metals (Category A), non-process equipment (Category B), inaccessible metals (Category B), painted light-gauge metals (Category D), and concrete (Category E). In addition, transite panels (Category G) used for building roofing and siding will be stacked on and banded to pallets and placed in interim storage. The combination of decontamination efforts identified above and stormwater runoff collection systems at the interim storage locations will mitigate any potential release of previously fixed contamination from the stockpiled debris; loose (removable) contamination will be minimal because of the prior decontamination activities (e.g., water wash, HEPA vacuuming). The runoff from the debris piles will be collected and treated, as necessary, in the site wastewater treatment system.

Likewise, airborne contaminant concentrations from the stockpiled debris have been and will continue to be negligible based on removal or fixation of surface contamination. Control measures will be consistent with the determination of Best Available Technologies for fugitive dust control, and could include use of dust suppression materials such as water, resin, surfactant, or covers.

Sufficient interim storage will be required for the materials that are retained for treatment and/or disposition until those activities can occur. Although the strategy to treat and dispose of OU3 materials directly following generation is a stated goal, logistical arrangements for treatment and disposal of materials do not always allow for this to happen. The current strategy for interim storage is the utilization of existing storage space that has adequate engineering controls, such as the Plant 1 Pad. In an effort to evaluate the ability for materials to be interim stored awaiting treatment and/or disposition, the Integrated Debris-Waste-Soil Model was developed and presented with August 14, 1996 amendments to the Removal Action 17 Work Plan.

Integrated Debris-Waste-Soil Model

The Integrated Debris-Waste-Soil Model compared the estimated project material generation rates, timeframes, storage configurations, and disposition options and related availability with current storage quantities, disposition availability, and site storage capacity. It was determined that with the bulk storage capabilities identified originally during Removal Action 17 planning, the storage capacity of the FEMP is adequate to handle waste generated both before the OSDF is available and during the OSDF construction and filling without the

need to construct additional storage facilities. Although adequate storage space currently exists based on the accelerated remediation schedule for the FEMP, assuming bulk storage strategies are followed, storage space availability will be reassessed during OU3 project designs and during any future reassessment of the FEMP remediation schedules. Concepts of utilizing best available storage will be employed in determining location of storage for materials from a project.

The Integrated Debris-Waste-Soil Model also estimates the volume and duration for material that is to remain in interim storage until OSDF disposal. Those estimates take into account when the OSDF is initially available for debris placement. Such detail is estimated in the Integrated Debris-Waste-Soil Model based on a 10-year site remediation plan; however, more accurate estimated durations on a project-specific basis will be provided in the project-specific implementation plans.

The model integrates debris generation from facility demolition, soil generation from excavation activities, OSDF construction, and legacy/nuclear/new generation waste management activities. The model consists of six modules: Model A - Debris Generation; Model B - Excavated Soil Generation; Model C - Non-Remediation Waste Disposition; Model D - On-Site Disposal, Storage, Staging, and Off-Site Shipping Calculation; Model E - Storage Location and Footprint Calculation; and Model F - OSDF Lift Computation. The following discussions are intended to present selected results from use of the Integrated Debris-Waste-Soil Model that are pertinent to interim storage of debris and not to provide an extensive discussion of the specifics of the model itself.

One of the primary outputs from the model is the identification of the debris volumes which must be interim stored prior to the capability of the OSDF to receive debris. The model provides projected quantities on a quarterly basis for debris for each of the debris categories, identifies debris container requirements, identifies debris to be placed into interim storage by location of storage, and the quantities and timing of debris placement in the OSDF. The quantities of debris generated, the amount placed in the OSDF, or in interim storage, and the storage duration are functions of facility demolition, soil excavation, and off-site shipment of wastes.

The model identifies four potential debris storage locations, presented here in descending order of preferred usage: Plant 1 Pad, Plant 7 Slab, Plant 4 Slab, and Plant 8 Pad — each of which are shown in Figure 2-2. By factoring in the current remediation schedule for OU3 to the model, the output demonstrates that Plant 1 Pad usage for interim storage of debris will peak during fiscal years 1997 and 1998 and will be discontinued in advance of the excavation of the pad scheduled in fiscal year 1999. After the removal of the Plant 1 Pad as part of Area 3 soils excavation (Area 3 was identified in the OU5 RD Work Plan), the Plant 7 and Plant 4 Slabs would be utilized for the small amounts of debris slated for interim storage. Both facilities would have stored debris dispositioned prior to fiscal year 2002. The model predicts that the Plant 8 Pad would not be required to support debris storage. These model results rely heavily on a number of funding and project interrelation assumptions.

The assumptions used in the model depend on the type of information desired in the output. A base set of assumptions that match the ten-year cleanup scenario were initially used to review the ramifications of the current plan (initially a validation or impact assessment of the conceptual plan). Key outputs of the model yield information about the need for debris or soil storage capabilities, which in turn allow the overall plan to be adjusted to minimize the

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production of soils or debris in excess of that which can be utilized effectively (one goal is to match soil excavation rates closely to debris generation and to placement activities).

The major base assumptions for the model include the assumptions of continuous funding under the ten-year level funding plan (and the associated funding of each of the remediation programs per the current approved budget baseline). Current estimated costs for each element of the remediation are also significant assumptions for the model. The following are also considered major assumptions with respect to soil and debris management and the model:

- Legacy waste disposition schedules;
- Bulking factors of debris in various storage configurations;
- Soil and debris placement rates (reliable weather, productivity, transport, etc. are embodied); and
- Projected soil to debris ratio in the OSDF.

Since the model is a general tool for remediation planning, it can also help answer the questions about what happens if one or a number of the model assumptions are changed. One example of how the model output might change if a major assumption is altered would be if the debris/soil sequence is not optimized, then a significant increase in debris storage could be required and possibly result in large periods of closure of the OSDF. The model might also identify that storage space is unavailable for such a scenario and yield a estimate of the needed additional footprint.

Several attachments to the Removal Action 17 Work Plan addendum, dated August 14, 1996, provided graphical outputs for modeling. One attachment revealed relationships between the modules referenced above in the model, while another illustrated the relationship between soil availability by period and its influences on the placement of debris in the OSDF. Of greatest importance to OU3 above-grade remediation were the attachments that: 1) illustrated the usage of containers for debris which will require containerized storage; 2) identified the quarterly generation rates for debris which will be eligible for bulk open storage; and 3) identified the Plant 1 storage capacity over the course of the OU3 remediation schedule.

The model will be updated periodically to incorporate actual inventory and changes in remediation plans.

### 3.3.3 Management of Secondary Waste

As remediation activities proceed, secondary waste materials will be generated and managed in accordance with ongoing site waste management practices. Secondary waste includes solids (e.g., vacuumed dust, High-efficiency Particulate Air (HEPA) filters, personal protective equipment, spent consumable equipment) and secondary liquids/solids resulting from component and equipment decontamination. Requirements for the management of such wastes will be specified in the design for those responsibilities tasked to the remediation subcontractor.

Management of secondary wastes is presented to the subcontractor in various forms within the performance specifications. Specification 01120 discusses both the minimization of

secondary wastes being generated and controls on the use of hazardous materials. Specification 01517 discusses requirements for secondary waste generation and collection. Specification 05126 requires the remediation subcontractor to collect and manage lead-based paint chips and debris generated as a by-product during structural steel dismantlement.

The predominant type of secondary waste to be generated which requires special management is wastewater. The most likely source of wastewater will be from the surface decontamination method of using high pressure, low volume water sprays. The strategy for managing wastewaters is to collect, filter particulates, transfer into 3,000 to 6,000 gallon containers, characterize, and discharge into the FEMP wastewater treatment system (WWTS). Collection of wastewater will involve the use of sump systems or other acceptable collection method and filtration using twenty micron and five micron filters prior to being transferred to temporary storage tanks at the project site (Specification 01517).

Secondary solid waste generated during remedial action will be collected by contaminant type, containerized, and managed in accordance with the strategies applicable to the appropriate material categories discussed in Section 3.3.1.

Contaminants that are likely to be encountered in aqueous waste streams generated during decontamination and dismantlement activities include oils, greases, solvents, and heavy metals in addition to uranium and other radionuclides. Depending on the contaminants of concern and the performance of the AWWT Facility for pollutants other than uranium (not yet fully determined), pretreatment of these waste streams may or may not be required. Pretreatment through processes such as granular activated carbon for organic compounds, precipitation/filtration for heavy metal removal, and/or nitrate removal through the biodenitrification (BDN) system will be determined by WWTS managers. The manner of discharge through the WWTS is defined by expected or actual contaminants in the wastewater, the effluent limitations and conditions in the National Pollution Discharge Elimination System (NPDES) permit, and the internal procedures governing uranium and radionuclide thresholds.

The RD/RA SAP, contained in Appendix D, describes sampling and analysis of wastewaters for which contaminant characterization is needed prior to discharge into the WWTS. Sampling and analysis of wastewater may not be necessary if sufficient process knowledge or available sampling data identifies that there are no contaminants of concern, or if the expected concentrations are negligible. The evaluation of available information and decision regarding whether or not pretreatment is required is made by the environmental compliance manager for wastewater treatment. If contaminant information about decontamination and dismantlement wastewaters indicates pretreatment is necessary for a specific pollutant or type of pollutant (as discussed above), the wastewater will be directed to the appropriate entry point within the WWTS. As OU3 remediation proceeds, and OU3 components that comprise the current WWTS are dismantled, wastewater treatment and disposal will be managed through the AWWT Facility.

Management of wastewaters that have been generated from HWMUs that have been associated with RCRA-listed constituents will require special attention to characterization prior to batch discharges to the WWTS. This subject has been addressed further in Section 3.5.3.3.

### 3.3.4 Waste Minimization

Two documents provide guidance in the area of waste minimization principles at the FEMP, the Waste Minimization and Pollution Prevention (WM/PP) Awareness Plan PL-3009, (FERMCO 1994 - to be updated in 1996), and the FERMCO Waste Minimization and Pollution Prevention Policy Statement PO-1013, (FERMCO 1993). The WM/PP Awareness Plan specifies those activities and methods that will be employed to reduce the quantity and toxicity of wastes generated at the FEMP. The plan also educates FEMP personnel, sets WM/PP goals, and plans WM/PP actions. It is designed to satisfy DOE Order 5400.1 - General Environmental Protection Program, and the WM/PP requirements established by the Pollution Prevention Act (PPA), RCRA, and CERCLA/SARA. The WM/PP Program reflects the goals and policies for waste minimization at the FEMP and represents an ongoing effort to make waste minimization/pollution prevention an integral part of the site's operating philosophy.

A primary mechanism for ensuring waste minimization for each project will be the development of performance specifications during remedial design that include provisions which specify the selection of remediation methods that minimize the quantity and types of secondary wastes generated by the remediation subcontractor. In Specification 01517, for example, it is stated that the remediation subcontractor is prohibited from using decontamination methods which will generate excessive secondary waste, as determined by FEMP Project Management. In addition, the specifications require the remediation subcontractor to perform certain activities outside the jobsite, if possible, so as to minimize the generation of waste products (e.g., see Specifications 01120 and 01515). The remediation subcontractor activity-specific work plans will be reviewed to ensure that FEMP waste minimization goals are included.

Waste minimization will be accomplished by eliminating or minimizing the generation of waste at the source. Remediation related waste materials that cannot be eliminated or minimized will be reused or recycled, where possible. Wastes that are generated as a result of remedial activities may be treated to reduce volume, toxicity, or mobility before storage or disposal, as appropriate.

All employees at the FEMP, including subcontractors, are responsible for participating in established recycling programs, conserving energy when possible, reusing equipment and materials when feasible, adhering to policies and procedures promoting WM/PP principles, and identifying areas where improvements to current practices can be made. The FEMP will assist employees in exploring waste reduction and recycling methods, and will promote waste minimization through employee education and incentives.

In addition, lessons learned from completed remediation activities will be incorporated into future OU3 projects. Examples of several recent waste minimization initiatives added to standardized subcontract language include:

1. The subcontractor will remove the lead flashing from the structures in such a way as to maximize the amount of lead amenable to recycling;

2. The subcontractor will flatten ductwork to minimize void space, thereby reducing the disposal volume occupied by this material;

3. Void space in containers of waste destined for off-site disposal will be filled with batt insulation removed from buildings undergoing dismantlement;

4. Certain materials will be bulk stored (i.e., not in containers) thereby maximizing the efficient use of roll-off containers; and

5. The subcontractor will dismantle the buildings in such a manner that straight lengths of structural steel beams will be maximized. The subcontractor shall minimize bending, twisting, and smashing of the structural members during sizing for bulk storage. Straight pieces of structural steel should be segregated to the extent practical in a manner that will enable future recycling.

Section 3.3.6 contains further information about additional waste minimization activities conducted through the FEMP Property Management program.

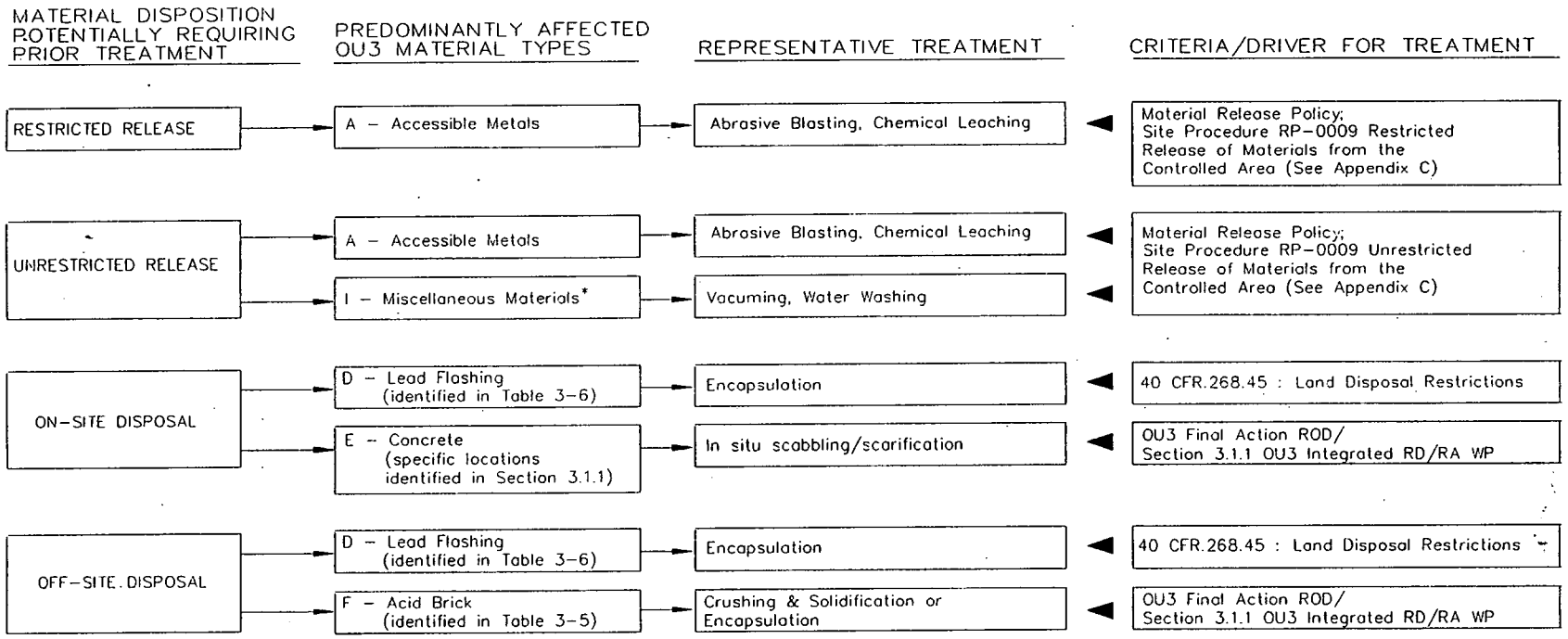
### 3.3.5 Material Treatment

As stated in the IROD, in situ decontamination serves as the initial stage of treating materials during OU3 remedial action and that permanent solutions to reducing toxicity, mobility, or volume would be addressed in the OU3 Final Action ROD. The OU3 Final Action ROD recognizes that much of the treatment of OU3 materials that represent the greatest threat to human health and the environment is accomplished during the safe shutdown preparatory action (discussed in Section 3.2.2) for certain facilities prior to remedial action. As stated in the OU3 Final Action ROD, additional treatment of OU3 materials will primarily consist of treating materials to meet WAC for the OSDF and/or off-site disposal facilities. The four scenarios in which treatment of OU3 materials may be applied include the following:

- to meet criteria for restricted or unrestricted release;
- to meet LDRs or other regulatory requirements;
- to meet WAC for the OSDF or off-site disposal facilities; and
- to additionally reduce contaminant levels on materials destined for the OSDF beyond levels required to meet OSDF WAC.

The strategy for treating materials begins with the evaluation of specific materials, during design, that fall into one of the scenarios identified above. Such material is identified in project waste management documentation, as discussed in Section 3.3.1, and in special conditions of a subcontract to require the performance of specific actions for decontamination, dismantlement, handling, and containerization. Figure 3-4 summarizes the application of treatment for predominant types of OU3 materials prior to each of the affected disposition routes.

In some instances, the scope of treatment may be completed in situ, such as will be the case when specific areas of concrete surfaces are removed to the depth prescribed earlier in Section 3.3.1 to remove the highest concentrations of Tc-99. In other instances, as with certain potential mixed wastes (lead sheeting and acid brick), materials will be evaluated for




* Considered for Unrestricted release to a Subtitle D Sanitary Landfill

**FIGURE 3-4 Primary Roles of Treatment in OU3 Remediation**

treatment on-site or for shipment off-site to a facility for treatment prior to recycling or disposal. On-site treatment of mixed waste will be performed consistent with provisions of the Site Treatment Plan (STP) (DOE 1995c), as appropriate.

Further Treatment for Restricted and Unrestricted Release

Generally, treatment may be applied to OU3 materials which are deemed suitable for decontamination and release under DOE Order 5400.5; however, treatment may also be applicable to restricted release of certain materials as well. The strategy and criteria for restricted and unrestricted release of OU3 materials from above-grade dismantlement operations are discussed in Section 3.3.6.1. Materials that are currently considered suitable, based on the nature and extent of OU3 contamination and economically feasible decontamination technologies, include certain non-porous materials that have only surface contamination.

If areas of radiological contamination exceeding unrestricted release criteria were to be discovered during the confirmatory screening process following in situ surface decontamination (Section 3.2.5), then further treatment (i.e., beyond in situ surface decontamination) would be necessary if it is desired to disposition that material under unrestricted release criteria. Minimum treatment anticipated would likely include ex situ surface decontamination efforts performed on-site to remove contamination to acceptable levels for unrestricted release. The washwaters derived from the treatment would then require treatment prior to its disposition.

Treatment to support restricted recycling or restricted use, beyond surface decontamination steps taken in situ, will consist of any additional decontamination technologies being applied on-site, usually within a decontamination facility, to allow release under restricted conditions. The need to implement such treatment will be contingent upon life-cycle cost analysis for recycling or reusing those restricted items.

Further Treatment to Meet TCLP Criteria of LDRs

Treatment to meet the TCLP criteria of LDRs applies to lead sheeting and potentially to acid brick, as identified in Section 3.1.1; however, this treatment standard would not apply to lead sheeting that is recycled. Prospective treatment technologies for meeting TCLP criteria of LDRs were identified, screened, and evaluated in Section 4 of the OU3 RI/FS Report for OU3 materials. Encapsulation was determined to be the representative treatment technology for lead sheeting, and crushing and solidification or encapsulation was identified for acid brick.

Further Treatment to Meet WAC

Although Section 3.1.1 identifies those materials that were designated for treatment and off-site disposition, with the remaining materials being dispositioned in the OSDF, there may be isolated instances where additional in situ decontamination is necessary to meet OSDF WAC. Such will be the case with inaccessible metals that fail the visual process residue inspection criteria per Specification 01517. Additional decontamination, beyond exterior surface decontamination, will be performed when practical or economically feasible to meet the visual process residue standard; when not practical or economically feasible, they will be dispositioned at an off-site disposal facility. For the OU3 materials that exceed the off-site WAC, further treatment would be decided on a case-by-case basis and would depend on the specific material, the level of contamination, and the cost-effectiveness of the treatment compared to other disposal options.

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In addition to the specific needs for treatment, opportunities for further new and innovative treatment technologies that would allow for additional reduction in toxicity, mobility, or volume of contaminants will be pursued. The approach to be used during OU3 remedial action will be to allow flexibility during detailed remedial action planning and design to adopt the most effective technologies, considering both performance and cost. Each project-specific remedial design will consider the latest available or prospective technology that has the potential to be practicable for that particular remedial action project. Because the OU3 remedial action is designed and implemented in a phased, somewhat iterative manner, the designs of subsequent projects benefit from lessons learned on the earlier designs and thus allow for incorporation of state-of-the-art technologies and improvements to baseline technologies. The first several decontamination and dismantlement projects performed under the OU3 interim remedial action are good examples of this principle in action. For the Plant 1 Complex - Phase I project, DOE invested in new technology by approving the Plant 1 Decontamination and Decommissioning Large Scale Technology Demonstration project. DOE investment in direct improvements to the technologies are designed to improve worker safety, reduce the amount of contamination on materials that could go to the OSDF, and improve characterization of the structure. DOE is also investing in similar projects at other DOE sites with potential applications at the FEMP. The FEMP is committed to utilizing improved approaches and new technologies as they may be applied to OU3 remediation.

### 3.3.6 Material Disposition

The routes for material disposition identified in the OU3 Final Action ROD include restricted release; unrestricted release; off-site disposal, and on-site disposal. The implementation strategies for each of these disposition routes are described below. Since the remedial design process for each project will define the disposition routes for specific project materials, the particular details for treatment/disposition of materials will be provided in the project-specific implementation plan.

#### 3.3.6.1 Restricted and Unrestricted Release

Based on initial disposition projections, as identified in Table 3-4, OU3 Debris Category A - Accessible Metals will be the predominant material considered for restricted release, and Categories A - Accessible Metals and I - Miscellaneous Materials exhibiting "At- or Below-Baseline" contaminant levels will be the predominant materials considered for unrestricted release. Other materials may be considered for either restricted or unrestricted release on a case-by-case basis during each project design. The determination as to whether materials will be evaluated for either restricted or unrestricted release will occur primarily during project design and appropriate segregation and containerization would be specified in the design package.

Materials evaluated during project design for restricted and unrestricted release will be based on process knowledge, OU3 RI/FS data, and current radiological surveys. Further evaluation will be conducted in the field to certify their eligibility for unrestricted release per the criteria and testing established in the Certification Program for Release of Materials from the FEMP, which currently consists of the revised draft of the FEMP Material Release Policy and Site Procedure RP-0009. Both the policy and procedure are contained in Appendix C of this work plan. The strategy for qualifying materials for both restricted and unrestricted release, including recycling, reuse, or commercial sanitary landfill disposal, involves the certification

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process described in Site Procedure RP-0009, which was developed to fulfill the requirements of the FEMP Material Release Policy.

Materials that meet the certification criteria for unrestricted release may either be recycled, reused, or dispositioned in an accepting landfill, depending on various market factors. Materials that do not meet unrestricted release criteria will be considered for any feasible restricted release opportunities.

Certification Program for Unrestricted Release of Materials

A portion of the materials and debris generated through the dismantlement of OU3 facilities may be released to the public for unrestricted use following evaluation and certification that residual radioactivity of the material meets the guidelines of DOE Order 5400.5, Radiation Protection of the Public and the Environment. The FEMP policy for release of unrestricted materials is provided by the certification program introduced earlier in this section. The current version of Site Procedure RP-0009, which implements the release policy, has been used since 1994 and has been used to release numerous items such as vehicles, equipment, tools, etc.

OU3 remedial design for above-grade dismantlement projects will include the application of Material Release Policy to identify and evaluate materials considered for unrestricted release. The design phase unrestricted release assessment will be made based on the application of the disposition methodology regarding alternatives to disposal of OU3 materials, which is discussed later in this section (see text under the subheading, Unrestricted Release Recycling/Reuse). The remediation phase determination involves the application of Site Procedure RP-0009.

Where unrestricted release is chosen as a disposition alternative for materials, appropriate material handling and certification requirements will be specified in subcontract documents. In general, the location of a component in relation to a posted radiologically controlled area ("Controlled Area") and the radiological history of the component will be used to determine whether the materials from that component are to be considered potentially contaminated. Once material is considered potentially contaminated, the requirements of the certification program will be reviewed considering the physical nature of the material to determine the feasibility of clearing the material for unrestricted release.

Per 10 CFR 835, a Controlled Area is required to be posted around any area to which access is managed in order to protect individuals from exposure to radiation and/or radioactive material. At the FEMP, the Controlled Area encompasses the former process area including the waste storage area and portions of the laboratory building. Additionally, smaller radiologically controlled areas are posted around isolated process facilities such as the Sewage Treatment Plant and the Storm Water Retention Basin. Areas of the FEMP site that are not posted as radiologically controlled areas typically include *administrative areas* and non-radiological process areas such as the new boiler plant.

All material and debris generated from the demolition of facilities that are currently located in a Controlled Area posted for radiological contamination control will be considered potentially contaminated until proven otherwise per the requirements outlined in RP-0009.

For above-grade projects that include facilities located outside of radiologically controlled areas, the requirements of RP-0009 would be applied on a case-by-case basis considering pre-job surveys, existing facility characterization surveys, and the radiological history of the

facility. If a significant potential exists for the facility or portions of the facility to have come in contact with unsealed or unconfined radioactive material then materials and debris originating from the area of concern will be considered potentially contaminated until proven otherwise following the unrestricted release certification process outlined in Appendix C. At a minimum, these areas include portions of the Administrative Building, Security Building, uncontrolled areas of the Laboratory building, Service Building, and other buildings constructed prior to 1989, when facility production operations ceased. Buildings or building additions constructed after 1989 will initially be evaluated based on pre-job surveys and existing facility characterization surveys. Additionally, periodic job coverage radiological surveys will be performed in areas exhibiting a potential for contact with radioactive material (such as areas of the buildings in contact with soil or older portions of the building). If no radioactivity is detected through performance of these surveys, materials generated from the facility dismantlement will be available for unrestricted release. If radioactivity is detected, then the material will be considered potentially contaminated.

All materials and debris that are considered potentially contaminated are subject to the survey and evaluation requirements of RP-0009 prior to unrestricted release from the FEMP. Radiological surveys are conducted in accordance with FEMP procedure RC-RDA-010, "Radiological Contamination Surveys" prior to releasing materials as unrestricted.

Where material is designated for both decontamination and recycling at an off-site vendor facility, the approved vendor's unrestricted release program will be audited for conformance with DOE Order 5400.5 prior to release of the material from that location.

The degree of effort required to certify material for unrestricted release is largely dependent upon the physical properties of the material. Physical properties of the material refers to the porosity of the potentially contaminated surface of the material, areas of the material that are inaccessible for survey, and the physical state of the material (i.e., liquid vs. solid). The following guidelines will be used to aid in the unrestricted release decision process.

- Non-porous surfaces of the material will be surveyed using standard survey techniques applying the surface contamination release limits of DOE Order 5400.5.

- When porous surfaces are encountered, an evaluation will be performed to ensure there is no potential for contamination within the material matrix. This evaluation will include considerations for leachability properties of the contaminant in the matrix, position of the material relative to the source of contamination, available sample and analysis data including surface contamination data, and other available process knowledge as applicable.

- Inaccessible areas of the material to be released will be evaluated on a case-by-case basis using available process knowledge and sampling data. Inaccessible areas that are potentially contaminated will be assumed to exceed the limits for unrestricted release unless the material is disassembled allowing access for survey or special survey techniques are employed that support the rationale that contamination of the inaccessible areas is not likely.

The surface contamination limits of DOE 5400.5 are not applicable to liquids or bulk materials that are potentially contaminated in depth or throughout the volume of the material. Examples of bulk materials expected to be generated by OU3 during above-grade dismantlement operations include concrete rubble and other CMU materials. Bulk materials will not be released for unrestricted use unless it can be shown that no radioactivity could have been added to the material as a result of DOE operations. Where applicable, this criteria will be supported through documented process knowledge, surface contamination surveys, and analytical data, or a combination thereof, as prescribed in RP-0009.

Unrestricted Release Recycling/Reuse

Based on OU3 RI/FS data, it is anticipated that only few materials from the former Production Area (materials associated with the uranium production period at the FEMP) will initially meet unrestricted release criteria. On the other hand, above-grade materials within the Administrative Area, which have not been in contact with processing operations, are expected to meet the criteria. Within the Administrative Area, OU3 Debris Categories A (Accessible Metals), and I (Miscellaneous Materials) have the potential to be readily released for unrestricted disposition (note: although Category E - Concrete from the Administrative Area also has the potential for unrestricted release, the current FEMP Material Release Policy does not include that waste stream for consideration at this time). These material categories have been identified as the only categories that exhibit at- or below-baseline levels of contamination, based on current data, as indicated in Table 3-4. Since baseline levels for these categories are less than DOE release criteria, it is initially assumed that only these volumes are initially eligible for unrestricted release.

Although Table 3-4 projected that a combined volume estimate of 309,000 $ft^3$ consisting of Accessible Metals and Miscellaneous Materials (Categories A and I, respectively) would constitute the material that is likely for unrestricted release, other non-porous materials and transite may be considered and evaluated for recycling/reuse during design. Of the non-porous metals, certain Inaccessible Metals (Category B) and Painted Light-Gauge Metals (Category D) may also be evaluated for potential recycling as restricted or unrestricted recycling/reuse. Significant changes from the projected disposition pathways, shown in Table 3-4, may occur over time concerning the feasibility of various disposition arrangements (e.g., due to contractual agreements), particularly with the more discretionary disposition options for OU3 materials, such as those in Categories A, B, and D, which comprise the majority of "scrap" metals at the FEMP. Therefore, DOE will implement the guidance previously introduced earlier in this section entitled, "Decision Methodology for Fernald Scrap Metal Disposition Alternatives," which was referenced earlier in Section 3.3.1, to support the commitment to continuously evaluate disposition options such as recycling and reuse of materials that are amenable to recycling/reuse from each project.

DOE will continue over the course of OU3 remediation to aggressively evaluate existing and emerging recycling technologies and markets to identify opportunities for cost-competitive application at the FEMP. DOE strives to maintain recycling and reuse as disposition options to be considered for each material at the time of its intended generation, and will continue to evaluate recycling and reuse on a case-by-case basis within each above-grade project design and reported in the project implementation plan.

Based on life-cycle analysis techniques, the disposition methodology is a tool to be used by FEMP decision-makers to compile and summarize the latest available data for comparison of competing disposition alternatives. The disposition methodology is designed to be very

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flexible, supporting incorporation of stakeholder input, as well as changes in cost, technology, regulations, and many other factors which impact the evaluation of disposition alternatives. The disposition methodology is adopted by this plan and applied broadly for the evaluation of alternatives to disposal, including scrap metals and other material categories that have high potential for alternatives to disposal.

The disposition methodology, initially presented to the interested stakeholders and regulators as a draft on June 11, 1996 at a public workshop that addressed recycling/reuse issues, was finalized and presented again to the public in a workshop on November 7, 1996. Presented below are some of the key concepts that make up the disposition methodology.

Specifically, the disposition methodology takes into consideration both quantitative and qualitative factors in three categories: 1) direct costs and benefits; 2) socio-economic issues; and 3) environmental safety and health impacts. The disposition methodology includes both the analytical requirements to develop defensible values for a comprehensive set of performance measures and the structure for using the performance measures to compare and rank alternative proposals.

A decision on metal disposition alternatives should be based on two categories of information: 1) the possible impacts of choosing each of the candidate alternatives; and 2) the values used in evaluating these impacts. Correspondingly, the disposition methodology is divided into two phases: 1) the life cycle analysis phase, in which the possible impacts of each of the candidate alternatives are assessed; and 2) the decision phase. In the first phase, the objectives and program scope are defined. The metal disposition alternatives are identified, performance measures are specified, and the impacts of the alternatives are described in terms of the performance measures. The following steps are involved in the life cycle analysis phase:

1. Define Nature of Decision and Program Scope;
2. Specify Objectives and Performance Measures;
3. Identify Alternatives;
4. Define Analytical Methods;
5. Assess the Impacts of the Alternatives; and
6. Summarize Results.

In the decision phase, the disposition methodology will aid the decision maker (or makers) in the final steps: comparison of alternatives, and selection of the most desirable alternative.

Materials that will be evaluated for unrestricted release may be classified as either recoverable or non-recoverable. Recoverable materials generated from a project may include steel, non-ferrous metals, and other material which may be successfully decontaminated for recycling, reuse, or unrestricted release. Recycling/reuse of materials is recognized as a positive route for disposition. Contracts for recycling/reuse will be arranged as basic ordering agreements intended to support project-specific recycling; however, specific material acceptance criteria are not currently known. FEMP material release requirements, however, are specified by the Material Release Policy for the FEMP which is based on DOE Order 5400.5. Some recycling and reuse may not require radiological decontamination if recycling and reuse of materials occur within a radiologically-controlled environment, such as another DOE facility, or, if decontamination is performed for unrestricted release by off-site commercial operations (i.e., by license holders). It is anticipated that structural steel (Category A) will be the predominant

material evaluated for recovery. Materials that are also potentially recoverable may include, but are not limited to, concrete, asphalt, glass, ceramics, and transite; however, their potential for recovery is currently being explored through DOE technology research and development. Recoverable materials may be those which are radiologically contaminated but that can be treated and, as a result, be reclassified for unrestricted release or controlled reuse.

Based on current knowledge of acceptance criteria for commercial recyclers of metal used in the past by the FEMP, recoverable metal may not be excessively oxidized or in a bi-material form where separation from the other materials would not be cost effective, nor should the metal be excessively twisted or otherwise disfigured by demolition activities. The two generally recognized classifications of recoverable metal at the FEMP are:

- Unrestricted Use Metal - Metal that may be economically decontaminated to a releasable level and all potentially contaminated surfaces of it are accessible for direct contamination survey. In general, unrestricted or "free release" metal has a low surface-area-to-mass ratio. Examples of unrestricted release metal are structural steel, tanks and decking. Metal may be considered for unrestricted release even if there are minor portions that cannot be decontaminated or monitored if that portion can effectively and readily be removed from the form.

- Restricted Use Metal - Metal that cannot be economically decontaminated or surveyed to verify whether release limits have been met. In general, restricted use metal is light gauge with a high surface-area-to-mass ratio or has inaccessible areas where contamination may be present and therefore difficult to remove. Examples include metals such as ductwork, cabinets, machinery, and odd-sized forms.

DOE will maximize use of equipment and minimize procurement of new items by identifying equipment which can be reused at the FEMP, reused within the DOE complex, or sold for reuse within the community. A large amount of FEMP materials have already been dispositioned in this manner. Lead by an equipment disposition team, the evaluation and certification for release of equipment requires documentation including the signed radiological compliance release certification, Property Management Excessing Forms, and the High Risk Evaluation Form. If equipment is determined to be low-level radioactively contaminated through process knowledge and/or radiological surveying, the equipment is screened to ascertain reuse opportunities either at the FEMP, within the DOE complex, or a licensed facility. If reuse of the piece of contaminated equipment is not an option, the equipment will be dispositioned in accordance with other available routes provided within this work plan.

If the equipment is determined to be uncontaminated through process knowledge (e.g., uninstalled/unused equipment, administratively determined) and/or meets the DOE Order 5400.5 criteria for unrestricted release, the equipment will be screened to ascertain reuse opportunities and may be donated to educational institutions, other governmental agencies, or sold in a public auction.

In addition to certification criteria for unrestricted release of materials from the FEMP, the process of dispositioning equipment will also include all necessary safeguards as required by the following regulatory drivers: Federal Property Management regulation 101, Subchapter H, "Utilization and Disposal"; Federal Acquisition Regulation 45.6, "Reporting, Redistribution, and

Disposal of Contractor Inventory"; DOE Property Management Regulation 109-43, "Utilization of Personal Property"; DEAR 945.6, "Reporting, Redistribution, and Disposal of Contractor Inventory"; DOE Order 2200.6, "Financial Accounting"; and the FEMP Management of Government Property Manual, "PM-0001".

Restricted Recycling/Reuse

Although not specifically estimated by the OU3 RI/FS Report, restricted recycling (recycling of contaminated materials that do not meet unrestricted release criteria) is one alternative that will be considered for disposal of metals. DOE is currently evaluating the use of contaminated metals to make contaminated waste disposal containers for use within DOE. The results of these evaluations will determine whether significant quantities of OU3 metals are recycled in this manner. Just as unrestricted materials undergo certification prior to release, so will restricted materials. The FEMP procedure for certifying release of restricted materials for recycling and reuse is provided in Section 7.2 of RP-0009.

Disposal at a Municipal Solid Waste Landfill

Waste that is destined for off-site disposition at a Municipal Solid Waste Landfill includes non-recoverable debris generated outside of a radiologically controlled area (ref. 10 CFR 835) which would not have become radiologically contaminated and which meets the criteria for unrestricted release as described above. Examples of debris that would qualify for disposal at a municipal waste landfill include glass, paper, scaffolding, equipment, piping, and construction wastes generated from administrative areas. Currently, a program is in place for office trash which is disposed by a local hauler. In general, debris with inaccessible surfaces which are likely to be contaminated but are of such size, construction, or location as to make them inaccessible for survey shall be assumed to exceed the unrestricted release limits, making them ineligible for off-site disposal at a solid waste landfill.

In addition to ensuring that the waste meets unrestricted release criteria, all materials must be evaluated for the characteristics listed below and be documented through the MEF process. The following materials are prohibited from disposal at a municipal solid waste landfill:

- RCRA Hazardous Waste;
- TSCA-regulated waste (≥ 50 ppm PCBs)
- Infectious waste; and
- Soils.

3.3.6.2 On-Site Disposal

The OU3 RI/FS Report estimated that approximately 780,000 cubic yards of OU3 materials would be disposed in the OSDF (without accounting for pursuit of recycling, reuse, and release alternatives to disposal). As a result of the OU3 decontamination and dismantlement activities, some of the materials to be disposed in the OSDF will be stored in containers and in bulk for an interim period until disposal can occur. The strategy for disposal includes the movement of those interim-stored materials, as well as receipt of materials directly from ongoing decontamination and dismantlement projects (i.e., without interim staging/storage). Movement of materials from storage is estimated to require up to three years after the OSDF is open for OU3 wastes.

As stated in Section 3.1.1, certain materials will not be allowed to be dispositioned in the OSDF. In order to comply with public preference that characteristic hazardous waste streams

are not disposed in the OSDF, acid brick and lead sheeting will be segregated from other materials that are destined for the OSDF. To minimize the disposal of materials in the OSDF, alternatives to disposal will be evaluated for selected materials generated from each of the OU3 decontamination and dismantlement projects during their respective remedial designs using the disposition methodology discussed in the previous section. To ensure that only the materials that are authorized for OSDF disposal meet the OSDF WAC, OU3 will certify each shipment of materials removed during above-grade dismantlement using a manifest.

OU3 will not accept any waste generated from off-site sources for OSDF disposal. A specific prohibition of the disposal of off-site generated wastes in the OSDF, except for secondary wastes associated with off-site processing of FEMP materials (which must also meet applicable WAC), has been included in the OU2 and OU3 RODs.

Waste Acceptance Criteria

The OU3 RI/FS Report discussed the development of WAC for the OSDF. The OSDF WAC primarily is concerned with characterization of materials and physical dimension criteria for debris. Below, each of these issues are discussed as to their relevancy during remedial design and implementation.

Because of the conservative nature of the OU3 RI/FS characterization program, as discussed in Section 3.3.1, there is inherent conservatism built into the source term and contaminant distribution estimates for OU3 materials. As a result, existing data was determined to be sufficient to make conservative decisions regarding how to meet OSDF contaminant WAC. These decisions include: 1) a technical decision to remove a predetermined volume of concrete found to have the highest concentrations of Tc-99 (identified in Section 3.3.1) in order to meet, and actually exceed, the mass of Tc-99 required to be removed from OU3 materials destined for the OSDF; and 2) an administrative approach to disposition Process Related Metals (Category C), Acid Brick (Category F), and Special Materials (Category J) off-site.

The IMPP lists certain items that are prohibited from disposal in the OSDF. The prohibition list will be reviewed during the preparation of impacted material management documentation during material evaluation stage of OU3 remedial design projects. The prohibition list includes the following:

- Impacted material exceeding the WAC presented in Table 4-1 of the IMPP;
- Material from any off-site source, including any other DOE site, except as provided in the OU5 ROD;
- Pressurized gas cylinders;
- Process-related metals (OU3 Debris Category C);
- lead sheeting, which has not been treated to meet LDRs;
- Product, residues, and other special materials (OU3 Debris Category J);
- Materials containing free liquids;

- Intact drums (i.e., drums must be empty and crushed);
- Acid brick (OU3 Debris Category F);
- Transformers which have not been either crushed or their voids filled with grout or other acceptable materials;
- Used oils;
- Whole or shredded scrap tires; and
- Materials not accompanied by the appropriate transportation manifest as specified in the IMPP.

As noted earlier, a general physical size constraint was placed on debris that are to be disposed in the OSDF by conditions provided in the OU2 IMPP. Section 4.3 of the IMPP lists physical waste acceptance criteria that must be applied to material destined for OSDF disposal. The dimensions provided in Table 3-8 represent the application of the general size constraint to OU3 material categories. The physical dimensions applied to OU3 materials have been accepted by OSDF design engineers as consistent with OSDF physical waste acceptance criteria.

Material dimensions would be limited in length to accommodate spreading and compaction equipment and limited in height to meet a specified lift thickness (i.e., thickness of OSDF compaction layers) for placement of construction materials in layers. Material placement will be also be specified by the IMPP developed pursuant to the OSDF design.

Most OU3 materials generated during dismantlement of OU3 facilities will fall into either Impacted Material Category 2 or Category 3. Category 2 refers to materials that can be spread in lifts no more than 18 inches (460 millimeters) thick and expected to be moderately compactible under the action of equipment similar to the Caterpillar dozer or 815C compactor, while Category 3 refers to impacted materials that have a maximum height of no more than four feet (1.2 meters) and are rectangularly shaped allowing impacted soil or material to be compacted around and against them. As noted in Table 3-8 (footnote), oversized materials, which fall into Impacted Material Category 5, may be allowed for OSDF placement on a case-by-case basis provided they meet the criteria established for those materials in the IMPP. Category 5 materials will likely require special handling, placement, and compaction procedures. These materials will be classified and designated in accordance with the approved RODs and the Waste Acceptance Criteria. If, during the project-specific design phase, material is identified that could potentially be considered Category 5 material, an evaluation of the material will be conducted in conjunction with the OSDF engineers to determine if further size reduction is necessary. The results of that evaluation will be documented in special placement plans prepared by OU2 that will accompany OU3 project implementation plans submitted for regulatory approval prior to utilization.

#### 3.3.6.3 Off-Site Disposal

The decision to dispose of certain materials at off-site locations has been administratively determined as a means to remain consistent with the "balanced approach" for FEMP waste disposition. Application of this principle results in retention of the larger volume of materials

**TABLE 3-8 OSDF Material Size Constraints**

| OU3 RI/FS Category | Associated Size Constraint |
|---|---|
| General for all categories | Any piece ≤ 10′ in any dimension<br>Any piece ≤ 1.5′ in height |
| A - Accessible Metals | Maximum length = 10′<br>Maximum width = 4′<br>Maximum height (incl. projections) = 1.5′ |
| B - Inaccessible Metals | Maximum length = 10′<br>Maximum width = 4′<br>Maximum height = (incl. projections) = 1.5′<br>Pipes with diameter ≥ 12" split in half |
| D - Painted Light Gauge Metals | Maximum length = 10′<br>Maximum width = 4′<br>Maximum height (incl. projections) = 1.5′ |
| E - Concrete | Maximum length = 6′<br>Maximum width = 4′<br>Maximum height 1.5′ |
| G - Non-Regulated ACM | Maximum length = 8′<br>Maximum width = 4′<br>Maximum height = 1.5′ (bundled stacks) |
| H - Regulated ACM | Maximum volume/piece = 27 $ft^3$<br>For pipes:<br>Maximum length = 10′<br>Maximum width = 4′<br>Maximum height = (incl. projections) = 1.5′<br>Pipes with diameter ≥ 12" split in half |
| I - Miscellaneous Materials | All miscellaneous materials will be compacted<br>Maximum length = 8′<br>Maximum width = 4′<br>Maximum height = 1.5′ |

Note: Material Categories C (Process Material), F (Brick), and J (Special Materials) are excluded from on-site disposal.
Size constraints can be exceeded on a case-by-case basis provided that criteria for Impacted Material Category 5 is met, as defined in Section 5.2 of the IMPP.

that have lower levels of contamination at the FEMP, while the smaller volumes of more highly contaminated materials are dispositioned off-site to locations with respectively higher protectiveness. For OU3, process-related metals (Category C), products/residues (Category J), acid brick (Category F), and technetium-contaminated concrete (Category E) from specific locations are designated for off-site dispositioning.

Potential recipients of contaminated material resulting from OU3 remedial action are the NTS facility, which is owned and operated by the DOE, and a PCDF. Specifically, the materials that will be dispose off-site include an estimated 151,000 cubic feet of OU3 process-related metals, 2,400 cubic feet of technetium-contaminated concrete, 5,280 cubic feet of potentially mixed waste acid brick; and 15,400 cubic feet of low-level waste acid brick. The determination as to which off-site facility will be used for these materials will be decided on a project-specific basis during above-grade remedial design projects and documented in the respective project implementation plans for above-grade dismantlement.

Nevada Test Site Disposition Requirements and Criteria

The NTS, located in Nye County, Nevada, is owned and operated by the DOE as the on-continent nuclear weapons test site. Since 1978, the NTS has also served as a major disposal facility for LLW generated at the facility and other DOE sites. The majority of the waste is placed in shallow pits and trenches that have formed as a result of subsurface nuclear bomb testing. The FEMP has been shipping LLW to NTS since August, 1984. Shipments have historically consisted of backlog LLW that has accumulated since on-site disposal ceased in 1986. Under the FEMP's current operating application to NTS (FEMP Application to Ship Waste to the NTS, Rev. 7, April 1996), the FEMP is approved to ship nine waste streams, consisting of historical and backlog LLW, to NTS. Mixed waste, transuranic and transuranic mixed waste, and PCB wastes greater than 50 ppm are excluded under the FEMP's current application at this time. Other than the waste streams listed above, all construction debris generated by OU3 remediation is expected to fall within the existing approved waste streams under the NTS application. For the excluded waste streams, a revision to this application would be required to allow for disposal at NTS.

The DOE's Nevada Field Office (DOE-NV) establishes the NTS general criteria and requirements for waste certification and transfer under document number NVO-325. NVO-325 establishes procedures, requirements, and criteria for safe transfer and disposal of LLW at the NTS. The NTS criteria are consistent, and in compliance, with DOE Order 5820.2A, "Radioactive Waste Management," and all applicable federal, state, and local regulatory requirements. The NTS may only accept waste from generators designated by DOE-Headquarters and approved by DOE-NV.

Before shipping waste to the NTS, the generator must complete the application process and obtain DOE-NV approval for each waste stream. For previously unapproved waste streams, the generator will, as part of the application process, provide general information such as facility location, operating information, organizational charts, plans for waste handling and traceability, waste minimization plan, and funding, as well as specific information on the waste streams to be dispositioned at the facility. Waste stream information requirements include radiological and chemical characterization of the waste. Once the application is approved, changes or additions to the application can be made. DOE-NV will also conduct periodic audits at the generating facility to ensure compliance with its criteria.

As part of the NTS criteria, a generator is required to demonstrate compliance with 40 CFR 261 through 268 and to provide information required under DOE Order 5820.2A for a performance assessment of the waste disposal site.

The NTS will not accept waste regulated as hazardous waste under RCRA or waste containing 50 ppm or more of PCBs which are regulated under the Toxic Substances Control Act (TSCA). All regulated (friable) asbestos waste must be segregated into a separate waste stream and must meet all requirements on regulated asbestos (40 CFR 61.140 through 61.157). NTS has received approval of its asbestos Operations and Maintenance Plan, so it can accept asbestos LLW from other sites. Further information on NTS requirements for the FEMP is included in the FEMP Application to Ship Waste to the NTS, Rev. 7, April 1996. Process knowledge and/or sampling and analysis may be used to demonstrate compliance with these requirements. All waste streams which are amenable to sampling and are considered for shipment to NTS must have a sampling and analysis plan generated for each specific waste stream. Currently, the NTS has accepted sampling plans for each of the OU3 waste streams that will be potentially shipped to that facility.

The OU3 waste streams that may potentially be shipped to NTS, process-related metals (Category C) and LLW acid brick (Category F), would be shipped under the current application for Contaminated Construction/Removal Action Waste (Application #ONLO000000002). Both of these waste streams are considered to be not amenable to sampling and will be characterized by using the OU3 RI/FS data and process knowledge. Product/residues (Category J) and technetium-contaminated concrete (Category E) will require confirmatory sampling before shipment approval will be allowed. Category E waste will be shipped under the current NTS application #ONLO000000002. Waste generated as Category J are planned to be disposed under the Low/High Grade Residues application (#ONLO000000006). A detailed guidance on preparation of the plan is provided in NVO-325 and is summarized in the OU3 RD/RA SAP, which is contained in Appendix D of this work plan.

The NTS requires generators to develop a waste certification program to ensure that all WAC are met. The FEMP's Quality Assurance Program (QAP) is documented in the FEMP Quality Assurance Program manual, referred to as RM-0012. RM-0012 addresses all appropriate quality assurance criteria specified in 10 CFR Part 830.120 - Quality Assurance Requirements and applicable guidance under QAMS-005/80 for preparing quality assurance plans. QA requirements associated with certifying materials for NTS disposition is detailed in the waste certification program is managed in accordance with RM-0040, "Waste Certification Program Plan" (WCPP) (DOE 1996h). The WCPP describes the procedures that are used by FEMP to ensure that the LLW shipped to NTS for disposal conforms with all pertinent federal, state and local regulations, and NTS acceptance criteria. The NTS requires the generator to designate a waste certification official to certify that all criteria are met before shipment. The FEMP may also designate a package certifier, who must be independent of waste generation activities, and who certifies that the package to be shipped and its contents meet U.S. DOT and DOE (non-hazardous) requirements.

Representative Permitted Commercial Disposal Facility Requirements and Criteria

At this time, one PCDF has been contracted by DOE-Oak Ridge for treatment and disposal of mixed wastes — the Envirocare of Utah, Inc. facility located in Clive, Utah. That DOE-Oak Ridge contract does not preclude OU3 potentially mixed waste from being dispositioned at another PCDF contracted in the future. OU3's potentially mixed wastes that will be treated and disposed at a PCDF include the estimated 5,237 cubic feet of acid brick, which was an administratively decision to minimize any future impacts that material might have if disposed in the OSDF. The other category of OU3 potentially mixed waste includes approximately 50 cubic feet of painted light-gauge metal which consists of lead sheeting. This material is currently projected for off-site treatment and disposition at a PCDF due to the current lack of treatment capacity on-site; however, if treatment of that material occurs on-site to meet the TCLP criteria of the LDR standards, it is likely that the 50 cubic feet of lead sheeting will be disposed in the OSDF.

The WAC of the Clive site are used as representative of a commercial operation, considering that during the course of the remedial action, other similar commercial disposal facilities may be identified as potential recipients of OU3 waste materials. These WAC are discussed in the following text to ensure proper material evaluation and handling to facilitate disposition. When other PCDFs become available they will be considered for disposal of those wastes as well.

The Envirocare of Utah facility received its license for the disposal of naturally occurring radioactive material (NORM) and later for LLW and mixed waste on February 2, 1988. The site meets the requirements of 40 CFR 192 - "Health and Environmental Protection Standards

for Uranium and Thorium Mill Tailings," and the Utah Radiation Control Rules of R447-25, which conforms to 10 CFR 61 - "License Requirements for Land Disposal of Radioactive Waste." The facility also holds a RCRA Part B Permit from the Utah Division of Solid and Hazardous Waste. The permit allows the facility to accept, treat, and dispose of solid mixed waste that requires stabilization in order to meet LDRs. The DOE Ohio Area Office currently has a contract with the Envirocare of Utah facility for LLW only; however, as noted earlier in this section, DOE-Oak Ridge has contracted with the Envirocare of Utah facility, on behalf of the whole DOE complex nationwide, for treatment and disposal of mixed waste.

The Envirocare of Utah commercial disposal facility confirms compliance with its criteria through an application process. The Envirocare of Utah Material Acceptance Process Manual establishes procedures, requirements, and criteria for safe transfer and disposal of NORM/Low Activity Radioactive Waste (LARW) and mixed waste material. Mixed waste loads must not exceed the maximum average concentration limits for waste as defined in the manual or else they will be rejected by Envirocare. If a low-level waste load exceeds these maximum limits, this material may be blended and values averaged.

Before shipping waste to the facility, the generator is required to complete several forms as appropriate, which include but may not be limited to the following: low-activity profile sheet, physical properties form, radiological evaluation form, and/or a mixed waste profile form. Each form requests specific information about the waste stream and establishes sampling and analysis requirements. Section 3.2.3 of the OU3 RD/RA SAP references sampling and analytical requirements to meet Envirocare of Utah WAC.

Tables F-2 through F-4 of the OU3 RI/FS Report provide specific waste acceptance requirements for NTS and Envirocare. These tables identify the specific parameters that each facility will use to determine if incoming waste is acceptable for disposal.

In addition to meeting PCDF certification requirements, OU3 will need to obtain a DOE exception to DOE Order 5820.2A prior to shipment/disposal of LLW at a PCDF since that order requires that DOE-generated LLW be dispositioned at a DOE site.

## 3.4 Coordination/Integration with Other CERCLA Activities

One of the primary programmatic objectives of the OU3 final remedial action is the integration of material disposition from ongoing or completed projects, certain programmatic removal actions, remedial actions being conducted by Operable Units 1, 2, 4, and 5, and waste management operations. The coordination or integration of each of these remediation activities is necessary to ensure the continuity and concerted approach towards achieving site-wide remediation goals.

### 3.4.1 Materials From Ongoing or Completed Projects

Materials that have been or will be generated from remedial actions and other FEMP response actions, which defer final material disposition to the OU3 final [integrated] remedial action, will be evaluated for disposition alternatives consistent with the provisions outlined in this work plan. The disposition evaluation of such materials will be made either individually, as is being performed with the accessible metals from the Building 4A remediation project, or collectively.

Dispositions decisions made for affected materials will be adopted into the respective project close-out documentation and provided to the regulatory agencies.

### 3.4.2 OU3 Removal Actions

Since production operations were halted in 1989, 30 removal actions have been identified and used to address immediate threats from the facilities, structures, and contaminants. These actions have been implemented as interim measures until the OU3 interim and final remedial actions can fully address the threats to human health and the environment. The scope of four programmatic removal actions have been integrated with the OU3 final remedial action and have been highlighted in the text that follows. One aspect of programmatic integration that is common to each of the removal actions discussed below is the manner in which the administrative close-out reporting will be accomplished. Since these actions will support most or all of the OU3 remediation projects, it is appropriate to prepare a close-out report at the completion of OU3 remediation that includes each of the removal actions incorporated into the OU3 integrated remedial action. As stated in Section 4.5, separate removal action completion reports will serve as the close-out reporting mechanism for these removal actions as their respective scopes of work adopted in support of OU3 remedial action are completed.

Removal Action 9 - Removal of Waste Inventories

The former Removal Action 9 decisions and procedures have been incorporated into the OU3 integrated remedial action through the preparatory action of Inventory Removal (Section 3.2.1) which is performed prior to facility decontamination and dismantlement, and during material management (Sections 3.3.5 and 3.3.6) for the characterization, treatment, packaging, and transportation of waste in a manner that ensures full compliance with DOE Orders, Department of Transportation shipping requirements, and NTS and PCDF WAC. As noted in Section 3.3.1, the procedures adopted from Removal Action 9 will be used to characterize and manage materials classified as "unknowns" since such material would fall under the category of "product, residues, and special materials".

Removal Action 12 - Safe Shutdown

The scope and decisions made for management of Removal Action 12 - Safe Shutdown have been incorporated into the OU3 integrated remedial action through the preparatory action - Safe Shutdown (Section 3.2.2), which is performed prior to decontamination and dismantlement of applicable facilities.

Removal Action 17 - Improved Storage of Soil and Debris[2]

The concepts for management of debris under Removal Action 17 - Improved Storage of Soil and Debris have been incorporated into the OU3 integrated remedial action by using applicable strategies and concepts previously developed for that removal action in the overall management of debris from OU3 above-grade decontamination and dismantlement projects. Section 3.3.2, Material Segregation and Containerization Criteria (Appendix A) and Specification 1120 (included in Appendix B) incorporate the essential elements of the approved Revision 3 of the Removal Action 17 Work Plan, including its addenda.

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[2] *OU3 RD/RA integration refers only to the above-grade debris; integration with soil and at- and below-grade debris management will be detailed in the OU5 SEP.*

Removal Action 26 - Asbestos Removal

The management of asbestos abatement provided under Removal Action 26 - Asbestos Removal has been incorporated into the OU3 integrated remedial action by including its scope and work practices into the strategies for above-grade decontamination and dismantlement projects (Sections 3.2.3, 3.3.2, and Specification 1516).

### 3.4.3 Coordination with Other Operable Units

The OU3 final remedial action will be integrated with other remediation activities at the FEMP and will contribute towards meeting the site-wide remedial strategy for the FEMP. The site-wide remedial strategy, as presented in the OU5 ROD, sets remediation goals necessary to attain long-term (minimum of 200 years) protection of the environment. The site-wide remedy incorporates the selected or preferred alternatives for each operable unit, as appropriate. The intent of the strategy is to progressively monitor the interfaces among the operable units to ensure that the final adopted site-wide remedy is well reasoned, cost-effective, and would ensure the long-term protection of human health and the environment. In general, the site-wide remedy incorporates a balanced approach to waste disposition that recognizes the technical and economic impracticality of removing and disposing of all contaminated FEMP materials at an off-site disposal facility. Under the site-wide remedy, materials with higher levels of contamination, deemed to represent the principal threat at the site, would be treated, if required, and shipped off-site for disposal. Material exhibiting lower contaminant concentrations distributed over a larger volume, termed a secondary threat, would be permanently dispositioned at the Fernald site in one central engineered disposal facility. The OU3 integrated remedial action has been planned in a manner that is consistent with this site-wide strategy.

Integration of the FEMP remedial actions is also concerned with coordination of activities that have or could have some impact on the operations of one or more of the other operable units. The key issues presented by remediation plans for the other operable units that have some affect on OU3 remediation planning are discussed in the following subsections.

Common to the RODs for Operable Units 1, 4, and the IROD for OU3 is the deferral of remediating any soil and perched groundwater that may be generated during the remedial actions to OU5 remedy decisions. The RODs for Operable Units 1, 4, and 5, and the ROD for the OU3 interim remedial action defer the final disposition of structural debris, i.e., from facilities used during their respective remedial actions, to the OU3 final remedial action. The sequencing of disposal facility preparation, decontamination and dismantlement, and the final soil and groundwater remediation will be closely coordinated among all operable units through the remedial design and remedial action phases of the site cleanup.

#### 3.4.3.1 Operable Unit 1 Remedial Action

The issues presented by the OU1 remedial action include the following: (1) coordination with OU1 for handling, transportation, and disposition of OU3 waste going to a PCDF; and (2) the decontamination and dismantlement of OU1 facilities consistent with the OU3 integrated remedial action, as discussed in Sections 2.2 and 6.1 of the OU1 RD Work plan. Transportation and disposal planning for shipments of waste to the PCDF, specifically regarding the handling of OU3 waste streams by either truck and/or rail will be closely planned and coordinated. Material handling and turnover arrangements for material which may be handled by OU1 will be determined through OU1 waste management planning.

The basic strategies developed for material evaluation and material management in this work plan (treatment and disposition decisions, at least) will apply to debris generated from dismantlement of OU1 treatment facilities; however, the planning and implementation of decontamination and dismantlement of OU1 treatment facilities will be determined by OU1 (e.g., subcontractor procurement, remedial tasks). The responsibility of submitting the design and implementation documentation to the regulatory agencies for decontamination and dismantlement of OU1 treatment facilities will lie with OU1.

3.4.3.2 Operable Unit 2 Remedial Action

The primary issues related to integrating the OU3 remedial action with OU2 remedial action regard the preparation, handling, and delivery of OU3 waste debris generated from above-grade dismantlement for disposal in the OSDF. Since the OU2 remedial action governs the staging and disposal of materials delivered to the OSDF, applicable WAC have been incorporated into the design specifications and material management strategies for the OU3 remedial action. Material preparation and handling requirements were discussed in Sections 3.3.2 and 3.3.6.2 of this work plan. Although institutional controls, deed restrictions, access controls, and operation and maintenance of the OSDF fall within the scope of the OU2 remedial action, OU3 has the responsibility to deliver OU3 waste debris in accordance with OSDF WAC and procedures. Applicable OSDF WAC and disposal requirements for impacted materials are incorporated into OU3 material management strategies, in part, by the provisions included in Section 3.3.6.2 of this work plan. It will be necessary for OU3 to closely coordinate waste shipments and long range planning of each remedial action, particularly with regard to updating the Integrated Debris-Waste-Soil Model outputs.

3.4.3.3 Operable Unit 4 Remedial Action

The primary issue that must be coordinated between OU3 and OU4 remedial actions is the decontamination and dismantlement of OU4 treatment facilities. The basic strategies developed for material evaluation and material management in this work plan (treatment and disposition decisions, at least) will apply to debris generated from dismantlement of OU4 treatment facilities; however, the planning and implementation of decontamination and dismantlement of OU4 treatment facilities will be determined by OU4 (e.g., subcontractor procurement, remedial tasks). The responsibility of submitting the design and implementation documentation to the regulatory agencies for decontamination and dismantlement of OU4 treatment facilities will lie with OU4.

3.4.3.4 Operable Unit 5 Remedial Action

Key elements for integration of remedial actions between the remedial actions implemented pursuant to the OU5 ROD and the decontamination and dismantlement of OU3 facilities include: (1) coordination and scheduling of at- and below-grade dismantlement of OU3 facilities and related material evaluation and disposition; (2) decontamination, dismantlement, and disposition of long-term remedial action facilities (e.g., biodenitrification system, AWWT) consistent with the strategies provided in this work plan; and (3) treatment and disposal of stormwater and decontamination washwater generated by OU3 remediation, as necessary. The first issue is addressed by SEP documents, the second issue is addressed by OU5 Aquifer Restoration Project RA documentation, and the third issue has been addressed in Section 3.5.2 of this work plan.

Section 3.2.7 provides a general strategy for dismantlement of OU3 at- and below-grade facilities; however, the SEP will provide scheduling and strategies for design, procurement, and implementation that apply to dismantlement of long-term remedial action facilities and at- and below-grade components and material management. The SEP will address the specific strategies regarding methods for evaluating materials during excavation design, shutdown of existing utilities, removal of concrete slabs and pilings, completion of HWMU decontamination activities, verification screening/sampling, material size reduction, staging, and disposal. SCEP Project Management will ensure that OU3 remedial action objectives are met during at- and below-grade remediation.

## 3.5 Compliance with ARARs

The remediation activities that fall within the scope of the OU3 integrated remedial action are required under Section 121 (d)(1) of CERCLA to attain standards, requirements, or criteria that are "applicable or relevant and appropriate" (i.e., ARARs) under the circumstances of the release at a site. The ARARs for the decontamination and dismantlement phase of the OU3 integrated remedial action are identified in Section 10 of the IROD, and those ARARs that apply to the material treatment, storage, and disposition phase are defined in Section 9.2 and Appendix B of the OU3 Final Action ROD. The criteria and strategies for implementing RD and RA tasks are developed based on those ARARs and TBCs. No activity-specific permitting is required for remedial actions described in this work plan; however, the substantive requirements of the ARARs will still be achieved.

The information contained in this section and in Appendix B of the OU3 Final Action ROD constitute the plan for satisfying permitting requirements as required by the ACA. The purpose of this section is to highlight the most prominent programs and actions that will be implemented during the OU3 integrated remedial action to ensure attainment of those ARARs and other requirements. Sections 3.5.1, 3.5.2, and 3.5.3 provide detailed discussions on how ARARs will be attained for control of air emissions, management of contaminated water, and HWMU decontamination activities.

### 3.5.1 Control of Air Emissions

The control of air emissions during activities performed under the OU3 integrated remedial action will occur through the selection and use of techniques that minimize air emissions and through the implementation of engineering controls. Engineering controls are required by performance specifications as well as the RRP developed for each project during design. The RRP specifies that radiological engineering controls be used to minimize, among other things, airborne radioactivity. The RRP provides stringent guidelines and contamination limits to the remediation subcontractor to ensure that airborne radioactivity is minimized.

Engineering controls will consist of physical barriers, air locks, fixatives, filtration equipment, sealants, water sprays, and wetting agents that will ensure the safety of workers and decrease airborne dust. The Ohio Air Pollution Control Regulations (OAC 3745-31-05) require the use of Best Available Technologies and work practices for the control fugitive dust emissions (e.g., forced negative air). The performance specifications require the remediation subcontractor to prepare plans detailing methods and materials to control fugitive emissions for various activities. For example, Specification 03315 includes such a provision for concrete removal. Such measures/controls, along with the project-specific air monitoring to be

performed (see Section 3.6.2.1 of this work plan) will also ensure compliance with DOE Order 5400.5 - Radiation Protection of the Public and the Environment.

Two areas of the NESHAPs regulations with which the FEMP is required to comply are pertinent to the actions to be taken under the selected remedy. The first is a requirement under 40 CFR 61, Subpart H, for monitoring radionuclide emissions from the site and point sources (i.e., stacks/vents). In the FEMP air monitoring program presented in the Draft Final Integrated Environmental Monitoring Plan (IEMP) (Draft Final, DOE 1997), Subpart H compliance will be demonstrated through an approach that relies on actual measurements of ambient radionuclide particulate concentrations at or near potential receptor locations. As such, fugitive emissions from decontamination and dismantlement operations, as well as other project-specific diffuse and point source emissions, will be measured collectively and evaluated against the NESHAP dose limit of 10 millirem (mrem)/year for the FEMP. Therefore, the data collected through the IEMP air monitoring program provides a direct measure of the collective effectiveness of project-specific point source and diffuse source emission controls relative to a health-based standard. Based on this approach, the IEMP meets its objective of providing an independent appraisal of air emissions and controls. Additional monitoring at the project level are not necessary to support compliance or to ensure protection of the public; however, OU3 has developed a project-specific radiological air monitoring approach that is both consistent with the air monitoring approach described in the Draft Final IEMP and reflective of commitments made to the public in the OU3 IROD and Final Action ROD. The OU3 project-specific radiological air monitoring strategy is presented in Section 3.6.2.1 of this work plan.

The second pertinent area of NESHAPs, 40 CFR 61, Subpart M, includes compliance with applicable asbestos standards for renovation (asbestos abatement) and demolition activities. The FEMP is required to notify the Ohio Department of Environmental Services of its intent to undertake asbestos abatement and/or demolition projects that involve removal of asbestos over a specified amount. This local notification serves as notification to both the U.S. EPA and Ohio EPA. The Department of Environmental Services is a multi-county agency which serves this region of Ohio. All subcontractors performing asbestos removal and/or demolition work at the FEMP must also notify the Ohio Department of Health that the project is being undertaken. These requirements are passed on to the remediation subcontractor in Specification 01516.

### 3.5.2 Management of Contaminated Water

Water produced during the decontamination and dismantlement activities or from surface runoff during above-grade decontamination and dismantlement projects will be managed within the project boundary by the use of engineering and/or administrative controls. The controls employed will be in accordance with the existing FEMP Stormwater Pollution Prevention Plan (DOE 1996i). The strategy for attaining the requirements for management of contaminated water is detailed in Section 3.3.3. For each decontamination phase of a project, the wash water will be collected in batches containers and characterized using a combination of process knowledge and sampling. The current site procedure that governs the evaluation and management of contaminated washwaters is EP-0005. After the characteristics of the water have been determined, the water will be pre-treated as necessary and undergo further treatment through the WWTS as decided by OU5 WWTS managers. The water will be managed to prevent the generation of additional waste streams and the spread of contaminants offsite. Treatment of contaminated water will be provided as necessary to comply with the FEMP NPDES Permit.

To provide for future OU3 wastewater treatment capacity, OU3 provided WWTS managers with an estimate of complex-specific washwater generation rates, OU3 remediation schedule, and lists identifying washwaters having special handling concerns (e.g., potential listed washwaters from HWMU decontamination and washwaters potentially having enrichment above one percent). Any revisions to that information will be provided to WWTS managers.

### 3.5.3 HWMU Remediation

HWMU remediation performed under the OU3 integrated remedial action will be consistent with all ARARs identified in Appendix B of the OU3 Final Action ROD, including compliance with Ohio hazardous waste regulations per the OAC. Storage, treatment, and disposal of hazardous and mixed wastes are discussed in Section 3.3.

#### 3.5.3.1 Integration of CERCLA and RCRA

On June 6, 1996 Ohio EPA issued a final DF&O to the FEMP. The DF&O integrates substantive RCRA closure requirements with the CERCLA remediation process. For OU3, the DF&O provides for the remediation of the RCRA regulated units through CERCLA removal actions and through the implementation of the Final Action ROD. These HWMU remediation activities will be performed by completing the substantive portions of RCRA as applicable.

Project completion reports for above-grade remediation, prepared in accordance with 40 CFR 300 and OSWER Directive 9320.2-3A for each OU3 complex, will document the remedial activities performed for each HWMU. These reports are described in further detail in Section 4.5 and 6.1.

#### 3.5.3.2 Units to be Clean Closed Under RCRA

Remediation fieldwork for 13 of the total 40 HWMUs in OU3 has been completed under RCRA, constituting a partial closure of the FEMP facility. These HWMUs have been identified in Table 3-9. Applicable RCRA closure requirements, under OAC 3745-66 (40 CFR 265, Subpart G), have been followed to formally close these units. Closure Plan Information and Data (CPID) packages have been submitted to Ohio EPA in compliance with the RCRA closure requirements identified in the Stipulated Amendment to the Consent Decree (SACD) for the units that required closure plans. CPIDs specify procedures for closure of HWMUs and each plan constitutes a partial closure of the FEMP facility. Certification documentation have been submitted to Ohio EPA for closure completed in accordance with an approved CPID. Since clean closure of the 13 HWMUs has been completed, dismantlement of any remaining structures decontaminated during RCRA closure within the 13 HWMUs will be performed under the OU3 integrated remedial action.

#### 3.5.3.3 Unit Remediation to be Completed Under RCRA/CERCLA Integrated Process

Table 3-10 lists the remaining 20 inactive HWMUs and the seven active HWMUs that will be remediated through the integrated RCRA/CERCLA process as discussed in the DF&O. The last two HWMUs at the FEMP, Waste Pits 4 and 5, will be remediated under the integrated RCRA/CERCLA process during OU1 remedial action. The integrated RCRA/CERCLA strategy allows for remediation of these units either through response actions performed by the FEMP work force or by the remedial action subcontractor.

**TABLE 3-9 Clean Closure of HWMUs Under RCRA**

| HWMU No. | HWMUs Clean Closed | Documentation Status |
|---|---|---|
| 3 | Waste Oil Storage in Garage | 6Jun96 OEPA Closure Certification Acceptance |
| 6 | Drummed HF Residue Storage Inside Plant 4 | 28Apr95 OEPA Closure Certification Acceptance |
| 7 | Drummed HF Residue Storage NW of Plant 4 | 2Jul96 OEPA Clean Closure Acceptance |
| 8 | Drummed HF Residue S/Cooling Tower | 2Jul96 OEPA Clean Closure Acceptance |
| 9 | Nitric Acid Rail Car and Area | 25Apr95 OEPA Closure Certification Acceptance |
| 13 | Wheelabrator Dust Collector - Building 66 | 5Apr96 OEPA Closure Certification Acceptance |
| 26 | Detrex Still | 27Nov95 OEPA Closure Certification Acceptance |
| 30 | Barium Chloride Salt Treatment Facility | 19Apr90 Closure Certification to OEPA |
| 31/32 | Bulk Storage Tanks T5 & T6 | 2Apr96 Closure Certification to OEPA |
| 38 | HF Tank Car | 27Nov95 OEPA Closure Certification Acceptance |
| 52 | North and South Solvent Tanks (Pilot Plant) | 24Jun96 OEPA Closure Certification Acceptance |
| 53 | Safe Geometry Digestion Sump (Plant 1) | 13Feb95 Letter of Completion to OEPA |

The Safe Shutdown Program, which has been integrated into OU3 remedial action as preparatory action, will continue to remove holdup material/residues from HWMUs, using the same methods as before the DF&O was signed in June 1996. Gross decontamination of equipment, tanks, associated pad surfaces, etc. will be performed using the most suitable and practical method (e.g., vacuuming, wiping). Safety, health, and the ultimate disposition of equipment, tanks, and associated concrete pad surfaces will continue to be the major factors considered in selecting the most appropriate method of decontamination.

The FEMP will provide notification to Ohio EPA prior to beginning decontamination work on the HWMUs. Site procedures and safe shutdown implementation plans will provide information on the decontamination methods to be used during safe shutdown. Adopted safe shutdown procedures will provide the details regarding decontamination methods.

Holdup material/residues generated by safe shutdown activities will be characterized and tracked via the strategies presented in Sections 3.3.1 and 3.3.2 (e.g., Material Evaluation Form and SWIFTS). Prior to disposition, the holdup material/residues will be stored in accordance with appropriate site procedures.

Dismantlement of the above-grade components will be performed by a remediation subcontractor. The preferred disposition route for equipment, tank(s), and debris associated with the HWMU is on-site disposal provided that the debris meets the OSDF WAC. The CAMU concept provides a regulatory mechanism for the disposition of HWMU-derived remediation wastes into the OSDF. Concrete pad sections of the HWMUs which may have been in contact with RCRA listed waste will be disposed into the OSDF provided the WAC can be met. Dismantlement and disposition of the pads, as well as other at- and below-grade materials will be addressed in the SEP developed under the OU5 RD/RA process. Equipment and tanks that contacted RCRA listed waste could be placed directly into the OSDF provided that they meet the OSDF WAC. Pads, tanks, and equipment will be decontaminated for radiological constituents as described in Section 3.2.5 prior to OSDF disposal. During

## TABLE 3-10 OU3 HWMUs To Be Closed Under the RCRA/CERCLA Integrated Process

| HWMU Number | HWMU Identification | Component Number | Above-Grade OU3 Complex/Action[1] | At- and Below-Grade SCEP Remediation[1] |
|---|---|---|---|---|
| | | **INACTIVE HWMUS** | | |
| 1 | Fire Training Facility | 73A,B,C,D,E | RvA 28 | Soil and Debris |
| 4 | Drum Storage Area Near Lab Loading Dock | 15A | N/A | Soil and Debris |
| 5 | Drum Storage Area South of W-26 | 15A | N/A | Soil and Debris |
| 10 | NAR System Components | 2A | Plant 2 Complex | Soil |
| 11 | Tank Farm Sump | 19D | N/A | Debris |
| 14 | Box Furnace | 74R | Plant 8 Complex | Soil and Debris |
| 15 | Oxidation Furnace #1 | 8A | Plant 8 Complex | N/A |
| 17 | Plant 8 East Pad | 74C | N/A | Soil and Debris |
| 18 | Plant 8 West Pad | 74D | N/A | Soil and Debris |
| 22 | Abandoned Sump | 13A | N/A | Soil and Debris |
| 25 | Plant 1 Storage Building | 67 | Plant 1 Complex - Phase I | Soil and Debris |
| 28 | Trane Incinerator | 39A | Plant 3 Complex | Debris |
| 36 | Storage Pad North of Plant 6 | 74J | N/A | Soil and Debris |
| 41 | Sludge Drying Beds | 25F | N/A | Soil and Debris |
| 46 | UNH Tanks - NFS Storage Area | 2E | Plant 2 Complex | Debris |
| 47 | UNH Tanks - North of Plant 2A | 2A | Plant 2 Complex | Debris |
| 48 | UNH Tanks - Southeast of Plant 2A | 18B | General Sump Complex | Debris |
| 49 | UNH Tanks - Digestion Area (2 locations) | 2A | Plant 2 Complex | Debris |
| 50 | UNH Tanks - Raffinate Building (2 locations) | 3E | Plant 3 Complex | Debris |
| 54 | Thorium Nitrate Tank (T2) | 13D | Pilot Plant Complex | Debris |
| | | **ACTIVE HWMUS** | | |
| 19 | CP Storage Warehouse (Butler Building) | 56A | Plant 1 Complex - Phase II | Debris |
| 20 | Plant 1 Storage Pad | 74T | N/A | Soil and Debris |
| 29 | Plant 8 Warehouse | 80 | Plant 8 Complex | Debris |
| 33 | Pilot Plant Warehouse | 68 | Pilot Plant Complex | Debris |
| 34 | KC-2 Warehouse | 63 | Plant 1 Complex - Phase II | Debris |
| 35 | Plant 9 Warehouse | 81 | Thorium/Plant 9 Complex | Debris |
| 37 | Plant 6 Warehouse | 79 | East Warehouse Complex | Debris |

1. Dates for remediation of above-grade HWMUs are determined by the remediation schedule for the affected OU3 component and reported in the appropriate project-specific implementation plan. Implementation plan submittal dates are provided in Section 6.3; At- and below-grade HWMU remediation to be addressed in the SEP.

above-grade project remedial design, material evaluation will include any washwater/rinsewater that may be generated from the radiological decontamination of the HWMUs that have been identified as potentially containing RCRA-listed constituents to determine the appropriate on-site treatment. If it is determined by FEMP WWTS managers to prevent RCRA-listed constituents from mixing with other site sludges, such washwaters/rinsewaters will be containerized in batches separately from other facility washwaters/rinsewaters and sampled to determine appropriate treatment and disposal requirements. The remedial design for above-grade decontamination and dismantlement of the HWMUs listed in Table 3-11 will require special evaluation of wastewaters due to potential RCRA-listed constituent concerns.

Records concerning the disposition of waste and debris from the HWMUs into the OSDF will be part of the RCRA Operating Record.

For HWMUs where characteristic hazardous waste is involved, process knowledge or appropriate decontamination methods (discussed in Section 3.2.5) will be used to verify that the debris does not exhibit any hazardous characteristics. The debris from these HWMUs will have to meet the OSDF WAC. If OSDF WAC cannot be met, that material will be treated and dispositioned at an approved treatment-storage-disposal facility (TSDF).

The seven active storage units will continue to be maintained as active units until no longer needed to support the OU3 integrated remedial action. The 27 units to be closed under the integrated RCRA/CERCLA process will be documented using the following strategy:

- activities which will constitute the necessary elements for remediation of the HWMUs will be specified in project-specific implementation plans for above-grade decontamination and dismantlement, and an accounting of any preparatory action (safe shutdown) HWMU decontamination activities;

- for attainment of substantive closure requirements, Table 3-12 provides a cross-reference as to where they will be found within the CERCLA documentation;

- project completion reports for above-grade decontamination and dismantlement projects will contain a summary of HWMU remediation activities that were performed for a given project; and

- documentation to support at- and below-grade HWMU remediation to be supplied pursuant to provisions in the SEP (refer to Table 3-12).

**TABLE 3-11 Above-Grade Remediation of HWMUs With Associated RCRA-Listed Wastes**

| No. | HWMU Identification | Component No. | OU3 Complex | Listed Constituents |
|---|---|---|---|---|
| 14 | Box Furnace | 74R | Plant 8 Complex | F002 PCE, TCA, TCE |
| 15 | Oxidation Furnace #1 | 8A | Plant 8 Complex | F002 TCA |
| 19 | CP Storage Warehouse (Butler Building) | 56A | Plant 1 Complex - Phase II | all stored* |
| 25 | Plant 1 Storage Building | 67 | Plant 1 Complex - Phase I | all stored* |
| 28 | Trane Incinerator | 39A<br>39B | Plant 3 Complex<br>Plant 2 Complex | F002 TCA<br>F002 TCA |
| 29 | Plant 8 Warehouse | 80 | Plant 8 Complex | all stored* |
| 33 | Pilot Plant Warehouse | 68 | Pilot Plant Complex | all stored* |
| 34 | KC-2 Warehouse | 63 | Plant 1 Complex - Phase II | all stored* |
| 35 | Plant 9 Warehouse | 81 | Thorium/Plant 9 Complex | all stored* |
| 37 | Plant 6 Warehouse | 79 | East Warehouse Complex | all stored* |

* Refers to RCRA-listed wastes having been stored in those HWMUs but specific constituents are still being determined.

## 3.6 Environmental Monitoring

The current focus of environmental monitoring at the FEMP is the implementation of: 1) site-wide environmental monitoring; and 2) project-specific environmental monitoring. Site-wide environmental monitoring is addressed in the IEMP while project-specific environmental monitoring will be addressed by project-specific environmental monitoring plans. For remediation activities that fall within the scope of the OU3 integrated remedial action, project-specific environmental monitoring requirements will be included in individual implementation plans.

### 3.6.1 Integrated Environmental Monitoring

The IEMP has been prepared in a manner that focuses on groundwater, surface water, and air surveillance and reporting necessary to ensure protection of human health and the environment during the site-wide remediation activities. The IEMP replaces the previous site Environmental Monitoring Plan (EMP). The IEMP includes the programmatic environmental monitoring requirements that have been prescribed for the OU3 integrated remedial action. The previous EMP had provided comprehensive on-property and off-property environmental surveillance requirements that specifically addressed the monitoring and reporting needs associated with an active uranium production facility and pre-remediation activities. The IEMP represents a revision of the EMP that focuses primarily on site remediation. The IEMP incorporates new regulatory requirements for site-wide monitoring, reporting, and tracking. The IEMP provides the central reporting mechanism to the regulators and stakeholders for the ongoing emission control/monitoring activities at the FEMP. Site-wide reporting under the IEMP does not preclude project-specific reporting for OU3 above-grade decontamination and dismantlement projects.

**TABLE 3-12 Crosswalk Between RCRA Closure Guidance Requirements and CERCLA Documentation For OU3 HWMUs**

| OEPA Closure Guidance Item | CERCLA Documentation for Above-Grade Structural Components | CERCLA Documentation for At- and Below-Grade Structural Components |
|---|---|---|
| Description/Detailed Drawings of Waste Management Units (Item 3.2/3.4) | Figure 2-2 and Table 3-10 of OU3 Integrated RD/RA WP, Implementation Plans for Above-Grade Decontamination and Dismantlement | OU5 RI Report |
| List of Hazardous Waste Managed In Units (Item 3.5) | Implementation Plans for Above-Grade Decontamination and Dismantlement | OU3 RI/FS Report; OU5 RI and FS Reports |
| Removal of Waste (Item 3.6) | OU3 Integrated RD/RA Work Plan (Secs. 3.2.3, 3.3, and 3.5.3); Implementation Plans for Above-Grade Decontamination and Dismantlement | SEP and Integrated Remedial Design Packages |
| Schedule For Closure (Item 3.7) | OU3 Integrated RD/RA Work Plan (Sec. 6); Implementation Plans for Above-Grade Decontamination and Dismantlement | OU5 Integrated Remedial Design Packages |
| Health & Safety Issues (Item 3.9) | OU3 Integrated Remedial Action HASP (Appendix E) | SEP and Integrated Remedial Design Packages |
| Decontamination Efforts (Item 3.10) | OU3 Integrated RD/RA Work Plan (Secs. 3.2.3, 3.5.3); Implementation Plans for Above-Grade Decontamination and Dismantlement | SEP and Integrated Remedial Design Packages |
| Remediation Standard for Soil & Ground Water (Item 3.11/23.12) | N/A | OU5 Record of Decision |
| Sampling Plan and Analytical Procedures (Item 3.13) | N/A | OU5 SEP, and Integrated Remedial Design Packages |
| Description of Removal Efforts/ Treatment Processes (Item 3.14) | Implementation Plans for Above-Grade Decontamination and Dismantlement | SEP and Integrated Remedial Design Packages |
| Landfill Closure Requirements (Item 3.15) | N/A | OU5 ROD, SEP, Integrated Remedial Design Packages |
| Certification (3.16) | Project Completion Reports for Above-Grade Decontamination and Dismantlement; Remedial Action Report. | Certification Reports and Remedial Action Report |
| Status of Facility After Closure (Item 3.17) | IROD | OU5 SEP |

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### 3.6.2 Project-Specific Environmental Monitoring

The project-specific environmental monitoring plans address sampling of air, wastewaters, and groundwater within and surrounding specified project boundaries. The need and extent of project-specific monitoring is based on the evaluation of the following three criteria:

- project complexity, extent of contamination, and scope;
- applicable ARARs, Occupational Safety and Health Act requirements and DOE Orders; and,
- existing monitoring data, modeling, and monitoring programs.

The project-specific monitoring plans, if needed, are modeled and designed based on the location specific constraints. Modeling for potential emissions early in the project design is the basis for identifying and instituting process controls and emission controls. The effectiveness of the project-specific emission controls will be evaluated through analysis of monitoring results to identify whether increased or altered emission control methods are necessary. Project-specific environmental monitoring planning will be documented in project implementation plans and a summary of monitoring results will be provided in project completion reports.

#### 3.6.2.1 Environmental Air Emissions Monitoring

The project-specific environmental air emissions monitoring for individual above-grade projects consists of air monitoring performed under one or more of three programs: 1) the Fernald Site Environmental Monitoring Program; 2) the Occupational Air Monitoring Program, which addresses worker safety; and if needed, based on additional process control requirements, 3) the supplemental environmental air monitoring program. The first two sub-programs are established programs that will continue throughout remediation; the first being addressed entirely within the IEMP, and the second being addressed in the OU3 Integrated Remedial Action HASP (Appendix E) and applied to each project via the project-specific RRP. The third program, supplemental environmental air monitoring, will be developed as needed specifically for each of the individual projects designed under the OU3 integrated remedial action. The supplemental environmental air monitoring program will be designed to address specific process control needs. Due to the predominance of radiological contaminants in OU3 components, since they represent the primary contaminants of concern, the focus of environmental monitoring will be for radionuclides; however, monitoring for other contaminants of concern will be added on a project-specific basis when warranted, such as for asbestos during decontamination of a component containing friable ACM. Section 8.1 of the OU3 Integrated Remedial Action HASP addresses air monitoring for work that will potentially release asbestos fibers.

<u>Supplemental Radiological Air Monitoring</u>
Any supplemental radiological air monitoring that is developed will be in accordance with the commitments provided in the IROD and OU3 Final Action ROD to use air sampling devices in a manner that ensures that airborne radiological activity is maintained at low levels. Although existing occupational monitoring efforts described in the OU3 HASP and environmental monitoring described in the IEMP may be sufficient to achieve the goal of ensuring that project-specific emissions are maintained at low levels, the OU3 supplemental radiological air monitoring program has been developed as a framework that allows project designers to

evaluate the extent of its application for any particular project. The supplemental air monitoring program is broadly designed to take advantage of existing and potential new sampling technologies to achieve the above-stated goal (i.e., samplers that would provide useful data on a timely basis to support prompt decision making). The supplemental program strategy includes a use of a combination of additional occupational and environmental air monitoring efforts which employ personal air sampling, breathing zone sampling, general area sampling, and perimeter sampling.

Whereas the sitewide radiological air monitoring program presented in the IEMP is designed to demonstrate compliance with NESHAPs Subpart H, the OU3 supplemental radiological air monitoring program is designed to evaluate the effectiveness of emissions control measures implemented for a project. As a supplemental program to the sitewide radiological environmental air monitoring program, it does not serve as a method to determine compliance with NESHAPs Subpart H.

The supplemental radiological air monitoring approach for each project will be defined during project design, as appropriate. During remedial design, the criteria listed below will be considered to determine the extent of radiological environmental air monitoring appropriate for a project.

- Availability and adequacy of existing air monitoring stations.
- Occupational monitoring program to be implemented.
- Project-specific phases and activities that have the potential for radiological air emissions, such as decontamination, dismantlement, material management, and the type of monitoring (continuous versus grab) that should be performed. Continuous sampling is desirable if airborne radionuclide concentrations have the potential to fluctuate widely.
- The need for pre- and post-project monitoring to compare data obtained during each project. Such data will also be used to verify the success of decontamination techniques.
- The potential hazard of the materials available for release, considering both the expected quantities and relative radiotoxicities. The review of previously obtained characterization data of radionuclides in a particular component, including ratios to other nonmeasurable radionuclides, is necessary since the control of radionuclide releases depends on the source available and any treatment system used.
- The expected dispersion of airborne releases, including predominant wind directions and the degree to which the radionuclides of concern may be diluted or reconcentrated in the biosphere. Air monitors will generally be concentrated downwind of the monitoring facility, but monitors in all directions are preferred.
- The length of time required to complete each activity that has the potential to cause fugitive emissions.

- Sample representativeness. Measurements should be made at the points/areas at which the data best represent what is being released to uncontrolled areas.

- Other remediation projects being performed simultaneously. Project-specific monitoring with results that can be attributed solely to one project may not be possible.

- The radionuclides or analytes to be measured. Gross radioactivity measurements will probably be inadequate, except under the following circumstances: when gross radioactivity releases are a small fraction of the off-site Derived Concentration Guide (DCG) values for "unidentified" mixtures; when ratios of specific radionuclides are sufficiently known (and constant) for which gross activity measurements are truly indicative; and when radionuclide concentrations are so low as to preclude specific nuclide measurements.

- Accessibility to the air monitoring station for maintenance and calibration.

The results of each project supplemental air monitoring evaluation will be presented in the respective implementation plans. For OU3 projects that include supplemental environmental radiological air monitoring, the project implementation plans shall include the following basic elements:

- results of computer modeling, including the base assumption for the distance to the theoretical "maximally exposed individual" and the maximum Effective Dose Equivalent calculated;

- identification of any emissions thresholds for which, if exceeded, would require mitigative actions;

- potential mitigative actions;

- type, number, and locations of supplemental radiological air sampling and the basis for choosing them;

- requirements for pre-implementation background monitoring, if necessary;

- sampling frequency; and

- reporting criteria.

Based on the criteria listed above, with primary input from OU3 RI/FS data, air emissions computer modeling will be performed to determine the potential dose from each project. The air emissions computer modeling method that has been used thus far for decontamination and dismantlement projects to assess potential radiological environmental emissions is the CAP88PC model, which is the personal computer version of the U.S. EPA model CAP88 that is the approved method for predicting emissions of radionuclides under the NESHAPs

regulations. It is anticipated that use of this model will continue throughout OU3 remediation unless superseded by new U.S. EPA guidance. It should be emphasized that the CAP88 model is being used as a tool for assessing potential emissions from a project for the purpose of identifying potential mitigative controls and possibly the use of supplemental monitoring measures; it is not being used as a means to demonstrate compliance with NESHAPs Subpart H. As discussed in Section 3.5.1, the method to be used for demonstrating NESHAPs Subpart H compliance is presented in the IEMP as a collective sitewide strategy. Either CAP88 or a comparable modeling tool will be used, as necessary. The modeling methodology used for each project will be described in the project implementation plans along with modeling results.

The results of the modeling will be evaluated by DOE, OU3 project managers, and IEMP managers to determine the applicability of supplemental monitoring and the potential need for additional emission control measures. Additionally, OU3 project management will proactively coordinate with IEMP planning and monitoring activities to evaluate the adequacy of sampling frequency and analytical regime to ensure that project emissions control objectives are going to be met.

The project design evaluation of the need for project-specific monitoring will also take into account modeling and air monitoring data from previous OU3 projects, such as Plant 7, Building 4A, and Plant 1 Complex - Phase I. The decision as to the types and number of samplers for a project will be made by evaluating the nature of the potential source, existing site air monitoring network, computer-generated air dispersion modeling (CAP88PC) results, project engineering requirements, and stakeholder concerns. Practical considerations such as availability of electrical power, process knowledge, accessibility for air monitoring, and siting criteria will also be evaluated.

For projects where supplemental environmental radiological air monitoring is not performed, the commitments in the OU3 IROD and Final Action ROD will be met by utilization of occupational monitoring data generated from breathing zone and general work area sampling (described in Section 8.1 of the OU3 Integrated Remedial Action HASP) and data from the extensive network of high volume air monitors operated under the FEMP integrated environmental monitoring program described in the IEMP.

Further details regarding the sampling and analytical strategies for the project-specific environmental air emissions monitoring program have been included in the RD/RA SAP contained in Appendix D.

#### 3.6.2.2 Surface Water (NPDES)

There are two aspects of surface water monitoring that OU3 remediation has to consider during project planning and design: stormwater and wastewater. Strategies for managing both stormwater and wastewater on a project-specific basis are described in Sections 3.3.3 and 3.5.2. For both categories of project water effluents, monitoring to determine compliance with the FEMP NPDES permit will be the responsibility of WWTS managers operating within the AWWT and Wastewater Project. The responsibility for OU3 project managers will be to ensure that the effluents are controlled (e.g., pre-filtered and batched, and through run-off control measures) according to requirements specified by WWTS managers.

### 3.6.2.3 Groundwater Monitoring

Groundwater monitoring is currently being managed by the Aquifer Restoration Project (ARP). The ARP currently provides the monitoring necessary to identify the effect of the current FEMP activities and are adequate for assessing potential impacts on groundwater quality due to OU3 remediation. In the event that collection of groundwater samples is needed to support OU3 remediation (or to assess any incidental releases), ARP managers will be notified to coordinate the appropriate activity.

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Section 4

# 4.0 RD/RA PLANNING AND EXECUTION

This section describes the planning and execution tasks that are necessary to implement above-grade decontamination and dismantlement and material management according to implementation strategies presented in Section 3. These tasks are programmatic in nature and will be subject to appropriate process improvements resulting from lessons-learned and cost effectiveness over the course of OU3 remediation. RD and RA planning and execution tasks that are needed to address at- and below-grade remediation are/will be presented in RD and RA plans for the SCEP.

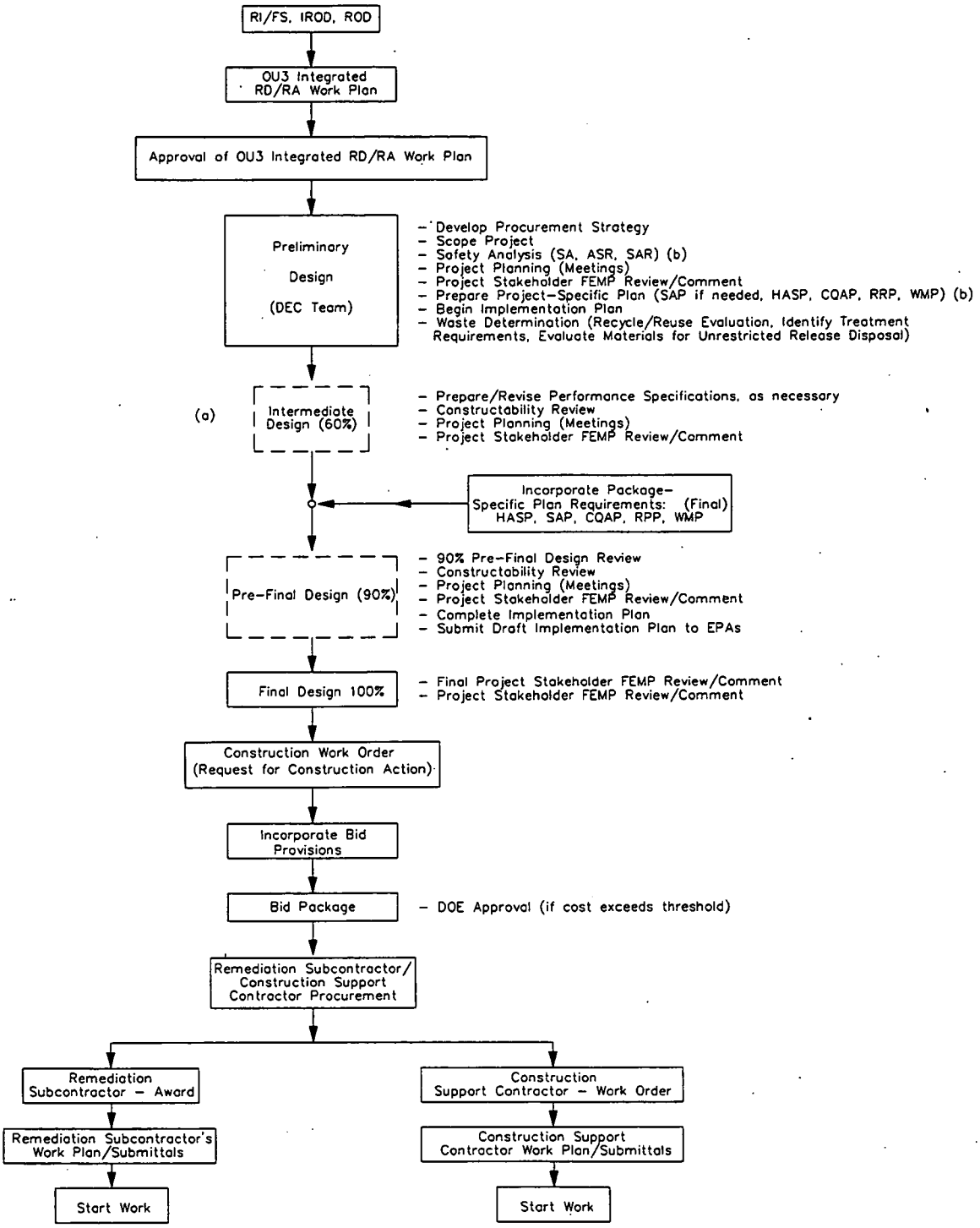
## 4.1 Remedial Design

The remedial design process will be phased over the course of the OU3 integrated remedial action, through the development of a planning and design documents needed to decontaminate, dismantle, and manage the treatment and disposition of materials from each project. Figure 4-1 provides an overview of the design and bid package process. The OU3 remedial design process will address, on a project-specific basis, the actions needed to effectively implement the scope of the OU3 integrated remedial action. The primary remedial design tasks to be performed during each project include the Preliminary Design, Intermediate Design, Pre-Final Design, Final Design, and preparation and submittal of an implementation plan to the regulators for approval.

The process of value engineering will be performed as necessary to develop alternative concepts that may produce a reduction in project costs and/or life-cycle cost of the project. An independent multi-disciplinary engineering team will evaluate the alternative concepts for feasibility and compliance with the design and performance objectives of the project. Value engineering may include analysis and use of alternative design approaches and activity sequences, and may consider other factors such as public acceptance. Project refinements will be limited to avoid significantly altering the intent of the OU3 Final Action ROD, unless otherwise approved by U.S. EPA. When the value engineering process is implemented during project design, the intent of the Office of Solid Waste Emergency Response (OSWER) Directive 9355.0-4A and DOE Order 4010.1A will be met. Should the value engineering process substantively affect design, the affected design elements will be identified in the respective implementation plan.

A DEC Team will be formed to perform and/or manage the remedial design tasks for each project. Organizational representation on the DEC Team and responsibilities of the DEC Team are discussed in Section 7.

The design documents preparation process will be carried out according to the requirements of the ACA and CERCLA RD/RA guidance, with some modifications due to the size and complexity of the OU3 RD/RA program. The RD/RA documentation is also intended to satisfy the technical and functional requirements of DOE Order 4700.1 - Project Management System (i.e., Conceptual Design Report, Design Criteria, Title I and II Design).




Footnotes: (a) - Dashed-line box presents potential intermediate review stages of design
(b) - SAR: Safety Analysis Report; ASR: Auditable Safety Analysis Report; HASP: Health & Safety Plan; CQAP: Construction Quality Assurance Plan; RRP: Radiological Requirements Plan; WMP: Waste Management Plan

**FIGURE 4-1 Overview of the Design Package/Bid Package Development Process**

### 4.1.1 Preliminary Design

The DEC Team, will develop a preliminary design scoping document to establish the framework for completing the remedial design and remedial action activities. This document will include the following sections:

Project Description
This section defines the scope of remedial activities, the purpose of the project, a brief process history of components, and a description of the remedial action activities required to meet the purpose.

Project Justification
This section summarizes the drivers to perform remedial activities on a complex basis and describes the need to complete this complex in the sequence selected.

Conceptual Drawings
The conceptual drawings provide the extent of the remedial activities in relation to surrounding site conditions.

Applicable Codes, Standards, ARARs, and Specifications
This section reiterates the need to perform all activities in accordance with all applicable federal, state, and local environmental laws and regulations and the ACA.

Budget Data
This section describes the funding sources for the project through the DOE activity data sheets and the project work breakdown structure.

Preliminary Cost Estimate
This section provides the preliminary cost estimate and identifies the need to perform a detailed estimate during pre-final design.

Schedule
The Level I schedule identifies the requirements to track the project from preliminary design through subcontract award. Critical path activities are added to the schedule to incorporate the needs of all project participants.

Statement of Work Methods
The Statement of Work (SOW) provides a flow diagram depicting the general requirements (Level I schedule) from preliminary design to project closeout. The work methods section also describes the primary job responsibilities for the organizations involved in the project. This section includes:

- labor determination;
- preparation of the bid package, evaluation of bids and remediation subcontractor award recommendation;
- preparation of the Certified for Construction (CFC) design package and obtaining preliminary design permissives which includes real estate approval to remove structures;
- preparation of performance specifications; and
- detailing remedial action tasks (Level II scheduling).

Special Conditions
This section depicts project-specific conditions that are unique to the project including pre-qualification requirements for the remediation subcontractor.

Possible Alternatives
This section states that a team independent of the DEC Team will be formed to use value engineering concepts for defining alternative concepts and cost saving measures.

Environmental Assessment, Health and Safety Plan, Safety Assessment, Risk Assessment, Quality Assurance
These sections state the need to develop project-specific plans and review current documentation to ensure compliance with project requirements.

One preliminary design scoping document will be developed for each design package (i.e., for each OU3 complex). In addition to developing the preliminary design document, the DEC Team will begin to define procurement strategies; long-lead permitting requirements; and coordination needs between safe shutdown activities, other operable units and other site organizations. These organizations could also begin key planning activities related to management of material as discussed in Section 3.3.

During preliminary design, efforts will also be undertaken to identify any additional characterization requirements. Sampling needed for discharge of decontamination wash/rinse water should also be defined at this stage. Environmental radiological air emissions sampling, including baseline monitoring, needed to support assessment of the environment monitoring during decontamination and dismantlement will also be defined at this point.

The final task of the preliminary design is to develop the remedial design subcontractor's SOW based on the approved preliminary design scoping document. The remedial design subcontractor has the primary responsibility to prepare such items as performance specifications and other engineering design specifications and drawings with the assistance, oversight, and approval of the DEC Team.

The remedial design subcontractor's SOW will consist of the following elements: a description of the work to be performed; the design methodology; design criteria; design deliverables; and other support functions required from the remedial design subcontractor (i.e., meeting participation, submittal reviews, and field support during the remedial action). One design SOW will be developed for each design package (i.e., for each decontamination and dismantlement project).

Design Methodology
The design methodology element of the SOW will be developed, taking the following factors into consideration: component and building configuration, location, structural integrity, types and levels of contamination, and construction type (see Section 3.2); regulatory requirements (i.e., ARARS); other requirements Engineering/Construction procedures); the "as low as reasonably achievable" (ALARA) principle; waste minimization requirements; available decontamination, dismantlement, size reduction, and segregation technologies; schedule and funding constraints; the potential need for any pre-design studies; division of labor issues; special regulatory compliance considerations (i.e., mixed waste treatment issues); and monitoring/sampling requirements.

Design Criteria

Design criteria will include studies, reports, and data related to the project; required formats for document/design submittals; and special design requirements for issues such as HWMUs (i.e., closure requirements/certification) and mixed waste treatment. The design criteria established to support the SOW will meet the intent of the design criteria requirement set forth in DOE Order 4700.1.

Design Deliverables

The design deliverables section will detail each of the remedial design subcontractor's deliverables with associated due dates. These items include but are not limited to the development of performance specifications, drawings, videos, and photographs.

In addition to developing and assigning remedial design subcontractor's tasks are the assignment and initiation of various essential planning and evaluation tasks to several of the organizations represented in the DEC Team. Among the planning tasks are performing or preparing the following:

Project Support Documents:

- review lessons-learned from previous projects to identify any revisions needed for generic performance specifications;
- project-specific sampling and analysis plans (as needed, for decontamination washwater);
- Safety Analysis documentation;
- Project-Specific Health and Safety Plan and Health and Safety Requirements Matrix;
- updating QA requirements, as needed;
- Radiological Requirements Plan; and
- Waste Management Plan.

U.S.EPA Deliverable

- Implementation Plan.

Several of these plans are further detailed in Section 4.1.3. The evaluation tasks that will be initiated during preliminary design, which are not already covered under the development of the above-listed project plans, include the following:

- Disposition Methodology Evaluation - to be performed in accordance with the strategies outlined in Sections 3.3.1 and 3.3.6, and the material release certification program outlined in Appendix C; and

- Material-Specific Treatment Evaluation - to be performed in accordance with the strategies outlined in Sections 3.3.1 and 3.3.5; given the selected disposition location, this evaluation will cover the project-specific strategy for treating mixed waste to meet LDRs, WAC, or for treating to meet restricted/unrestricted release criteria.

4.1.2 Intermediate Design

Remedial design for each project may necessitate review of the design comments between the preliminary and pre-final/final design phases. At the discretion of the DEC Team, a design submittal review may be required at 60 percent completion of the design. This

submittal should consist of plans, specifications, and engineering drawings reflective of the expected progress at this point of the design. All design-oriented items will be formally reviewed by the DEC Team. Formal written comments will be provided to the remedial design subcontractor who, in turn, will provide written responses that propose comment resolution.

### 4.1.3 Pre-Final Design

During the pre-final design phase, project-specific design plans, drawings, and specifications representing approximately 90 percent completion will be submitted for internal review by responsible organizations in the DEC Team and the remedial design subcontractor. All design-oriented items will undergo a formal internal review using established engineering configuration management procedures. Formal written comments will be provided to the remedial design subcontractor who in turn will provide written responses which indicate proposed comment resolution. Subsequent to approval, comment resolutions will document changes required to drawings and specifications for final approval. Work completed up through the pre-final design is parallel to Title I and Title II Design set forth in DOE Order 4700.1.

Pre-final design includes the completion of the following documentation:

- engineering design, drawings, videos, and photographs;
- revised performance specifications;
- project plans;
- engineering survey;
- cost estimate; and
- project schedule.

<u>Engineering Design, Drawings, Videos, and Photographs</u>
As part of the remedial design, engineering drawings, and photographic images will be prepared to convey the following: existing conditions; project boundaries; potential staging and queue areas; lay-down and turnover areas; utility disconnect points; utility installation locations; recommended and optional dismantlement techniques; container sizes and configurations; floor loading restrictions; ventilation requirements; and any other specific requirements associated with the remedial design. To the extent practicable, existing drawings will be utilized to depict existing conditions. If the use of existing drawings is not feasible, new engineering drawings will be generated. The required format/presentation for engineering drawings will be included in the SOW to the remedial design subcontractor. Design drawings will usually include the information listed below:

<u>General</u>

- list of symbols and abbreviations; and
- access to the components in the complex.

<u>Project Plans/Conditions</u>

- project boundaries;
- project site topography;
- project grading and excavation;
- plans and elevations for existing buildings, utilities, drainage, yard piping;
- location of field offices, borrow pits, staging areas, and storage areas;

- location of future queue and storage areas, monitoring wells, containment systems, utility hookups; and
- project site restoration.

Process Design (if required)

- process descriptions; and
- mass and energy balance.

Videos and photographs have proven to be an excellent means of conveying existing conditions for the eventual subcontractor. If desired, videos and photos can be detailed to convey design and removal requirements as well. According to the Advisory Council on Historic Preservation Guidelines, the Ohio Historic Preservation Office has determined that the FEMP site is of historic significance and is eligible for inclusion on the National Register of Historic Places. To comply with the National Historic Preservation Act, photographic images, engineering drawings, and process descriptions will be generated prior to remedial activities in order to document the architectural and historical significance of the site.

QA criteria will be developed on a project-specific basis, incorporated into the design package, and presented to the remediation subcontractor as part of the bid package.

Specifications

Design specifications will be prepared for all major remedial and construction activities. A variety of technical specifications will be developed and included in each design package. The technical specifications used to communicate the project requirements to the remediation subcontractor will be in the form of performance-based specifications. Performance specifications differ from detailed specifications in that the remediation work methods are not specified in the former type. The performance specifications state what is to be done; what regulations, codes, and standards apply; and any limitation on activities, while leaving details of task implementation to the remediation subcontractor. This approach allows the remediation subcontractor to use experience and existing equipment in the development of a competitive bid. By allowing maximum remediation subcontractor flexibility in the decontamination and dismantlement methods to be used, the costs will be minimized. The remediation subcontractor will be required to submit work plans for review and approval. Those work plans will contain the specific methods to be used to meet the requirements of the performance specifications. The most current version of the generic performance specifications are included in Appendix B of this work plan. These performance specifications represent a set which was revised due to the OU3 Final Action ROD, and design changes and lessons-learned from implementation of the Building 4A and Plant 1 - Phase I decontamination and dismantlement projects.

Project-Specific Plans

Project-specific plans to supplement the general project plans will be developed for the pre-final design for complex projects, and will consist of project-specific documents that support the remedial activity. The project-specific plans were identified in Section 4.1.1 as being initiated during the preliminary stage of design. Several of these plans, which will be incorporated into the design during the pre-final stage, are discussed below:

**Radiological Requirements Plan** - The RRP outlines requirements that must be met by the remediation subcontractor concerning radiological limits. The provisions outlined for a typical project include stop work authority, contamination limits allowable on materials

prior to release from the controlled work environment, hold points for material evaluation, and notification and documentation requirements.

**Waste Management Plan** - The Waste Management Plan (WMP) encompasses subcontractor and FEMP workforce waste handling responsibilities for each of the material categories to be generated during the decontamination and dismantlement of the components in a project. This plan provides the appropriate waste handling steps, in chronological sequence, that will be required of the remediation subcontractor. The WMP will reflect the handling and management requirements developed for specific materials that are evaluated for alternative disposition — based on the outcome of the project disposition methodology evaluation discussed in 3.3.6.1. This plan also references additional waste handling criteria that can be found in the project specifications and in exhibits contained in the remediation subcontract.

**Project-Specific Sampling and Analysis Plan(s)** - As discussed in Section 3.3.1, OU3 materials have been characterized sufficiently to determine disposition, environmental monitoring requirements, and health and safety concerns, and that OU3 RI/FS data, process knowledge, and other existing data will be reviewed during remedial design of a project to provide the documentation needed for those activities. However, it may be determined during remedial design that additional data is needed to support certain activities such as decontamination washwater discharge. In those cases, a systematic approach for data collection will be developed in accordance with the SAP through the preparation of one or more project-specific SAPs. Sampling requirements that may be necessary during the remediation will be incorporated into the design. The project-specific SAP will identify the following general components:

- site background;
- sampling objective(s);
- sampling location and frequency;
- sampling designation;
- sampling equipment and procedures; and
- sample handling and analysis.

**Project-Specific Health and Safety Plan** - The purpose of the project-specific HASP is to provide health and safety guidance for protecting workers during implementation of decontamination, dismantlement, and some aspects of material management. Specific health and safety guidance and requirements for each major decontamination and dismantlement project will be identified in a project-specific HASP and Health and Safety Requirements Matrix (example provided as an attachment to the OU3 HASP in Appendix E) and included in each design package to provide health and safety requirements for each discrete phase or activity in the project. Based on the package-specific health and safety requirements, the remediation subcontractor will prepare its own health and safety plan. The project-specific HASP identifies the following components:

- project organization and responsibilities;
- hazards associated with the project tasks;
- worker training requirements;
- personal protective equipment for each project task;
- medical surveillance requirements;
- frequency and types of air and personnel monitoring;
- site control measures;

- decontamination procedures;
- emergency response and contingency plans;
- confined space entry procedures, if needed; and
- other standard operating procedures.

Engineering Survey

In accordance with 29 CFR 1910.850, Subpart T, an engineering survey of the structures included in a project will be performed. The remedial design subcontractor will perform this survey during the design, and complete a report for incorporation into each design package. This survey, performed by a Professional Engineer registered in the State of Ohio, shall include the components identified for that design package to determine the condition of the framing, floors, and walls and the possibility of the unplanned collapse of any portion of those components.

Cost Estimate

A project cost estimate will be prepared that addresses all decontamination and dismantlement project-related activities including construction, operations, maintenance, permitting, sampling and analysis, shipping, disposal (if applicable), administrative, decommissioning activities, closure, and contingency costs for the project. The cost estimate will provide a detailed breakout of remedial cost and include vendor and subcontractor estimates for the major tasks. The final project cost estimate should be within -10 percent to +15 percent of actual costs.

Schedule

A project schedule that includes a breakout of the tasks required for remediation will be prepared and included in the design package.

### 4.1.4 Final Design

The final design stage represents a design effort that is 100 percent complete and is ready for incorporation, either in part or total, into the bid package for distribution to prospective remediation subcontractors during the bid process. All comments from the review of the pre-final design will have been incorporated through comment resolution. The final design, as prepared by the remedial design subcontractor, will undergo formal review and approval. Approval will be indicated by the signatures of cognizant personnel from the FEMP organizations responsible for design review and those of the design subcontractor. Approved drawings and specifications will be issued as CFC and included in the design package. The engineering project leader will develop and issue a Request for Construction Action document to CFC for the design process. The Request for Construction Action contains the following information:

- scope or SOW;
- drawings/specifications/sketches;
- schedule;
- PWID;
- project-specific HASP, safety assessment, and preliminary hazard analysis;
- equipment to be ordered; and
- construction interaction requirements:
- safe shutdown and waste management operations;
- pre-subcontractor site preparation;

- interacting construction projects; and
- operations interfaces.

This design phase completes work parallel to Title II Design set forth in DOE Order 4700.1. The final design document will be provided to the U.S.EPA and Ohio EPA upon request.

4.1.5 Implementation Plan

An implementation plan will be prepared for each above-grade decontamination and dismantlement project and submitted to U.S. EPA and Ohio EPA for review, comment, and approval in accordance with the schedule established in Section 6.3. By preparing and submitting to the regulators one implementation plan at the completion of each design project, the ACA requirement for submittal of a schedule for implementation of the RD/RA tasks and submittal of RD/RA reports, will be met. Each implementation plan will be prepared in lieu of preliminary, intermediate, and final design regulatory submittals. For remediation of at- and below-grade debris, the SEP prepared for the SCEP addresses the appropriate implementation documentation for regulatory submittal.

Each above-grade implementation plan will also be prepared in conformance with the DF&O finalized by Ohio EPA on June 6, 1996. Implementation plans will be used to provide the substantive requirements for above-grade remediation of HWMUs in lieu of submitting separate closure plans.

The above-grade implementation plans, which will in most cases be prepared prior to the pre-final design phase using performance specifications, the remediation subcontract SOW, and environmental monitoring requirements, will provide a summary of the key elements of a specific design effort that are pertinent to the remediation of one or more buildings/components contained within that design package. It summarizes all project-specific information developed during the remedial design that document how a project will be performed in compliance with the requirements of this work plan. Since most of the strategies for performing remediation activities are discussed in detail in this work plan, each implementation plan will represent a streamlined report of important project-specific applications not available during the preparation of this work plan.

Above-grade implementation plans incorporate by reference the engineering specifications used for bidding the project, as well as other key aspects of remediation (e.g., environmental monitoring, HWMU remediation requirements, etc.). This information is compiled in a format that parallels this work plan. Since implementation plans can be prepared and submitted concurrent with the bidding process, they are particularly suited for turnkey subcontracting — a effort which results in expedited remedial action. Listed below are the are the key elements of the remedial design that will be included in each implementation plan.

- an introductory section which provides a project statement, scope of work, and description of the components that make up the project;

- a section which describes material management details, such as volume and weight estimates for materials, segregation and containerization of materials, interim storage requirements, alternative technologies to be used for material management (e.g., recycling),

and waste treatment and disposition decisions, including summary results and matrix table from the disposition methodology evaluation;

- a section which describes the project lay-out, including project site drawing, site preparation requirements, and sequence for component dismantlement, and environmental monitoring (see Section 3.6.2.1 for the basic elements of the project supplemental radiological air monitoring program that will be described in each implementation plan);

- subsections which describe the component-specific remediation approach for each of the components in the project, including requirements for each of the remediation tasks that were not defined in Section 3.2 of this work plan. This section will discuss in particular, materials removed during inventory removal and safe shutdown, any details regarding HWMU remediation, friable asbestos removal, alternative technologies to be applied to surface decontamination and above-grade dismantlement, and references to applicable performance specifications;

- reporting on any alternative technologies (including D&D and recycling) in the implementation plan;

- a schedule for implementation and deliverables which will include the three enforceable milestones: 1) Notice to Proceed; 2) Completion of Field Activities; and 3) Submittal of the Project Completion Report to U.S. EPA and Ohio EPA; and supplemental (non-enforceable) information will also be included in the remediation schedule which identifies the subcontract award date and projected durations for field activities and document preparation;

- a section describing how the project will be managed; and

- appendices which contain any project-specific SAPs prepared during design, a listing of the performance specifications, selected design drawings, and photographs.

## 4.2 Decontamination and Dismantlement

This section describes the activities that will be performed by the FEMP construction manager and subcontractors to implement and manage the remedial action, including: subcontractor procurement, execution of work, oversight activities, and documentation and certification of action. The following discussions detail the scope of work and oversight and inspection processes.

### 4.2.1 Remediation Subcontractor Procurement

The remediation subcontractor procurement begins during the preliminary stage of each project design for above-grade decontamination and dismantlement. At that time, a contracting strategy will be developed that considers optional approaches, potential

number and scope of contracts, contract types, and contracting procedures. The number and scope of contracts will be dependent on the complexity of each project and funding availability. The method for subcontracting may utilize either the IFB or RFP process, or the Site Support Contract/TOA methods, as introduced in Section 3.1.4. Each of the three methods require a well-defined scope of work, adequate competition, and realistic estimates of proposed costs and uncertainties.

Discussions will be held with the preferred subcontractor prior to award to ensure the work scope, list of deliverables, schedule, work phasing, and all other requirements for the project are truly understood. If appropriate, potential subcontractors will be pre-qualified to determine their resources and capabilities prior to being allowed to compete in the IFB/RFP process.

Statement of Work

Developed during the remedial design, the remediation SOW defines the activities that the remediation subcontractor will be required to perform. This SOW is a subset of the overall RD/RA project SOW developed by the remedial design subcontractor. The remediation SOW identifies the following project-specific information and requirements for a project:

- General Scope of Work;
- Specific Description of Work;
- Material, Equipment or Services Furnished by the FEMP;
- Interfaces and Restraints;
- Temporary Facilities and Utilities;
- Site Location, Access, Laydown Areas and Limits of Construction Area;
- Work Hours;
- Performance Schedule and Sequence of Work;
- Pay Item Schedule;
- Requirements for Subcontractor's Schedule;
- Subcontract Progress Report;
- Submittals; and
- Alignment and Kickoff Meeting.

Prequalification

Qualifications required for potential remediation subcontractors will be specified in the IFB/RFP documentation. These qualifications address safety record, similar work experience, government contracting experience (determined on a package-by-package basis), etc., and may range from normal construction experience to very sophisticated experience on heavy industrial and/or hazardous waste sites.

The request for qualifications of prospective bidders is advertised in the *Commerce Business Daily*. "Dodge Reports" and the Cincinnati-Dayton Business Development Center are also used for advertisement. The advertisement identifies the type of work to be contracted and the minimum qualifications for bidders. Qualified and interested bidders are asked to submit an expression of interest. The purpose of the advertisement is to pre-qualify prospective bidders by evaluating their response to the request to determine whether or not they indeed meet the qualification standards. Only pre-qualified prospective bidders will receive a IFB/RFP package.

Award of Contract

Once all Expressions of Interest from prospective bidders have been received and evaluated, a pre-bid meeting will be held with them to allow an opportunity for all bidders on a remediation subcontract to resolve questions about the procurement package, site policy, and site conditions. The pre-bid meeting may include a tour of the remediation area as well. Typical topics covered at the meeting include the following: introductions; bid and award; scope of work; terms and conditions; project labor agreement and related documents; substance abuse program; radiation protection requirements, safety plan, special hazards and safety training specific to remediation subcontract; security; quality assurance plan and quality control requirements; temporary utilities and facilities; schedule requirements, milestones, and work coordination; pay item schedule; reporting; invoicing; and submittals.

Under the IFB process, the bids are reviewed to ensure that the apparent low bidder is responsive and responsible. Determination of responsiveness is based on proper completion of bid forms, acknowledgement of amendments, and submission of the bid bond. The apparent low bidder will be deemed responsible if this bidder possesses the capability and experience as required in the solicitation to perform the remedial action in a safe and timely manner at the bid price. In addition, a list of questions will be developed for the apparent low bidder which is designed to demonstrate that the bidder understands the SOW, the design methodology, safety and health requirements, and QA requirements. Responses are evaluated to determine if the apparent lowest bidder is both responsive and responsible. If the apparent lowest bidder is determined to be neither responsive nor responsible, the next lowest bidder will be evaluated.

Following determination that the apparent low, responsive bidder is responsible, the contracts administrator recommends award. The recommendation is reviewed based upon authorization thresholds established by DOE. The award is then made to the lowest responsive, responsible bidder.

The RFP process follows a similar award strategy but involves the evaluation of proposals based on various criteria, including technical and cost elements. In the RFP process, the award will be made to the bidder whose proposal obtains the highest overall rating from the evaluation process.

Identification of tasks during the planning phase and their sequence for implementation form the basis for work sequencing. During bid document preparation, tasks assigned to the remediation subcontractor will be identified. Mandatory work phase sequences may be identified in the procurement documents to ensure that hazards are minimized.

For example, the DEC Team responsible for scoping and directing the implementation of the Plant 7 Dismantling Removal Action decided that removal of interior asbestos and "lock down" of loose contamination on the interior surfaces of the building should be undertaken using the construction support subcontractor under a labor-hour contract. A firm-fixed-price subcontract was awarded to a subsequent subcontractor for removal of piping, ductwork and equipment, transite, concrete, and structural framing.

As discussed in Section 3.2, inventory removal and safe shutdown activities will probably be accomplished by site labor forces. It is anticipated that the remaining decontamination and dismantlement tasks described in Section 3.2 will be included in an above-grade

remediation subcontract. Most at- and below-grade remediation activities for the same area will be handled under a separate subcontract that will be managed under the ARP.

### 4.2.2 Design Reviews

The remediation subcontractor will submit project-specific information to DOE, as required, and ensure that remedial action activities meet the requirements set forth in the remedial design. Typical documents/submittals that may require review/input during this oversight may include: the remediation subcontractor's work plans, quality assurance plan, asbestos removal plan, vendor submittals, and Construction Change Requests/Engineering Change Proposals.

Remediation Subcontractor Work Plans
Subsequent to the award of the remediation subcontract for a particular procurement package, the successful bidding subcontractor will develop and submit proposed work plans for performing the required remediation activities. These submittals will identify the remediation subcontractor's proposed remediation methodology, plans, techniques, and equipment by which the work will be done. These submittals will undergo formal FEMP review and approval.

Quality Assurance Plan
The remediation subcontractor will be required to submit a fully developed Quality Assurance Project Plan for DOE review and approval. Typical quality criteria are: qualifications, duties, and responsibilities for all key personnel; an outline of the remediation contractor's training program that assures knowledge and capability in the environmental and technical arenas required for the interim action; the requirement for the remediation subcontractor to report any non-conforming conditions to the construction manager; an outline of the remediation subcontractor's document control system; and how quality inspections will be controlled and performed. The current QA Plan criteria that have been developed for OU3 remediation subcontracts have been included in Appendix F along with a description of the overall FEMP QA Program.

Asbestos Removal Plan
Where appropriate, interior asbestos abatement within OU3 will be integrated into the remedial action. The design approach to the removal of interior ACM will be identified by the remediation subcontractor in an asbestos removal work plan. All activities involved in the removal of ACM will be conducted in accordance with the requirements identified in the design specification and regulatory requirements identified in Section 3.2.4.

Vendor Submittals
Once the remediation subcontractor has been selected, vendor data will be submitted by the remediation subcontractor for review and approval. Vendor data will be reviewed to ensure compliance with the procurement package. In general, the remediation subcontractor's work plans will be approved prior to vendor data submittals, with the exception of long-lead procurement items.

Construction Change Requests/Engineering Change Proposals
As OU3 remediation progresses, the original design may require modification. At that time the remedial design subcontractor will perform any additional design required to address the field modification. Significant changes to the design will require CFC modification and may require that affected activities be suspended until the revision has been completed and

approved. At the same time, while the CFC remedial design is being revised, DOE will determine, in consultation with the U.S. EPA, if there is a need to perform either of the following: amend the RODs; submit to U.S. EPA an explanation of significant difference to the RODs; amend this work plan; and/or amend the implementation plan. Since each design package will provide performance-based specifications rather than detailed specifications, it is not anticipated that a CFC remedial design will require significant changes.

### 4.2.3 Execution and Oversight of Work

Once a remediation subcontract has been awarded, the remedial activities will be initiated. The alignment meeting will kick off the remedial action. Soon after the alignment meeting, the remediation subcontractor will be issued a Notice to Proceed (NTP). At that time, the remediation subcontractor will be required to start compiling the required submittals specified in the subcontract. These submittals will be required at various stages of the project and will require, at a minimum, review and approval by the construction manager.

In addition to the alignment meeting, pre-construction meetings and coordination meetings will be held in support of remedial action activities. It is anticipated that these will be held weekly and will include the DOE Facilities Representative, DOE project technical leads, FEMP construction management, the remediation subcontractor, the remedial design subcontractor, and other FEMP functional organizations that need to be involved. These coordination meetings will address progress, deviations, requests for clarification of information, planning, schedule status, and concerns.

Both DOE and FEMP organizations will inspect the performance of remedial activities. DOE will provide direct project oversight in two ways, both of which become a concerted effort to assure performance of remedial activities and adherence to project requirements. DOE will perform independent field oversight of all remedial activities performed under this project by having a representative from DOE Headquarters who is assigned to this role. This DOE representative will have the authority to stop work if conditions warrant such action. The Program Manager from the DOE Fernald Area Office (DOE-FN) will further ensure that the performance of remedial activities meet specifications and requirements by having technical leads perform oversight. The DOE Facilities Representative and technical leads will immediately notify the DOE Program Manager of any issues or problems that arise in an effort to seek prompt resolution. DOE responsibilities during remedial action are further discussed in Section 7.2.

FEMP Construction inspections of remedial activities will be performed throughout field activities and at two stages at the end of the project. A pre-final inspection will be performed when the project is substantially complete and a final inspection will be performed at the completion of field activities.

Throughout the project execution, quality and safety assessments are performed for the project in support of the project DEC Team. These assessments and oversight functions are key portions of the project management function, which provide the ability to assure project compliance. Several other notable key project organization and oversight functions are described below.

#### 4.2.3.1 Alignment Meeting

Remediation subcontractor representatives, DOE representatives, and FEMP managers from Construction will participate in an alignment meeting prior to the NTP. The meeting will include the appropriate site organizations required to support the remedial action. The objective of this meeting is to establish common goals and joint execution plan to accomplish the contracted scope of work with emphasis on safety, quality, compliance with regulatory requirements, budget and schedule.

#### 4.2.3.2 Pre-Construction Meeting

A pre-construction meeting will be held between the construction management organization, the remedial design subcontractor, and the remediation subcontractor to coordinate construction activities, promote efficient planning and performance of the work, and define the requirements for mobilization. The pre-construction meeting members will review the project SOW, applicable changes or modifications, and any pending, unresolved or missing information. The status of technical and engineering deliverables will be stated, safety requirements will be reviewed and discussed, material status and shop fabrication will be reviewed, and coordination of remediation subcontractor's work, inspections, and testing will be planned.

#### 4.2.3.3 Coordination Meetings

Remediation coordination meetings will be scheduled as necessary to support the coordination of specific remediation projects and activities. These meetings will bring the remediation subcontractor, remedial design subcontractor, and site management personnel together to review the schedule and determine if any conflicts or problems exist.

On a sitewide basis, it will be necessary to coordinate activities, resources, and the use of the FEMP infrastructure with other operable units as they implement their remedial actions. The goal is to eliminate or minimize interferences between the remedial activities that will be performed by various subcontractors for each operable unit. The coordination effort includes the management of subcontractors and the construction support contractor's activities where applicable. Also included in these activities are: the coordination of permits and support resources (i.e., radiation protection technicians and quality control inspectors); interfacing with plant operations and waste management personnel; arranging for use of construction equipment and lay-down areas; and interfacing with organizations responsible for preparing facilities for remedial action.

The coordination effort will rely on an established remedial project-related communications system which involves all organizations that are responsible for providing support for the remedial design and management of the remedial action.

#### 4.2.3.4 Daily Surveillance and Inspection

Throughout the remediation subcontractor's field activities, an OU3 project management representative will inspect the work in progress and provide surveillance of all activities. The surveillance and inspection will verify that the subcontractor's plans, specifications, and drawings are being properly implemented. If changes to the subcontractor's documents are required, then the subcontractor or construction management will initiate a change request as described in Section 4.2.2.

If deficiencies are noted during inspection and surveillance activities, the subcontractor shall be notified immediately so that corrective actions are taken as soon as possible. Failure of the subcontractor to correct deficiencies will constitute cause for FEMP construction management to stop work until the subcontractor is willing to correct deficiencies or until the deficiencies are eliminated using a change request. Situations where there is an immediate danger to life and health shall be cause for immediate stoppage of work activities until the situation is reviewed and a safe corrective action is implemented.

4.2.3.5 Pre-Final Inspection

When the project is near completion, a pre-final inspection will be conducted to identify and "punchlist" incomplete or deficient work. The pre-final inspection will consist of a walk-through inspection of the entire project site. An inspection of the work will be conducted to determine whether the project is complete and consistent with the contract documents, the implementation plan, and this work plan. Responsible site personnel and remediation subcontractor personnel will participate inspections in order to prepare and document a punchlist of unsatisfactory or remaining activities and deliverables. Work activities will be controlled and conducted in accordance with findings of the punchlist. An update on the status of the project will be required at remediation coordination meetings.

Following the pre-final inspection, a punchlist is developed and serves as the pre-final inspection report. This punchlist/report will outline the outstanding remediation items, actions required to resolve them, completion date for these items, and date for the final inspection. The punchlist/report is provided to the FEMP project and contract managers to ensure that the tasks and other obligations specified in the subcontract statement of work have been met and to allow project managers to follow-up on those activities that remain to be completed before the final inspection. The project completion report (discussed in Section 4.5 of the work plan) will summarize activities completed by the subcontractor and also provide a comprehensive account of the entire remediation.

4.2.3.6 Final Inspection

Upon completion of punch-listed activities and deliverables, a final acceptance inspection walk-through (referenced under site procedure CT-3.6.1 (7.4.4): Subcontract Punchlist Walkdown) will be performed. For the final inspection, the FEMP field construction coordinator, field construction engineer, and subcontractor will walkdown all punchlist items to verify that they were completed correctly. Upon verification of the punchlist items, the field construction engineer will sign the punchlist. The remediation subcontractor's demobilization activities should also be completed. If any items remain unresolved, the inspection will be considered a pre-final inspection requiring that another punchlist be developed.

4.2.4 Completion of Field Activities

Completion of Field Activities will be achieved when the Final Acceptance and Turnover Document is signed by the FEMP Contracts Manager (reference: Section 7.7 of site procedure CT-3.6.1). The remediation subcontractor will be notified of final acceptance of the remediation activities via its receipt of the approved final acceptance document. Following issuance of the final acceptance and turnover document, the FEMP contract manager will issue a transfer document to the facility/system owner which signifies

acceptance of the project. The issuance of this transfer document, referred to as the Transfer of Care, Custody and Control Letter (reference: Section 7.8.1 of the procedure), will allow for the proper transfer of the project area for future use or at- and below-grade remediation.

## 4.3 Material Management

Beginning with the mobilization stage and continuing throughout each above-grade decontamination and dismantlement project, material management tasks need to be performed. Material management field activities required by the FEMP workforce include at least the following:

- delivering and removing containers and palletized material from the queuing area;
- maintaining project log book of all containers generated throughout the project;
- providing field guidance regarding segregation and size requirements;
- verifying that proper material characterization, segregation, and handling is being conducted per the PWID, the MSCC, and subcontractor work plans;
- ensuring tracking paperwork has been prepared for each container generated and entered into SWIFTS;
- providing a material summary report at the end of the project, including container quantities, contents, and current status;
- ensuring all material has been managed in accordance with its identified disposition;
- if applicable, for material remaining to be packaged by site personnel, packaging the material for identified disposition route;
- overseeing that material generated during decontamination efforts and demobilization is managed correctly; and
- ensuring that all containers requiring interim bulk storage are identified, emptied, and reallocated to other decontamination and dismantling projects.

Depending upon the final disposition route of the material, a variety of tasks need to be performed following the removal of containers/material from the construction area. The specific tasks to be followed for each of the disposition routes are described below.

<u>Unrestricted Release</u>
Materials certified for unrestricted release from the project area will be managed through one of two scenarios. In the first scenario, material that meets radiological unrestricted

release criteria (do not require decontamination) will be released from the project site per the requirements of site procedure RP-0009. For the second scenario, materials that require decontamination, the material will be either decontaminated and released by the FEMP through site procedure EW-0024 or transported to an off-site vendor facility for decontamination and release. The radiological release criteria set forth in the certification program will be applied to both scenarios.

On-Site Disposal

Two scenarios exist for managing materials for on-site disposal: 1) materials in interim storage that were generated prior to the opening of the OSDF; and 2) material generated during the OSDF operation.

Prior to the availability of the OSDF, material will have been both bulk stored and stored in containers. For bulk stored material, paperwork will be prepared in accordance with the OSDF WAC, and the designated material transported to the OSDF staging area or Plant 1 Pad, as appropriate. For containerized material, documentation required pursuant to the WAC will be prepared and the container transported to the OSDF staging area. All deliveries of material to the OSDF will be tracked through SWIFTS.

During OSDF operations, material generated, which is destined for the OSDF, will be packaged and be transported to the OSDF staging area following the preparation of appropriate OSDF documentation. The generation, transportation, and delivery of the containers will be tracked by SWIFTS.

Off-Site Disposal

Material containerized for shipment off-site will be certified according to QA inspection criteria and shipment documentation will be prepared in accordance with U.S. Department of Transportation regulations and the WAC of the disposal facility. The packaged material will be loaded and transported to the designated off-site disposal facility. SWIFTS will be updated to indicate shipment information and change of status for all shipped containers.

### 4.4 Review and Submittal of Implementation Sequence

The task of periodically reviewing and submitting an updated schedule for submittal of implementation plans is discussed in Section 6.4.

### 4.5 Remedial Action Reporting

Remedial action reporting includes the preparation and submittal to regulatory agencies of three types of reports:

- individual Project Completion Reports for Above-Grade Decontamination and Dismantlement for each OU3 project;
- programmatic close-out reports for the completion of removal actions adopted into the OU3 integrated remedial action; and
- one Final Remedial Action Report following completion of the OU3 integrated remedial action.

Upon satisfactory completion of the decontamination and dismantlement activities that are within the scope of each bid package, a Project Completion Report for Above-Grade Decontamination and Dismantlement will be prepared and submitted to the U.S.EPA and the Ohio EPA within sixty days following DOE approval of the Certification of Construction Completion. The project completion reports were previously titled, "Remedial Action Reports" in the OU3 RD/RA Work Plan for Interim Remedial Action. The title, "Remedial Action Report" has been reserved for the report which will be prepared and submitted to the regulators following completion of the OU3 integrated remedial action.

Each project completion report will summarize the following information for an above-grade decontamination and dismantlement project:

- reiteration of remediation activities defined in the project-specific implementation plan and a statement indicating their performance in accordance with project specifications;
- substantive deviations to project performance specifications that impacted remediation strategies;
- HWMU remediation activities per the DF&O;
- identification of materials that have or will be treated and disposition locations for materials listed in the MSCC;
- project-specific material management information, which will be summarized in a SWIFTS report;
- description of any alternative technologies used or evaluated during the project, including those being used or pursued to execute recycling or disposition options;
- summary of results from project-specific environmental monitoring activities; and
- explanations of any modifications to this work plan and/or implementation plan, and the reasons these were necessary for the project.

The removal actions adopted into the scope of the OU3 integrated remedial action will require a form of reporting to programmatically close-out those actions as they apply to above-grade decontamination and dismantlement. Since applications of decisions and procedures adopted from removal actions may be used during at- and below-grade remediation (e.g., Removal Action 9 for management of any product, residues, or special materials), amendments to removal action close-out reports would be included as elements to remedial action reporting for the SCEP. Applicable elements of removal action close-out reporting outlined under 40 CFR 300.165 will be documented in individual close-out reports unless the timing is such that removal action completion coincides with the overall completion of OU3 remedial action, whereupon such reporting would be included in the OU3 Final Remedial Action Report.

The Final Remedial Action Report will serve as the final report for the OU3 integrated remedial action. Although OSWER Directive 9355.4A applies to fund-financed remedial action, this report will be prepared consistent with that directive by including the following elements:

- an introduction which summarizes the scope of the OU3 integrated remedial action;
- a chronology and brief description of each of the above-grade decontamination and dismantlement projects, with references to the appropriate project completion reports;
- summary of the treatment and disposition routes taken by materials generated from each project;
- a statement that the requirements stipulated under the OU3 IROD, OU3 Final Action ROD, and performance standards provided in this work plan have been met; and
- a summary of quality assurance/quality control measures taken to ensure remedial action objectives were met.

Remedial action reporting for at- and below-grade decontamination and dismantlement will be provided by OU5 following excavation and removal of at- and below-grade facilities. Reporting will be done according to the OU5 schedule for soil remediation of OU3 at- and below-grade structures.

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Section 5

## 5.0 COMMUNITY INVOLVEMENT

The Community Relations Plan (CRP) is the site-wide plan for all community relations activities at the FEMP. The site-wide CRP was revised to provide guidance on post-ROD public involvement activities and was approved by the U.S. EPA in January 1995. In particular, the revised CRP describes further public involvement activities during the remedial design and remedial action phases of cleanup. The CRP has been and will continue to be reviewed regularly by DOE and revised as necessary to reflect changing community concerns as well as changes in the law, regulations, or regulatory agreements.

The requirements for public involvement during the remedial design and remedial action phases are limited to preparing a fact sheet describing the remedial design and offering a public briefing upon completion of the final engineering design and prior to beginning remedial action. These requirements were satisfied for the OU3 interim remedial action by providing the following events:

- Introducing the remedial design and remedial action process to the public during a public briefing held on June 2, 1994;
- Distributing to stakeholders a fact sheet in January 1995 that was titled, "Remedial Design and Remedial Action Update for the Operable Unit 3 Interim Remedial Action at Fernald"; which provided an overview of the RD/RA process for the OU3 interim remedial action and described the first remediation project for OU3; and,
- Holding a public workshop on February 21, 1995, to discuss the outcome of the first remedial design effort, OU3 remedial design and remedial action planning, and public involvement opportunities during the remedial design phase.

In addition, the public was kept informed of the OU3 interim remedial action initiatives through regular updates in the "Fernald Report" — a monthly publication for stakeholders; Fernald Envoy reports, and regular community meetings.

As stated in the OU3 Final Action ROD, DOE is committed to providing opportunities for public involvement and input into the decision process beyond those required by law. Throughout the OU3 integrated remedial action, the community will be kept informed of remedial action schedules and any new findings or significant developments within OU3. The public will be given opportunities to inspect all formal, completed design-related deliverables submitted to the regulatory agencies. Informal notices for public inspection will be issued for key decision-making documents, including this RD/RA work plan and the project-specific implementation plans. Upon completion of the final engineering design and prior to the beginning of the remedial action, DOE will offer a public briefing to present the outcome of the first remedial design that incorporates requirements provided for under this integrated RD/RA work plan, and prepare a fact sheet describing the remedial design. Rather than mandate a formal process for responding to public comments, DOE will consider each comment on a case-by-case basis to determine the appropriate means of response. This "consultative process" of addressing comments may include telephone calls, one-on-one meetings, written responses or other means. Additional community relations activities may be offered at key milestones throughout the RD/RA process including periodic briefings at township and citizens' group meetings, community roundtables or workshops, site tours, publications, and fact sheets.

Copies of this work plan, other RD/RA documents (e.g., implementation plans and remedial action reports), and the CRP (including any future revisions) will be available to the public in the Administrative Record, located at the FEMP's Public Environmental Information Center, Jamtek Building, 10845 Hamilton-Cleves Highway, Harrison, Ohio 45030, (513), 738-0164. Copies will also be placed in the U.S. EPA, Region 5, Administrative Record, 77 West Jackson Boulevard, Chicago, Illinois, 60604-3590.

**FEMP PUBLIC ENVIRONMENTAL INFORMATION CENTER HOURS**

Monday, 7:30 a.m. to 7 p.m.
Tuesday, Wednesday, and Thursday, 7:30 a.m. to 5 p.m.
Friday, 7:30 a.m. to 4:30 p.m.

Section 6

# 6.0 SCHEDULE AND DELIVERABLES

Documents and reports, as listed in Section 6.1, will be submitted to the regulatory agencies for review, comment, and/or approval throughout the OU3 integrated remedial action. Section 6.2 presents the current schedule for the decontamination and dismantlement of OU3 complexes. Section 6.3 identifies the remedial design milestone dates that were developed based on the remediation schedule, and Section 6.4 discusses the submittal of any future schedule modifications.

## 6.1 Submittals to the Regulatory Agencies

This section identifies the reports and work plans to be submitted to the regulatory agencies to support the OU3 integrated remedial action. The descriptions of reports and work plans listed below reflect the initial draft submittals of those documents, which will undergo review, comment and revision, as necessary, until agency approval unless otherwise noted:

- OU3 Integrated RD/RA Work Plan - This document supersedes the OU3 RD/RA Work Plan for Interim Remedial Action, the OU3 PSR, and the debris management aspects of the Removal Action 17 Work Plan. This submittal consists of a single volume which contains the body of the work plan and five appendices. The submittal of the draft version of this document to the regulatory agencies, which was 60 days from signature of the OU3 Final Action ROD, was accomplished on November 20, 1996.

- Implementation Plans - An implementation plan will be prepared for each above-grade decontamination and dismantlement project (as defined in Table 2-4) and submitted for review, comment, and approval in accordance with the implementation plan submittal schedule provided in Section 6.3. Each implementation plan will define three regulatory project milestones: 1) Notice to Proceed (see Sec. 4.2.3); 2) Completion of Field Activities (see Sec. 4.2.4); and 3) submittal of the Project Completion Report to the regulatory agencies. The contents of the implementation plans are discussed in Section 4.1.5.

- Updated Implementation Plan Submittal Schedules - The schedule for submitting draft implementation plans will be reviewed periodically. Any necessary updates to this schedule will be submitted to the regulators for review and approval.

- Project Completion Reports - Within sixty days from the execution of the final Acceptance and Turnover Document for each above-grade decontamination and dismantlement project, which identifies to the subcontractor that DOE recognizes the completion of field activities, a Project Completion Report for Above-Grade Decontamination and Dismantlement will be submitted to the regulatory agencies for review and approval. Elements to be included in these documents are discussed in Section 4.5.

- Removal Action Close-out Reports - Unless included as reporting elements in the OU3 Final Remedial Action Report, individual removal action closeout reports will be prepared and submitted to the regulatory agencies to fulfill the substantive reporting elements for completion of the removal actions adopted into the OU3 integrated remedial action. These reports will be submitted to the regulatory agencies within 60 days following the programmatic completion of the specific removal action activities adopted into the OU3 integrated remedial action. Since the overall completion of these removal action activities are dependent on decontamination and dismantlement project scheduling, proposed close-out report submittal dates cannot be provided in this work plan.

- Final Remedial Action Report - Within sixty days from completion of the disposition of materials from the last above-grade decontamination and dismantlement project, a Final Remedial Action Report will be submitted to the regulatory agencies for review and approval. Elements to be included in this report are discussed in Section 4.5.

## 6.2 OU3 Remediation Schedule

Section 2.5 presented the sequence for remediating OU3 complexes. The major milestones, as discussed in Section 6.1, are the submittals of the implementation plans for each complex or a portion thereof, status updates, and project completion reports.

Figure 6-1 shows the current schedule for OU3 remediation. This schedule reflects a strategy that provides the best utilization of anticipated funds to complete the goals of the OU3 integrated remedial action. The projected remediation schedule provides the anticipated durations for remediation activities for each of the complexes, including the safe shutdown effort. This schedule provides the basis for determining the submittal dates for the implementation plans, which are discussed in Section 6.3 as the regulatory remedial design milestones for OU3. As noted in Section 6.1, complex-specific remediation schedules will be submitted in the respective complex implementation plans.

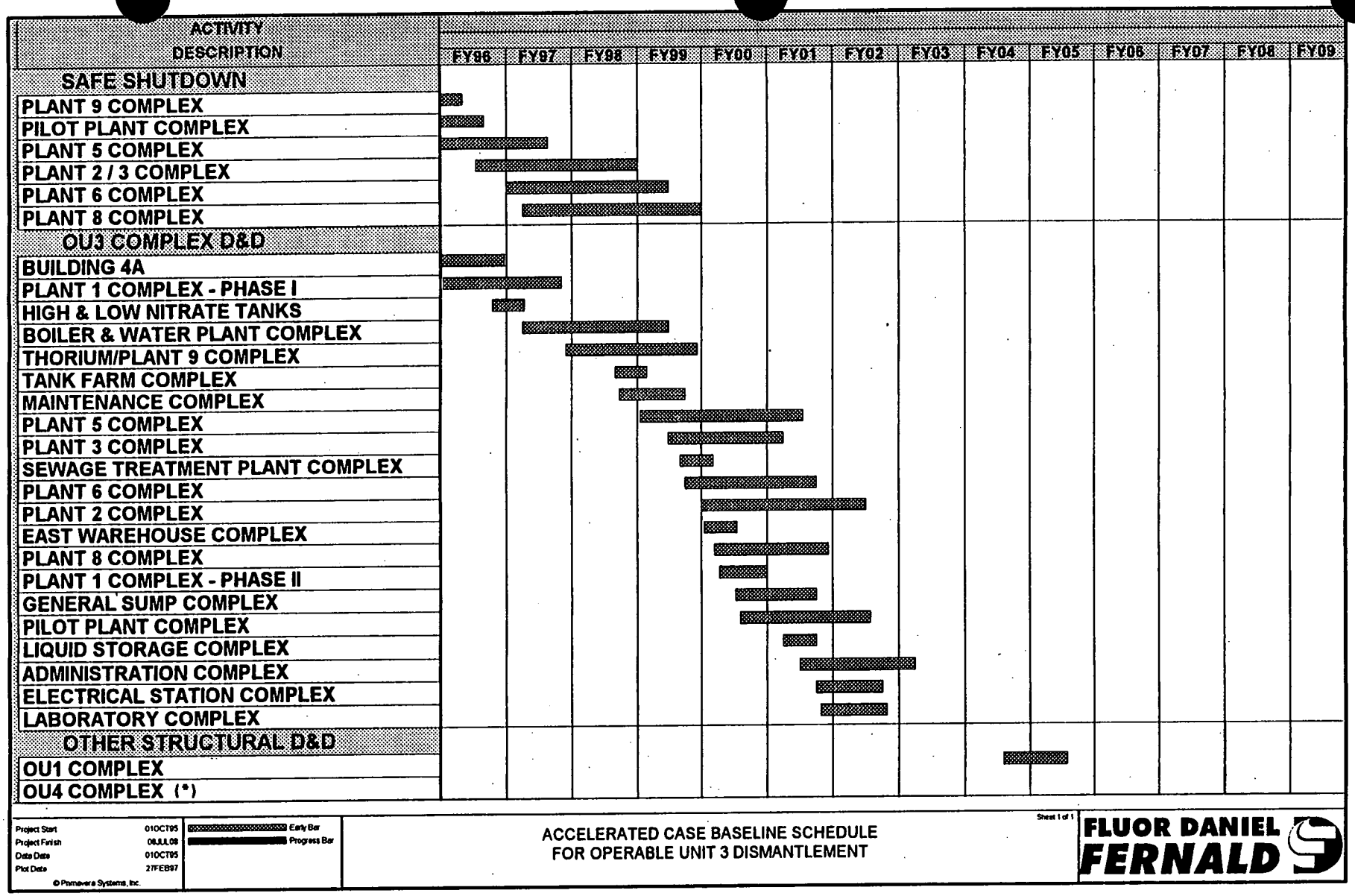


**FIGURE 6-1 OU3 Base Remediation Schedule**

(*) To be determined; D&D schedule pending resolution of OU4 milestone rescheduling effort.

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## 6.3 OU3 Remedial Design Milestone Dates

The establishment of regulatory milestones follows an iterative process wherein certain milestones can be established at the design phase, while others cannot be established until design is complete and remediation is set to begin. Even though the RD/RA planning documents for the OU3 integrated remedial action are somewhat different than those traditionally seen, the establishment of milestones needs to still follow that same iterative process. Specifically, prior to design, milestones should be reflective of the submittal of design documents, and through the design, more definitive remediation start and completion dates can be established. Therefore, the regulatory remedial design milestones which can be legitimately established are the submittal of the draft implementation plan for each of the complexes. Until details of the design have been completed, definitive project durations cannot be established. Without these durations, project start and completion dates are uncertain.

Table 6-1 provides an updated listing of the regulatory milestones. The revised regulatory milestone listing was necessary due to reduced funding projections for OU3 decontamination and dismantlement projects in FY-97 and FY-98. These milestones reflect the submittal of the draft implementation plan for each of the complexes defined in Table 2-4 of this work plan. Submittal dates are based on a 60-day review period by the regulators and coincide with 90 days prior to issuance of a Notice to Proceed. When the individual implementation plans are submitted, they will then propose the following three regulatory milestones: 1) Notice to Proceed; 2) Completion of Field Activities; and 3) submittal of the Project Completion Report to the U.S. EPA and Ohio EPA.

## 6.4 Submittals of Updated Schedules

As discussed in Section 6.1, the schedule for implementation plan submittals will be updated when necessary and submitted to the regulatory agencies for review and approval. The most likely cause for a schedule revision would be a change in the projected funding levels used to develop the base schedule. Since the budget for the remediation of the FEMP is approved by the U.S. Congress annually and prioritized at the FEMP for optimal risk reduction, the planned funding for decontamination and dismantlement projects in the out-years can only be based on current projections. The base schedule has been developed using these projections and current site-wide remediation priorities. In the event that additional, unexpected funding for OU3 remediation is obtained, the base schedule will be accelerated accordingly. Any resulting modifications to the implementation plan submittal dates will be submitted for regulatory approval.

In addition to the potential for changes in funding, other potential factors that may account for a schedule revision include changes in remediation priorities, lessons learned from previous or ongoing projects, and improved operation and project management.

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**TABLE 6-1 OU3 Remedial Design Regulatory Milestones**

| Complex | Implementation Plan Submittal Dates |
|---|---|
| Building 4A | 19 Sep 94 [a] |
| Plant 1 Complex - Phase I | 3 Nov 95 [a] |
| High and Low Nitrate Tanks | 20 Feb 96 [a] |
| Boiler Plant/Water Plant Complex | 12 Sep 96 [a] |
| Thorium/Plant 9 Complex | 2 Jan 97 [a] |
| Tank Farm Complex | 5 Mar 98 |
| Maintenance Complex | 2 Apr 98 |
| Plant 5 Complex | 18 Jul 98 |
| Plant 3 Complex | 2 Dec 98 |
| Sewage Treatment Plant Complex | 5 Mar 99 |
| Plant 6 Complex | 2 Apr 99 |
| East Warehouse Complex | 16 Jul 99 |
| Plant 2 Complex | 14 Aug 99 |
| Plant 8 Complex | 15 Sep 99 |
| Plant 1 Complex - Phase II | 6 Oct 99 |
| General Sump Complex | 20 Dec 99 |
| Pilot Plant Complex | 17 Jan 00 |
| Liquid Storage Complex | 4 Oct 00 |
| Administration Complex | 18 Dec 00 |
| Electrical Complex | 3 Apr 01 |
| Laboratory Complex | 1 May 01 |
| OU1 Complex | 11 Feb 04 |
| OU4 Complex | (b) |

(a) actual submittal date
(b) to be determined; submittal date pending resolution of OU4 milestone rescheduling effort.

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Section 7

## 7.0 PROJECT MANAGEMENT

This section describes the current overall functional management structure for implementation of the remedial design, remedial action, and material management activities discussed in this work plan. The following organizations and their responsibilities are based on those established by the current DOE environmental management contractor (Fluor Daniel Fernald) and are presented as functional manner which sets forth the basic roles and responsibilities necessary for implementing the OU3 integrated remedial action. Although the FEMP Operable Units have been "projectized" for the current RD/RA focus of the site, wherein OU3 RD/RA falls into the "Facilities Closure and Demolition Projects," this section will continue to refer to the "OU3" title.

Since the activities and tasks to be performed during the RD/RA have been established in previous sections of this work plan, they will not be repeated in this section; rather, this section highlight roles and responsibilities related to functions within the project management structure. DOE responsibilities are highlighted in the introductory text for both remedial design and remedial action. DOE-FN is the ultimate authority for ensuring that the remedial design and remedial action are performed in a manner that meet all project goals, standards, specifications, and requirements of the OU3 Final Action ROD and this work plan. Although DOE will perform direct oversight of the remedial design and remedial action, it will be represented and actively involved in all stages of project planning, design, and implementation.

The OU3 integrated remedial action will require project management, coordination, and integration from the following:

- DOE-FN;
- RD/RA subcontractors; and
- other FEMP organizations supplying project management, technical compliance, and administrative support not within the scope of subcontracts.

Support organizations are formed into a project-specific group, referred to as the DEC Team, for remedial design and the decontamination and dismantlement phase of remedial action. Since the responsibilities for the DEC Team differ from the design phase of a project to the implementation stage, it is appropriate for the purposes of discussions in this section to differentiate between the two roles. Accordingly, the DEC Team that functions during remedial design will hereinafter be referred to as the "Design/Bid" DEC Team, and the DEC Team that functions during project implementation will hereinafter be referred to as the "Construction/Remediation" DEC Team. Material management, after OU3 materials have left the project site, is primarily the responsibility of the waste management organization and does not require direct interaction with other FEMP organizations to perform its functions. The main role of both the Design/Bid and Construction/Remediation DEC Teams is to provide for the integration and coordination of all necessary activities for design and implementation, respectively, for each specific decontamination and dismantlement project. All technical, regulatory, and administrative input required for any given project will be focused within these two groups, depending on the phase of the project, and be managed by a project manager.

The charter responsibilities for both the Design/Bid and Construction/Remediation DEC Teams include the following:

- communicate clearly to the project manager all requirements within their area of designated technical representation;
- plan and arrange for delivery of technical support, including review of work products from the organizations they represent, as directed by the project manager;
- maintain an appropriate level of knowledge regarding project scope and status as it pertains to their designated technical organizations to ensure effective participation; and
- represent their respective organizations in all meetings and other project communications with the project manager.

## 7.1 Remedial Design Management and Organization

This section describes the functional management structure to implement the design tasks associated with above-grade decontamination and dismantlement projects. Figure 7-1 illustrates the relationship between the Design/Bid DEC Team, DOE, the Remedial Design Subcontractor, and the lead and primary organizations that support the remedial design effort. Although this section discusses the overall responsibilities of the Design/Bid DEC Team, project execution plans developed during the early stages of each design project will further add any necessary detail to these responsibilities to address such matters as schedules for internal deliverables.

The Design/Bid DEC Team is a team that is established for each OU3 project to prepare the design/bid package and then carry that package through the IFB/RFP process. The life cycle of this team extends from the start of the package conceptual design process (Title I) and runs through the CFC (Title II design) until the IFB/RFP process is complete and a remediation subcontractor has been selected for award. This team is lead by the organization responsible for engineering at the FEMP and is supported by various multi-disciplinary organizations that provide technical, regulatory, and administrative requirements for a project.

DOE is an active participant in the Design/Bid DEC Team process by assigning a program manager and one or more technical leads responsible for ensuring that DOE programmatic requirements, and engineering, quality assurance/quality control, and health and safety requirements are incorporated into the design. The three subsections which follow describe the primary responsibilities for organizations involved in the remedial design effort.

### 7.1.1 Engineering

The organization responsible for engineering activities for OU3 ("Engineering") is responsible for leading the Design/Bid DEC Team in coordinating and managing remedial design efforts and for supporting the preparation of the remedial design documents by the remedial design subcontractor.

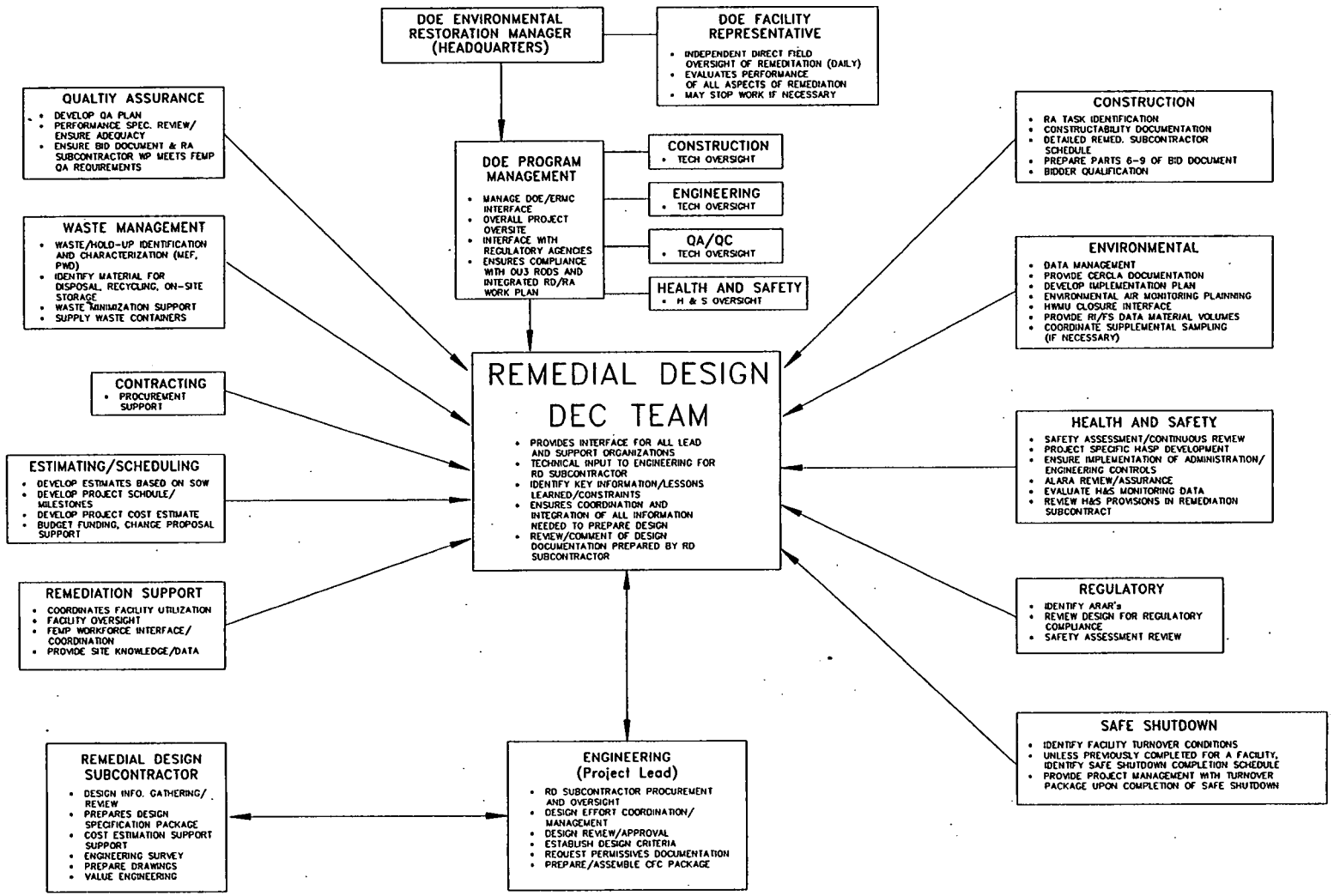


**FIGURE 7-1 Remedial Design Conceptual Organization Drawing**

Upon initiation of a remedial design project, a project manager will be designated to manage the design project for a project-specific Design/Bid DEC Team within the approved funding baseline scope, schedule, and budget. The manager's responsibility also includes managing the remedial design subcontractor's activities needed to support the remedial design. Engineering is also responsible for the following activities: establishing design criteria and scope; identifying design activities; performing pre-design studies; determining waste disposition; identifying funding constraints; developing the SOW for the remedial design subcontractor; procuring the services of the remedial design subcontractor; overseeing remedial design subcontractor work: reviewing and approving the various design submittals developed by the subcontractor to ensure that the work product is performed in accordance with the SOW; providing assistance in the preparation of bid/RFP documents; coordinating the review and approval of any necessary engineering change proposals; initiate requests for all project-specific plans, including the implementation plan; and obtaining and coordinating support, as needed, from the other organizations at the FEMP identified in Section 7.1.3. The work product resulting from Engineering's efforts will directly support the efforts by the organization responsible for construction activities for OU3 (Construction) to prepare for and implement remedial action. Both Engineering and Construction organizations will work closely during design to effect proper continuity between design and remediation.

### 7.1.2 Remedial Design Subcontractor

The remedial design subcontractor, will be responsible for tasks identified by the remedial design subcontract SOW. These tasks may include the following:

- information gathering and review;
- engineering survey;
- further development and establishment of remediation criteria;
- development of plans/documents, engineering designs, performance and procurement specifications, engineering drawings and photographs;
- coordinating and/or performing necessary pre-design studies;
- cost estimate support;
- remedial action project schedule support; and
- submittal of specific design deliverables (see Section 4.1 for identification of deliverables).

The remedial design subcontractor will not be responsible for those plans and documents needed to support the design that are within the function of a FEMP organization, such as health and safety plans and waste management plans.

### 7.1.3 Other Support Organizations

This section identifies the FEMP organizations, other than Engineering, that will support the remedial design effort. For the preparation of each of the design packages, a Design/Bid DEC Team will be formed, consisting of a core group and support group. The core group will include those organizations that provide continual required input into the remedial design.

The organizations that will directly support the remedial design currently include those responsible for construction planning ("Construction"), environmental compliance and sampling issues ("Environmental"), occupational safety and health planning ("Health and Safety"), waste management planning ("Waste Management"), FEMP project support coordination and planning ("Remediation Support"), project controls ("Scheduling and Estimating"), procurement ("Contract Support"), regulatory compliance ("Regulatory Compliance"), and quality assurance ("Quality Assurance"). An overview of their responsibilities follows.

**Construction** will be primarily responsible for providing construction-related requirements for the design and constructability reviews of the preliminary, intermediate, pre-final, and final design documents. Construction will also support remedial design by imparting "lessons learned" into the design process, determining potential cost savings, reviewing value engineering assessments, identifying duration and logic for each project, and identifying temporary utilities required.

For each design package, **Environmental** will be generally responsible for ensuring that environmental compliance requirements committed to in the OU3 Final Action ROD and work plan are met; providing OU3 RI/FS data for evaluating material, health and safety, and modeling air emissions; ensuring that HWMU remediation requirements are integrated into the design; and planning and coordinating any sampling efforts to support the design, including the preparation of project-specific SAPs, as discussed in Section 4.1.3 of this work plan. Environmental will also be responsible for participating, as needed, in the development of the design, ensuring that the remedial design adheres to the strategies provided in this work plan and coordinating remedial design submittals to the regulatory agencies.

For each design package, the **Health and Safety** will be responsible for specifying the minimum health and safety requirements (federal, state, DOE, site-specific) that must be met. This effort will be provided through the development of Project-Specific HASPs as discussed in Section 4.1.3 this work plan. Health and Safety will also be responsible for performing a safety analysis of activities in the design.

Other organizations within and outside of OU3 will also be responsible for providing support to the remedial design effort. **Waste Management** will be responsible for evaluating materials and identifying requirements for sizing, segregation, containerization, staging/storage, treatment, waste minimization/pollution prevention, and disposition according to the strategies discussed in Section 3.3. Waste Management will also be responsible for preparing the Waste Management Plan, as discussed in Section 4.1.3. **Remediation Support** will identify remediation issues that arise out of the inventory removal and safe shutdown preparatory actions and address any additional project support requirements. **Scheduling and Estimating** organization assigned to OU3 will provide support in scheduling, reviewing proposed schedules, and reviewing cost estimates by the remedial design subcontractor. **Contract Support** for OU3 will provide procurement support, both for the remedial design subcontractor and for the development, submittal, and tracking of contract documents necessary for

implementing the OU3 remedial action. **Regulatory** will provide information concerning ARARs and TBCs, permits, and environmental monitoring requirements for the remedial action. Based on the description of the FEMP Quality Assurance Program contained in Appendix F of this work plan, the **Quality Assurance** organization will develop package-specific quality assurance criteria that must be met by the remediation subcontractor's quality assurance plan.

## 7.2 Remedial Action Management and Organization

This section describes the functional management structure for both the above-grade decontamination and dismantlement phase and material management phase of remedial action, and the responsibilities of the organizations assigned to perform tasks for those phases. Due to the relative importance of both phases, they have been separated into individual subsections. It may be noted that the two phases overlap, but only to a degree that ensures continued coordination and consistency between both phases.

### 7.2.1 Above-Grade Decontamination and Dismantlement

As identified in Section 7.0, the Construction/Remediation DEC Team is established to manage the contracting and field activities associated with above-grade decontamination and dismantlement activities discussed in Sections 3.2 and 4.2. The life of this team extends from the subcontractor award in the IFB/RFP cycle until the materials generated from a project are placed/stored in containers and stored or placed in a queuing area for further on-site waste management. Waste management responsibilities that continue beyond those discussed above for decontamination and dismantlement projects (e.g., waste treatment and disposition) are discussed in Section 7.2.2.

Figure 7-2 illustrates the relationship between the DOE, the Construction/Remediation DEC Team, remediation subcontractor, and the primary organizations that support the remedial action effort. The Construction/Remediation DEC Team for remedial action is lead by the organization responsible for construction at the FEMP, and supported by various multi-disciplinary organizations that provide continual technical and administrative support to the remediation process.

DOE will be ultimately responsible for ensuring that the performance of the remedial action is in accordance with all regulatory and programmatic requirements, including the requirements specified by the OU3 Final Action ROD and this work plan. DOE will provide direct oversight of remedial action in two ways, both of which become a concerted effort that ensure performance of remedial activities in adherence to specifications and other requirements for each project. The Office of Safety Assessment of DOE-FN will assign an individual from DOE Facilities Representatives Department that will perform independent field oversight of all remedial activities performed under this project. This individual will be experienced/knowledgeable in the areas of engineering, construction, quality assurance/quality control, and health and safety; and will be responsible for daily inspections of all field activities and necessary reporting to the DOE Program Manager at the Fernald Area Office. The Facilities Representative will have the authority to stop work if conditions warrant such action.

DOE-FN will also conduct field oversight through technical leads responsible for construction, engineering, quality assurance and quality control, and health and safety. The DOE Facilities

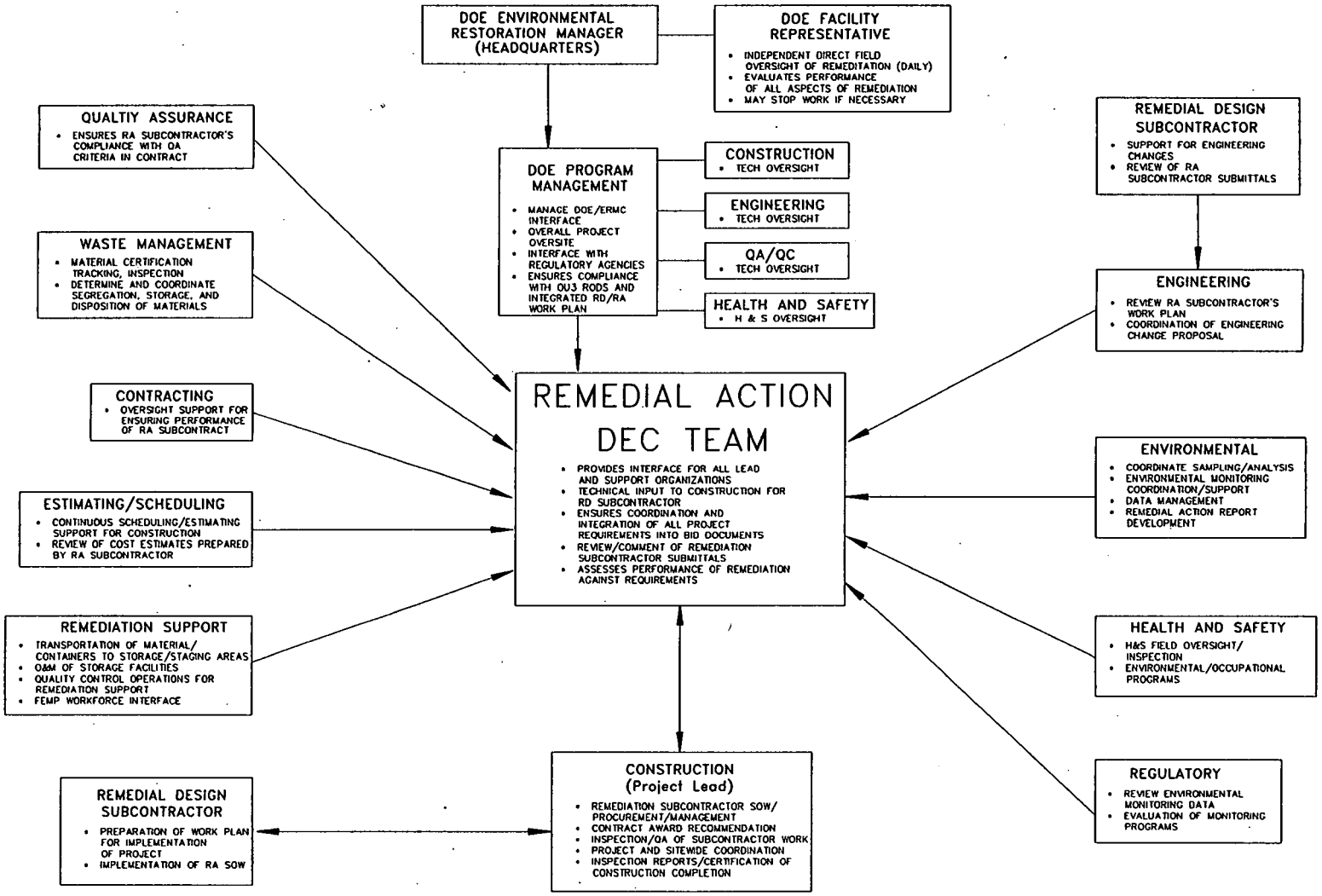


**FIGURE 7-2 Decontamination and Dismantlement Project Conceptual Organization Drawing**



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Representative and technical leads will immediately notify the DOE Program Manager of any issues or problems that arise in an effort to seek prompt resolution. The DOE Program Manager will oversee the remedial action through its participation in the DEC Team review and approval process and by performing the following functions:

- assuring the selection of qualified subcontractor(s) that meet prequalification criteria, including safety record, similar work experience, etc.;
- assuring that the recommended subcontractor is responsive and responsible; and
- reviewing, commenting, and approving of remediation subcontractor work plans.

The three subsections that follow describe the primary FEMP organizations, other than DOE that are responsible for implementing or supporting the implementation of the remedial action and purposely does not include many of the administrative organizations that support the organizations identified.

7.2.1.1 Construction

Construction is responsible for managing the implementation of the remedial action. Construction will also be the lead organization for the Construction/Remediation DEC Team during remedial action by coordinating support among the organizations identified in Section 7.2.1.3. Construction will be responsible for the following activities: directing all organizations involved in the Construction/Remediation DEC Team during remedial action; remediation subcontract SOW development; phasing/assignment of work for the remediation subcontractor; IFB/RFP development; pre-qualifying prospective subcontractors; contract award recommendation; inspections of all remedial action activities; remedial action documentation and certification; overall project coordination within a project and among other site projects; review/approval of various contract-required submittals from the remediation subcontractor during remedial action; and procuring and coordinating support outside of OU3. Construction is also responsible for the implementation of a QA/QC program. It should be noted that all activities which lead up to and include bid package/RFP development will probably occur concurrent with the development of the design for each discrete remedial project. During the execution of work, Construction will manage the remediation subcontract and all construction activities undertaken in support of OU3 remediation, including the following:

- conduct an alignment meeting, pre-construction meetings, and weekly coordination meetings with the remediation subcontractor to address all concerns, schedule status, planning, progress, deviations;
- direct oversight of decontamination and dismantlement and material management within the project boundaries;
- performing quality assurance of all remediation tasks to determine adherence to performance specifications by conducting inspections of the remedial activities performed by the remediation subcontractor and

those performed by FEMP workforces/labor support contractors in support of the remedial action; and

- performing pre-final and final inspections and preparing reports.

Upon completion of project remedial activities, Construction will certify that the remediation is complete by approving the remediation subcontractor's checklist and issuing a Certification of Construction Completion.

7.2.1.2 Remediation Subcontractor

The remediation subcontractor will be responsible for implementing the remedial activities identified in the remedial action SOW provided in the subcontract. Prior to commencing remedial activities, the remediation subcontractor will be responsible for developing work plans that detail the approach to be used to meet the requirements specified in the subcontract. Project-specific remediation subcontractor responsibilities will be identified in the subcontract and by the methodologies, procedures, etc., specified in the remediation subcontractor's work plans.

7.2.1.3 Other Support Organizations

This section identifies the FEMP organizations by their function, other than Construction and the remediation subcontractor, that will support the decontamination and dismantlement projects. The Construction/Remediation DEC Team will consist of a core group and a support group. The core group will include only organizations that provide continual active support for the management of remedial activities. These organizations currently include the remedial design subcontractor and the organizations which represent the following functions: Waste Management; Remediation Support; Engineering; Environmental; Health and Safety; Scheduling and Estimating; Contract Support; Regulatory Support; and Quality Assurance. An overview of their responsibilities follows.

The remediation subcontractor's activities will be performed in conjunction with those of Remediation Support. Remediation Support, under the direction of OU3 management, will perform various remedial support activities required for implementation of the remedial action, including some surface decontamination activities, material transport within the site, secondary size reduction/segregation, maintenance of interim storage facilities required for dismantled materials, and quality control operations. Remediation Support's specific responsibilities will vary from package to package, depending on the particular remediation needs of each OU3 component.

Engineering, in addition to Construction, will be responsible for reviewing the remediation subcontractor's work plans to determine whether or not the approach completely and adequately addresses all design requirements. Engineering will be responsible for performing field inspections during remediation, assessing and coordinating any proposed changes to the design, and compilation of necessary data for project and program remedial action reporting. The remedial design subcontractor, directly reportable to Engineering, will be responsible for support of engineering design changes and may be used for reviewing remediation subcontractor submittals, if necessary.

Environmental will be responsible for conducting environmental radiological air monitoring, assisting with any sampling and analysis required during the remedial action, data

management, assessing compliance with the requirements of the OU3 Final Action ROD and this work plan, and assist with remedial action reporting.

Health and Safety will be responsible for reviewing the remediation subcontractor's HASP and ensuring that the remedial action is performed in compliance with package-specific health and safety requirements and the remediation subcontractor's HASP. Health and Safety will also provide support during the remedial action by performing necessary environmental and worker safety monitoring.

Although Figure 7-2 illustrates the interface of waste management during remedial action, Section 7.2.2 provides greater detail on that function and its breakdown structure.

Scheduling and Estimating will provide support in scheduling, reviewing proposed schedules, and reviewing cost estimates by the remediation subcontractor. Contract Support will provide support for overseeing the remediation subcontractor's performance of contract requirements, including review of any potential modifications to the contract (e.g., contract price).

Regulatory Support will support the remediation efforts through continuous review of environmental monitoring data and the monitoring programs to ensure that those programs are providing adequate data.

Quality Assurance will determine the remediation subcontractor's compliance with the quality assurance criteria specified in the approved subcontractor quality assurance plan.

### 7.2.2 Material Management

Material management tasks and activities described in this work plan are assigned to the Waste Management function. These tasks and activities were discussed in Section 3.3 for remedial design and in Section 4.3 for remedial action. Figure 7-3 presents a functional organization chart for Waste Management.

As with remedial design and decontamination and dismantlement phases, DOE Program Management oversees waste management operations. In addition to an oversight role, DOE-FN provides focused oversight for three waste management functions: waste minimization/pollution prevention, hazardous/mixed waste treatment and disposition, and low-level waste transportation and disposal.

The key Waste Management functions associated with above-grade decontamination and dismantlement projects include program level management roles such as Conduct of Operations, Project Controls and Integration, and Material Control and Accountability. Key functions in support of OU3 material management field operations include Waste Operations, Waste Storage Management, Sampling and Characterization, Waste Minimization and Pollution Prevention, Shipping, Traffic Management, Quality Assurance, Hazardous/Mixed Waste Treatment and Disposition, Low-Level Waste Disposition, and Nuclear Material Disposition. Figure 7-3 identifies the responsibilities for each of these functions.

Although the FEMP currently maintains a Waste Management organization that is structured to support each of the FEMP RA projects, OU3 will utilize the Waste Management functions listed above to varying degrees depending on the specific waste management requirements of each OU3 project.

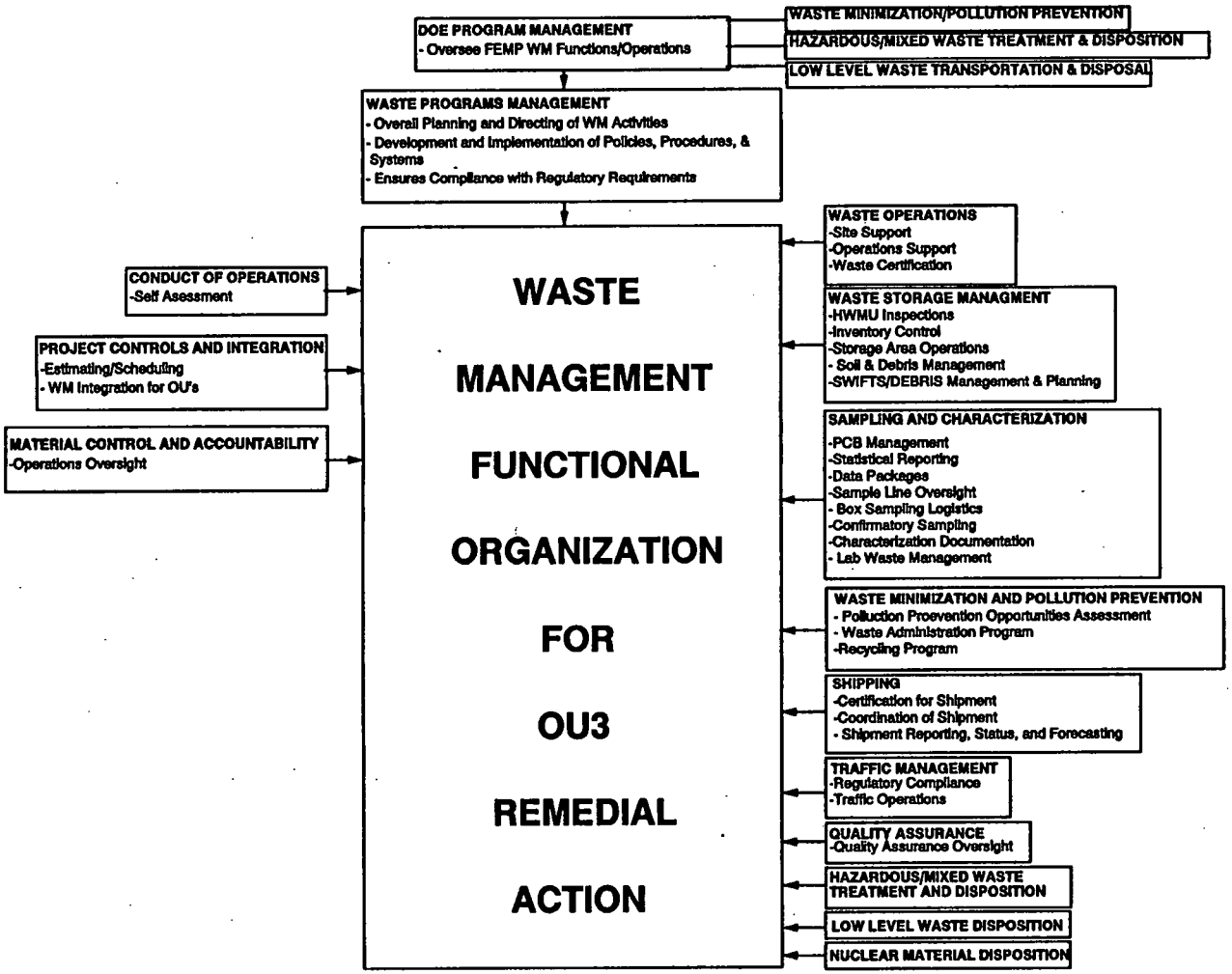


**FIGURE 7-3 Material Management Conceptual Organization Drawing**

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Appendix A

# APPENDIX A

# MATERIALS SEGREGATION AND CONTAINERIZATION CRITERIA

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# APPENDIX A
# MATERIALS SEGREGATION AND CONTAINERIZATION CRITERIA

This appendix provides the criteria developed for segregation and containerization of OU3 materials, based on management strategies that were introduced in Section 3.3 of the OU3 Integrated RD/RA Work Plan. For continuity, the information in this appendix references the related sections in the work plan.

Section 2.3 of the work plan introduced the categorization of OU3 materials as defined by the OU3 RI/FS Report. Section 3.3 further detailed the strategies developed during the RD/RA planning process, including the strategy for evaluation, segregation, and containerization of OU3 materials. Material segregation requirements are based on the projected disposition routes, which were identified in Table 3-4 of the work plan, and the waste acceptance criteria of the facilities expected to receive the materials identified.

Section 3.3.1 identified the Materials Segregation and Containerization Criteria (MSCC) form as one of the principle documents to be used during the evaluation of materials generated during decontamination and dismantlement of OU3 components. The MSCC form shown in the attachment to this appendix was recently prepared during remedial design evaluation of materials for the Boiler Plant/Water Plant Complex project.

The MSCC form will serve as a guide to the remediation subcontractor and DOE to initially segregate and containerize the majority of materials at the job site. The MSCC form is organized to correspond to distinct remedial activities during which the materials are expected to be generated. Each remedial design material evaluation process will include the preparation of a similar version of the MSCC form that is particular to the materials contained within the components remediated during that project. The MSCC table will be included as an attachment to the Waste Management Plan developed during design for eventual incorporation into the subcontract documents. The performance specifications which directly relate to the segregation and containerization elements of the project are titled, Waste Handling Criteria (Specification 01120).

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# MATERIAL SEGREGATION AND CONTAINERIZATION CRITERIA

| TASK | WASTE STREAM | TYPE | PREFERRED CONTAINERS: LARGE METAL BOX (Top Loader) | SMALL METAL BOX B-12 | SMALL METAL BOX B-25 | ISO | DRUM | ROLL-OFF BOX | DUMPSTER | NO CONTAINERS[3] | SIZE CRITERIA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation & Mobilization | Cardboard, Paper | | | | | | | | I | | - |
| | Plastic | | | | | | | | I | | - |
| | Wood | | | | | | | I | | | (1) |
| | Concrete Dust | | | | E | | | | | | - |
| | Strapping | | | | | | | | I | | - |
| Asbestos Removal | Pipe Insulation (Including non-process piping) | | | | | H | | | | | (2)(5) |
| | Equipment Insulation | | | | | H | | | | | (1) |
| | Feeder Cable | | | | | | | G | | | - |
| | Floor Tile | | | | | | | G | | | - |
| | Refractory | | | | | | | G | | | - |
| | PPE (Asbestos) | | | | | H | | | | | - |
| | HEPA Filters (Asbestos) | | | | | H | | | | | - |
| Demolition Debris Removal | Refractory (Non-Asbestos) | | | | | | | I | | | (3) |
| | Light Fixtures | | | | | | | B | | | (1) |
| | Ductwork[2] | | | | | | | D | | | (2) |
| | Plumbing Fixtures | | | | | | | I | | | (1) |
| | Lab Cabinets | | | | | | | B | | | (1) |
| | Cable Trays | | | | | | | B | | | (2) |
| | Metal Fume Hoods | | | | | | | B | | | (1) |
| | Valve, Fittings | | | | | | | B | | | (2)(5) |
| | Eye & Safety Showers | | | | | | | I | | | (1) |
| | FLEX Connections | | | | | | | | I | | (2) |

**CATEGORIES:**

A - Accessible Metals
B - Inaccessible Metals
D. Light Gauge Metal
E - Concrete
G - Non-Regulated ACM
H - Regulated ACM
I - Miscellaneous Materials
J - Special Materials[3]

FOOTNOTES: 1 Transite will be handled separately from other Non-Regulated ACM. Transite will be band-wrapped, stacked on pallets and stored in a stockpile configuration.
2 Ductwork shall be flattened.
3 Waste Streams designated as Category J must be containerized by specific waste stream (i.e., segregated).

**SIZE CRITERIA:**

(1) maximum size 10' long x 4' wide x 1' high (including projections)
(2) maximum size 10' long with 1' projection (max. height = 1.5' including projections)
(3) maximum size 6' long x 4' wide x 1.5' high
(4) bundles 8' long x 4' wide x 1.5' high
(5) piping w/ > 12" dia. must be split in half lengthwise
(6) leave intact

# MATERIAL SEGREGATION AND CONTAINERIZATION CRITERIA

| TASK | WASTE STREAM | TYPE | PREFERRED CONTAINERS: LARGE METAL BOX (Top Loader) | SMALL METAL BOX: B-12 | SMALL METAL BOX: B-25 | ISO | DRUM | ROLL-OFF BOX | DUMPSTER | NO CONTAINERS[3] | SIZE CRITERIA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Demolition Debris Removal (Cont'd) | Non-Process Piping | | | | | | | B | | | (2)(5) |
| | PVC Piping | | | | | | | I | | | (2) |
| | Acoustic Ceiling | | | | | | | | I | | (1) |
| | Gypsum Material | | | | | | | | I | | (1) |
| | Junction Boxes | | | | | | | B | | | (1) |
| | Partitions | | | | | | | I | | | (1) |
| | Conduit and wire | | | | | | | B | | | (2) |
| | Instrumentation | | | | | | | B | | | (1) |
| | Panels | Elect. | | | | | | B | | | (1) |
| | Fluorescent Bulbs | | | | | | J | | | | (6) |
| | Ballasts | Elect. | | | | | J | | | | - |
| | Bulbs-Incandescent | | | | | | | I | | | - |
| | Motors | Elect. | | | | | | B | | | (1) |
| | Feeder cable | | | | | | | G | | | (2) |
| Equipment removal | Conveyors | | | | | | | B | | | (1) |
| | Dust Collectors | | | | | | | B | | | (1) |
| | Boilers | | | | | | | B | | | (1) |
| | Furnaces | | | | | | | B | | | (1) |
| | Condensers | | | | | | | B | | | (1) |
| | Process Pumps | | | | | | | B | | | (1) |
| | Reactors | | | | | | | B | | | (1) |
| | Tanks | | | | | | | B | | | (1) |

**CATEGORIES:**

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I - Miscellaneous Materials
J - Special Materials[3]

FOOTNOTES: 1 Transite will be handled separately from other Non-Regulated ACM. Transite will be band-wrapped, stacked on pallets and stored in a stockpile configuration.
2 Ductwork shall be flattened.
3 Waste Stream designated as Category J must be containerized by specific waste stream (i.e., segregated).

**SIZE CRITERIA:**

(1) maximum size 10' long x 4' wide x 1' high (including projections)
(2) maximum size 10' long with 1' projection (max. height = 1.5' including projections)
(3) maximum size 6' long x 4' wide x 1.5' high
(4) bundles 8' long x 4' wide x 1.5' high
(5) piping w/ > 12" dia. must be split in half lengthwise
(6) leave intact

# MATERIAL SEGREGATION AND CONTAINERIZATION CRITERIA

| TASK | WASTE STREAM | TYPE | PREFERRED CONTAINERS: LARGE METAL BOX (Top Loader) | SMALL METAL BOX: B-12 | SMALL METAL BOX: B-25 | ISO | DRUM | ROLL-OFF BOX | DUMPSTER | NO CONTAINERS[3] | SIZE CRITERIA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equipment Removal (Cont'd) | Absorber | | | | | | | B | | | (1) |
| | Fans | | | | | | | B | | | (1) |
| | Air Dryer | | | | | | | B | | | (1) |
| | Scales | | | | | | | B | | | (1) |
| | Agitators | | | | | | | B | | | (1) |
| | Exhaust Fans | | | | | | | B | | | (1) |
| | Gear Reducers | | | | | | | B | | | (1) |
| | Depressurized Storage Cylinder | | | | | | | B | | | (1) |
| | Compressors | | | | | | | B | | | (1) |
| | Filters | Metal | | | | | | B | | | (1) |
| | | Gas | | | | | | B | | | (1) |
| | Separators | | | | | | | B | | | (1) |
| | Scrubbers | | | | | | | B | | | (1) |
| | Columns | Pyrex | | | | | | I | | | (1) |
| | Cooling Coils | | | | | | | B | | | (1) |
| | Preheaters | | | | | | | B | | | (1) |
| | Drying Oven | | | | | | | B | | | (1) |
| | Heat exchangers | | | | | | | B | | | (1) |
| | Controllers | | | | | | | B | | | (1) |
| | Transformers | | | | | | | B | | | (1) |
| | Hoists | | | | | | | B | | | (1) |
| | Vibrators | | | | | | | B | | | (1) |

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2 Ductwork shall be flattened.
3 Waste Streams designated as Category J must be containerized by specific waste stream (i.e., segregated).

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(5) piping w/ > 12" dia. must be split in half lengthwise
(6) leave intact

# MATERIAL SEGREGATION AND CONTAINERIZATION CRITERIA

| TASK | WASTE STREAM | TYPE | PREFERRED CONTAINERS: LARGE METAL BOX (Top Loader) | SMALL METAL BOX: B-12 | SMALL METAL BOX: B-25 | ISO | DRUM | ROLL-OFF BOX | DUMPSTER | NO CONTAINERS[3] | SIZE CRITERIA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equipment Removal (Cont'd) | Roll-up Doors | | | | | | | B | | | (1) |
| | Heaters | | | | | | | B | | | (1) |
| | Control Centers | | | | | | | B | | | (1) |
| | Drinking Fountains | | | | | | | B | | | (1) |
| | Vacuum Systems | | | | | | | B | | | (1) |
| | Settling Tank | | | | | | | B | | | (1) |
| | Bucket Elevator | | | | | | | B | | | (1) |
| | Water/Air Tanks | | | | | | | B | | | (1) |
| | Platforms | | | | | | | B | | | (1) |
| | Pulverizers | | | | | | | B | | | (1) |
| | Augers | | | | | | | B | | | (1) |
| | Feed/Weigh Hoppers | | | | | | | B | | | (1) |
| | Reducers | | | | | | | B | | | (1) |
| | Filter Units | | | | | | | B | | | (1) |
| | Blowers | | | | | | | B | | | (1) |
| | Burners | | | | | | | B | | | (1) |
| | Cyclone Seperators | | | | | | | B | | | (1) |
| | Chutes | | | | | | | B | | | (1) |
| | Mixing Boxes | | | | | | | B | | | (1) |
| | Misc. Tanks | | | | | | | B | | | (1) |
| | Drum Lifts/Handler | | | | | | | B | | | (1) |
| | Surge Hoppers | | | | | | | B | | | (1) |

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(6) leave intact

# MAT[illegible]L SEGREGATION AND CONTAINERIZATION CRITE[illegible]

| TASK | WASTE STREAM | TYPE | PREFERRED CONTAINERS: LARGE METAL BOX (Top Loader) | SMALL METAL BOX B-12 | SMALL METAL BOX B-25 | ISO | DRUM | ROLL-OFF BOX | DUMPSTER | NO CONTAINERS[3] | SIZE CRITERIA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equipment Removal (Cont'd) | Air Handling Units | | | | | | | B | | | (1) |
| | Misc. Non-Process Equipment | | | | | | | B | | | (1) |
| | Crane | | | | | | | B | | | (1) |
| | Substation | | | | | | | B | | | (1) |
| Interior Transite | Transite Panels[1] | | | | | | | | | G | (4) |
| | Metal Wall Studs | | | | | | | B | | | (1) |
| | Interior Doors | | | | | | | I | | | (1) |
| | Batt Insulation | | | | | | | I | | | - |
| | Lead Fasteners | | | | D | | | | | | - |
| Clean Building | Floor Debris (General) | | | | | | J | | | | - |
| Exterior Transite | Transite Panels[1] | | | | | | | | | G | (4) |
| | Window Panes/Glass | | | | | | | I | | | (2) |
| | Exterior Doors | | | | | | | B | | | (1) |
| | Metal Vent Stacks | | | | | | | B | | | (2) |
| | Metal Louvers | | | | | | | D | | | (1) |
| | Lead Flashing | | | | D | | | | | | - |
| | Gutter Cleanout | | | | | | H | | | | - |
| | Lead Gutters | | | | D | | | | | | (2) |
| | Downspouts | | | | | | | D | | | (1) |
| | Lead Downspout Joints | | | | D | | | | | | - |
| Structural Steel | Mainframe Members | | | | | | | | | A | (2) |
| | Stairs & Ladders | | | | | | | B | | | (1) |

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(6) leave intact

# MATERIAL SEGREGATION AND CONTAINERIZATION CRITERIA

| TASK | WASTE STREAM | TYPE | PREFERRED CONTAINERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LARGE METAL BOX (Top Loader) | SMALL METAL BOX | | ISO | DRUM | ROLL-OFF BOX | DUMPSTER | NO CONTAINERS[3] | SIZE CRITERIA |
| | | | | B-12 | B-25 | | | | | | |
| | Floor Decking | | | | | | | | | A | (1) |
| | Handrail | | | | | | | B | | | (2) |
| | Metal Angle | | | | | | | | | A | (2) |
| | Lead Paint Chips | | | | | | J | | | | - |
| | Paint Remover | | | | | | J | | | | - |
| | Bar Joists | | | | | | | B | | | (2) |
| | Metal Roof Panels | | | | | | | | | D | (4) |
| | Grating | | | | | | | B | | | (1) |
| Concrete Removal | Concrete | | | | | | | E | | | (3) |
| | Masonry Units | | | | | | | E | | | (3) |
| | Cinderblock Walls | | | | | | | E | | | (3) |
| | Built-up Roofing | | | | | | | I | | | (1) |
| Demobilization | Polyethylene | | | | | | | | I | | - |
| | Hydraulic Fluid/Oil/Grease | | | | | | J | | | | - |
| | PPE (Non-asbestos) | | | | | | | | I | | - |
| | HEPA Prefilter (Non-asbestos) | | | | | | | | I | | - |
| | Empty Material Containers | | | | | | | | I | | (1) |
| | Aerosol Cans (Punctured) | | | | | | | B | | | - |
| | Water Filters (Non-asbestos) | | | | | | | | I | | - |
| | Water Filters (Asbestos) | | | | | H | | | | | - |

**CATEGORIES:**

A - Accessible Metals
B - Inaccessible Metals
D. Light Gauge Metal
E - Concrete
G - Non-Regulated ACM
H - Regulated ACM
I - Miscellaneous Materials[2]
J - Special Materials[3]

FOOTNOTES: 1 Transite will be handled separately from other Non-Regulated ACM. Transite will be band-wrapped, stacked on pallets and stored in a stockpile configuration.
2 Ductwork shall be flattened.
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**SIZE CRITERIA:**

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(3) maximum size 6' long x 4' wide x 1.5' high
(4) bundles 8' long x 4' wide x 1.5' high
(5) piping w/ > 12" dia. must be split in half lengthwise
(6) leave intact

Appendix B

# APPENDIX B

## PERFORMANCE SPECIFICATIONS FOR DECONTAMINATION AND DISMANTLEMENT

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# APPENDIX B

## PERFORMANCE SPECIFICATIONS FOR DECONTAMINATION AND DISMANTLEMENT

Performance specifications provide the standard requirements that must be met by a remediation subcontractor during the implementation of a decontamination and dismantlement project. Based originally on the performance specifications used for the Plant 7 Dismantling project (Removal Action 19) and the first four decontamination and dismantlement design and/or implementation projects — Building 4A, Plant 1 Complex - Phase I, Boiler Plant/Water Plant Complex, and Thorium/Plant 9 Complex — the performance specifications were revised to reflect current OU3 remediation strategies and goals. This updated set of performance specifications is included in this appendix. These specifications have been referenced in the body of the work plan as they apply to the remediation strategies developed for the OU3 integrated remedial action.

A complete set of these specifications will be reviewed, revised (if necessary), and incorporated into the respective decontamination and dismantlement subcontract documents during project design. Revisions to specifications would typically be expected to incorporate lessons learned and design changes from preceding projects.

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# DECONTAMINATION AND DISMANTLEMENT ENGINEERING PERFORMANCE SPECIFICATIONS

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# SECTION 01010

# GENERAL REQUIREMENTS

## PART I GENERAL

### 1.1 SCOPE

A. The intent of these specifications is to provide technical direction for work required and necessary to support the Decontamination and Dismantling (D&D) efforts at the FEMP.

B. These general requirements form a part of any technical specifications submitted to subcontractor for Decontamination and Dismantling (D&D) services at the Fernald Environmental Management Project (FEMP).

B. In all cases where the terms "Vendor" or "Seller" or "Manufacturer" or similar terms appear in these specifications or in the appendices to these specifications, they shall be understood to refer to an individual or firm(s) providing materials, equipment or services, as noted, under a contract to Fluor Daniel Fernald (FDF).

C. In all cases where the term "subcontractor" appears in these specifications, it shall be understood to refer to the Construction Contractor or Subcontractor and their subtier subcontractors who are performing the D&D services at the FEMP.

D. In all cases where the words "Contractor" or "Construction Manager" appear, they shall be understood to refer to FDF.

#### 1.1.1 Testing

A. The Subcontractor shall provide written procedures for FDF's review and approval of all tests to be performed as identified in the drawings and specifications. These procedures shall provide the detailed step-by-step operations with sign-off columns and date columns and shall be submitted and approved prior to testing.

B. The Subcontractor shall not deviate from construction acceptance tests as reviewed and approved by FDF.

C. All field test instruments shall have been calibrated within 12 months prior to use on this contract or at intervals as recommended by vendor, by a calibration laboratory whose calibration equipment and instruments are fully traceable to National Institute of Standards and Technology (NIST) standards. The Subcontractor shall provide individual certification of calibration and NIST standards traceability for all field test instruments used on this contract.

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## 1.2 GOVERNING CODES

All work shall be accomplished in accordance with the following code requirements:

A. Ohio Basic Building Code (OBBC) 1994.

B. Uniform Building Code (UBC) 1994.

C. Life Safety Code 101 - 1994.

D. All other National Fire Protection Association (NFPA) Codes - All inclusive, including 1995 revisions.

E. 29 CFR 1910 - Occupational Safety and Health Administration - Department of Labor.

F. 29 CFR 1926 - Occupational Safety and Health Administration (OSHA).

G. 40 CFR - United States Environmental Protection Agency (US EPA).

H. DOE Order 441.1 - Radiological Protection for DOE Activities

I. DOE Order 5400.5 - Radiation Protection of the Public and the Environment and 10 CFR 835 - Occupational Radiation Protection.

References to specific codes, regulations, standards, or other criteria documents in these specifications are indicated as the latest edition of revision of each document, as of the date when these specifications were prepared.

## 1.3 OPERATING MANUALS AND SPARE PARTS LISTS

A. If required, provide twelve (12) copies of a recommended spare parts list which shall be submitted at least sixty (60) days prior to the shipment of any item of equipment.

B. An Installation, Operation, and Maintenance (IOM) Manual shall be prepared so as to provide optimum operation and maintenance of the equipment and systems being furnished.

C. The cover of the IOM Manual shall include the following information:

1. Project Title -_____.
2. Subcontractor.
3. Construction Manager - FDF.
4. Subcontractor (name of subcontractor, if any).



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D. The IOM Manuals shall be bound into one or more volumes for ease of handling, and shall have an index. The manual shall include descriptive literature, drawings, performance curves and rating data, test reports, and spare parts lists. The maintenance section shall divide maintenance procedures into two categories, "Preventive Maintenance" and "Corrective Maintenance," and a subsection for "Safety Precaution." Preventive maintenance shall include cleaning and adjustment instructions. Corrective maintenance shall include instructions and data arranged in the normal sequence of corrective maintenance (i.e., troubleshooting, logical effect to cause), then repair and replacement of parts, then the parts list. Safety Precautions shall comprise a list of safety precautions and instructions to be followed before, during, and after making repairs, adjustments, or routine maintenance.

E. If required, provide twelve (12) copies of complete sets of final, approved manuals at least sixty (60) days prior to the shipment of the equipment or system.

## 1.4 SPECIFICATION EXPLANATION

A. General: The technical specifications are of the abbreviated, simplified, or streamlined type and include incomplete sentences. Omissions of words or phrases such as "the contractor shall,' "in conformity therewith," "shall be," "as noted on the drawings," "according to the plans," "a," "the," and "all" are intentional. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the drawings.

For convenience of reference and to facilitate the letting of contracts, the specifications may be separated into titled divisions. The following defines the separations referred to in the specifications:

| | | |
|---|---|---|
| 1. | Division: | Separate numbered division of specifications (e.g., Div. 16) |
| 2. | Section: | Separate numbered section of a division (e.g.,Sec. 16020) |
| 3. | Article: | Separate numbered article of a subsection (e.g., Article 2.1) |

B. Definitions: Certain terms and words as used throughout the specifications shall be defined as follows, unless otherwise particularly specified:

| | | |
|---|---|---|
| 1. | "Provide": | Furnish and install, complete, in place. |
| 2. | "Indicated": | As shown on the drawings and/or specified. |
| 3. | "Directed," "Authorized," "Permitted": | Shall be as directed, authorized, or permitted by FDF. |
| 4. | "Selected": | Shall be as selected by the Subcontractor or FDF. |

5. "Satisfactory,"
"Acceptable": Satisfactory or acceptable to FDF.

6. "Necessary,"
"Required,"
"Suitable": As necessary, required, or suitable for the intended purpose as determined by FDF.

7. "Submit": Submit to FDF unless otherwise specified.

8. "Above-grade": Refers to second, third, etc. stories of a facility.
"At- & Below-Grade": Refers to facility slab and/or basement.

In all cases where the words "or equal" appear in these specifications, they shall be understood it to mean "or approved equal."

## 1.5 ABBREVIATIONS FOR REFERENCED STANDARDS AND SPECIFICATIONS

A. The following list denotes abbreviations used in the technical portions of these specifications:

B. Invoking all or any part of these standards are to be accomplished in accordance with normal industry practices.

C. Standards listed in this section can be used in their entirety or applicable sections depending on their application to the services being rendered by the Subcontractor.

| Abbreviation | Authority |
|---|---|
| AASHTO | American Association of State Highway Transportation Officials |
| ACGIH | American Conference of Governmental Industrial Hygienists |
| ACI | American Concrete Institute |
| ACRI | Air Conditioning and Refrigeration Institute |
| ADC | Air Diffusion Council |
| AGC | Associated General Contractors of America |
| AISC | American Institute of Steel Construction |

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| Abbreviation | Authority |
|---|---|
| AISI | American Iron and Steel Institute |
| AMCAAir | Movement and Control Association |
| ANSI | American National Standards Institute |
| APA | American Plywood Association |
| API | American Petroleum Institute |
| ASCE | American Society of Civil Engineers |
| ASHRAE | American Society of Heating, Refrigerating, and Air Conditioning Engineers |
| ASME | American Society of Mechanical Engineers |
| ASTM | American Society for Testing and Materials |
| AWS | American Welding Society |
| AWWA | American Water Works Association |
| CFR | Code for Federal Regulations |
| DHI | Door and Hardware Institute |
| ERDA | Energy Research and Development Administration |
| FGMA | Flat Glass Marketing Association |
| FM | Factory Mutual System |
| GA | Gypsum Association |
| ICBO | International Conference of Building Officials |
| IEEE | Institute of Electrical and Electronics Engineers |
| IFB | Invitation to Bid |
| IMIAC | International Masonry Industry All-Weather Council |

## SECTION 01010

| Abbreviation | Authority |
|---|---|
| MBMA | Metal Building Manufacturers Association |
| NAAMM | National Association of Architectural Metal Manufacturers Association |
| NCMA | National Concrete Masonry Association |
| NEC | National Electric Code |
| NEMA | National Electrical Manufacturers Association |
| NETA | National Electrical Testing Association |
| NFPA | National Fire Protection Association |
| NIST | National Institute of Standards and Technology |
| ODOH | Ohio Department of Health |
| ODOT | Ohio Department of Transportation Occupational Safety and Health Administration |
| OSHA | Occupational Safety and Health Administration |
| PCA | Portland Cement Association |
| PCI | Prestressed Concrete Institute |
| PS | United States Department of Commerce, Voluntary Products Standards |
| RFP | Request for Proposal |
| SDI | Steel Door Institute |
| SIGMA | Sealed Insulating Glass Manufacturers Association |
| SJI | Steel Joist Institute |
| SMACNA | Sheet Metal and Air Conditioning Contractors National Association |

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| Abbreviation | Authority |
|---|---|
| SSPC | Steel Structures Painting Council |
| UL | Underwriters Laboratories, Inc. |

**END OF SECTION**

# SECTION 01120

# DEBRIS/WASTE HANDLING CRITERIA

## PART I GENERAL

### 1.1 SCOPE

A. This section provides the requirements for handling and containerization of debris/waste generated during the dismantlement of processing and support facilities. Debris/waste will be segregated into established categories and containerized accordingly. This includes, but is not limited to, the following:

1. Segregation of debris/waste.
2. Containerization of debris/waste.
3. Movement of containers within the construction zone.
4. Weighing and tagging containers.

### 1.2 RELATED SECTIONS

A. Section 01515 - Mobilization and Demobilization.

B. Section 01516 - Asbestos Abatement.

C. Section 01517 - Removing/Fixing Radiological Contamination.

D. Section 01519 - Decontamination of Subcontractor Provided Tools, Equipment, and Material.

E. Section 03315 - Concrete Removal.

F. Section 04225 - Masonry Removal.

G. Section 05126 - Structural Steel Dismantlement.

H. Section 07415 - Transite Removal.

I. Section 15065 - Equipment Dismantlement

J. Section 15066 - Interior Dismantlement.

K. Section 15067 - Ventilation and Containment.

### 1.3 REFERENCE MATERIALS

A. See Invitation for Bid/Request for Proposal (IFB/RFP) for the following:

1. Index of Drawings.
2. Photographs.

3. Existing Drawings.
4. Subcontractor Work Plan Format Requirements.

B. See IFB/RFP for the following:

1. Waste Management Plan, which includes the Material Segregation and Containerization Criteria (MSCC) form. The MSCC form identifies anticipated waste streams to be generated and their respective waste categories. In addition, the MSCC identifies preferred containers (where applicable) for the waste streams, size criteria, and special waste handling criteria.

## 1.4 REFERENCES, CODES AND STANDARDS

All work shall be accomplished in accordance with the following reference, code, and standard requirements:

A. United States Department of Energy

| | | |
|---|---|---|
| 1. | DOE Order 460.1 | Packaging and Transportation Safety. |
| 2. | 10 CFR 835 | Occupational Radiation Protection |

## 1.5 SUBMITTALS

A. The Subcontractor shall submit the following for approval by Fluor Daniel Fernald (FDF).

1. Prior to mobilization, the Subcontractor shall submit a detailed debris/waste handling work plan in accordance with IFB/RFP, Subcontractor Work Plan Format Requirements, for approval by FDF. The work plan shall include equipment for loading and handling containers, and verifying that the weight capacity of container is not exceeded.

2. Information on method for weighing containers, including:

   a. Catalog cut sheets or drawings.
   b. Calibration and maintenance schedule.

3. The work plan shall include the Subcontractor's:

   a. method for control of wash water runoff.
   b. method for loading containers.
   c. location of the satellite accumulation area (SAA).

## 1.6 PROJECT CONDITIONS

A. FDF will produce categories of debris/waste as indicated in Part 6 of the IFB/RFP, Waste Management Plan, "Material Segregation and Containerization Criteria (MSCC)."

B. Generation of additional debris/waste shall be minimized by unpacking equipment and material prior to entering the Controlled Area whenever possible. The Subcontractor shall not bring any hazardous material to the construction zone unless prior approval is received from FDF . Alternatives to hazardous materials shall be used whenever possible.

# PART II PRODUCTS

## 2.1 EQUIPMENT

A. The Subcontractor shall supply all equipment required to move containers, except ISO containers, between and within the container queuing area and construction zone, as well as all equipment to load containers. FDF will move all ISO containers.

## 2.2 MATERIALS

A. FDF will provide appropriate containers, except as specified in the IFB/RFP, for debris/waste categories as identified on the Material Segregation and Containerization Criteria (MSCC), except liquid storage tanks as noted in Section 01517 of this specification package. These containers include, but are not limited to, the following:

| Container Designation | Nominal Exterior Dimensions (HxWxL) | Maximum Gross Weight (lbs) |
|---|---|---|
| Large white metal box (LMB) (top load) | 8'x8'x20' | 42,000 |
| ISO container (top load) | 8'x8'x20' | 42,000 |
| ISO container (end load) | 8'x8'x20' | 42,000 |
| Small metal box | 3'x4'x6' | 9,000 |
| 55-gallon drum with lid | — | 882 |
| Roll-off boxes (ROB) | 6'x8'x22' | 42,000 |

B. The Subcontractor shall supply fiber-reinforced polyethylene or polyester sheeting approved for outdoor storage: color, yellow; minimum thickness of 6-mils; ultraviolet resistant; as manufactured by Griffolyn, Herculite or equal.

C. FDF will deliver empty ("prepped" if required) containers, pallets (possibly radiologically contaminated), and miscellaneous materials, as required, to the container queuing area.

D. The Subcontractor shall furnish 8 ½" x 11" weatherproof removable tags.

E. FDF will furnish the pallets and dunnage as required in Section 3.2.B for movement of equipment or material. The Subcontractor shall furnish the fiber-reinforced sheeting.

## PART III EXECUTION

### 3.1 PREPARATION

A. The Subcontractor shall establish a container queuing area in the location indicated on reference site drawings and provide a physical boundary to define this area. The queuing area shall be used as a temporary storage area for empty and full debris/waste containers.

B. The Subcontractor shall identify a satellite accumulation area or an approved RCRA storage area for hazardous waste handling, treatment, and disposal as needed. Areas shall be secured to prevent unauthorized entry, controlled by FDF, and managed in accordance with applicable RCRA requirements. Size and location of the accumulation area shall be coordinated with FDF.

C. The Subcontractor shall provide labor and equipment required to handle small metal boxes, roll-off boxes, and large metal boxes as follows:

1. Remove lid or tarp and place in designated location to prevent damage.

2. Remove any freestanding water.

3. Replace lid or tarp on the box and secure with clamping devices, pins, or other FDF approved method.

D. Request for containers shall be made, at least 24 hours in advance of need, to FDF.

### 3.2 APPLICATION

A. The Subcontractor shall be responsible for retrieving empty containers from the queuing area, except ISO containers, for containerization; segregating debris/waste; loading, weighing, securing containers; tagging for on-site movement; and moving containers back to the queuing area. The Subcontractor will use the MSCC as the basis of all containerizing activities and will be responsible for minimizing debris/waste generation by limiting the amount of material brought on site.

B. Equipment or material requiring movement outside the enclosed building to be containerized or palletized, must meet the requirements of Section 01517 of this specification package. If the requirements cannot be attained, the material may be encapsulated or wrapped in fiber-reinforced sheeting and sealed prior to movement to

prevent the migration of radioactive contamination during movement.

Pallets shall be managed by the Subcontractor as follows:

1. Place fiber-reinforced sheeting over pallet, position material on pallet, and wrap the sheeting over material.

2. Secure fiber-reinforced sheeting over material to prevent migration of contamination.

3. Secure material to pallet with vinyl or metal bonding material.

C. Structural steel will be stored in place on the slab, unless otherwise indicated in Part 6 of the IFB/RFP Package.

## 3.3 LOADING OF CONTAINERS

A. The Subcontractor shall:

1. Provide a debris/waste handling supervisor to supervise operations. The supervisor will be required to complete (FDF conducted) NVO-325 training.

2. Ensure that personnel handle debris/waste for containerization in accordance with this specification.

3. Segregate and containerize all debris/waste according to the categories defined in the MSCC. Should a debris/waste stream be discovered that is not on the MSCC, then work on the handling of this debris/waste will stop. Contact FDF for further direction.

4. Upon receipt of containers, the Subcontractor shall perform a visual inspection to ensure the containers do not hold freestanding water (FDF will remove water if any is found). If freestanding water accumulates in the containers after the Subcontractor accepts the containers, the Subcontractor shall be responsible for removing the water by either draining the container or using absorbent material. ***After movement of appropriate containers to the loading area, remove the container lid and place in a designated location to prevent damage.***

5. Fill containers, boxes, and drums such that the interior volume is as efficiently and compactly loaded as practical up to the maximum gross weight limit of the container. When applicable, FDF or the D&D Subcontractor will use batt insulation to fill void space in shipping containers. Any container exceeding maximum allowable gross weight shall have contents removed, as required, to lower the weight to an acceptable range. Contents shall be prepared for containerization so as to minimize load shifting or damage during movement.

6. Ensure that debris/waste to be containerized is not on the following "Prohibited Materials List." This list shall be displayed in the containerization area or on each container. Notify FDF if any of the prohibited materials are identified for further material handling directions.

**PROHIBITED MATERIALS LIST**

a. Compressed gases (e.g., unpunctured aerosol cans).

b. Explosives.

c. Free liquids.

d. Fine particulates (respirable fines).

e. Hazardous waste.

f. Corrosive materials.

g. Etiologic agents.

7. Notify FDF at least 24 hours in advance of loading containers.

8. Visually check debris/waste for free liquid prior to loading. If free liquid is present, notify FDF. The Subcontractor will be required to take appropriate action to remove or absorb free liquid.

9. The Subcontractor shall provide and install weatherproof removable tags on each debris/waste container prior to moving to the queuing area. Tags shall identify container contents by debris/waste category specified in the MSCC and the debris/waste's building of origin. For Category J, an exact description of the contents is required.

10. Thorium contaminated debris/waste shall be containerized separately from non-thorium contaminated debris/waste.

## 3.4 SECURITY AND MOVEMENT OF CONTAINERS

A. The Subcontractor shall:

1. Move containers to the specific task location from the queuing area.

2. Ensure that the lid, doors, or tarps on unfilled debris/waste containers are secured when no containerization is in progress to prevent addition of unknown materials and release of container contents. Containers must be weather protected when lid is not secured, to prevent entry of snow and rain



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and release of container contents.

3. Secure full containers.

   a. End-loading ISO containers will be secured as follows using FDF-supplied material:

      1) Close and latch doors, ensuring that all latching mechanisms are engaged.

   b. Drums will be secured as follows:

      1) Place lid on drum, ensuring that gasket is seated to maintain a tight seal.

      2) Install bolt-type lock ring on lid and torque to 45 $\pm$ 5 foot-pounds.

      3) Drums shall be strapped together on pallets.

   c. Top-Loading Metal boxes (large and small) will be secured as follows:

      1) Inspect gasket for damage and repair, if required.

      2) Place gasket and lid on the box and secure with clamping device or pins.

   d. Roll-Off Boxes (ROBs)

      1) Cover ROB with tarp or steel lid.

      2) Secure tarp (with straps) or steel lid (with clamping device or pins).

      3) Secure all gate chains.

   e. Ensure that containers have not been damaged during loading.

   f. Return full, secured containers (except ISO containers) to the queuing area.

4. Secure ACM-filled containers as follows:

   a. Label all containers prior to on-site movement. These labels shall identify that ACM is present and the labels shall be placed as specified by FDF.

   b. Inspect all containers, double bagged materials, drums, boxes, or

double wrapped components for exterior contamination and damage before removing them from the work area.

c. Prior to securing lid or doors on ACM containers, fold fiber-reinforced sheeting over ACM and seal with tape.

d. Return full, secured container to the queuing area.

B. FDF will perform the final securing and disposition of full containers placed in the queuing area by the Subcontractor.

C. When applicable, Roll-Off Boxes that contain bulk storable debris/waste will be emptied by FDF at a bulk storage location(s) and returned to the queuing area for reuse.

D. The Subcontractor shall decontaminate waste containers, equipment, tools, etc., prior to exiting the construction zone or queuing area as necessary in accordance with Section 01519.

E. Multi-Level Floor Demolition Debris Movement: If the Subcontractor chooses to stage any demolished material on a floor other than the ground floor of a multi-floored structure or an equipment platform, an engineering analysis shall be required. It shall be the Subcontractor's responsibility to perform the analysis to verify the loading capacity of said floor and submit the analysis to FDF signed and stamped by a professional engineer (PE) to ensure that the load capacity is not exceeded.

## 3.5 BULK STAGING OF DEBRIS/WASTE

A. Some debris will be bulk-staged to permit the most effective handling of these media. In cases where bulk staging is desired, the debris will be managed to assure minimization of airborne emissions, and staging will occur to assure control of runoff. Refer to Specification Sections 01515 and 03315 for control of run-off. This debris will be staged in a manner to minimize double handling, minimize costs by optimizing container use, and minimize labor associated with maintenance. Debris categories considered for bulk staging within the work zone include Category A, accessible metals.

## 3.6 FIELD QUALITY ASSURANCE

A. The Subcontractor and FDF shall inspect filled containers upon their return to the queuing area to verify that no damage has occurred during the filling of the container.

**END OF SECTION**

# SECTION 01515

# MOBILIZATION, DEMOBILIZATION AND

# GENERAL SITE REQUIREMENTS

## PART I GENERAL

### 1.1 SCOPE

A. This section consists of the work related to Subcontractor mobilization and demobilization. The principal items included in this section are:

1. Site access.
2. Patching building slab.
3. Construction utilities.
4. Signs and barriers.
5. Potential use of existing overhead bridge cranes.
6. Gravel pads for access and queuing areas.
7. Establishing lay down, cutting, storage and queuing areas.
8. Protecting adjacent facilities and components.
9. Debris chutes.
10. Remediation equipment.
11. Ventilation and containment.

### 1.2 RELATED SECTIONS

A. Section 01120 - Waste Handling Criteria.

B. Section 03315 - Concrete Removal.

C. Section 05126 - Structural Steel Dismantlement.

D. Section 07415 - Transite Removal.

E. Section 15065 - Equipment Dismantlement.

F. Section 15066 - Interior Dismantlement.

G. Section 15067 - Ventilation and Containment.

### 1.3 REFERENCE MATERIALS

A. See Part 7 of the Invitation for Bid Package/Request for Proposal (IFB/RFP) for the following:

1. Index of Drawings.
2. Photographs.
3. Existing Drawing.

SECTION 01515

## 1.4 REFERENCES, CODES AND STANDARDS

The entire work under this section shall be in compliance with the provisions of the following:

A. American Society of Testing and Materials (ASTM):

1. ASTM A36/A36M-94 Standard Specification for Carbon Structural Steel.
2. ASTM C109-93 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.
3. ASTM C136-93 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates (AASHTO T27).
4. ASTM D698-91 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbs/ft.).
5. ASTM C1042-91 Standard Test Method for Bond Strength of Latex Systems Used with Concrete by Slant Shear.

B. National Fire Protection Association (NFPA)

1. NFPA 70 National Electrical Code, 1996 Edition.
2. NFPA 101-94 Code for Life from Fire in Buildings and Structures.

C. American National Standards Institute (ANSI)

1. ANSI C2-93 National Electrical Safety Code.
2. ANSI C135.1-79 Galvanized Steel Bolts and Nuts for Overhead Line Construction.
3. ANSI 05.1-92 Wood Poles Specifications and Dimensions.

D. American Wood-Preservers Association (AWPA)

1. AWPA C4-95 Poles, Pressure Treatment

E. National Electrical Manufacturers Association (NEMA)

1. NEMA LA 1-92 Surge Arresters.
2. NEMA WC 7088 Cross-Linked-Thermosetting Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

F. Underwriters Laboratories (UL)

1. UL 96-94 UL Standard for Safety Lightning Protection Components.

2. UL Electrical Directories, 1995 Construction Materials.

G. United States Department of Agriculture, Soil Conservation Service

1. Water Management and Sediment Control in Urbanizing Areas.

H. Code of Federal Regulations (CFR)

1. 29 CFR 1926 Occupational Safety and Health Administration, Dept. of Labor (as applicable).

2. 29 CFR 1910 Occupational Safety and Health Administration, Dept. of Labor (as applicable).

## 1.5 SUBMITTALS

A. The Subcontractor shall submit the following for approval by Fluor Daniel Fernald (FDF):

1. Drawings and Data

a. Provide detail and layout drawings showing locations of any additional barriers and/or fencing the Subcontractor will use for construction zone and radiological control boundaries as well as for protection of adjacent structures.

b. Layout of temporary access and roadways required during mobilization of major equipment components (i.e., cranes, field offices, tool and equipment storage, lay down areas, chutes within the stated limits of the construction zone).

c. Layout, details and applicable equipment, or plans the Subcontractor will employ to control storm water runoff, migration of wash water, and erosion control.

d. Provide detail and layout drawings that show lay down areas, building vestibule sizes and locations, cutting areas, and container queuing areas.

e. Provide shop drawings for all debris chutes to be used.

1. Provide manufacturer's data or calculations to verify that the chute, its support system and the existing structure (if the debris chute is attached) can withstand all dynamic impact loads they will be subjected to during dismantlement operations.

2. Debris Chute drawings and calculations submitted must bear the stamp of a Registered Professional Engineer.

2. Safe Work Plan for providing temporary utilities (such as; water, steam, electric power) from the point source location identified on the reference site drawings in Part 7 of the IFB/RFP.

3. Verification that the patching grout compressive and bond strengths are in accordance with ASTM C109 and ASTM C1042, respectively.

4. Results of the Engineering Survey per 29 CFR 1926.850. (If any building or if part of a building to be dismantled is identified in the Subcontractor's engineering survey as being structurally deficient, the Subcontractor shall submit a Safe Work Plan to shore the structure so that safety of the workers is maintained.)

5. Methods and materials to be utilized for control of fugitive emissions.

6. Means of controlling migration of liquids, if used.

7. Written statement of acceptability of utilities isolation.

B. Submittals shall include temporary structures, office building, trailers, size reduction facilities and interior/exterior contamination zones. See Part 6 of the IFB/RFP for traffic flow for deliveries and access to the building within the construction boundary by FDF.

## PART II PRODUCTS

### 2.1 MATERIALS

A. Patching Grout: Non-shrink type, premixed compound consisting of non-metallic aggregate; cement; water reducing and plasticizing agent; capable of developing minimum compressive strength of 5,000 psi in 28 days; capable of developing a bond strength of 1,200 psi in 28 days; conforming to ASTM C 109 and ASTM C827.

1. Acceptable products and suppliers (or equal):

   a. Masterflow 713, by Masters Builders.
   b. SikaGrout 212, by Sika Corp.
   c. Sealtight 588, by W. R. Meadows.

2. The "or equal" products will be approved by FDF prior to use on the FEMP.

B. Construction Zone Fencing: Shall be red or orange plastic construction fencing. Gates shall be plastic yellow chain fixed to stanchions. Stanchions shall be located on grade.

C. Ensure that clean granular fill is used to fill large openings in the base slab, including pits, large sumps, etc. This material will be supplied by the Subcontractor. Use of fine aggregate shall be natural river sand, bank sand or sand manufactured from stone or air-cooled blast furnace slag; washed; free of silt, clay, loam, friable or soluble materials, and organic matter; within the following limits:

| Sieve Size | Percent Passing |
|---|---|
| No. 4 | 100 |
| No. 50 | 10 - 40 |
| No. 200 | 0 - 5 |

D. Wood Poles

1. Use 45' Class 2 wood poles.

2. ANSI 05.1; treated southern pine poles.

3. Select poles for straightness, minimum sweeps and short crooks. FDF shall be notified of any sweeps or crooks prior to installation for determination of acceptance.

4. Preservative: ANSI 05.1 and AWPA C4, Pentachlorophenol.

5. Apply preservative to AWPA C4 with minimum net retention of 12 lbs/ft$^3$ (285 kg/m$^3$). Obtain complete sapwood penetration.

E. Pole Hardware

1. Miscellaneous Pole Hardware: Hot dipped galvanized after fabrication.

2. Bolts and Nuts: ANSI C135.1.

3. Butt Plate: Copper.

4. Guy Strand: High strength, seven strand steel cable galvanized to ASTM A475, Class A or B.

5. Guy Termination: Three-bolt clamp type.

6. Guy Guards: 8 foot (2 m) long plastic, colored yellow.

7. Ground Wire: Soft drawn copper conductors, 6 AWG minimum size.

8. Air Terminal: UL 96; 18 inch copper air terminal.

9. Guy Adapter: Twin Eye.

F. Line Conductors

1. Secondary Conductors: Copper, triplex (three) cable with 600 volt cross-linked polyethylene insulation for phase conductors. Use bars, extra high strength copper messenger for ground.

G. Arresters

1. Surge Arresters: NEMA LA 1; valve type, arranged for pole mounting, and rated 3 kv.

2. Mechanical Connectors: Bronze.

3. Wire: Stranded copper.

a. Grounding Conductor: Size to meet NFPA 70 requirements.

H. Anchors

1. Helical Screw Anchors: Galvanized steel, ASTM A36/36M.

I. Gravel Pads for Access and Queuing Areas

1. The aggregate shall be crushed carbonate stone, crushed gravel, crushed air-cooled slag, granulated slag, a mixture of crushed and granulated slags.

## PART III EXECUTION

### 3.1 EXAMINATION

A. The Subcontractor shall perform an Engineering Survey in accordance with the requirements of OSHA 29 CFR 1926.850, approved by FDF prior to the Subcontractor proceeding with any work activities beyond mobilization.

### 3.2 PREPARATION

A. Site Access

1. Vehicle, equipment and pedestrian access/egress shall be directed through the designated radiological control points.

2. Have provisions in place for emergency vehicles to enter the construction zone at all times.

B. Patching Building Slab

1. Conduit, piping, sump openings, etc. shall be plugged/capped at grade level.

2. The subcontractor shall ensure that large openings in the base slab including pits, sumps, etc. are free of water and loose debris.

3. If required in Part 6 of the IFB/RFP, the subcontractor shall fill large openings, pits, sumps, etc. with granular fill material to within 2 inches of grade and topped off with grout.

   a. To ensure proper bond to concrete, all grease, oil, dirt and other deleterious materials shall be completely removed and handled in accordance with Section 01120 of this specification package.

   b. Roughen the surfaces to assure bond to the existing concrete. Loose or broken concrete shall be removed and handled in accordance with Section 01120 of this specification package.

   c. Follow all manufacturer's recommendations for the application of patching grout.

   d. Fill in damaged areas of base slab and small openings including drains, chases, small sumps, etc., with a patching grout to create a surface level with surrounding slab. Maximum allowable depression not requiring repair is 1 inch in depth.

C. Construction Utilities

1. Utilities: All electric, gas, water, steam, sewer, and/or other service lines to the building have been disconnected and/or capped. Prior to performing any D&D work, the Subcontractor shall conduct a survey to verify that all utilities are capped and/or controlled to the Subcontractor's satisfaction, and notify FDF in writing of the acceptability of the utilities isolation.

2. FDF will provide electrical power and water to the locations indicated on reference site drawing listed in Part 7 of the IFB/RFP. Capacities for water and power provisions are listed in Part 6 of the IFB/RFP. The Subcontractor shall determine if the capacities that can be provided by FDF are adequate for their needs; if not, the Subcontractor shall supply any additional capacities required. All penetrations made through transite for temporary power lines shall be accomplished in accordance with Section 07415 of this specification package.

3. The Subcontractor shall remove all grounding conductors to grade level.

4. The Subcontractor shall extend the power from the point source location or provide portable generators.

5. All electrical appurtenances required for temporary power shall be in accordance with the National Electric Code.

6. Temporary heating or cooling, if needed, shall be provided by the Subcontractor. All portable heaters shall be Underwriters Laboratories (UL) listed or American Gas Association (AGA) certified for their intended use, and are not modified for other applications. Ventilation for fuel-fired heaters and adequate clearance to combustible materials, surfaces, and furnishings shall be provided according to manufacturer's recommendations. Use of LPG gas-fired heaters shall be approved by the Fire Protection group. All portable Continuous running of gas fired heating systems require 24 hour coverage by the Subcontractor.

D. Signs and Barriers - The Subcontractor shall:

1. Protect manholes, catch basins, valve pits, underground utilities, post indicator valves, pipe racks and drains, adjacent structures, and groundwater monitoring wells from damage during the work.

2. Protect all existing exterior benchmarks and survey monuments during the course of the work. If displaced or lost, the Subcontractor shall reinstall at no additional cost to FDF.

3. Remove all existing chain link fencing as noted on the reference drawings and install construction zone fencing outlining construction boundary except as noted in Section 3.2.D.7 below.

4. The Subcontractor shall supply and post construction safety signs, such as "Hard Hat Area" and "Danger-Demolition Ongoing," and construction barriers as necessary to protect the operations and adjacent structures. Signs shall be placed approximatley every 25 feet around the defined construction area.

5. The Subcontractor shall install and maintain throughout the performance period of this subcontract, barriers (minimum - orange snow fence) around the construction area to control access.

6. FDF shall supply signs, barriers, fencing, and tape indicating radiological control zones.

7. Install Radiological fencing as follows:

   a. Yellow snow fence shall be installed around radiological areas in outdoor areas to designate the following boundaries:

      - Contamination Area/Controlled Area
      - High Contamination Area
      - Adjacent Contamination Areas controlled to different isotopes

   b. When the requirements for orange construction boundary fence and yellow radiological fence overlap, the yellow radiological fence may serve as the sole boundary.

c. When yellow fence requirements coincide with an existing barrier such as chain link fence or a building wall, the existing physical barrier may serve as the boundary.

d. Fencing for short-term work may be supported with portable stanchions. Fencing for long-term activities must be supported by posts driven into the ground. Posts of stanchions shall be no more than six feet apart. Entry points shall be established such that they may be easily opened and can be held closed. These points shall be metal gates with metal posts driven into the ground and large enough to support traffic and/or movement of waste containers. For situations where personnel access is the only need, the subcontractor may utilize building doors or overlapping yellow fence that can be tied back and supported by the remaining fence while open (i.e. will not lie on the ground).

E. Potential Use of Existing Overhead Bridge Cranes

a. Use of permanent facilities shall be in accordance with the requirements of Section 5 of Temporary Facilities and Utilities of Part 6 of the IFB/RFP.

F. Gravel Pads for Access and Queuing Areas

a. Grading of site shall prevent ponding of water. Use a minimum slope of 1 percent. All grading will direct water toward the site's storm drainage system.

G. Protecting Adjacent Facilities and Components

a. The Subcontractor is responsible for avoiding damage to adjacent structures, material and equipment including underground utilities during decontamination and dismantlement activities.

H. Debris Chutes

1. The Subcontractor shall ensure that catch platforms, chutes and other means of handling debris are properly isolated by gates or barriers designed and constructed to eliminate impact hazards and to control the flow of material to its final destination.

2. Debris chutes shall meet the requirements of 29 CFR 1926.852.

3. Debris chutes shall be fully enclosed, dust-tight and ventilated.

4. FDF may prohibit the use of a debris chute if the radiological contamination levels could result in the uncontrolled generation of airborne radioactivity.

I. Remediation Equipment

1. Identify any special requirements for storing material or equipment.

2. To minimize the generation of waste products by the Subcontractor, all equipment requiring periodic oil and filter changes shall have this maintenance performed just prior to arrival on site.

3. Additional requirements for mobilization and demobilization of remediation equipment are listed in the IFB/RFP in the Project Radiological Requirements Plan.

J. Ventilation and Containment

1. Install a vestibule on the entry/exit of the building access to prevent the escape of airborne contamination when applicable. If a vestibule is used, its material of construction and performance characteristics shall be in compliance with Section 15067 of this specification package.

2. Ensure that all holes, gaps, openings are sealed with duct tape, fiber-reinforced sheeting, plywood or foam material (including where doors or windows are missing) in accordance with Specification Section 15067.

## 3.4 FINAL PROJECT SITE ACCEPTANCE

A. Final project site acceptance shall be conducted by FDF in accordance with Site Procedures, and will consist of verification of completion of all work activities relating to the work scope.

**END OF SECTION**

# SECTION 01516

# ASBESTOS ABATEMENT

## PART I GENERAL

### 1.1 SCOPE

This section specifies the requirements for an asbestos hygiene program, and methods to be used for removal, movement, and disposition of asbestos-containing material (ACM) and other materials contaminated with asbestos. This section does not cover transite.

### 1.2 RELATED SECTIONS

A. Section 01120 - Waste Handling Criteria.

B. Section 01517 - Removing/Fixing Radiological Contamination.

C. Section 15067 - Ventilation and Containment.

D. Section 07415 - Transite Removal.

### 1.3 REFERENCE MATERIALS

A. See the Invitation for Bid/Request for Proposal (IFB/RFP) Package for the following:

1. Index of Drawings.
2. Photographs.
3. Existing Drawings.
4. Air Cleaning Device (ACD) Procurement Specification.
5. Air Cleaning Filter Procurement Specification.
6. Subcontractor Work Plan Format Requirements.
7. HEPA Vacuum Cleaner Requirement.
8. HEPA Air Filtration Device Requirement.

B. For ACM information on the project, refer to Part 6 of the IFB/RFP Package.

### 1.4 REFERENCES, CODE AND STANDARDS

All work shall be accomplished in accordance with the following reference, code and standard requirements:

A. 29 CFR 1910 Occupational Safety and Health Administration - Department of Labor (as applicable).

B. 29 CFR 1926 Occupational Safety and Health Administration - Department of Labor (as applicable).

C. Ohio Department of Health Asbestos Hazards Abatement Rules Chapter 3701 - 34, OAC (Ohio Department of Health).

D. Ohio Environmental Protection Agency Chapter 3745-20, OAC.

E. United States Environmental Protection Agency (US EPA) 40 CFR 61, Subpart M, (NESHAPS).

## 1.5 SUBMITTALS

A. The Subcontractor shall submit the following for approval:

1. An asbestos abatement work plan as described in the IFB/RFP Part 8, Safety and Health and Training Requirements.

2. Prior to initiation of ACM work, the Subcontractor shall submit the following items to Fluor Daniel Fernald (FDF):

   a. Ohio Department of Health/OSHA-required documentation for Asbestos Removal Contractors:

      1) Documentation of training.
      2) Medical surveillances.
      3) Respirator fit-test.
      4) Employee exposure assessments.

   b. State of Ohio certificates and licenses for the Subcontractor.

   c. State of Ohio certification for all personnel as required by law.

3. Prior to submittal of notification to government agencies, the Subcontractor shall provide a copy of the notification to FDF for concurrence.

4. Product Data: The Subcontractor shall submit manufacturer's technical information including application instructions for each material proposed for use.

## 1.6 DELIVERY, STORAGE, AND HANDLING

A. The subcontractor shall take precautions to prevent creation of friable ACM during

handling.

B. Materials shall be in original, new, and unopened containers bearing 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. Thinning instructions.
e. Application instructions.

## PART II PRODUCTS

### 2.1 MATERIAL

A. Polyethylene sheeting shall be a minimum of 6 mils thick as manufactured by Blueridge Films Inc. or equal.

1. Fire retardant polyethylene shall be used.

2. All outside containments shall be constructed of reinforced polyethylene.

B. Surfactants (wetting agents), encapsulants, and lockdowns shall be mixed in a proportion specified by the manufacturer.

1. Surfactants:

a. Childers CP-225 CHIL-SORB.
b. Certech.
c. Expert Environmental Products.
d. International Protective coatings Corp.

2. Encapsulants:

a. Certane 2050 Certified Technologies.
b. Expert Environmental Products - Eppco #1.
c. International Protection Coatings Corp. - Serpiloc.

3. Lockdowns:

a. 1050 - Clearcoat by Certane.
b. Fiber-Seal by Eppert.
c. International Protection Coatings Corp.-Serpiloc.

4. Equivalent or better products may be acceptable and shall be approved by FDF.

## 2.2 EQUIPMENT

A. Negative pressure Air Filtration Device (AFD) equipped with HEPA filtration and operated in accordance with the requirements of 29 CFR 1926.1101 (See Part 7 of the IFB/RFP).

B. All ventilation inside containments used for asbestos abatement operations shall be capable of maintaining a minimum of 0.02 inches water gauge (w.g.) of negative pressure within the containment, as recorded by manometric measurements. The ventilation system for this type of operation shall provide a minimum of four air changes per hour.

C. For mini-enclosures and glovebags, a HEPA filtered vacuum system may be substituted to provide negative air pressure. Ensure that the HEPA filtered vacuum system meets the four air changes per hour capacity required for mini-containments. See Part 7 of the IFB/RFP for requirements for HEPA vacuum systems acceptable to FDF.

D. HEPA filtered vacuum system used of asbestos abatement cleanup.

E. The Subcontractor shall supply a Portable Asbestos Hygiene Facility (See Attached Asbestos Hygiene Facility drawing). The size of this facility shall be large enough to handle the asbestos workers during peak manpower periods. The facility shall meet the requirements for a hygiene facility specified by OSHA 29 CFR 1926.1101, DOE and site radiological control requirements. When exiting a radiological controlled area, radiological control requires whole body monitoring prior to showering. The requirements of the hygiene facility compliance with radiological control requirements, are as follows:

1. The asbestos hygiene facility shall be located adjacent to the radiological contamination area. The size of this facility is based on the number of employees that will be using the facility; this determines the number of showers required. The minimum number of showers required (based on number of workers) is located in 29 CFR 1910.141, Sanitation. It is recommended that the Subcontractor provide more showers than are legally required so the workers can exit the work area in a timely manner.

2. The doffing room (dirty change area) of the asbestos hygiene facility shall be maintained under negative pressure in relation to the rest of the hygiene facility. The air in the dirty change area shall be exhausted through a HEPA filtered air filtration device to assist in cleaning the air in the change area. The air change requirement in the dirty changes area is 4 air changes per hour at a minimum of - 0.02 of water pressure differential, relative to outside pressure. The dirty change

area shall be large enough to accommodate four containers for segregation of asbestos contaminated waste and personal protective equipment, and an Air Filtering Device. The dirty change area should have hooks or shelves for storage of hardhats and toolbelts.

3. A buffer area must be placed between the doffing room and the shower area (with room for a PCM) by dividing the doffing area into two areas using fire-retardant material. The first area of the doffing room will be considered a radiological contaminated area (this area will be maintained under negative pressure to the rest of the facility). A step-off pad will be established in the airlock/doorway separating the radiological contaminated area from the radiological controlled area creating a boundary for control of asbestos contaminated items and radiological contamination. The second area in the doffing room (buffer area) will be a radiologically controlled area which should be maintained free of any asbestos or radiological contamination. The Subcontractor shall ensure that an electrical outlet exists for the PCM. The minimum power requirements for the PCM are 120 volts AC and 1 amp. The PCM minimally requires an area of 5.5 feet by 4 feet. The buffer area shall also contain a sink for the rinsing of respirators prior to removal.

4. The clean room shall contain benches, lockers for storage of workers' personal clothing, and shelves for storage of personal protective equipment.

## PART III EXECUTION

### 3.1 PREPARATION

A. The Subcontractor shall notify the Ohio Department of Health (ODOH), and FDF shall notify the EPAs and all other applicable governmental agencies before start of work.

B. The Subcontractor shall be responsible for:

1. Adherence to and compliance with work practices and procedures set forth in all applicable Federal, State, and local codes, regulations, and standards.

2. Obtaining certifications and licenses.

C. To prepare work for removal:

1. Isolate the work area.
2. Establish hygiene facility/equipment room.
3. Install primary containment barriers.
4. Cover the floor with two layers of 6 mil polyethylene sheeting.

5. Size plastic to minimize seams.
6. Cover walls and any contained work area with 6 mil polyethylene sheeting.
7. Provide load out facility and emergency exits.
8. Post the required asbestos hazard warning signs.

## 3.2 APPLICATION

A. Use the following removal procedures:

1. Wet all ACM to be removed from the component with an amended water solution.

2. Saturated ACM shall be removed in manageable sections and maintained wet until placed into disposal containers or sealed in plastic.

3. Material removed from building structures or components shall not be dropped or thrown to the floor or into disposal containers.

4. Large components removed intact may be wrapped in two layers of 6-mil polyethylene sheeting, secured with tape and properly labeled.

5. Asbestos-containing material with sharp-edged components (e.g., nails, screws, metal lath, tin sheeting) which will tear the polyethylene bags and sheeting shall be placed into Subcontractor-supplied, properly labeled containers, and subsequently bagged for disposal.

6. After completion of all stripping work, surfaces from which ACM has been removed shall be wetbrushed and sponged or cleaned by some equivalent method to remove all visible ACM residue.

B. Use the following cleanup procedures:

1. Remove and containerize all visible accumulations of ACM and asbestos-contaminated material.

2. Wet clean all surfaces in the work area.

3. After cleaning the work area, wait at least 24 hours to allow fibers to settle, and HEPA vacuum and wet clean objects and surfaces in the work area again.

4. Inspect the work area for visible residue.

5. The work area shall be cleaned until visual inspection reveals no evidence of any AMC as determined by FDF.

6. Apply lockdown to all surfaces in the work area.

7. Aggressive clearance testing shall be performed by FDF and the acceptable limit <0.01 f/cc by PCM.

8. Upon successful completion of aggressive clearance testing by FDF, the Subcontractor shall remove containment and dispose of it as ACM waste per Part 6 of the IFB/RFP.

9. Wastewater associated with asbestos abatement shall be handled in accordance with Section 01517 of this Specification package.

C. ACM Insulated Piping:

1. All piping (less than 12 inches in diameter) insulated with ACM may be removed with ACM in place. Wrap the piping with 6 mil polyethylene sheeting. Remove ACM from area of cut utilizing glovebags as containment. Exposed ACM ends shall be capped and the pipe shall be wrapped in 6-mil polyethylene sheeting. Containerize according to the Waste Management Plan, located in Part 6 of the IFB/RFP.

D. Asbestos Removal:

1. Wet methods and state of the art engineering controls/containment shall be utilized throughout abatement activities to prevent employee exposure as well as the release of visible asbestos emissions to the environment.

2. The Subcontractor shall remove non-friable asbestos such as floor tile, mastic and gaskets in accordance with government, state, and local asbestos abatement regulations.

**END OF SECTION**

# SECTION 01517

# REMOVING/FIXING RADIOLOGICAL CONTAMINATION

## PART I GENERAL

### 1.1 SCOPE

A. Decontamination of dismantled equipment or structural debris to a level that permits removal of the equipment from a local containment, 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.

5. Fixing of contamination.

#### 1.1.1 Project Conditions

A. The Subcontractor shall establish an inspection area to allow Fluor Daniel Fernald (FDF) to inspect waste materials and perform radiological surveying.

1. The inspection area shall be arranged such that routine access is prevented by means of fencing and/or barrier tape with appropriate posting to identify that the items contained are being held for survey and the area is off limits to individuals other than FDF/Subcontractor radiological survey personnel.

2. Only those items which meet the requirements for leaving the local containment or building should enter the inspection area. The requirements for items to leave local containment or a building enclosure are given in Section 3.2.C of this specification.

B. If by visual inspection, hold-up material is found (solid or liquid), FDF shall be notified immediately. If the volume is estimated to be less than 1 quart, the D&D Subcontractor will be responsible for removing and containerizing the hold-up in accordance with the Waste Management Plan, located in Part 6 of the IFB/RFP. If the material found is estimated to be greater than 1 quart by volume, activities will cease on that piece of demolition debris.

SECTION 01517

## 1.2 RELATED SECTIONS

All work shall be accomplished in accordance with the following code requirements:

A. Section 01120 - Waste Handling Criteria.

B. Section 03315 - Concrete Removal

C. Section 04225 - Masonry Removal.

D. Section 05126 - Structural Steel Dismantlement.

E. Section 07415 - Transite Removal.

F. Section 15065 - Equipment Dismantlement.

G. Section 15066 - Interior Dismantlement.

H. Section 15067 - Ventilation and Containment.

## 1.3 REFERENCE MATERIALS

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

1. Index of Drawings.
2. Photographs.
3. Existing Drawings.

## 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 Subcontractor shall submit for approval a work plan in accordance with IFB/RFP, Part 7, Subcontractor Work Plan Format Requirements, describing the system design for removing and/or fixing contamination, including 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 Subcontractor shall submit manufacturer's technical information including the material to be used, its intended use, and its application instructions.

## PART 2 PRODUCTS

### 2.1 SUBCONTRACTOR'S EQUIPMENT

A. The Subcontractor shall supply all equipment required to remove and/or fix contamination.

B. The Subcontractor 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 Sections 3.2.E and 3.2.F of this specification. The Subcontractor shall supply all equipment required to control, filter, and move effluent produced during removal and/or fixation 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 Subcontractor shall supply all effluent containment vessels and associated secondary containment systems as specified in Sections 3.2.E and 3.2.F of this specification.

3. The Subcontractor shall supply a drum scale for determining compliance with limits for drum contents. The drumming requirement are listed in Section 3.2.F.

### 2.2 MATERIALS

A. If stabilizer coatings are employed, they shall be Carboline D3358 or approved equal. Manufacturers may include, but are not limited to: Tnemec Series 6 - Tnemec-Cryl, Sherwin-Williams, or International Protective Coatings.

B. If non-strippable coatings are employed, they may include, but are not limited to: Polymeric Barrier System (Bartlett), or an approved equal.

## PART 3 EXECUTION

### 3.1 APPLICATION

A. To remove equipment or debris out of a local containment or enclosure or prior to loading into containers, or to containerize outside of an enclosure, or prior to moving to the inspection area, all surfaces shall be free of visible process residues and dry as determined by FDF. The definition of visible process residues (green salt, yellow cake, etc.) is material on the interior or exterior surfaces of debris that is obvious and that if rubbed, would be easily removed. If an item fails visual inspection, the items shall be deemed a Category C (Process-Related Metals) item and shall either be encapsulated or wrapped in accordance with Section 01120 of this specification package and containerized as stated in the Waste Management Plan located in Part

6 of the IFB/RFP. Dirt, oil, stains, rust, corrosion, and flaking do NOT qualify as visible process material. Dirt, oil, stains, rust, corrosion, and flaking will be considered for contamination control purposes. All equipment, material, and debris are still considered to be radiologically contaminated.

B. Requirements common to both Equipment Decontamination and Structure Decontamination:

1. Acceptable methods for removing contamination include, but are not limited to: Hydro-blasting or steam-cleaning with a minimum of 1,000 psi, sponge blasting, and HEPA vacuuming.

2. Fixing of contaminants is required, if contamination levels have not been met and decontamination has been attempted at least once. Acceptable methods for fixing contamination, which is not readily removed by the above identified methods include, but are not limited to: Stabilizer coatings and Non-strippable coatings.

3. If stabilizer or non-strippable coatings are used as fixatives, they will meet the requirements of this specification (see Section 2.2).

4. The Subcontractor shall take precautions to prevent the breaching of stabilizer coatings applied to equipment or structure. If a stabilizer coating is breached after application, during activities leading up to but not including structural demolition, the Subcontractor must take action to reseal the breached areas.

C. Requirements specific to equipment decontamination and removal from a building enclosure or local containment:

1. The Subcontractor shall remove contamination on equipment, materials, or debris in accordance with this Specification Section and move equipment to an inspection area.

2. Thorium-contaminated items cannot be released from the building enclosure or local containment areas unless surveyed for 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 Subcontractor.

3. Hazardous Waste Management Unit (HWMU) equipment shall be rinsed or otherwise decontaminated to clean, as determined by visual inspection as defined in Section 3.1.A of this specification.

4. Equipment identified by FDF as being contaminated with uranium with an enrichment over 2 percent will be removed and containerized by the Subcontractor for disposition as contaminated material without decontamination.

D. Requirements specific to Structure Decontamination:

1. Prior to opening a building to the environment by removing the exterior siding or demolishing a building, the Subcontractor shall remove and/or fix radiological contamination on all structural surfaces within the facility until the detected radioactivity levels are below the criteria as defined in Part 8 of the IFB/RFP.

   FDF may perform a radiological release survey to ensure the radioactivity criteria are met.

2. Down posting of thorium contaminated areas requires that contamination levels meet the thorium -specific release limits.

3. If hydro-blasting or steam cleaning is employed, the Subcontractor shall:

   a. Seal floor cracks/seams and building cracks using sealants to protect the environment from migration of contaminants through slabs.

   b. Contain effluents to the building interior and subsequently to collection systems.

4. The Subcontractor 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 material levels.

5. The Subcontractor shall take precautions to prevent the spread of contamination from other more-contaminated areas of the facility.

6. For Hazardous Waste Management Units (HWMUs), the slab surface of the HWMU shall be rinsed with a water spray, or other approved gross decontamination methods, at least one time.

E. Rinseate/Effluent Handling:

1. All effluents and sludges shall be collected in separate containers from other effluents and sludges until after sampling and analysis. FDF will perform all effluent and sludge sampling and analysis. Approval to commingle the effluents and sludges must be provided by FDF. The collection containers will meet the requirements defined in the following subsections.

2. For the washing of equipment/material or a structure containing uranium and/or thorium contamination, the Subcontractor shall supply effluent storage tanks with a minimum storage capacity to allow 30 calendar days storage without impacting operations. Effluent tanks require secondary containment with a minimum of 10 percent of the overall effluent tank capacity housed and not less than the volume of one full tank, whichever is greater.

3. In addition to effluent tanks, the washing of enriched equipment/material, as listed in Part 8 of the IFB/RFP, requires the use of smaller tanks to permit safe quantities to be maintained (for nuclear criticality safety purposes). There are no mass restrictions for rinsates 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 Subcontractor shall supply effluent storage tanks of no greater than 175 gallon capacity, in numbers sufficient to permit 15 calendar days storage without impact to Subcontractor 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 Section 3.2.C.4), the Subcontractor shall supply effluent storage tanks no greater than 30 gallon capacity, in numbers sufficient to permit 15 calendar days storage without impact to Subcontractor operations.

   c. The Subcontractor shall store sludge, resulting from enriched equipment/material washing, in 55 gallon drums (supplied by FDF). Filled drums may be stored no closer than 2 feet apart. A storage area will be posted and designated by FDF.

   d. Equipment/material washing operations and effluents shall be maintained separate, based on enrichment and type, by the following: uranium less than or equal to 1 percent enrichment, uranium greater to 1 percent enrichment but less than or equal to 1.25 percent enrichment, uranium greater than 1.25 percent enrichment but less than or equal to 2 percent enrichment, and thorium. Wash systems can be maintained separate by campaign or by physically separate systems.

   e. Approval to transfer effluents to large effluent tanks is required from FDF.

4. Upon approval from FDF, the Subcontractor shall empty the contents of the effluent storage tanks and transport the effluent to the FEMP Advanced Wastewater Treatment Facility.

F. Sludge Drumming

Sludge limits for individual drums from enriched washing operations are restricted to the weight listed below. (Note: The weight is limited due to Department of Transportation and/or the maximum allowable weight of the drum.)

1. 104 grams of U-235 per 55 gallon drum.

## 3.2 QUALITY ASSURANCE

A. All QA activities to be provided by the Subcontractor will be stated in Part 3, "General Terms and Conditions", and Part 9 of the IFB/RFP.

SECTION 01517

## 3.3 QUALITY CONTROL

A. The Subcontractor is to perform or witness inspections and test of procured material, equipment and items, work in progress and completed items within the bounds of the contract.

## 3.4 DELIVERY, STORAGE, AND HANDLING

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

1. Name or title of material.
2. Manufacturer's stock number and date of manufacture.
3. Manufacturer's Name.
4. Application instructions.
5. Material Safety Data Sheets.

B. All possible shipping and packing materials will be removed upon receipt at the site prior to entering the controlled area to minimize contaminated waste generation.

**END OF SECTION**

# SECTION 01519

# DECONTAMINATION OF SUBCONTRACTOR PROVIDED TOOLS, EQUIPMENT, AND MATERIAL

## PART I GENERAL

### 1.1 SCOPE

A. Preventative measures for and decontamination of Subcontractor provided tools, equipment (including vehicles), and material to a level that permits removal from an enclosure/work zone, restricted reuse, or unrestricted release. This section includes, but is not limited to:

- Preventative measures/waste minimization.
- Decontamination area requirements.
- Methods of decontamination activities.
- Control of effluent and waste management activities.
- Relocation, reuse, and release activities for tools, equipment, and material.

#### 1.1.1 Project Conditions and Requirements

A. All facilities, unless expressly noted in Part 6 of the IFB/RFP, shall be considered contaminated with radioactive material.

B. The Subcontractor shall establish a holding area to allow Fluor Daniel Fernald (FDF) to perform tool and equipment radiological surveying.

1. The holding area shall be arranged such that routine access is prevented by means of fencing and/or barrier tape with appropriate posting to identify that the items contained are being held for survey and the area is off limits to individuals other than FDF/Subcontractor radiological survey personnel.

2. Only those items which meet the requirements (as described in this Specification Section) for leaving the work zone should enter the inspection area.

C. The subcontractor should assume that extensive dismantlement and an aggressive decontamination effort will be required to achieve unrestricted release of items that have come in contact with radioactive material or were used extensively in contamination areas. Based on past experience using the best available technologies, decontamination and survey access requirements to meet the release criteria may be difficult to achieve.

D. Hand and portable tools used in contaminated areas for performance of the subcontract are to be considered expendable as specified in Part 4 IFB/RFP, Special Terms And Conditions, Disposition of Subcontractor Provided Equipment, Tools, and Materials That Have Become Contaminated (SC-11).

# SECTION 01519

## 1.2 RELATED SECTIONS

A. Work related to this Specification Section shall also be accomplished in accordance with the following Specification Sections:

- Section 01120 - Waste Handling Criteria.
- Section 01517 - Removing/Fixing Radiological Contamination.
- Section 15067 - Ventilation and Containment.

## 1.3 REFERENCE MATERIALS

A. See Part 4 IFB/RFP, Special Terms and Conditions, Disposition of Contaminated Tools, Equipment, and Materials (SC-11).

## 1.4 REFERENCES, CODES, AND STANDARDS

A. United States Department of Energy (DOE):

- DOE Order 5400.5, Radiation Protection of the Public and the Environment.
- DOE/EH-0256T, Radiological Control Manual, April 1994.
- DOE/EM-0142P, Decommissioning Handbook, Chapter. 9, Mar. 1994.

B. 10CFR835 Occupation Radiation Protection

## 1.5 SUBMITTALS

A. The subcontractor must provide FDF with a list of all tools, vehicles, equipment and material to be brought on site which have been used in conjunction with radioactivity in the past including such information as:

- Previous use of the equipment.
- Dates of use.
- Levels of contamination.
- Radioisotopes involved.

This list must be submitted as soon as known but no less than 30 days in advance of bringing the item on site. FDF reserves the right to reject the subcontractor's request to bring these items on site.

1. Any tools or equipment contaminated with a radioactive material other than <1% enriched uranium or thorium-232 will be rejected.

2. Thorium contaminated tools and equipment may only be used in a thorium contaminated area.

B. The Subcontractor shall submit the manufacturer's technical information for any decontamination or contamination controlling agents for compliance review prior to use. This information shall include:

- Material to be used.
- Intended use.
- Application instructions.
- MSDS Sheets.

C. Before start of decontamination work, the Subcontractor shall submit a Safe Work Plan addressing tool and equipment decontamination for compliance review in accordance with Part 7 IFB/RFP, Subcontractor Work Plan Format Requirements, describing the following:

- Preventative measures to be employed.
- The design and construction of the decontamination area.
- The methods to be utilized for decontamination (see 3.1, C of this Section).
- The methods and equipment for controlling and handling effluent and/or secondary waste produced during decontamination activities.
- Plans for relocating, reusing, or releasing tools and equipment.

## PART 2 PRODUCTS

### 2.1 SUBCONTRACTOR PROVIDED TOOLS AND EQUIPMENT

A. The subcontractor shall furnish all equipment, tools, and material required to perform the work described in the subcontract except where the contract explicitly states FDF will provide the item.

1. The Subcontractor shall deliver approved decontamination and contamination controlling agent materials in original, new and unopened containers bearing the manufacturer's label, and the following information:

   - Name or title of material.
   - Manufacturer's stock number and date of manufacture.
   - Manufacturer's Name.
   - MSDS Sheets.

2. All possible shipping and packing materials will be removed upon receipt at the site prior to entering the controlled area to minimize contaminated waste generation.

B. For the purposes of meeting the "As Low As Reasonably Achievable" ( ALARA) goal for tools, equipment, and materials, it is expected that all reasonable efforts are used to control residual contamination to the extent that there is no detectable contamination on items that were free of contamination prior to use or there is no increase in the level of contamination on items that were previously contaminated and allowed to be used using standard field survey instruments when the items are no longer required for use. This includes, but is not limited to, the following:

- Protective measures prior to use of items.
- Preventative measures while items are being used.
- Decontamination upon completion of work activities.

1. All subcontractor furnished tools, vehicles, equipment, and material may be inspected for radioactive contamination by FDF personnel prior to initial entry and upon removal from the radiological controlled area.

2. The Subcontractor shall supply all equipment required to remove and/or control contamination.

3. The Subcontractor shall supply all equipment required to control, filter, and move effluent produced during removal of contaminants.

## PART 3 EXECUTION

### 3.1 APPLICATION

A. Prevention of or Minimizing Contamination

1. The subcontractor shall plan and coordinate all work to minimize exposure of equipment, tools, and vehicles to potential radioactive contamination. Equipment shall be located in the area with the least potential for contamination. For example, locate equipment outside the facility with leads, hose lines, etc. wrapped and run to the interior of the facility. Typical examples of equipment where this approach should be used include air compressors, high pressure washers, welders, generators, oxy-acetylene cylinders, and battery chargers.

2. It is the subcontractor's responsibility to evaluate materials, tools and equipment for ease of decontamination and disassembly that may be required for decontamination prior to use on-site. Use of unrestricted release items (i.e. those other than expendable as defined in Part 4 IFB/RFP, Special Terms And Conditions, Disposition Of Subcontractor Provided Equipment, Tools, And Materials That Have Become Contaminated) should incorporate appropriate precautions to prevent contamination which should be implemented prior to and during use. Examples of precautionary measures may include the following which are expected to be implemented as described in the Safe Work Plan:

   - Internal combustion equipment subject to contamination should make use of pre-filters or have a separate source of outside air on the intake.
   - High volume air handling equipment such as blowers, compressors, etc. shall have a filtered inlet to minimize the potential for internal contamination due to build up of low level radioactivity. Vents for air cooling shall be covered in a similar manner.
   - The Subcontractor is prohibited from bringing electrical driven mobile equipment to the FEMP (e.g., fork-lifts) except where only electric driven equipment is available.

- Protective sheathing/covers, strippable coatings, or protective caps should be used to minimize the potential for contamination (e.g., coating the buckets of man lifts or other walking/standing surfaces). In addition, all openings on equipment, tools, or vehicles that may permit contamination of inaccessible or difficult to clean areas shall be covered and protected.

B. Decontamination Area Requirements

1. Tools and equipment utilized inside an enclosure/building may be decontaminated at an existing indoor debris washing location.

2. The following are examples of options for establishing outdoor decontamination areas.

   - Utilize an existing pad.
   - Construct a temporary containment area.
     - Containment must have a bermed perimeter to ensure runoff control.
     - An example of acceptable containment is Herculite with sandbag underlayment perimeters on a non penetrating grade.
     - Containment used must be adequate to maintain its integrity.

C. Methods of Decontamination Activities

1. If decontamination becomes necessary, the subcontractor should at a minimum use the following as applicable:

   - Dry cleaning.
   - Steam cleaning.
   - High pressure hot water washing (may be used in conjunction with abrasive techniques and approved decontamination agents) with a minimum of 1,000 psi and HEPA vacuuming.

2. When selecting a decontamination technique other than those identified in 1 above, consideration should be given to those technologies which minimize radiological airborne emissions, secondary wastes, and tool or equipment damage.

3. As an alternative to decontamination, replacement of contaminated components shall be in accordance with the requirements of Part 4 IFB/RFP, Special Terms And Conditions, Disposition of Subcontractor Provided Equipment, Tools, and Materials That Have Become Contaminated (SC-11).

   a. The contaminated components are subject to the cleaning and handling requirements of 3.4, B of this Specification Section.

b. The contaminated components will be managed and handled per Specification Section 01120 and Part 6 of the IFB/RFP subsequent to the cleaning as directed by FDF.

c. Actual disposal of the contaminated components will be provided by FDF.

D. Control of Effluent and Waste Management Activities

1. The Subcontractor shall control and collect all waste and effluent generated while removing and/or fixing contamination in accordance with the requirements listed in Part 7 IFB/RFP, Specification Sections 01517 and 01120. Effluent may be either pumped to an existing approved sump or to an effluent holding tank.

2. Management of wastes generated during decontamination activities shall be in accordance with Specification Section 01120 and the Waste Management Plan located in Part 6 of the IFB/RFP.

E. Relocation, Reuse, and Release of Tools, Equipment, and Material

1. The Subcontractor shall perform all decontamination and surveying activities required to verify that the surface contamination limits identified in Table 1 of this section are not exceeded. FDF shall perform final verification surveying.

2. The Subcontractor is to provide a minimum of 24 hours prior notice to FDF of intent to remove tools and equipment from the work area.

3. Release of tools, equipment, and material from Contamination Areas to the Controlled Area

a. If removable contamination in excess of the limits of Table 1 is present on the tools, equipment or material, then the items must remain in the contamination area for decontamination or the item must be contained such that no contaminated surfaces of the item are accessible without disassembling the equipment or breaching the containment.

b. Examples of acceptable containment include plastic wrapping, yellow Herculite wrapping, or a sealable hard container. However, the containment used must be adequate to maintain its integrity considering the weather, conditions of storage, and the methods or conditions of transport.

c. If the removable contamination limits are met but the total (fixed plus removable) limit is exceeded, the item may be labeled or identified as radioactive material by FDF and released to the controlled area.

4. Unrestricted Release Criteria

a. All items are considered potentially contaminated if they have been used or stored in Controlled Areas that could contain unconfined radioactive material.

b. Prior to being released from the controlled area, all items will be surveyed by FDF to determine whether both removable and total surface contamination (including contamination on and under any coating) are in compliance with the levels given in Table 1 and that the item has been subjected to the ALARA process as described in Part 2.1, B of this Section.

c. Tools and equipment with detectable radioactivity may be released with the approval of a FDF Material Release Evaluator if all of the following have been met:

1) Residual radioactivity is at or below the unrestricted release limits identified in Table 1.

2) All areas must be readily accessible for survey for residual radioactivity including proper surface counting geometry to allow for accurate quantification. Items with inaccessible areas which are likely to be contaminated but are of such size, construction, or location as to make them inaccessible for survey shall be assumed to exceed the limits for release. The item must either be disassembled to permit an adequate survey to certify that internal contamination is at or below the limits of Table 1 or well documented process knowledge can be applied to provide confidence that contamination in inaccessible areas is not probable. In evaluating the potential for contamination in inaccessible areas, consideration will be given to where the item was used on site and preventative measures taken prior to use such as coverings, wrappings, air intake filters, etc.

3) The decontamination effort performed was such that the residual levels of radioactivity are as low as reasonably achievable and further significant reduction in radioactivity would require unreasonable efforts.

5. Release to an Off-Site Licensed Facility

A. If the subcontractor possesses the appropriate license to receive, possess, use, and transfer the equipment, tools, material, or vehicles with radioactive contamination, subcontractor may elect to remove such items from the site in lieu of decontamination. The responsibility of complying with all state, local and federal regulations during the packaging, shipping, and receipt of the equipment shall be the responsibility of the subcontractor. The subcontractor shall submit a copy of the license and applicable procedures to FDF for compliance review

prior to removal of the contaminated equipment. A copy of all Bills of Lading shall be submitted to Fluor Daniel Fernald prior to shipment.

B. The Subcontractor is to provide 24 hours notice to FDF prior to shipping radioactive tools, equipment, and/or material.

## 3.2 QUALITY ASSURANCE

A. FDF will perform quality assurance and other oversight activities during the life of project to ensure contract specification are met. All QA requirements required to be met by the Subcontractor will be stated in Part 9 of the IFB/RFP.

## 3.3 QUALITY CONTROL

A. The Subcontractor is to perform or witness inspections and tests of procured material, equipment and items, work in progress and completed items within the bounds of the contract.

## 3.4 UNSUCCESSFUL/IMPRACTICAL SUBCONTRACTOR DECONTAMINATION

A. If FDF determines that the subcontractor has implemented the requirements of this Section and the Safe Work Plan and the subcontractor's decontamination efforts are unsuccessful or decontamination is not practical (as identified below), refer to Part 4 IFB/RFP, Special Terms And Conditions, Disposition of Subcontractor Provided Equipment, Tools, and Materials That Have Become Contaminated (SC-11) for action to be taken.

1. Decontamination may be considered impractical for non-expendable items that are integral parts of equipment and not readily replaceable such as porus materials (e.g. wood and fiberglass), wire rope, chains, brushes, items with finned surfaces, and similar items where contamination may be embedded within the material configuration matrix. These items may not be released if detectable contamination is identified on the surface.

B. All tools, material, vehicles equipment accepted by FDF for disposition must have been cleaned to meet the visual inspection requirements defined in Specification Section 01517 and handled as defined in Specification Section 01120 and the Waste Management Plan located in Part 6 of the IFB/RFP.

## SECTION 01519

Table 1

SURFACE CONTAMINATION LIMITS[a]

| NUCLIDE[f] | FIXED PLUS REMOVABLE | | REMOVABLE[b,e] |
|---|---|---|---|
| | AVERAGE[b,c] | MAXIMUM[b,d] | |
| U-nat, U-235, U-238, and associated decay products, alpha emitters. | 5,000 dpm /100 $cm^2$ | 15,000 dpm /100 $cm^2$ | 1,000 dpm/100 $cm^2$ |
| Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129 | 100 dpm/100 $cm^2$ | 300 dpm/100 $cm^2$ | 20 dpm/100 $cm^2$ |
| Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133 | 1,000 dpm/100 $cm^2$ | 3,000 dpm/100 $cm^2$ | 200 dpm/100 $cm^2$ |
| Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above. | 5,000 dpm /100 $cm^2$ | 15,000 dpm /100 $cm^2$ | 1,000 dpm /100 $cm^2$ |

[a] Where surface contamination by both alpha and beta-gamma emitting nuclides exists, the limits established for alpha and beta-gamma emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each object.

[d] The maximum contamination level applies to an area of not more than 100 $cm^2$.

[e] The amount of removable radioactive material per 100 $cm^2$ of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f] The limits presented for transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, and Ac-227 may be adjusted on a case by case basis. Consult with Radiological Compliance when required to apply these limits for unrestricted release.

**END OF SECTION**

# SECTION 03315

# CONCRETE REMOVAL

## PART I GENERAL

### 1.1 SCOPE

A. Dismantling of all above- and at-grade concrete, including:

1. Elevated floor and roof slabs.
2. Cast-in-place walls.
3. Precast concrete components.
4. Foundations, piers, and selected curbs.
5. Concrete encasement (e.g., fireproofing).
6. Built-up roofing, gypsum roof panels, and insulation.
7. Control of fugitive emissions.
8. Windows, doors, roof louvers and lead.

### 1.2 RELATED SECTIONS

A. Section 01120 - Waste Handling Criteria.

B. Section 01515 - Mobilization and Demobilization.

C. Section 01517 - Removing/Fixing Radiological Contamination.

E. Section 05126 - Structural Steel Dismantlement.

F. Section 15067 - Ventilation and Containment.

### 1.3 REFERENCE MATERIALS

A. See Part 7 of the Invitation for Bid/Request for Proposal (IFB/RFP) Package for the following:

1. Index of Drawings.
2. Photographs.
3. Existing Drawings.
4. Subcontractor Work Plan Format Requirements.

### 1.4 REFERENCES, CODES, AND STANDARDS

All work shall be accomplished in accordance with the following reference, code, and standard requirements:

A. American National Standards Institute (ANSI):

1. ANSI A10.6-90 Safety Requirements for Demolition Operations.

2. ANSI A10.8-88 Construction and Demolition Operations - Scaffolding - Safety Requirements.

3. ANSI A10.9-83 Construction and Demolition Operations - Concrete and Masonry Work - Safety Requirements.

B. National Fire Protection Association (NFPA):

1. NFPA 101-94 Code for Safety to Life from Fire in Buildings and Structures.

2. NFPA 241-93 Standard for Safeguarding Construction, Alteration, and Demolition Operations.

C. United States Department of Energy (DOE):

1. DOE N441.1 Radiation Protection of the Public and the Environment.

2. 10 CFR 835 Occupational Radiation Protection.

D. Ohio Administrative Code (OAC):

1. 3745-17-08 Restriction of Emission of Fugitive Dust.

## 1.5 SUBMITTALS

A. The Subcontractor shall submit for approval a concrete removal work plan in accordance with IFB/RFP, Part 7, Subcontractor Work Plan Format Requirements, that contains the following information:

1. Detailed method and sequence of dismantlement, including equipment to be used.

2. Methods for control of contaminants, including control of fugitive emissions during cutting activities to control visible dust emissions.

3. Controlled explosive methods may be used on building structures that are constructed of precast columns and roof beams. A detailed work plan containing the following information shall be prepared:

a. Methods and materials to be used.

b. Means to protect adjacent structures, equipment, material, and underground utilities from damage, including protection from projectiles.

c. Methods and materials to control fugitive emissions.

d. Contingency plan for detonation failure.

e. Proof of permit, issued by the Bureau of Alcohol, Tobacco and Firearms, to use explosives.

f. Methods and materials to store explosives according to the requirements of 29 CFR 55 Subpart K.

g. Evidence of previous work experience using controlled explosives to take down multi-story structures near other structures within the last 5 years. Provide project locations and contacts for verification.

4. Methods of cutting, including equipment to be used.

5. Calculations to verify structural adequacy of partially dismantled structure, as applicable.

6. If dismantlement method requires personnel on the roof, the Subcontractor shall provide calculations verifying the structural adequacy of the roof to support personnel and equipment. These calculations shall be stamped by a Registered Professional Engineer.

## 1.6 QUALITY ASSURANCE

A. Calculations to verify the structural integrity of the partially dismantled structure must bear the stamp of a Registered Professional Engineer.

# PART II PRODUCTS

## 2.1 MATERIALS

A. Non-woven Geotextile Fabric:

1. Trevira Spunbond 1120 by Hoechst Celanese Corp.
2. Mirafi 160N by Mirafi, Inc.
3. ADS 600 by Advanced Drainage Systems, Inc.
4. Equal products manufactured by others will be acceptable.

B. Surfactant used in amended water.

1. Childers CP-225 CHIL-SORB.
2. Certech.
3. Expert Environmental Products.
4. International Protective Coatings Corp.

# SECTION 03315

## PART III EXECUTION

### 3.1 PREPARATION

A. The Subcontractor shall ensure that adequate lay down space has been cleared and barriers have been established.

B. The Subcontractor shall take the following precautions to control fugitive emissions. A wet dust suppression system shall be used. This system will utilize the following:

a. Amended water (with surfactant).
b. Finely atomized water spray.

### 3.2 APPLICATION

A. Concrete shall have contamination fixed or removed prior to leaving local containment or building enclosure, in accordance with Section 01517 of this specification package.

B. All bituminous roofs felled through the use of explosives are to be dropped in a single unit and impact the ground in a horizontal plane.

C. All dismantlement activities shall be performed in accordance with the references listed in Article 1.4 of this section.

1. Activities to fell concrete structures outside their own footprint require prior approval.

2. Activities to fell concrete structures shall maintain the integrity of porous surfaces to the extent practical to minimize dispersal of debris.

D. If concrete dust is a result of removal operations (due to crumbling, etc.), dust suppression techniques must be employed during demolition and, if necessary, during transportation.

E. The Subcontractor shall prevent damages to adjacent structures, materials, and equipment including underground utilities, during dismantlement activities.

F. All lifting and rigging required shall be in accordance with Part 8 of the IFB/RFP.

G. Removal of Above-Grade Concrete Projections

1. Above-grade concrete equipment, column, and other miscellaneous foundation piers, walls, and curbs are to be sealed and may remain intact until structural dismantlement.

2. Prior to structural dismantlement, a FDF approved method shall be used to minimize fugitive emissions.

3. After structural dismantlement, the concrete is to be segregated and containerized per the Waste Management Plan located in Part 6 of the IFB/RFP.

H. Removal of At-Grade Concrete

1. At-grade concrete equipment, column, and other miscellaneous foundation piers, walls, and curbs will be sealed and may remain intact during and after structural dismantlement.

I. Cutting

1. All material shall be cut as required for containerization in accordance with Section 01120 of this specification package and the Waste Management Plan located in Part 6 of the IFB/RFP.

2. Embedded steel reinforcing is considered part of concrete.

3. Because of contamination levels, some concrete may require local containment for cutting activities in accordance with Section 15067 of this specification package. These areas are identified in Part 6 of the IFB/RFP.

J. Interior concrete/Concrete Masonry Unit (CMU) walls shall be removed using non-explosive methods prior to opening the shell of the structure. A water spray shall be used to minimize fugitive emissions.

## 3.3 SPECIAL INSTRUCTIONS

A. The following items are also included (where applicable) in the sequence of concrete removal:

1. Doors, Windows, and Frames

a. The Subcontractor shall remove all windows in one piece and place them in appropriate containers.

b. The Subcontractor shall remove all doors (wood and/or steel) and place them in appropriate containers.

2. Lead Materials

a. The Subcontractor shall segregate all lead materials (i.e., flashing, vent stacks, etc.) and place them in appropriate containers in accordance with Section 01120 of this specification package and the Waste Management Plan located in Part 6 of the IFB/RFP.

b. Prior to torch cutting on a surface coated with a lead-based paint, an eight inch strip of paint shall be removed at the area of the cut.

c. The Subcontractor shall (whenever possible) dismantle lead flashing in a manner that will facilitate recycling. This will include minimizing inaccessible surfaces and maximizing straight lengths. This will also include avoiding the use of fixatives on the lead flashing that would require an abrasive method of removal.

3. Wall and Roof Louvers

a. The Subcontractor shall ensure that louvers and roof vents are removed during exterior concrete removal and placed in appropriate containers.

B. All material will be placed in containers as per the requirements of Section 01120 of this specification package and the Waste Management Plan located in Part 6 of the IFB/RFP.

**END OF SECTION**

# SECTION 03920

# CONCRETE RESURFACING

## PART I GENERAL

### 1.1 SCOPE

A. This section defines the work related to the removal of a surface layer from the existing concrete pads utilizing surface removal technologies. Principals included in the section are:

1. Removing surface layer.
2. Controlling and transporting waste produced during the removal of concrete.
3. Controlling the spread of radiological contamination in the operating area.
4. Equipment types and usage.

### 1.2 RELATED SECTIONS

A. Section 01120 - Waste Handling Criteria.

B. Section 01517 - Removing/Fixing Radiological Contamination.

B. Section 15067 - Ventilation and Containment.

C. Section 01519 - Decontamination of Subcontractor Provided Tools, Equipment, and Materials.

### 1.3 REFERENCE MATERIALS

A. See Part 7 of the Invitation for Bid/Request for Proposal (IFB/RFP) Package for the following:

1. Index of Drawings.
2. Photographs.
3. Existing Drawings.

B. See Part 8 of the IFB/RFP Package for the Radiological Requirements.

### 1.4 REFERENCES, CODES, AND STANDARDS

A. See General Section 01010 for these references, codes and Standards.

### 1.5 SUBMITTALS

A. Before start of concrete removal work, the Subcontractor shall submit for approval a work plan describing the system design for removing concrete. The work plan shall describe methods and equipment for removing concrete, including equipment used for controlling, filtering, and transporting waste generated during removal activities. The work plan shall also describe methods and equipment used to control the generation and spread of contamination.

B. Product Data: The Subcontractor shall submit manufacturer's technical information on all materials to be used, including their intended use and application instructions.

C. See Part 6 of the IFB/RFP for additional submittal requirements.

## 1.6 QUALITY ASSURANCE

A. Prior to commencement of work, the Subcontractor shall demonstrate the methods for removing concrete on a sample area of a concrete floor selected by FDF.

## 1.7 PROJECT CONDITIONS

A. Radiological contamination has been detected on concrete pads, as shown on referenced drawings. The Subcontractor is to remove surface layers of concrete in the locations and to the depth specified in the IFB/RFP. This may require concrete removal adjacent to curbs and foundations.

B. See referenced drawings in Part 7 of the IFB/RFP for work area and local underground utilities.

# PART II PRODUCTS

## 2.1 MANUFACTURERS/EQUIPMENT

A. The Subcontractor shall supply a system with all equipment required to remove concrete, including equipment to control, filter, and transport waste produced during concrete removal.

B. The concrete removal system (equipment) shall include, but not be limited to, the following features:

1. Integral vacuum system with pre- and HEPA filters.

2. Controlled, dustless process with personnel exposure below DAC limits as defined in Part 8 of the IFB/RFP.

3. Simultaneous collection of waste in 55-gallon drums.

4. No use of water where technetium-99 contamination is of concern.

5. Equipment shall be portable.

6. Consideration shall be used to select equipment that can be easily decontaminated for free release after use. For details on releasing tools and equipment, refer to Specification Section 01519.

7. Equipment shall implement waste management technology that minimizes secondary waste.

8. Vacuum design shall allow operator to fill, seal, remove, and replace the waste drum under negative pressure vacuum conditions/enclosures.

C. Acceptable equipment vendors are identified below. The listing of this typical equipment below in no way precludes alternate suppliers. Subcontractor is encouraged to investigate all alternatives to determine Best Available Technology. Alternate technologies may be proposed, provided they meet the requirements of this specification.

1. Typical equipment:

Pentek Moose, Squirrel and Corner-Cutter scabblers
Pentek Inc.
Decontamination Products Division
1026 Fourth Avenue
Coraopolis, PA 15108

D. FDF will provide standard 55-gallon drums for collection of waste. The Contractor shall provide all replacement filters.

E. Vendor shall provide method(s) for concrete removal adjacent to areas such as curbs and around foundations.

F. Erection of any necessary local containment shall be defined by the vendor in accordance with the requirements of Section 15067.

## PART III EXECUTION

### 3.1 APPLICATION

A. All concrete removal activities shall be performed in accordance with 10 CFR 835.

B. All work is to be performed according to FDF's health and safety requirements. Personnel in the controlled area shall be required to wear personal protective equipment as detailed in the health and safety matrix.

C. The Subcontractor shall control dust and debris generated while removing concrete. FDF shall monitor the area for airborne contamination. Subcontractor shall be required to make changes to operating methods and equipment if unacceptable levels of airborne contamination are found in the operating area.

D. The Subcontractor shall collect all waste generated while removing concrete. Waste and effluent shall be packaged in accordance with the requirements in the Waste Management Plan, located in Part 6 of the IFB/RFP.

E. Once the concrete has been removed, the Subcontractor shall take precautions to prevent the further spread of radiological contamination to the area.

SECTION 03920

## 3.2 FIELD QUALITY ASSURANCE

A. The subcontractor shall verify that the removal depths indicated in Part 6 of the IFB/RFP are met. The removal depths are the minimum requirements for concrete removal. Acceptable performance is achieved when the minimum removal has occurred over the work area specified.

B. FDF shall perform oversight and field verifications of the removal activity to ensure the removal depth criteria is met.

END OF SECTION

# SECTION 04225

# MASONRY REMOVAL

## PART I GENERAL

### 1.1 SCOPE

A. The work includes:

1. Removal of all interior and exterior masonry according to the requirements of the following sections.

2. Removal of acid brick where required.

### 1.2 RELATED SECTIONS

A. Section 01120 - Waste Handling Criteria.

B. Section 01515 - Mobilization and Demobilization.

C. Section 01516 - Asbestos Abatement.

D. Section 01517 - Removing/Fixing Radiological Contamination.

E. Section 15066 - Interior Dismantlement.

F. Section 15067 - Ventilation and Containment.

### 1.3 REFERENCE MATERIALS

A. See Part 7 of the Invitation for Bid/Request for Proposal (IFB/RFP) Package for the following:

1. Index of Drawings.
2. Photographs.
3. Existing Drawings.
4. Subcontractor Work Plan Format Requirements.

### 1.4 REFERENCES, CODES, AND STANDARDS

All work shall be accomplished in accordance with the following reference, code, and standard requirements:

A. American National Standards Institute (ANSI):

1. ANSI A10.6-90 — Safety Requirements for Demolition Operations.

2. ANSI A10.8-88 — Construction and Demolition Operations - Scaffolding - Safety Requirements.

3. ANSI A10.9-83 — Construction and Demolition Operations - Concrete and Masonry Work - Safety Requirements.

B. National Fire Protection Association (NFPA):

1. NFPA 241-93 — Standard for Safeguarding Construction, Alteration, and Demolition Operations.

## 1.5 SUBMITTALS

A. The Subcontractor shall submit to Fluor Daniel Fernald (FDF) for compliance review a masonry removal work plan in accordance with IFB/RFP, Part 7, Subcontractor Work Plan Format Requirements, that contains the following information:

1. Detailed method and sequence of dismantlement, including equipment to be used.

2. Methods of dust control.

3. Methods of cutting, including equipment to be used.

4. If dismantlement method requires personnel on the roof, the Subcontractor shall provide calculations verifying the structural adequacy of the roof to support personnel and equipment. These calculations shall be stamped by a Registered Professional Engineer.

## 1.6 PROJECT CONDITIONS

A. Conduct dismantlement to avoid damaging adjacent structures.

# PART II PRODUCTS

Not used.

# PART III EXECUTION

## 3.1 PREPARATION

A. Clean and/or fix contamination on interior surface of exterior masonry walls in accordance with Section 01517 of this specification package prior to dismantlement.

## 3.2 APPLICATION

A. Dismantle masonry walls, using controlled means. Some masonry walls or acid brick may require local containment in accordance with Section 15067 of this specification package. See Part 6 of the IFB/RFP for identification of any areas with this requirement.

B. Follow procedures in ANSI A10.6, A10.8, and A10.9, and in NFPA 241.

C. Cut all reinforcing and anchors (if applicable) flush with base slab. Fill in damaged areas of base slab with patching grout as described in Section 01515 of this specification package.

D. Remove all acid brick down to supporting concrete slab.

E. Place materials in containers as required by Section 01120 of this specification package and the Waste Management Plan located in Part 6 of the IFB/RFP.

F. The Subcontractor shall take the following precautions to control fugitive emissions or visible dust emissions. A wet dust suppression system shall be used as approved by FDF. This system will utilize the following:

a. Amended water (with surfactant).
b. Finely atomized water spray.

## 3.3 SPECIAL INSTRUCTIONS

A. The following items are also included (where applicable) in the sequence of masonry removal:

1. Doors, Windows, and Frames:

a. The Subcontractor shall remove all windows in one piece and place them in appropriate containers.

b. The Subcontractor shall remove all doors (wood and/or steel) and place them in appropriate containers.

2. Lead Materials:

a. The Subcontractor shall segregate all lead materials (i.e., flashing, vent stacks, etc.) and place them in appropriate containers in accordance with Section 01120 of this specification package and the Waste Management Plan located in Part 6 of the IFB/RFP.

b. Prior to torch cutting on a surface coated with a lead-based paint, an eight inch strip of paint shall be removed at the area of the cut.

c. The Subcontractor shall (whenever possible) dismantle lead flashing in a manner that will facilitate recycling. This will include minimizing inaccessible surfaces and maximizing straight lengths. This will also include avoiding the use of fixatives on the lead flashing that would require an abrasive method of removal.

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3. Wall and Roof Louvers:

   a. The Subcontractor shall ensure that louvers and roof vents are removed during exterior masonry removal and placed in appropriate containers.

**END OF SECTION**

# SECTION 05125

# NEW STRUCTURAL STEEL

## PART I GENERAL

### 1.1 SCOPE

A. Design, fabrication, and erection of miscellaneous metal items for protective barriers, lifting assemblies, rigging, and temporary bracing and supports.

### 1.2 RELATED SECTIONS

A. Section 01120 - Waste Handling Criteria.

B. Section 05126 - Structural Steel Dismantlement.

### 1.3 REFERENCE MATERIALS

A. See Part 7 of the Invitation for Bid/Request for Proposal (IFB/RFP) for the following:

1. Index of Drawings.
2. Photographs.
3. Existing Drawings.

### 1.4 REFERENCES, CODES, AND STANDARDS

A. American Society for Testing and Materials (ASTM):

| | | |
|---|---|---|
| 1. | ASTM A36/A36M-94 | Standard Specification for Carbon Structural Steel. |
| 2. | ASTM A307-94 | Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength. |
| 3. | ASTM A325M-94 | Standard Specification for Bolts, Structural Steel, Heat Treated, 120/105 KSL Minimum Tensile Strength. |

B. American Welding Society (AWS):

| | | |
|---|---|---|
| 1. | AWS A2.4-93 | Standard Symbols for Welding, Brazing, and Nondestructive Examination. |
| 2. | AWS D1.1-94 | Structural Welding Code Steel. |

C. American Institute of Steel Construction (AISC):

1. AISC — Steel Construction Manual - Allowable Stress Design (ASD), 9th Edition.

D. American National Standards Institute (ANSI):

1. ANSI A10.13-89 — Construction and Demolition Operations - Steel Erection - Safety Requirements.

## 1.5 SUBMITTALS

A. The Subcontractor shall submit the following for conformance review by Fluor Daniel Fernald (FDF).

1. Calculations: Indicate design loads, member forces, moments and stresses, and connection forces.

2. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

3. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths. Submit copies of welder's certifications with shop drawings.

4. Plan for conducting and documenting field quality testing and inspection including test methods and reports required under Field Quality Assurance.

B. For additional submittal requirements see Part 6 of the Invitation for Bid/Request for Proposal (IFB/RFP).

## 1.6 QUALITY ASSURANCE

A. Calculations and shop drawings must bear the stamp of a Registered Professional Engineer.

## 1.7 DELIVERY, STORAGE, AND HANDLING.

A. ASTM A325 high strength bolts shall be delivered to the site in the original labeled containers and once on site shall not be transferred into unlabeled containers. The label information shall include the type of bolt, purchase order number, and the name of the supplier.

# SECTION 05125

## PART II PRODUCTS

### 2.1 MATERIALS

A. Steel Sections: ASTM A36.

B. Threaded Fasteners: Heavy hexagon bolts, nuts, and hardened washer shall be ASTM A325 or ASTM A307.

1. Bolts connecting primary members shall be A325.

C. Expansion Anchors: Expansion bolts used for securing steel to concrete shall be one of the following:

1. "Parabolt" as manufactured by Molly Fastener Group of Emhard, Temple, PA 19560.

2. "Wedge Anchors" as manufactured by ITT Phillips Drill Division, Michigan City, IN 46360.

3. "Kwik Bolt" as manufactured by Hilti, Inc., Stamford, CT 06405.

D. Welding Materials: AWS D1.1 - Structural Welding Code.

### 2.2 FABRICATION

A. For delivery to site, fit and ship assemble in largest practical sections.

B. Supply components required for anchorage of fabricated structural assemblies.

C. All welding procedures, welder's certification, and visual acceptance criteria must be in accordance with AWS D1.1, Chapter 5.

D. Clean surfaces of rust, scale, grease, and foreign matter prior to applying shop primer.

E. Shop prime with one coat of rust-resistant red oxide primer.

F. Do not prime surfaces in direct contact with concrete or where field welding shall be required.

G. All coatings shall be lead and chromium free.

## PART III EXECUTION

### 3.1 PREPARATION

A. Prior to fabrication, the Subcontractor shall verify field dimensions.

SECTION 05125

## 3.2 INSTALLATION - GENERAL

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow for erection loads and provide temporary bracing to maintain true alignment until completion of erection.

C. Field weld components as indicated on the approved drawings. Field welding shall be in accordance with AWS D1.1, Chapter 3.

D. Fasteners shall be tightened to manufacturer's specifications or applicable design requirements.

E. Field modifications to load bearing structures shall require prior approval from FDF.

F. After erection, prime field welds and abrasions. Any steel embedded in concrete is an exception.

G. All steel shall be fabricated and erected in accordance with the codes and standards referenced in Article 1.4 of this section.

H. After use, all steel shall be dismantled and cut for containerization in accordance with Section 01120 and Section 05126 of this specification package.

I. All coatings shall be lead and chromium free.

## 3.3 FIELD QUALITY ASSURANCE

A. The Subcontractor shall inspect high-strength bolted connections for all shop-fabricated steel, perform tests and prepare test reports in accordance with the AISC specifications. All test results shall be submitted to FDF.

B. The Subcontractor shall conduct and interpret tests, shall state in each report whether test specimens comply with requirements, and shall specifically state any deviations. Deviations must be approved in writing by FDF.

C. Shop and Field Welding

1. The Subcontractor shall: inspect and test, during fabrication and erection of structural steel assemblies in accordance with AWS Structural Welding Code and as follows:

   a. Conduct inspections and tests as required. Record types and locations of all defects found in the work. Record work required and performed to correct deficiencies. All test results to be submitted to FDF.

   b. Perform visual inspection of all welds.

   c. Perform nondestructive tests of welds per Subcontractor submitted plan.

d. All welds that fail shall be repaired per approved Subcontractor repair plan.

e. Reworked areas shall be retested in accordance with the original design requirements.

2. Full penetration welded connections on structural steel rigging frame utilized for critical lifts, as defined in the FEMP Hoisting and Rigging Manual, shall be 100 percent radiograph tested by an independent certified testing lab. Results shall be submitted to FDF for approval.

a. All welds that fail shall be repaired per approved Subcontractor repair plan.

b. Reworked areas shall be retested in accordance with the original design requirements.

D. Correction of Substandard Work:

1. The Subcontractor shall correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements.

**END OF SECTION**

# SECTION 05126

# STRUCTURAL STEEL DISMANTLEMENT

## PART I GENERAL

### 1.1 SCOPE

A. Dismantling and containerization of structural steel, miscellaneous steel, and metal siding/roofing:

1. Structural steel.
2. Bar joists.
3. Floor plate/decking.
4. Grating.
5. Stairs, ladders, and handrail.
6. Metal siding and roofing, including doors, louvers, and windows.
7. All other miscellaneous steel.
8. Control of fugitive emissions.

### 1.2 RELATED SECTIONS

A. Section 01120 - Waste Handling Criteria.

B. Section 01517 - Removing/Fixing Radiological Contamination.

C. Section 03315 - Concrete Removal.

D. Section 07415 - Transite Removal.

### 1.3 REFERENCE MATERIALS

A. See Part 7 of the Invitation for Bid/Request for Proposal (IFB/RFP) Package for the following:

1. Index of Drawings.
2. Photographs.
3. Existing Drawings.
4. Subcontractor Work Plan Format Requirements.

## SECTION 05126

### 1.4 REFERENCES, CODES, AND STANDARDS

All work shall be accomplished in accordance with the following reference, code, and standard requirements:

A. American National Standards Institute (ANSI):

1. ANSI A10.6-90 — Safety Requirements for Demolition Operations.
2. ANSI A10.8-88 — Construction and Demolition Operations - Scaffolding - Safety Requirements.
3. ANSI A10.13-89 — Construction and Demolition Operations - Steel Erection.

B. National Fire Protection Association (NFPA):

1. NFPA 241-93 — Standard for Safeguarding Construction, Alteration, and Demolition Operations.

C. United States Occupational Safety and Health Administration:

1. 29 CFR 1926.858 — Removal of Steel Construction

### 1.5 SUBMITTALS

A. The Subcontractor shall submit to Fluor Daniel Fernald (FDF) for conformance review a structural steel removal work plan in accordance with IFB/RFP, Part 7, Subcontractor Work Plan Format Requirements, that contains the following information:

1. Detailed sequence of dismantlement, including equipment to be used.
2. Methods for contaminant control, including fugitive emissions during cutting.
3. If controlled explosive methods are used for structural steel dismantlement, a detailed work plan containing the following information shall be prepared:
   a. Methods and materials to be used.
   b. Means to protect adjacent structures, equipment, material, and underground utilities from damage, including protection from projectiles.

## SECTION 05126

c. Methods and materials to control fugitive emissions.

d. Contingency plan for detonation failure and safe recovery of all undetonated charges.

e. Proof of permit, issued by the Bureau of Alcohol, Tobacco and Firearms, to use explosives.

f. Evidence of previous work experience using controlled explosives to take down multi-story structures within the last 5 years. This experience may be shown through the sub-tier contract. Provide project locations and contacts for verification.

g. If interior concrete/concrete masonry unit (CMU) walls and slabs are removed, refer to concrete removal method in Sections 03315 and 04225 of this specification package for methods.

h. Identify locations of all cuts and charges and detonation sequence on composite drawings which will be provided by FDF.

i. Provision of adequate protection of charges to prevent shrapnel from damaging the non-electric detonation system or persons near the exclusion boundary.

j. Predications of rubble/debris piles should be made to ensure that safe exclusion zones are established.

4. Methods of cutting, including equipment to be used.

5. Detailed plan for protecting lay down and cutting areas from contamination by lead paint chips and for controlling airborne radioactivity.

6. Methods and materials used for cutting lead-painted steel.

7. Calculations to verify the structural integrity of the partially dismantled structure must bear the stamp of a Registered Professional Engineer.

8. In addition, the Subcontractor shall submit a detailed work plan that describes plans for personnel tie offs, use of pick boards and walking on or near roof purlins/girders.

# SECTION 05126

## PART II PRODUCTS

### 2.1 MATERIALS

A. Non-woven Geotextile Fabric:

1. Trevira Spunbond 1120 by Hoechst Celanese Corp.
2. Mirafi 160N by Mirafi Inc.
3. ADS 600 by Advanced Drainage Systems, Inc.
4. Equal products manufactured by others will be acceptable.

B. Surfactants:

1. Childers CP-225 CHIL-SORB.
2. Certech.
3. Expert Environmental Products.
4. International Protective Coatings Corp.

## PART III EXECUTION

### 3.1 PREPARATION

A. The Subcontractor shall ensure that adequate lay down space has been cleared and barriers have been established.

B. Steel and siding shall have contamination removed or removed and fixed prior to exposing steel and siding to the environment in accordance with Section 01517 of this specification package.

C. If controlled explosive methods are used, the Subcontractor shall take precautions to control fugitive emissions by saturating the explosion footprint with water 2 to 4 hours prior to the implosion.

### 3.2 APPLICATION

A. All dismantlement activities shall be performed in accordance with the standards listed in Part 1.4 of this section.

## SECTION 05126

B. The Subcontractor shall apply mechanical means of cutting and removing the structural steel to the largest extent possible.

C. The roof deck and roofing material, panels and concrete floor deck shall also be tripped with the structure wherever possible. Roofing material containing ACM shall not be tripped with structural steel.

D. The Subcontractor shall dismantle, shear and segregate the structural steel to maximize accessible surfaces.

1. The Subcontractor shall shear the steel (beams, joists, purlins, etc.) as close to the joints (cross members, plates, decking, etc.) as practical to create long, accessible (straight) metal pieces which may be recycled.

   NOTE: Some bending of the structural steel may occur during shearing activities.
   Straight pieces may be difficult to obtain where main structural members are connected to plates, deck, grates, or cross members.

2. The Subcontractor shall segregate the structural steel into two categories/piles. The segregation criteria for the steel categories are defined as follows:

   Category 1 Structural Steel: Steel allowing access to surfaces for a radiological contamination survey for unrestricted release. Surfaces must be accessible to a Geiger Mueller pancake probe to allow areas to be surveyed. Category 1 steel includes steel with ends crimped due to sizing (e.g., shearing) operations. Welded and riveted joints that have been in place since original construction are not required to be made accessible. However, brackets or structural members bolted to the superstructure must be removed to allow access for survey.

   Category 2 Structural Steel: contains surfaces which cannot be radiologically surveyed.

3. The Subcontractor shall minimize bending, twisting, and smashing of the steel during segregation and bulk storage.

E. Control of fugitive emissions shall be maintained at all times during this removal work to minimize visible dust.

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F. If structural steel is removed in sections, verify the structural adequacy of the remaining structure.

G. Prior to torch-cutting any steel or siding that has a lead based coating, an 8 inch strip of paint shall be removed at the area of the cut.

H. All lifting and rigging required shall be in accordance with the Fluor Daniel Fernald Hoisting and Rigging Manual.

I. All temporary bracing and rigging frames required shall be in accordance with Section 05125 of this specification package.

J. All steel columns, anchors, and other projections shall be removed flush with the floor slab or existing grade.

K. Lead-based paint chips and debris, released during structural steel dismantlement, shall be collected and managed in accordance with Section 01120 of this specification package and the Waste Management Plan located in Part 6 of the IFB/RFP.

### 3.3 SPECIAL INSTRUCTIONS

A. The following items are also included (where applicable) in the sequence of structural steel dismantlement:

1. Doors, Windows, and Frames:

   a. The Subcontractor shall remove all windows.

   b. The Subcontractor shall remove all doors and frames (wood and/or steel).

2. Lead Materials:

   a. The Subcontractor shall segregate all lead materials (i.e., flashings, vent stacks, etc.) and place them in appropriate containers in accordance with Section 01120 of this specification package and the Waste Management Plan located in Part 6 of the IFB/RFP.

   b. Prior to torch cutting on a surface coated with a lead-based paint, an eight inch strip of paint shall be removed at the area of the cut.

SECTION 05126

c. The Subcontractor shall (whenever possible) dismantle lead flashing in a manner that will minimize inaccessible surfaces and maximize straight lengths. This will also include avoiding the use of fixatives on the lead flashing that would require an abrasive method of removal.

3. Gutters, and Wall and Roof Louvers:

a. The Subcontractor shall ensure that louvers, gutters (see Specification Section 07415 for gutters), and roof vents are removed during structural steel dismantlement.

4. Metal Siding and Roofing:

a. The Subcontractor shall remove metal siding and roofing in full sheets in tact without cutting or bending the sheets, to the extent feasible.

B. All material shall be cut and managed in accordance with the Waste Management Plan located in Part 6 of the IFB/RFP.

END OF SECTION

# SECTION 07415

# TRANSITE REMOVAL

## PART I GENERAL

### 1.1 SCOPE

A. The work includes:

1. Removal of all interior and exterior transite panels (ACM).

2. Use of an encapsulant, lockdown, and/or surfactant on the transite panels before removal to prevent airborne asbestos fibers.

### 1.2 RELATED SECTIONS

A. Section 01120 - Waste Handling Criteria.

B. Section 01516 - Asbestos Abatement.

C. Section 01517 - Removing/Fixing Radiological Contamination.

D. Section 15066 - Interior Dismantlement.

E. Section 15067 - Ventilation and Containment.

### 1.3 REFERENCE MATERIALS

A. See Part 7 of the Invitation for Bid/Request for Proposal (IFB/RFP) for the following:

1. Index of Drawings.
2. Photographs.
3. Existing Drawings.
4. Subcontractor Work Plan Format Requirements.

### 1.4 REFERENCES, CODES, AND STANDARDS

A. 29 CFR 1910.1001 Asbestos (General Industry).
29 CFR 1926.1101 Asbestos (Construction Industry).
29 CFR 1910.134 Use of Respirators.

B. Ohio Department of Health Asbestos Hazards Abatement Rules Chapter 3701-34, OAC (Ohio Department of Health).

C. Ohio Environmental Protection Agency Chapter 3745-20, OAC.

D. United States Environmental Protection Agency (US EPA) 40 CFR 61 Subpart M (NESHAPS).

SECTION 07415

## 1.5 SUBMITTALS

A. The Subcontractor shall submit to Fluor Daniel Fernald (FDF) a detailed work plan for approval in accordance with Part 7, Subcontractor Work Plan Format Requirements, and Part 8, Asbestos Abatement Work Plan Requirements, of the IFB/RFP, including the procedures proposed for use in complying with the requirements of this specification.

1. Include in the plan:

   a. The location and layout of storage and queuing areas.

   b. The method of applying encapsulant, lockdown, and/or surfactant.

   c. The methods and sequencing of interior and exterior panel removal.

   d. The interface of trades involved in the performance of work.

   e. A detailed description of the methods to be employed to prohibit visible emissions in the work area.

   f. A detailed description of the methods for moving transite panels from the location to storage to containerization.

   g. A detailed description of methods to be employed to ensure transite panels are removed without cutting, abrading, or breaking.

2. Describe the use of a portable HEPA ventilation system, the containerization of removed asbestos debris, the method of treating broken and/or damaged panels, and the method of protecting adjacent structures.

3. The plan must be approved by FDF prior to commencement of work.

4. If dismantlement method requires personnel on the roof, the Subcontractor shall provide calculations verifying the structural adequacy of the roof to support personnel and equipment. These calculations shall be stamped by a Registered Professional Engineer.

5. The Subcontractor shall submit a detailed work plan that describes plans for personnel tie off, use of pick boards and walking on or near roof purlins/girders.

B. Prior to initiation of the work, the Subcontractor shall submit the following items to FDF:

1. OSHA-required documentation for Asbestos Removal Contractors.

   a. Documentation of training.
   b. Medical surveillances.
   c. Respirator fit-test.

d. Employee exposure assessments.

C. Prior to submittal of notification to government agencies, the Subcontractor shall provide a copy to FDF for concurrence.

D. Product Data: The Subcontractor shall submit for approval manufacturer's technical information, including application instructions for each material proposed for use.

## 1.6 QUALITY ASSURANCE

A. Prior to commencement of work, the Subcontractor shall provide for approval a FDF selected sample area of transite for approval, 10 feet by 10 feet in size, to demonstrate encapsulant, lockdown, and/or surfactant methods. The approved mock-up shall serve as a standard for the balance of the work.

## 1.7 HANDLING AND STORAGE

A. The Subcontractor shall:

1. Manage transite in accordance with Specification Section 01120 and the Waste Management Plan, located in Part 6 of the IFB/RFP.

2. Take precautions to prevent breakage of transite panels during handling.

## 1.8 PROJECT CONDITIONS

A. Subcontractor shall apply encapsulants, lockdown, and/or surfactants according to the product manufacturer's specifications for application conditions (e.g., temperature).

# PART II PRODUCTS

## 2.1 MATERIALS

A. Deliver materials in original, new, and unopened containers bearing 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. Thinning and application instructions.

B. Encapsulants:

1. Certane 2050 Certified Technologies.
2. Expert Environmental Products - Eppco #1.

3. International Protective Coatings Corp. - Serpiloc.

C. Surfactants:

1. Childers CP-225 CHIL-SORB.
2. Certech.
3. Expert Environmental Products.
4. International Protective Coatings Corp.

D. Lockdowns:

1. 1050-Clearcoat by Certane.
2. Fiber-Seal by Eppert.
3. International Protective Coatings Corp. - Serpiloc.

E. Fiber-reinforced polyethylene or polyester sheeting approved for outdoor storage: color, yellow; minimum thickness of 6 mils; ultraviolet resistant, as manufactured by Griffolyn or Herculite.

F. Or equal.

## PART III EXECUTION

### 3.1 PREPARATION

A. The Subcontractor shall notify the Ohio Department of Health (ODOH) and FDF shall notify the EPA's and all other applicable governmental agencies before the start of work.

B. The Subcontractor shall be responsible for:

1. Adherence to and compliance with work practices and procedures set forth in the most current and applicable Federal, State, and local codes, regulations, and standards.

2. Obtaining certifications and licenses.

C. Subcontractor shall maintain the integrity of the exterior of the building until the interior transite and insulation has been removed and encapsulant or lockdown, and/or surfactant has been applied to the interior surface of exterior panels. Encapsulation, lockdown, or surfactant on interior surfaces of exterior panels is not required if the building passes an aggressive air test for asbestos.

### 3.2 APPLICATION

A. For exterior transite, the Subcontractor shall:

1. If necessary, apply the encapsulant, lockdown, and/or surfactant to the interior surface of the exterior panels prior to removal. When encapsulant or lockdown is applied, it shall be applied to provide visible coverage.

2. Wherever practical, the Subcontractor shall use a scan climber as the preferred method to remove transite from the roof and building siding.

B. Apply encapsulant, lockdown, and/or surfactant to areas around fasteners of transite panels before removal of fasteners. If cut, fasteners shall be cut in a manner which minimizes abrading the transite panel. A flat, sharp instrument shall be used to cut the fasteners. If original application becomes dried out before or during removal or handling, apply a second application.

C. Unwrapped transite panels shall be lowered to the ground, or placed in an impervious waste bag, or wrapped in 6 mil fiber-reinforced sheeting and lowered to the ground no later than the end of the work shift. Removed transite panels shall be wrapped in 6 mil fiber-reinforced sheeting and sealed by the end of the work shift. Refer to Waste Managment Plan located in Part 6 of the IFB/RFP for transite handling.

D. In the event a transite panel is broken or deteriorated, the Subcontractor shall apply encapsulant, lockdown, and/or surfactant to the edges of deteriorated areas.

E. Removal of transite roof panels:

1. Removal of transite roof panels shall be sequenced to minimize exposed surfaces.

2. Bodily contact with the transite roof panels, as practical, shall be avoided.

3. When dust is observed between panels, collect the dust with a HEPA-filtered vacuum.

4. Apply the encapsulant, lockdown, and/or surfactant to the interior surface of the two layers of panels prior to removal. Encapsulant, lockdown, and/or surfactant shall be applied to provide visible coverage.

5. Load the panel into a skip box.

## 3.3 SPECIAL INSTRUCTIONS

A. The following items are also included (where applicable) in the sequence of transite removal:

1. Gutters:

a. The Subcontractor shall remove and collect all ACM from gutters, apply an encapsulant, lockdown, and/or surfactant to the gutters before their removal.

2. Insulation:

## SECTION 07415

a. The Subcontractor shall remove the mineral wool insulation between the transite panels and/or other materials.

3. Doors, Windows, and Frames:

a. The Subcontractor shall remove all windows in one piece.

b. The Subcontractor shall remove all doors (wood and/or steel).

4. Lead Materials:

a. The Subcontractor shall segregate all lead materials (i.e., flashing, vent stacks, etc.) and place them in appropriate containers in accordance with Section 01120 of this specification package and the Waste Management Plan located in Part 6 of the IFB/RFP.

b. Prior to torch cutting on a surface coated with a lead-based paint, an eight inch strip of paint shall be removed at the area of the cut.

c. The Subcontractor shall (whenever possible) dismantle lead flashing in a manner that will facilitate recycling. This will include minimizing inaccessible surfaces and maximizing straight lengths. This will also include avoiding the use of fixatives on the lead flashing that would require an abrasive method of removal.

B. The Subcontractor shall use dust control techniques (minimum of applying amended water) to minimize airborne contaminants generated during insulation removal.

C. All material shall be managed in accordance with the Waste Management Plan located in Part 6 of IFB/RFP.

**END OF SECTION**

# SECTION 15065

# EQUIPMENT DISMANTLEMENT

## PART 1 GENERAL

### 1.1 SCOPE

A. This section includes the Subcontractor's responsibility for removal or dismantlement of equipment from a facility and support systems within or outside a facility.

### 1.2 RELATED SECTIONS

A. Section 01120 - Waste Handling Criteria.

B. Section 01515 - Mobilization and Demobilization.

C. Section 01517 - Removing/Fixing Radiological Contamination.

D. Section 15067 - Ventilation and Containment.

### .3 REFERENCE MATERIAL

A. See Part 6 of the Invitation for Bid/Request for Proposal (IFB/RFP) for the Waste Management Plan.

B. See Part 7 of the IFB/RFP for the following:

1. Index of Drawings.
2. Photographs.
3. Existing Drawings.
4. HEPA Vacuum Cleaner Requirements.
5. HEPA Air Filtration Device Requirements.
6. Air Cleaning Device (ACD) Procurement Specification.
7. Air Cleaning Device Filter Procurement Specification.
8. Subcontractor Work Plan Format Requirements.

C. See Part 8 of the IFB/RFP for the hoisting and rigging information.

### 1.4 REFERENCES, CODES, AND STANDARDS

All work shall be accomplished in accordance with the following reference, code, and standard requirements:

a. 29 CFR 1926.301 Hand Tools.
b. 29 CFR 1926.302 Power Operated Hand Tools.

## SECTION 15065

### 1.5 SUBMITTALS

The Subcontractor shall submit the following for approval:

1. Detailed removal work plan in accordance with IFB/RFP Part 7, Subcontractor Work Plan Format Requirements, including sequence, methods of removal and dismantlement, equipment required, catalog cut sheets, drawings and method and materials to control possible generation of fugitive emissions from cutting operations, methods to seal equipment openings for each equipment type and location of interim storage areas and allowable floor loads.

2. Catalog cuts, proposed location, and method of installation of all hoisting equipment, and specialized construction equipment submitted for approval by FDF with the work plan.

### 1.6 QUALITY ASSURANCE

A. Calculations submitted on maximum allowable floor loading must bear the stamp of a Registered Professional Engineer.

### 1.7 PROJECT CONDITIONS

A. Residual process material (hold-up) has been removed from equipment to the maximum extent practical. If hold-up is found, FDF shall be notified immediately. If the volume is estimated to be less than 1 quart, the D&D Subcontractor will be responsible for removing and containerizing the hold-up in accordance with the Waste Management Plan, Part 6 of the IFB/RFP. If the material found (solid or liquid), is estimated to be greater than 1 quart by volume, D&D activities will cease on that piece of equipment.

## PART II PRODUCTS

### 2.1 EQUIPMENT

A. The Subcontractor shall supply items such as duct tape, 6 mil fiber-reinforced sheeting, ½ inch plywood and an approved foam that is not ultraviolet degradable as sealing materials.

B. The Subcontractor shall use mechanical means of cutting whenever possible.

C. Prior to torch-cutting any material that has a lead-based coating, an 8 inch strip of paint shall be removed at the area of the cut.

### 2.2 MATERIALS

A. The Subcontractor shall supply all materials required to seal equipment openings, to prevent spillage and/or migration of contaminants, per requirements of this section.

B. Fiber-reinforced polyethylene or polyester material approved for outdoor storage: color, yellow; minimum thickness of 6 mils; ultraviolet resistant; as manufactured by Griffolyn, Herculite, or equal.

SECTION 15065

## PART III EXECUTION

### 3.1 APPLICATION

A. All equipment and piping shall be dismantled, cut, and segregated per the requirement of Section 01120 of specification package and Part 6 of the IFB/RFP.

B. If methods used for dismantlement generate loose contamination, or if upon dismantlement, loose contamination is discovered, the openings on the equipment shall be sealed. Sealing material shall be sufficiently durable to maintain its integrity during handling, containerization, and exposure to weather. The Subcontractor shall seal openings after cleaning and after verification inspection by FDF as defined in Section 01517.

C. Prior to cutting into tanks or piping where the potential for flammable lining exists, it shall be the Subcontractor's responsibility to verify that no lining exists. Should the Subcontractor find lined pipes or tanks, the pipes or tanks shall be cut and removed by mechanical means and shall not be torch cut.

D. In some cases, equipment may be elevated from the ground by the means of a structural platform. In these cases, the equipment should be cut away or disconnected from the platform and lowered to the ground. The dismantlement of this equipment shall be accomplished by shearing and cutting whenever possible. If this is not possible, the equipment shall be dismantled at convenient assembly joints.

E. Equipment which must be removed in one piece during dismantlement of the building will be required to meet the criteria in Specification Section 01517.

F. If necessary, the equipment shall be rigged in accordance with the FEMP Hoisting and Rigging Manual.

### 3.2 INTERIM MATERIAL STORAGE

A. Where removed materials are staged or stored within the facility, they shall be stored in designated floor storage areas as described in Specification Section 01120.

B. Damaged areas within facilities identified by the Subcontractor's Engineering Survey shall not be used for interim material storage.

### 3.3 SPECIAL INSTRUCTIONS

A. Lead Materials:

1. The Subcontractor shall segregate all lead materials (i.e., flashing, vent stacks, etc.) and place them in appropriate containers in accordance with Section 01120 of this specification package and the Waste Management Plan located in Part 6 of the IFB/RFP.

## SECTION 15065

2. Prior to torch cutting on a surface coated with a lead-based paint, an eight inch strip of paint shall be removed at the area of the cut.

3. The Subcontractor shall (whenever possible) dismantle lead flashing in a manner that will facilitate recycling. This will include minimizing inaccessible surfaces and maximizing straight lengths. This will also include avoiding the use of fixatives on the lead flashing that would require an abrasive method of removal.

**END OF SECTION**

# SECTION 15066

# INTERIOR DISMANTLEMENT

## PART I GENERAL

### 1.1 SCOPE

A. This section includes the Subcontractor's responsibility for the removal of demolition debris materials within the facility and support items within or outside the facility. Segregation of demolition debris into various waste streams and preparation for containerizing shall include, but not be limited to, the following:

1. Conduit.
2. Wire.
3. Electrical boxes (junction, switch).
4. Contactors.
5. Lighting fixtures.
6. Motor operated valves.
7. Lighting station.
8. Raceway and troughs.
9. Cable trays.
10. Piping.
11. Assorted valves, fittings, elbows, gauges, spool pieces, etc.
12. Ductwork, plenums, branches, etc.
13. Miscellaneous similar items.

### 1.2 RELATED SECTIONS

A. Section 01120 - Waste Handling Criteria.

B. Section 01515 - Mobilization and Demobilization.

C. Section 01516 - Asbestos Abatement.

D. Section 01517 - Removing/Fixing Radiological Contamination.

E. Section 15067 - Ventilation and Containment.

### 1.3 REFERENCE MATERIAL

A. See Invitation for Bid/Request for Proposal (IFB/RFP) for the following:

1. Index of Drawings.
2. Photographs.
3. Existing Drawings.
4. Subcontractor Work Plan Format Requirements.
5. Air Cleaning Device (ACD) Procurement Specification.
6. Air Cleaning Device Filter Procurement Specification.

SECTION 15066

## 1.4 REFERENCES, CODES, AND STANDARDS

All work shall be accomplished in accordance with the following reference, code, and standard requirements:

| | |
|---|---|
| 29 CFR 1926.301 | Hand Tools. |
| 29 CFR 1926.302 | Power Operated Hand Tools. |

## 1.5 SUBMITTALS

A. The Subcontractor shall submit the following for conformance review:

1. Detailed removal work plan, in accordance with IFB/RFP Part 7, Subcontractor Work Plan Format Requirements, including sequence, methods of removal and dismantlement; equipment required, catalog cut sheets; drawings; methods and materials to control possible generation of fugitive emissions from cutting operations; and locations of interim storage areas and allowable floor loadings.

2. Catalog cuts, proposed location, method of installation of all hoisting equipment, and specialized construction equipment submitted for approval by Fluor Daniel Fernald (FDF) with the work plan.

## 1.6 QUALITY ASSURANCE

A. Calculations submitted on maximum allowable floor loading must bear the stamp of a Registered Professional Engineer.

## 1.7 PROJECT CONDITIONS

A. Residual process material (hold-up) has been removed from the demolition debris to the maximum extent practical. If hold-up is found, FDF shall be notified immediately. If the volume is estimated to be less than 1 quart, the D&D Subcontractor will be responsible for removing and containerizing the hold-up in accordance with the Waste Management Plan, located in Part 6 of the IFB/RFP. If the material found is estimated to be greater than 1 quart by volume, D&D activities will cease on that piece of demolition debris.

# PART II PRODUCTS

## 2.1 EQUIPMENT

A. Subcontractor shall supply all tools and equipment required for demolition debris material removal.

B. All lifting and hoisting equipment required shall be in compliance with the FEMP Hoisting and Rigging Manual.

## 2.2 MATERIALS

A. The Subcontractor shall supply all materials required to seal openings, to prevent spillage and/or migration of contaminants, per requirements of this section.

B. The Subcontractor shall supply duct tape, 6-mil fiber-reinforced sheeting, ½ inch plywood and an approved foam that is ultraviolet degradable as sealing materials.

C. A fiber-reinforced polyethylene or polyester sheeting approved for outdoor storage: color, yellow; minimum thickness of 6 mils; ultraviolet resistant; as manufactured by Griffolyn, Herculite or equal.

# PART III EXECUTION

## 3.1 APPLICATION

A. The Subcontractor should remove the ductwork and piping and seal at both ends prior to movement. Prior to removal, the Subcontractor shall take the necessary actions to preclude spillage of residual material, if encountered. Sealing is not a requirement for conduit. All demolition debris shall be managed in accordance with Section 01120 of this specification package and Part 6 of the IFB/RFP.

B. The Subcontractor shall utilize mechanical dismantlement means using best available technology, such as mechanical shears whenever possible.

C. Uncontrolled dropping of materials is not allowed.

D. Piping insulated with asbestos may be removed in its entirety per the requirements of Section 01516 of this specification package.

E. Prior to cutting into tanks or piping where the potential for flammable lining exists, it shall be the Subcontractor's responsibility to verify that no lining exists. Should the Subcontractor find lined pipes or tanks, the tanks shall be cut and removed by mechanical means and shall not be torch-cut.

F. Hanging light fixtures may be required to be wrapped in plastic to prevent the spread of contamination prior to being cut down.

G. For management of debris and waste refer to Section 01120 of this specification package and the Waste Management Plan in Part 6 of the IFB/RFP.

H. Prior to torch-cutting any material that has a lead based coating, an 8 inch strip of paint shall be removed at the area of the cut.

## 3.2 INTERIM MATERIAL STORAGE

A. When removed materials are staged or stored within the facility, they shall be placed in areas designated as storage areas as described in Specification Section 01120.

B. Damaged areas within facilities identified by the Subcontractor's Engineering Survey shall not be used for interim material storage.

## 3.3 SPECIAL INSTRUCTIONS

A. Lead Materials:

1. The Subcontractor shall segregate all lead materials (i.e., flashing, vent stacks, etc.) and place them in appropriate containers in accordance with Section 01120 of this specification package and the Waste Management Plan located in Part 6 of the IFB/RFP.

2. Prior to torch cutting on a surface coated with a lead-based paint, an eight inch strip of paint shall be removed at the area of the cut.

3. The Subcontractor shall (whenever possible) dismantle lead flashing in a manner that will facilitate recycling. This will include minimizing inaccessible surfaces and maximizing straight lengths. This will also include avoiding the use of fixatives on the lead flashing that would require an abrasive method of removal.

*END OF SECTION*

# SECTION 15067

# VENTILATION AND CONTAINMENT

## PART I GENERAL

### 1.1 SCOPE

A. This section consists of the work related to the Subcontractor-supplied ventilation and local containment that is required for radiological contamination purposes. The principal items included in this section are:

1. Local containment and vestibule design requirements.
2. Ventilation requirements.
3. Types of ventilation/local containment design.
4. Guidance on type of ventilation/local containment applicability.
5. Exterior items; such as, dust collectors.

B. Definitions:

1. Local Containment - is an enclosure that is designed to maintain 0.1 inch water gauge negative pressure or six air changes per hour within its structure to prevent fugitive emissions from escaping to the outside environment.

2. Vestibule - is an enclosed entrance, a passage, or space that is between the outer door and the interior of the building. The space within the vestibule does not have to be under a negative pressure.

3. Enclosure - is the exterior wall of a sealed building.

### 1.2 RELATED SECTIONS

A. Section 01120 - Waste Handling Criteria.

B. Section 01515 - Mobilization and Demobilization.

C. Section 01517 - Removing/Fixing Radiological Contamination.

D. Section 03315 - Concrete Removal.

E. Section 04225 - Masonry Removal.

F. Section 05126 - Structural Steel Dismantlement.

G. Section 07415 - Transite Removal.

H. Section 15065 - Equipment Dismantlement.

SECTION 15067

I. Section 15066 - Interior Dismantlement.

## 1.3 REFERENCE MATERIALS

A. See Part 7 of the Invitation for Bid/Request for Proposal (IFB/RFP) Package for the following:

1. Index of Drawings.
2. Photographs.
3. Existing Drawings.
4. Air Cleaning Device Procurement Specification.
5. Air Cleaning Device Filter Procurement Specification.

## 1.4 REFERENCES, CODES, AND STANDARDS

All work shall be accomplished in accordance with the following reference, code, and standard requirements:

A. The entire work under this section shall be in compliance with the provisions of the following:

1. United States Department of Energy (DOE):

   a. DOE 6430.1A — General Design Criteria Division 15.

   b. DOE 5400.5 — Radiation Protection of the Public and the Environment.

   c. DOE/EH 0256T — Radiological Control Manual, April 1994.

2. Energy Research and Development Administration (ERDA):

   a. ERDA 76-21-79 — Nuclear Air Cleaning Handbook.

3. American Conference of Governmental Industrial Hygienists (ACGIH):

   a. ACGIH — Industrial Ventilation (latest edition).

4. American Society of Civil Engineers (ASCE):

   a. ASCE 7-95 — Minimum Design Loads for Buildings and Other Structures.

## 1.5 SUBMITTALS

A. The Subcontractor shall submit a work plan in accordance with IFB/RFP, Part 7, Subcontractor Work Plan Format Requirements, with the following information to Fluor Daniel Fernald (FDF) for approval.

1. Drawings and Data:

   a. Indicate materials of construction, sizes, locations, entrances, and egresses that do not allow for breach of the local containment or vestibule, and all other details of local containments and vestibules to be erected.

   b. Provide calculations and air flow diagrams for local containment and vestibule ventilation.

   c. Submit calculations indicating that a minimum negative pressure of 0.1 inch water gauge or six air changes per hour is maintained in all local containments when the ventilation system is in operation.

   d. All drawings and calculations shall bear the stamp of a Registered Professional Engineer.

   e. If any part of this affects or involves asbestos activities, the Ohio Department of Health/OSHA Asbestos Hazard Abatement Project Designer certification shall be part of the documentation submitted with the work plan.

2. Equipment:

   a. Submit vendor information on all accessory ventilation equipment that will be used.

3. Provide building-specific work plans on the use of portable HEPA units including replacement of HEPA filters and prefilters.

## PART II PRODUCTS

### 2.1 MATERIALS

A. The Subcontractor shall provide air cleaning devices, HEPA, and prefilter elements, and all other ventilation accessory equipment for the completion of this project in accordance with Part 7 of the IFB/RFP.

B. Polyethylene sheeting as manufactured by Blueridge Films Inc., or equal.

## PART III EXECUTION

### 3.1 EXAMINATION

A. All vestibules, equipment, and/or structure containment material shall be noncombustible, or fire resistant and corrosion resistant.

B. Local containment structures shall be designed to be leak-tight and capable of maintaining a negative pressure of at least 0.1 inches water gauge or six air changes per hour. Typical design features on various local containments should include the following standardized features, where applicable:

1. Windows and mountings.
2. Glove ports.
3. Ease of cleaning.
4. Adequate interior illumination.
5. Connections for services lines, conduits, instrument leads, and ductwork.
6. 6 mil polyethylene sheeting.
7. Pressure differential readouts.
8. Attachments for interconnection of local containments.

C. Where practical, and without penetrating the local containment, all equipment components not functionally required to operate directly in the presence of radioactive materials shall be located outside the local containment.

D. The local containment or vestibule structure external to the building shall be designed to withstand the effects of normal operating conditions and the environment.

## 3.2 PREPARATION

A. The Subcontractor shall ensure that all building exterior holes, gaps, or openings are adequately sealed to prevent exhaust of airborne radioactive particulates.

B. The Subcontractor shall ensure that all ductwork used is free of dust or dirt before installing it in the ventilation system to prevent premature impingement loading of the prefilters and HEPA filters.

C. The Subcontractor shall ensure that all vestibules are large enough to support appropriate storage containers, material handling and dismantling equipment, and debris containerizing operations.

## 3.3 ERECTION/INSTALLATION/APPLICATION

A. The Subcontractor shall block, tie-down, or wheel lock all portable HEPA units.

B. The Subcontractor shall ensure HEPA filter and prefilter element replacements occur as indicated in Part 7 of the IFB/RFP Package. All HEPA filter and prefilter element replacements shall be provided by the Subcontractor.

C. The following guidelines for localized ventilation and in-place cutting control measures shall be adhered to by the Subcontractor. The exhaust volume rate shall be at least 10 percent of the actual containment air volume per minute. Ventilation provided must be HEPA filtered. When containments are out-of-doors or border the outdoors, or are to be used for torch-cutting in the size reduction area, containments must have an airlock for the passage of equipment, personnel,

and materials, so the main body of the containment is never directly open to the atmosphere. Other containments must be maintained such that there are no undesigned holes in the containment and the entrance/exit-way closes sufficiently to meet the air exchange/negative pressure requirements. The following criteria shall be met by the Subcontractor:

1. The Subcontractor shall ensure that ventilation air is provided in the quantities required to maintain OSHA air quality limits, all Permissible Exposure Limits (PELs), and all ACGIH Threshold Limit Values (TLVs).

2. For activities outside of enclosures, HEPA filters with a flexible ventilation duct shall be used as follows:

   a. Exhaust rate of the HEPA filters with a flexible ventilation duct shall maintain sufficient airflow capture velocity to prevent entry of fumes into the room. A minimum face velocity of 150 fpm is required.

   b. Each HEPA filters with a flexible ventilation duct in the cutting area should be capable of being isolated by means of control dampers to prevent backflow through a hood when it is not in service.

D. The Subcontractor shall ensure that all local containments can maintain negative pressures.

E. The Subcontractor shall comply with all other requirements for HEPA air filtration devices indicated.

F. Within an enclosure, the Subcontractor shall use local ventilation to maintain exposures ALARA.

## 3.4 FIELD QUALITY ASSURANCE

A. Final acceptance of local containments, building enclosures, and vestibule structures shall be obtained from FDF.

**END OF SECTION**

Appendix C

# APPENDIX C

# CERTIFICATION PROGRAM FOR RELEASE OF MATERIALS

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# APPENDIX C

## CERTIFICATION PROGRAM FOR RELEASE OF MATERIALS

Sections 3.3.5 and 3.3.6 of the Operable Unit 3 Integrated Remedial Design/Remedial Action Work Plan discuss the material management strategies that involve the certification of materials for restricted and unrestricted release from controlled or radiological areas. This appendix includes two documents that have been prepared to implement the certification program: 1) the revised draft version of the Material Release Policy; and 2) Site Procedure RP-0009 - "Radiological Requirements for the Release of Materials at the Fernald Environmental Management Project", which was developed to implement that policy. The procedure addresses three specific certification procedures:

1) Unrestricted Release of Materials from the Controlled Area;
2) Restricted Release of Materials from the Controlled Area; and
3) Release of Materials from Contamination Areas, High Contamination Areas or Airborne Areas to Controlled Areas.

The procedures outlined in the RP-0009 reference specific contamination limits, survey methods and isotopes of concern, survey reporting, release forms for unrestricted and restricted release, and tracking documentation. The OU3 integrated remedial action has adopted the Material Release Policy and procedures provided in RP-0009 to certify materials for restricted and unrestricted release from controlled areas. The procedures, however, are subject to change based on regulatory and policy changes. It should be recognized that the current release certification process or procedures may be revised when necessary, but they would still contain procedures that are within the bounds and intent of the Material Release Policy and regulatory drivers. Should substantive revisions to the procedures occur, the U.S. EPA and Ohio EPA will be provided with a copy of the revised procedures for review.

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# FLUOR DANIEL FERNALD MATERIAL RELEASE POLICY

DRAFT

## 1.0 OBJECTIVE

Fluor Daniel Fernald will manage the release of FEMP materials to ensure protection of public health and the environment, to ensure safe use or disposal of the material, to promote reuse/recycling, and to facilitate rapid and efficient site remediation consistent with the FEMP Mission Statement.

DOE 5400.5, "Radiation Protection of the Public and the Environment," was the primary consideration in the formulation of this policy.

## 2.0 SCOPE

This Policy is applicable to all Fluor Daniel Fernald departments that are involved with the disposition of material potentially contaminated with residual radioactive material. Disposition includes activities such as treatment, storage, disposal, reuse or recycling. Any addititional restrictions placed upon material release based on non-radiological criteria must be determined separately and are not included within the scope of this policy.

## 3.0 DEFINITIONS

3.1 Low-Level Radioactive Waste - radioactive material that: (1) is not high-level radioactive waste, spent nuclear fuel, transuranic waste, or by-product material as defined in Section IIe(2) of the Atomic Energy Act of 1954 [42 U.S.C. 2014(e)(2)]; and (2) the Nuclear Regulatory Commission, consistent with existing law, classifies as low-level radioactive waste. The requirements for the management of low-level wastes are presented in DOE 5400.1 and 5820.2A.

3.2 Material - as used in this Policy, includes personal property; waste, recycle, and reuse material; equipment and debris as described in DOE 5400.5, II. 5, "Release of Property Having Residual Radioactive Material."

3.3 Potential for Contamination - material shall be considered to be potentially contaminated if (1) it has been used or stored in areas that could contain unconfined radioactive material or (2) where the property could be exposed to beams or particles capable of causing activation.

3.4 Release - unless otherwise specified, means release for unrestricted use or unrestricted disposition.

3.5 Residual Radioactive Material - any radioactive material which is in or on the soil, air, equipment, or structures as a consequence of past (DOE) operations or activities.

3.6 ALARA (As Low As Reasonably Achievable) - a phrase (acronym) used to describe an approach to radiation protection to control or manage exposures (both individual and collective to the work force and the general public) and releases of radioactive material to the environment as low as social, technical, economic, practical, and public policy considerations permit. As used in this policy, ALARA is not a dose limit, but rather it is a process that has as its objective the attainment of dose levels as far below the applicable limits as practicable.

## 4.0 ELEMENTS

The "Material Release Flow Chart" (Figure 1) identifies the process by which materials are evaluated for suitability of release for disposal or recycle. The major elements of this process are described below.

### 4.1 Determination of Potential for Contamination

The determination of the potential for contamination is an administrative decision based on the radiological characterization (posting) of the area in which the material resides.

### 4.2 Release Without Restrictions

Materials originating outside of the Controlled Area which have no potential to contain residual radioactive material may be released for use without restrictions. Confirmatory surveys would be done at the discretion of the Radiological Controls Department.

### 4.3 Determination of Surface Versus Volume Contamination

Materials originating from the Controlled Area must be evaluated for potential for residual radiological contamination. The determination of surface contamination versus volume contamination is based on the physical and chemical configuration/characteristics of the material and the contamination.

### 4.4 Surface Accessibility

All potentially contaminated surfaces should be readily accessible to be allow for proper survey with portable instruments.

Materials with features which are difficult to survey due to the nature of the material or the contaminant may require alternate evaluation techniques.

4.5 Evaluation of Contamination on Inaccessible Surfaces

Where surfaces are not accessible, the material may be released after a case-by-case evaluation to demonstrate that the unsurveyable surfaces are likely to be within the guidelines in DOE 5400.5.

4.6 Conducting Surveys of Potentially Contaminated Materials

Material shall be surveyed for removable and total surface contamination. Procedures for determining the radiological status of potentially contaminated materials are developed and implemented by the Radiological Controls Department.

4.7 Contamination Guidelines

Contamination must be below the published guidelines in DOE 5400.5. The Radiological Control Department also uses guidance in the DOE Radiological Control Manual. Figure 1 provides that materials with surface contamination greater than the guidelines must be managed as radioactive material.

4.8 ALARA Evaluation

The ALARA Evaluation is an assessment to ensure that contamination has been reduced to levels as low as is reasonably achievable and to determine if additional administrative controls should be placed on the material prior to release. The evaluation may be quantitative or qualitative. In accordance with DOE 5400.5, qualitative analyses are acceptable, in most instances, for ALARA judgments, especially where potential doses are well below the dose limit. The bases for such judgments should be documented. More detailed analyses should be considered if the decisions might result in doses that approach the limit. Where no radioactivity distinguishable from background is detected, no further ALARA evaluation is necessary.

4.9 Decontaminate to ALARA

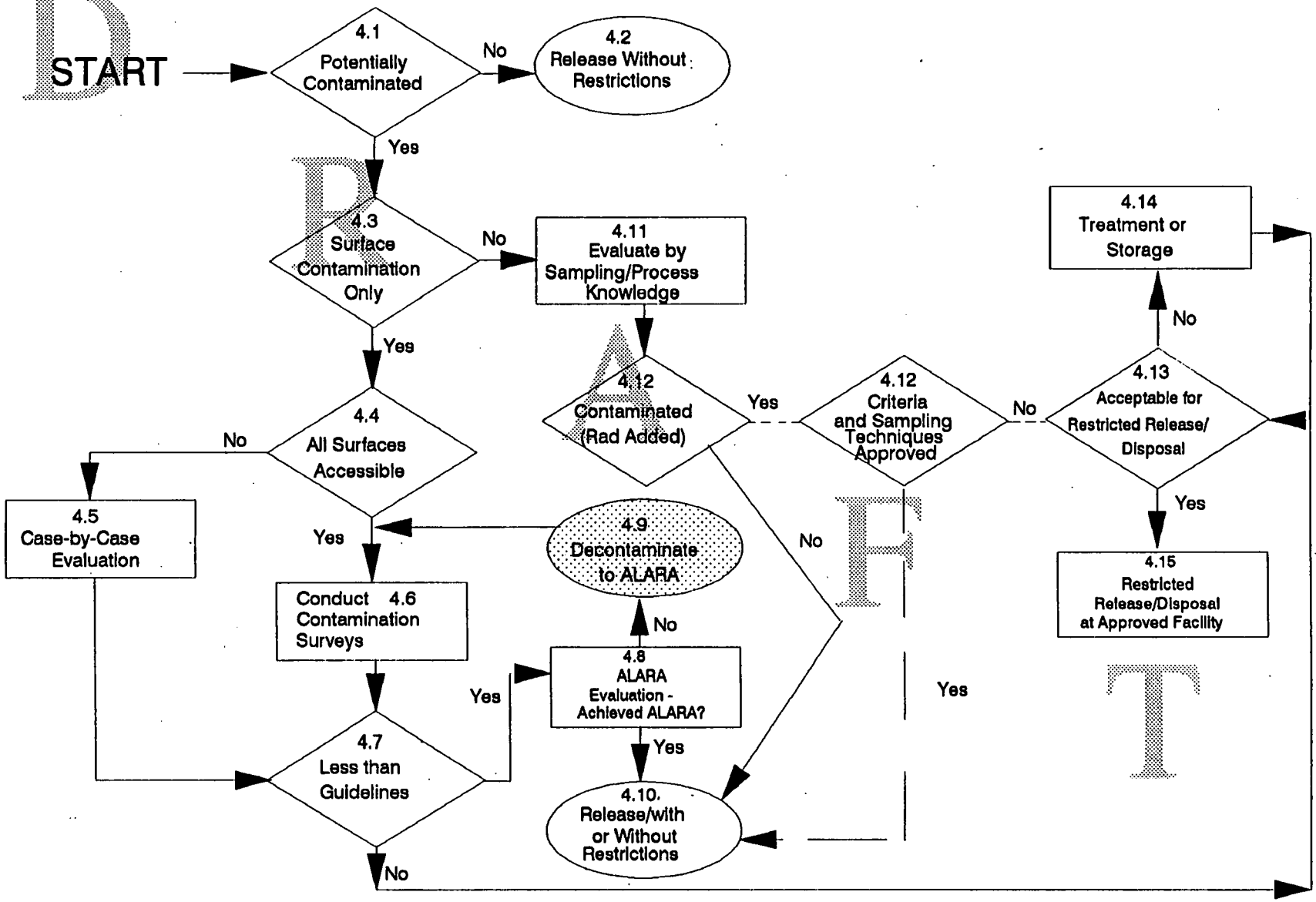
Results from the ALARA evaluation conducted on materials with radioactivity above background (but less than free-release levels) indicate that additional decontamination is practicable prior to releasing the material.

4.10 Release Without Restrictions

Material may be released for use without restrictions.

DRAFT

# MATERIAL RELEASE FLOW CHART




Figur

4.11 Determination of Residual Radioactive Material

Materials which are potentially contaminated in depth (e.g., porous materials, granular substances, and liquids) must be evaluated for radiological contamination by sampling and/or process knowledge.

4.12 Release Criteria to Address In-Depth or Volumetric Contamination

In order to release materials evaluated for in-depth contamination, it must be demonstrated that no radioactivity has been added to the material in-depth as a result of site operations. A combination of process knowledge, surface contamination data or analytical data as appropriate must be provided to support the determination that the material is not contaminated in depth. Material must also meet DOE 5400.5 guidelines for surface contamination.

Materials which cannot be proven to contain no added radioactivity in-depth, using the methods described above, will not be released for unrestricted use.

4.13 Determine Disposition Options

Materials that are surface contaminated in excess of the guidelines or that are contaminated in depth must be evaluated for the most appropriate disposition.

4.14 Material in Storage, Undergoing Treatment, or Designated for Reuse, Recycle
4.15 or Disposal

Material is designated for restricted reuse or recycle, treatment, storage or disposal.

DRAFT

ATTACHMENT 2

826

CONTROL NUMBER:
SITE PROCEDURE RP-0009 (RC-DPT-019)
REVISION NO. 1

UNCONTROLLED 6/25/96 H. Jones

# RADIOLOGICAL REQUIREMENTS FOR THE RELEASE OF MATERIALS AT THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

RP-0009

**Effective Date:** 6/12/95

Originator (Subject Expert): James R. Wells, Health Physicist — 6/7/95 Date

Checker Concurrence: G. J. Calhoun, Manager, Rad. Compliance — 6/9/95 Date

APPROVED BY: S. L. Hinnefeld, FAM, Radiological Protection — 6/12/95 Date

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

**Fernald Environmental Restoration Management Corporation**
P. O. Box 538704
Cincinnati, Ohio 45253-8704

287

| Title: Radiological Requirements for the Release of Materials at the Fernald Environmental Management Project | DOCUMENT NO: RP-0009 | |
|---|---|---|
| | Date: 06/12/95 | Revision No. 1 |
| COMPLIANCE WITH THIS PROCEDURE IS MANDATORY WHILE PERFORMING THE ACTIVITIES WITHIN ITS SCOPE | Page 1 of 20 | |

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## ISSUE AND REVISION SUMMARY

| Revision | Date | Description of Issue or Revision |
|---|---|---|
| 0 | 05/26/94 | Intial Implementation |
| 1 | 06/12/95 | Being revised to incorporate changes initiated by J. Wells and format changes in accordance with MS-08-1001. |
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| | | |
| | | |

## 1.0 PURPOSE

To establish the methods and requirements for the release of materials from Controlled Areas or from Radiological Areas established to control surface or airborne radioactivity to the Controlled Areas.

## 2.0 SCOPE

This procedure discusses the release of material for unrestricted use as well as the restricted release of material for items which are maintained under FEMP administrative control. It applies to all Radiological Control personnel involved in the release process at the FEMP. The survey requirements of this procedure do not apply to materials exiting Controlled Areas that are established based on radiation levels alone.

## 3.0 REFERENCES

3.1 FERMCO Radiological Control Requirements Manual RM-0020

3.2 DOE Order 5400.5, Radiation Protection of the Public and the Environment

3.3 10 CFR 835, Occupational Radiation Protection

3.4 DOE/EH-0256T, Radiological Control Manual

3.5 DOE Performance Objective for Certification of Non-Radioactive Hazardous Waste (REV 1, dated October 10, 1994)

3.6 Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors

3.7 SD-ESH-BAS-3014, Decision Basis to Release Materials For Unrestricted Use

3.8 SD-ESH-BAS-3013, FEMP Technical Basis Document for the Use of Portable Instrumentation

3.9 RC-RDA-010, Radiological Contamination Surveys

3.10 RP-0010, Identification and Movement of Radioactive Material

3.11 SP-P-35-050, Identification of Radioactive Material

3.12 SR-0004, Establishment and Management of Radioactive Material Management Areas (RMMAs)

3.13 RC-RDA-013, Radiological Assessment Records Management

3.14 RC-DPT-023, Quality Control of Radioactivity Counting Systems

3.15 SD-ESH-BAS-3022, Technical Basis: Quality Control of Radioactivity Counting Systems

3.16 SSOP-0086, Performing Personnel Monitoring

## 4.0 RESPONSIBILITIES

### 4.1 General Employee

Notifies Radiological Control to perform a radiological release survey prior to removing materials from Controlled Areas or Radiological Areas established to control the spread of contamination. This includes movement of material from a Controlled Area to the uncontrolled area unless that area is posted based on radiation levels alone, or movement of material from a Contamination Area, High Contamination Area, or Airborne Radioactivity Area to the Controlled Area.

Provides documented process knowledge, analytical data, or other documentation as requested by Radiological Control personnel when necessary to support the release decision.

### 4.2 Manager, Radiological Control

Ensures that all radiological control personnel performing this procedure are trained to this procedure.

Designates additional personnel who are authorized to act as a Material Release Evaluator outside of those positions/job titles already authorized by this procedure.

### 4.3 Manager, Radiological Compliance

When requested, provides regulatory or technical guidance to assist those personnel involved in the release process.

Approves the restricted release of material when the material is to exit beyond the FEMP property boundary.

### 4.4 Material Release Evaluators

Evaluates the unrestricted release of material when any of the following conditions are encountered:

- Material has the potential for contamination in areas which are inaccessible for proper survey.
- Process knowledge is used to support the release decision.
- Material has the potential of contamination beneath a coating applied while the material was in the Controlled Area.

- Material has the potential for volume or in-depth radioactivity within the material matrix.
- Special case items are being released such as radioactive consumer products, industrial sources, etc.
- Material has detectable activity present but the activity is below the contamination limits listed in Attachment A.

For material with detectable contamination but less than the release limits of Attachment A, performs an evaluation to ensure that all reasonable attempts have been made to reduce the residual activity to as low as reasonably achievable prior to the release.

Evaluates and approves the restricted release of all material prior to exiting the Controlled Area of the FEMP to ensure the material is controlled or of such condition that no reasonable potential exist for the spread of contamination beyond the Controlled Area. The evaluator shall ensure that the Radiological Control Technician and the individual receiving the material understand all restrictions placed upon the restricted release.

4.5 Radiological Control Technicians (RCT)

Performs and documents all radiological release surveys.

Routes survey data and related release packages for approvals as required in this procedure and RC-RDA-013, Radiological Assessment Records Management.

4.6 Radiological Control Technician Supervisor

Reviews the Restricted Release Log on a weekly basis for correctness, and to determine material status.

## 5.0 GENERAL

5.1 Acceptable surface contamination levels for known radionuclides are set forth in Attachment A, Surface Contamination Limits.

5.2 Appropriate instrumentation for release surveys based on instrument detection limits and the isotope of concern are listed in Attachment B, Survey Methods and Isotopes of Concern. If the Lower Limit of Detection of the monitoring method in use is below the removable limits of Attachment A for the specific isotope of concern then removable surveys are not required and the material may be evaluated based on direct monitoring methods alone.

5.3 The specific isotope of concern for various areas within the FEMP site are listed in Attachment B. If isotopes other than U-238 and associated daughter products are suspected then the most restrictive release limit must be applied until adequate isotopic data can be obtained.

**NOTE: Attachment B serves as a general guideline only. Isotopic data or process knowledge may be used over these general guidelines where appropriate.**

5.4 When normal or depleted uranium is the contaminant of concern, beta surveys alone are acceptable for verifying compliance within the release limits.

5.5 Contamination surveys may be performed with hand held portable instruments or automated equipment provided that the contamination limits given in Attachment A can be detected.

5.6 Materials with inaccessible areas which are likely to be contaminated but are of such size, construction, or location as to make them inaccessible for survey shall be assumed to exceed the limits for release, unless the item can be disassembled to permit an adequate survey or well documented process knowledge can be applied to certify that internal contamination is not probable.

5.7 Items such as liquids, bulk materials (sand, concrete rubble, etc.) must be evaluated for the potential for volume or in-depth contamination within the material matrix prior to release. A combination of process knowledge, surface contamination data, or analytical data as appropriate must be provided to support the rationale that no radioactivity could have been added to the material as a result of site operations.

5.8 All documented process knowledge used to support the release decision must be attached to the release package.

5.9 Items with detectable fixed contamination which is less than the unrestricted release limits of Attachment A must be further evaluated prior to unrestricted release to ensure that all reasonable attempts have been made to reduce the residual activity on the item as low as reasonably achievable.

5.10 Contamination surveys are to be performed in accordance with the requirements of RC-RDA-010, Radiological Contamination Surveys.

5.11 Direct frisk release surveys may not be performed in an area of background exceeding 300 cpm beta/gamma or alpha instrument background >12 cpm.

5.12 Items with surface contamination exceeding the release limits of Attachment A must be handled as radioactive material in accordance with SP-P-35-050, Identification of Radioactive Material.

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5.13 Personal items are to be surveyed at the control point exits in accordance with the posted frisking instructions and SSOP-0086, Performing Personnel Monitoring. These items may be surveyed by the material owner or by the RCT if requested.

5.14 Material that is in the original sealed manufacturers packaging or material with internal surfaces sealed from the environment with no potential for contamination within the material internals may be released based on surface contamination monitoring techniques only. Material Release Evaluator concurrence is not required in this situation.

5.15 Materials not immediately released upon survey shall be controlled to prevent contact with radioactive contamination while awaiting release.

5.16 Materials not released to uncontrolled areas within eight hours following survey shall be resurveyed unless each of the following conditions have been met. This step is not applicable to items placed in a staging area as discussed Step 5.17.

5.16.1 The material or articles are placed in a container or building that meets the unrestricted release limits.

5.16.2 The containers or buildings are sealed using a tamper proof seal with a unique identification number. If required, tamper proof tape with RCT initials across the seal may be used but this is least preferred. Containers may be anything that prevents contamination such as drums, sealands, toolboxes, etc.

5.16.3 The seal identification number shall be recorded on the radiological survey report form.

5.16.4 If the container is to be released with the materials inside, its external surfaces must be resurveyed per this procedure prior to release.

5.17 Where storage in containers or buildings is not practical, large items or lots of items may be placed in a staging area while awaiting survey results or finalization of release documentation with the following additional controls.

**NOTE: The use of these areas should be minimized. Immediate release following survey or the controls outlined in Step 5.16 should be pursued prior to establishing these areas.**

5.17.1 A comprehensive unrestricted release survey must be performed on all materials prior to entry into the staging area.

5.17.2 Radiological Control oversight of the area (Radiological Control notification prior to entry) must be maintained to prevent mixing of previously surveyed items and potentially contaminated material.

**NOTE: If material mixing is suspected then a comprehensive unrestricted release survey must be re-performed on all items within the staging area.**

5.17.3 A cursory survey (including large area smears as a minimum) shall be performed prior to the actual release of the staged material to the uncontrolled area.

## 6.0 PREREQUISITES

### 6.1 Training

**Manager, Radiological Control (or designee)**

By reviewing training records, ensure that all radiological control personnel performing this procedure are trained to this procedure.

## 7.0 PROCEDURE

### 7.1 UNRESTRICTED RELEASE OF MATERIAL FROM THE CONTROLLED AREA

**Radiological Control Technician**

7.1.1 Determine the material history considering the purpose of the item, the current and past use of the item, location in which the item was stored, and if the item had ever been used for work with radioactive material.

7.1.2 Determine the need for material disassembly for access into internals or other inaccessible areas. This determination may require assistance from a Material Release Evaluator.

7.1.3 Ensure that any residual radioactive material labels/indicators are defaced from the material. This could include radioactive material stickers, painted trefoils, or other radioactive material symbols.

7.1.4 Perform large area smears on 100% of the effective area of the material to evaluate for gross removable contamination. If no detectable levels of removable contamination are found then proceed to Step 7.1.6.

7.1.5 If detectable levels of removable contamination are found, then don protective clothing such as gloves to complete the survey and perform disc smears to evaluate for removable activity per 100 $cm^2$.

**NOTE: The material must be considered radioactive until the results of the disc smear survey prove otherwise.**

A. If no detectable levels of removable contamination are found then proceed to 7.1.6.

B. If detectable levels of removable contamination are found on the disc smears, then the material may not be released for unrestricted use without further evaluation and approval by a Material Release Evaluator.

7.1.6 Evaluate for fixed activity on 100% of the effective area of the material using direct frisking or automated monitoring techniques.

7.1.7 If no detectable contamination is discovered during the survey, then proceed to Step 7.1.10.

7.1.8 If detectable contamination is discovered during the survey and the activity is less than the unrestricted release limits outlined in Attachment A, then a Material Release Evaluator must approve the release decision.

7.1.9 If contamination levels exceeding the unrestricted release limits of Attachment A are discovered, then the material may not be released for unrestricted use and must be controlled as radioactive material.

7.1.10 Document the survey results and fill in the applicable portions of Attachment D, Material Unrestricted Release Form.

A. Annotate any supporting memo numbers or process knowledge document numbers in the Release Justification block as applicable.

B. If any of the blocks on the Material Unrestricted Release Form are not applicable then annotate N/A in that block.

7.1.11 If any of the conditions of Step 4.4 are met, then route the release package to a Material Release Evaluator for further evaluation and approval of the release decision. If none of these conditions are met then proceed to Step 7.1.13.

**Material Release Evaluator**

7.1.12 Review the release package and the material if needed. If all requirements for unrestricted release have been met, then sign the Material Release Form to approve the release.

**Radiological Control Technician**

7.1.13 Distribute copies of the release package to the survey requester or material owner.

7.1.14 Maintain the original copy of the release package in Radiological Control files.

7.2 RESTRICTED RELEASE OF MATERIALS FROM THE CONTROLLED AREA

**Radiological Control Technician**

7.2.1 Perform a removable contamination survey on 100% of the effective area of the material.

7.2.2 Evaluate for fixed contamination of the material using direct frisk or automated monitoring techniques.

7.2.3 Document the results of the survey on Attachment C, Radiological Survey Report form.

7.2.4 Fill out the applicable portions of Attachment E, Material Restricted Release Form and route the release package to a Material Release Evaluator for review.

7.2.5 Log the item in Attachment F, Restricted Release Log, including survey number, item description, date released and the material owner.

**NOTE: For items being shipped to an offsite licensed facility, the name of the facility or lab receiving the material should be listed in the Material Owner block and the date returned block is not applicable.**

**Material Release Evaluator**

7.2.6 Evaluate for the potential for the spread of contamination if the material is used in the uncontrolled area based on contamination levels on the material, use of the material, etc.

7.2.7 List any further administrative controls which may need to be applied to the material to prevent a potential spread of contamination in the comments section of the Material Restricted Release form. This may include storage requirements, limitations of use, containment of the material, RCT escort, or other controls as applicable.

**NOTE: Radioactive material must be labeled appropriately and stored in an approved, properly posted area when the material is not in use or under escort by a qualified Radiological Worker.**

7.2.8 If the requirements for restricted release of the material have been met, then sign the Material Restricted Release Form to approve the release.

**Radiological Control Technician**

7.2.9 If the material will be exiting beyond the FEMP property boundary then route the release package to Radiological Compliance for approval.

**NOTE: Radiological Compliance approval is required to ensure that other regulatory requirements are not violated such as Department of Transportation shipping regulations or facility licensing requirements.**

7.2.10 Route the release package to the survey requestor for signature. Inform the survey requestor of special requirements associated with the restricted release and the need to contact Radiological Control when the item is returned to the Controlled Area.

**Survey Requestor**

7.2.11 Sign the Material Restricted Release Form accepting responsibility for the material while it is in the uncontrolled area and ensure that all controls applied to the material are met. This step is not applicable when sending radioactive or potentially radioactive materials to licensed facilities.

**NOTE: Only FEMP qualified Radiological Workers may sign for responsibility of materials undergoing a restricted release.**

7.2.12 Inform the Radiological Control Technician when the item is returned to the Controlled Area for material tracking purposes and completion of Attachment F.

**Radiological Control Technician**

7.2.13 Distribute copies of the release package to the survey requester or material owner.

7.2.14 Maintain the original copy of the release package in Radiological Control files.

**Radiological Control Technician Supervisor (or designee)**

7.2.15 Review the Restricted Release Log on a weekly basis for completeness and to determine material status.

7.3 RELEASE OF MATERIALS FROM CONTAMINATION AREAS, HIGH CONTAMINATION AREAS, OR AIRBORNE RADIOACTIVITY AREAS TO CONTROLLED AREAS

Radiological Control Technician

7.3.1 Don protective anti-contamination gloves, as a minimum.

7.3.2 Determine material history considering the purpose of the item, current and past use of the item, location in which the item was stored and if the item had been used for work with radioactive materials.

7.3.3 Determine the need for material disassembly for access to the material internals or other inaccessible areas.

7.3.4 Perform a radiological survey in accordance with RC-RDA-010, Radiological Contamination Surveys, to evaluate for both removable and fixed plus removable contamination levels on the material. Document results on Attachment C, Radiological Survey Report Form.

7.3.5 If the release limits of Attachment A are met then the item may be released to the Controlled Area.

7.3.6 If removable contamination on the material exceeds the surface limits of Attachment A then the material may be conditionally released for movement on-site from one Radiological Area for immediate placement in another Radiological Area in accordance with the requirements of RP-0010, Identification and Movement of Radioactive Material.

7.3.7 If the item has fixed contamination exceeding the Attachment A limits and the removable levels of contamination are below the Attachment A limits then the item may be released to the Controlled Area provided the item is tagged and/or painted to identify the item as radioactive material in accordance with RP-0010, Identification and Movement of Radioactive Material.

7.3.8 Distribute copies of the release package to the survey requestor or material owner.

7.3.9 Maintain the original copy of the release package in Radiological Control files.

8.0 DRIVERS

8.1 FERMCO Radiological Control Requirements Manual RM-0020

8.2 DOE Order 5400.5, Radiation Protection of the Public and the Environment

8.3 10 CFR 835, Occupational Radiation Protection

8.4 DOE/EH-0256T, Radiological Control Manual

8.5 DOE Performance Objective for Certification of Non-Radioactive Hazardous Waste (REV 1, dated October 10, 1994)

## 9.0 DEFINITIONS

9.1 Detectable Activity - Activity detected on the material which exceeds the minimum detectable activity value for the measurement method in use.

9.2 Effective Area - Those areas of the material which are likely to be contaminated such as welding machine cooling fans, installed filters, electric motor armatures, etc.

9.3 Lower Limit of Detection (LLD) - The smallest amount of sample activity that will yield a net count for which there is a confidence at a predetermined level that activity is present. LLD values for various measurement processes are further discussed in SD-BAS-ESH-3014, Decision Basis to Release Materials for Unrestricted Use.

9.4 Material Release Evaluator - An individual authorized to evaluate and approve the unrestricted release of materials when special considerations referenced in Step 4.4 are encountered. Unless otherwise approved by the Radiological Control Manager, the Radiological Control Technician Supervisors, Radiological Engineering and the Radiological Compliance Health Physicists are the only personnel authorized to evaluate such items for unrestricted release.

9.5 Personal Items - Items such as personal briefcases, pens, papers, personal umbrellas, personal clothing, etc.

9.6 Process Knowledge - Documented evidence, provided by the material generator, user or owner, demonstrating that no radioactivity could have been added to the material as a result of site operations. This generally includes material handling, usage, and storage methods/procedures or other material history which supports the release. Process knowledge documentation is the responsibility of the material generator but may require assistance from Radiological Control personnel.

9.7 Staging Area - An area established to clearly mark and isolate material which has been surveyed for unrestricted release and is awaiting finalization of the survey data or documentation. This does not constitute a radiological posting and may typically be identified with white rope and notification signs requiring RCT notification or escort prior to entry into the area. Yellow and/or Magenta signs or barricades should not be used for this purpose.

9.8 Radioactive Material Management Area (RMMA) - An area in which the potential exists for contamination due to the presence of unencapsulated or unconfined radioactive material. This term is driven by the DOE EM-30 Performance Objective for Certification of Non-Radioactive Hazardous Waste. In accordance with SR-0004, Establishment and Management of Radioactive Material Management Areas, all Controlled Areas of the FEMP are considered RMMAs unless they are controlled based on radiation levels alone. RMMAs do not require special posting.

9.9 Radiological Areas - Any area within a controlled area which must be posted as a "Radiation Area", "High Radiation Area", "Very High Radiation Area, "Contamination Area", "High Contamination Area", or "Airborne Radioactivity Area" in accordance with 10 CFR 835.603.

9.10 Release Package - A collection of documentation supporting the release decision. It generally contains the radiological survey report for the item to be released, a material release form, and any associated documentation of process knowledge. As a minimum, the following information must be contained within the release package:

A. Property description
B. Date on which the release survey was performed
C. Identity of the individual performing the release survey
D. Type and identification of the instrument used
E. Results of the survey
F. Identity of the recipient of the released material
G. Location from which the material was released
H. Material Release Evaluator review and approval of the release (as applicable)

9.11 Restricted Release - A release of material from the Controlled Area of the FEMP in special situations. Examples include but are not limited to temporary transfer of materials between Controlled Areas, material transfers to other DOE facilities, and release of samples to off-site NRC or agreement state licensed labs for analysis. This release applies administrative controls on the material to maintain it under FEMP control (or transfers the material control to another facilities radiological control program in the case of off-site shipments) and ensures the material is returned to the Controlled Area after use.

9.12 Unrestricted Release - Release of material from administrative control after confirming that residual radioactive material meets the guidelines of DOE 5400.5.

## Attachment A - SURFACE CONTAMINATION LIMITS[a]

| NUCLIDE[f] | FIXED PLUS REMOVABLE | | REMOVABLE[b,e] |
|---|---|---|---|
| | AVERAGE[b,c] | MAXIMUM[b,d] | |
| U-nat, U-235, U-238, and associated decay products, alpha emitters. | 5,000 dpm /100 $cm^2$ | 15,000 dpm /100 $cm^2$ | 1,000 dpm/100 $cm^2$ |
| Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129 | 100 dpm/100 $cm^2$ | 300 dpm/100 $cm^2$ | 20 dpm/100 $cm^2$ |
| Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133 | 1,000 dpm/100 $cm^2$ | 3,000 dpm/100 $cm^2$ | 200 dpm/100 $cm^2$ |
| Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above. | 5,000 dpm /100 $cm^2$ | 15,000 dpm /100 $cm^2$ | 1,000 dpm /100 $cm^2$ |

[a] Where surface contamination by both alpha and beta-gamma emitting nuclides exists, the limits established for alpha and beta-gamma emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each object.

[d] The maximum contamination level applies to an area of not more than 100 $cm^2$.

[e] The amount of removable radioactive material per 100 $cm^2$ of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f] The limits presented for transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, and Ac-227 may be adjusted on a case by case basis. Consult with Radiological Compliance when required to apply these limits for unrestricted release.

## Attachment B - SURVEY METHODS AND ISOTOPES OF CONCERN

| Isotope of Concern | Area [1] | Preferred Survey Technique |
|---|---|---|
| Ra-226 | K-65 Silo 1 & 2 Residues | Alpha direct frisk in scaler mode. Smears counted on a low background counter. |
| Th-230 | Waste Pit 1-5<br>Plant 1 Ore Silos<br>Silo 3 in Waste Storage Area | Alpha direct frisk in scaler mode. Smears counted on a low background counter. |
| Th-232 | Pilot Plant Wet Side<br>Building 64, 65, 67, 68<br>Quonset Huts, Plant 6<br>Thorium Furnace, Plant 8<br>Control Room Walls, Plant 9<br>Derby Soaking Furnace | Alpha direct frisk. Smears counted on a low background counter. |
| U-235 (enriched uranium) | Plant 1 Safe Geometry | Alpha direct frisk. Smears may be counted using portable alpha instruments |
| U-238 (depleted or normal uranium) | Controlled Areas other than those mentioned above | Beta direct frisk or automated monitor. Smears counted using portable beta/gamma instruments. |

[1] Uranium ore material, low enriched uranium and Th-232 were processed in the past in various areas throughout the site including the Pilot Plant, Plants 1, 2/3, 8 and 9. When accessing holdup material within equipment internals, base the isotope of concern on available process knowledge, radiological survey results and available analytical data.

## Attachment C - Radiological Survey Report Form

FEMP
RADIOLOGICAL SURVEY REPORT

| DATE: | LOCATION: | RCT: | BADGE: | PAGE: |
|---|---|---|---|---|
| TIME: | LEVEL: | SIGNATURE: | | 1 OF __ |

| REASON FOR SURVEY | |
|---|---|

| MODEL | SERIAL NUMBER | TYPE (α, β, γ) | CALIBRATION DUE DATE | BKGD. (cpm) | EFF./CF | COUNT TIME (min) | MDA (dpm) | BKGD./PERFORMANCE TEST SAT? YES | NO |
|---|---|---|---|---|---|---|---|---|---|
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| ITEM NUMBER | LOCATION AND/OR DESCRIPTION | HEIGHT (FT.) | DPM/100cm² ALPHA | | DPM/100cm² BETA-GAMMA | | CORRECTED DOSE RATE (MREM/HR) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | REMOVABLE (1) | FIXED PLUS REMOVABLE | REMOVABLE (1) | FIXED PLUS REMOVABLE | γ CONTACT | β CONTACT | γ AT __ FT. | β AT __ FT. |
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Note (1): Values identified by an asterisk (*) indicate results are less than the calculated MDA (RC-RDA-010).

| NO. | DISTRIBUTION OF COPIES |
|---|---|
| 1 | RECORD |
| 2 | DCS |
| 3 | RA MANAGER |

| NOTIFICATION OF SURVEY RESULTS | | | | | |
|---|---|---|---|---|---|
| SUPERVISOR NOTIFIED | TIME | DATE | NOTIFIED BY | REVIEWED BY | DATE |
| | | | | | |

PB-F-1993-1

Attachment D - Material Unrestricted Release Form

# MATERIAL UNRESTRICTED RELEASE FORM

SURVEY # _____ PAGE 1 OF _____

DATE: | LOCATION: | KEY POINTS: | SIGNATURE: | BADGE #:

| INDOC | SERIAL NUMBER | TYPE: ALPHA or BETA/GAMMA | CAL DUE DATE | BKGD (CPM) | DE | BKG (CPM) | BKT PERFORMANCE TEST (SAT) YES | NO |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
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| TIME | INIT | MATERIAL DESCRIPTION | RELEASE CRITERIA (LIMIT or YES) | FIXATE ALPHA REMOVABLE | FIXATE ALPHA FIXED + REM | FIXATE BETA/GAMMA REMOVABLE | FIXATE BETA/GAMMA FIXED + REM | RELEASE JUSTIFICATION | RELEASE | MATERIAL RELEASE EVALUATOR (Badge # and SIGNATURE (1)) |
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Comments _____

REVIEW: INITIAL _____ DATE _____

(1) Material Release Evaluator approval required in accordance with RP-0009 (RC-DPT-010), Radiological Requirements for Release of Materials at the FEMP, if any of the following conditions exist:

- a. Material has potential for contamination in areas which are inaccessible for proper survey.
- b. Process knowledge is used to support the release decision.
- c. Material has potential of contamination beneath any coating applied while the material was in the Controlled Area.
- d. Material has potential for volume or in-depth radioactivity within the material matrix.
- e. Special case items are being released, such as radioactive consumer products, industrial sources, etc.
- f. Material has detectable activity present and the activity is below the contamination limits listed in Attachment A of RC-DPT-010.

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## Attachment E - Material Restricted Release Form

| Item Number | Item Description | RCT | Material Release Evaluation Print/Signature [1&3] | Material Owner/Survey Requestor Print/Signature [2&3] |
|---|---|---|---|---|
| | | | | |

Additional Comments _____

[1] Signature by Material Release Evaluator indicates the material may be released for restricted use in the uncontrolled area of the FEMP site only. This material is not being released for unrestricted use.

[2] Signature by the Material Owner/Survey Requestor indicates acceptance of responsibility for the material while in the uncontrolled area and the material will be returned to the controlled area following use.

[3] Additional approval by the Manager of Radiological Compliance is required prior to allowing the material to exit beyond FEMP property boundary. This allowance may be annotated in the additional comments section of the form.

## Attachment F - FERNALD ENVIRONMENTAL MANAGEMENT PROJECT Restricted Release Log

| RAD. SURVEY NUMBER | ITEM DESCRIPTION | DATE RELEASED | DATE RETURNED* | Material Owner/Survey Requestor* | RCT INIT. |
|---|---|---|---|---|---|
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* - For environmental samples or other items undergoing restricted release to off-site NRC or Agreement State licensed facilities, the name of the facility or lab receiving the material should be listed i the Material Owner/Survey Requestor block and the Date Returned block is not applicable.

**RCT Supervisory Review**_____ **Date**_____

# APPENDIX D

## OPERABLE UNIT 3
## INTEGRATED REMEDIAL ACTION
## SAMPLING AND ANALYSIS PLAN

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**OU3 INTEGRATED REMEDIAL ACTION**
**SAMPLING AND ANALYSIS PLAN**
**FINAL**
**MAY 1997**

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## LIST OF ATTACHMENTS

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# NOTATION

## Abbreviations, Acronyms, and Initials

| | |
|---|---|
| ACA | Amended Consent Agreement |
| ARAR(s) | applicable or relevant and appropriate requirement(s) |
| ASL(s) | analytical support level(s) |
| CCW | constituent concentration in the waste |
| CCWE | constituent concentration in the waste extracts |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 |
| CFR | Code of Federal Regulations |
| CLP | Contract Laboratory Program |
| COCs | Constituents of Concern |
| CRQL(s) | contract required (reliable) quantitation limit(s) |
| CVAA | cold vapor atomic absorption |
| DEC | Design-Engineering-Construction |
| DF&O | Director's Findings & Orders |
| DOE | United States Department of Energy |
| DOE-NV | DOE Nevada Field Office |
| DQO(s) | data quality objective(s) |
| ERMA | Environmental Resource Management and Analysis |
| FAA | furnace atomic absorption |
| FACTS | Fernald Analytical Computerized Tracking System |
| FEMP | Fernald Environmental Management Project |
| FFCA | Federal Facilities Compliance Act |
| FID | flame ionizing detector |
| FIDLER | field investigation for the detection of low energy radiation |
| GC | gas chromatography |
| GM | Geiger-Müller |
| HASP | health and safety plan |
| HWMU(s) | hazardous waste management unit(s) |
| ICP | Inductively Couple Plasma Atomic Emission Spectrometry |
| KPA | kinetic phosphorescence analysis |
| LARW | low activity radioactive waste |
| LDR | land disposal restriction |
| LLW | low-level waste |
| MC&A | Material Control and Accountability [report] |
| MEF(s) | material evaluation form(s) |
| MS | mass spectrometry |
| NEPA | National Environmental Protection Act |
| NORM | naturally occurring radioactive material |
| NPDES | National Pollutant Discharge Elimination System |
| NRC | Nuclear Regulatory Commission |
| NTS | Nevada Test Site |
| NVO | Nevada Operations |
| OEPA | Ohio Environmental Protection Agency |
| OSDF | On-site Disposal Facility |
| OU3 | Operable Unit 3 |
| OU5 | Operable Unit 5 |
| PCB(s) | polychlorinated biphenyl(s) |

| | |
|---|---|
| PIC | pressurized ion chamber |
| PID | photo-ionization detector |
| QA | Quality Assurance |
| QAPjP | Quality Assurance Project Plan |
| QC | Quality Control |
| RCRA | Resource Conservation and Recovery Act |
| RD/RA | Remedial Design/Remedial Action |
| RI/FS | Remedial Investigation and Feasibility Study |
| ROD | Record of Decision |
| SAA | Satellite Accumulation Area |
| SAP | Sampling and Analysis Plan |
| SCQ | FEMP Sitewide CERCLA Quality Assurance Project Plan |
| SDCR(s) | Sampling and Analysis Plan document change request(s) |
| SED | sitewide environmental database |
| SVOC(s) | semivolatile organic compound(s) |
| TAL | target analyte list (per Contract Laboratory Program) |
| TBC(s) | to be considered |
| TCL | target compound list (per Contract Laboratory Program) |
| TCLP | toxic characteristics leaching procedure |
| TRU | transuranic |
| TSCA | Toxic Substance Control Act of 1976, as amended |
| U.S. EPA | United States Environmental Protection Agency |
| VFCN | Variance/Field Change Notice [form] |
| VOC(s) | volatile organic compounds(s) |
| WAC | waste acceptance criteria |
| WPA | OU3 RI/FS Work Plan Addendum |
| WWTS | Wastewater Treatment System |
| XRF | X-Ray Fluorescence |

# 1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) was prepared to support above-grade decontamination and dismantlement and material management performed under the Operable Unit 3 (OU3) integrated remedial action. The scope of activities under this action are described in the OU3 Integrated Remedial Design/Remedial Action (RD/RA) Work Plan (Draft, DOE 1996a). Section 1 of this SAP provides a brief discussion of the purpose and scope of this support document and an overall introduction into the OU3 remedial action sampling program. Section 1 also introduces the concept of using project-specific SAPs, which are used to identify sampling requirements for each of the individual projects. Section 2 provides a general discussion about data needs and data quality objectives; project-specific SAPs; and data management. Section 3 discusses the programmatic approach toward sampling and analysis as well as the need to evaluate process knowledge, existing Material Evaluation Forms (MEFs), and existing analytical data to determine data gaps. Section 3 also discusses planned environmental sampling, and sampling of decontamination washwaters/rinsewaters. Section 4.0 references sampling and analytical procedures. Section 5 provides a discussion on quality control and quality assurance for OU3 sampling. Section 6 discusses the implementation strategy including logistical planning, program management, and laboratory contracting.

## 1.1 Purpose and Scope

This SAP contains the guidance and requirements that apply to data collection during the OU3 RD and RA processes for above-grade remediation. Any sampling and analysis required for supporting the at- and below-grade remediation of OU3 will be addressed in the Soil Excavation Plan, which implements the soil remediation element of the Operable Unit 5 (OU5) Record of Decision (ROD). The purpose of this document is to define the strategies for obtaining data needed to support the following activities:

- release of certain OU3 materials from the FEMP, as appropriate;
- treatment and disposition of decontamination washwater;
- environmental monitoring;
- treatment of mixed wastes; and
- waste certification for off-site disposition.

The data needs and objectives identified in this SAP reflect the data that may be required to complete those activities. This SAP has been structured to address the sampling and analysis strategy for each of the activities covered by the five bullets listed above.

This SAP does not include a distinct Quality Assurance Project Plan (QAPjP) as a self contained element. At the Fernald Environmental Management Project (FEMP), all quality assurance related elements for sampling and analysis have been compiled in a single document, the Sitewide Comprehensive Environmental Response Compensation Liability Act (CERCLA) QAPjP, also known as the SCQ. The SCQ addresses protocol for all sampling activities at the FEMP, including OU3 sampling activities. Sampling and analysis procedures needed to support OU3 remediation are already in place at the FEMP and have been referenced in this document. The relevant sections of the SCQ are included in this SAP by reference to fulfill the requirements of a QAPjP.

## 1.2 Site Background Description

OU3, as defined in the Amended Consent Agreement (ACA) (U.S. EPA 1991a), consists of the former production area and all production-associated facilities and equipment (including all above- and below-grade improvements) not specifically included in any other operable unit. OU3 is comprised of all structures, equipment, utilities, drums, tanks, solid waste, waste product, thorium, effluent lines, K-65 transfer line, wastewater treatment facilities, fire training facilities, feedstocks, and coal piles — all referred to as *components*. Due to the large number and diversity of items that make up OU3, the operable unit was divided into components. Prior to implementation of the OU3 removal actions, there were 233 components, as discussed in Section 2.2 of the OU3 Integrated RD/RA Work Plan. The former production area covers approximately 136 acres and operated as a uranium refinery and foundry with an numerous support and related facilities. The soil and water beneath OU3 components are within the definition of OU5.

## 1.3 Use of Project-Specific SAPs

This SAP contains a broad range of sampling activities to meet the potential data needs that might be encountered during the OU3 RD/RA process. As discussed in Section 4.1.3 of the OU3 Integrated RD/RA Work Plan, project-specific data requirements will be defined in the design process. The project-specific SAPs will reference applicable protocols and procedures, as referenced in this SAP. Development of this SAP and the project-specific SAPs will be done in accordance with the SCQ. Development of the project-specific SAPs is further discussed in Section 2.5.

# 2.0 GENERAL SAMPLING AND DATA COLLECTION APPROACH

This section presents the objectives of the OU3 integrated remedial action sampling program followed by a discussion of the data collection approach. Based on the RD/RA data needs and the data quality objectives, the approach for collecting data and the proposed Analytical Support Level (ASL) are presented. This section also discusses sample representativeness, sensitivity requirements, sample numbering, tracking system, and the overall data management plan. Based on the global approach defined in this SAP, Section 2.5 describes how project-specific SAPs will be developed to identify sampling needs for individual projects.

## 2.1 Sampling Program Objectives

The objectives of the OU3 integrated remedial action sampling program are to collect specific data not already available through existing sources, needed to supplement decisions regarding the activities listed in Section 1. It should be emphasized that the OU3 Remedial Investigation/Feasibility Study (RI/FS) Report (DOE 1996b) supplies the primary data that were necessary to make decisions regarding treatment and disposition of OU3 materials; however, supplemental characterization will likely be needed to certify that materials destined for off-site disposal or release (restricted and unrestricted) meet the applicable criteria. Characterization needed for disposal of certain OU3 materials in the on-site disposal facility (OSDF), as identified in Section 3.3 of the OU3 Integrated RD/RA Work Plan, has been satisfied; therefore, OU3 materials destined for the OSDF will not require supplemental characterization. Characterization, in this context, refers to sampling and analytical work beyond the visible process material inspection per decontamination and dismantlement project performance specification 01517.

The overall objective of any remedial action is to eliminate, reduce, or otherwise mitigate the potential for exposure to contaminants and thus minimize associated risks to public health and the environment. To meet those objectives during the OU3 integrated remedial action, the general approach for sampling is as follows:

- sample OU3 materials through radiological screening methods to verify attainment of release cleaning criteria;
- sample decontamination and rinse waters to determine treatment requirements by the on-site Wastewater Treatment System (WWTS);
- sample air outside project enclosures to assess the effectiveness of project engineering controls, if necessary, for potential radiological and asbestos emissions;
- sample treated OU3 materials such as acid brick, if amenable to sampling and if treatment is performed on-site, to determine if treatment standards have been met; and
- perform sampling as specified by the designated receiving facility waste acceptance criteria (WAC), as needed, in order to provide data needed to certify that waste acceptance has been met.

Based on the scope and approach for sampling during the OU3 integrated remedial action, this SAP was revised from the version originally presented in Volume II of the OU3 RD/RA Work Plan for Interim Remedial Action to address a reduced scope of sampling. As stated in Section 1, this SAP provides the strategies for obtaining data for five distinct activities: release of materials (restricted and unrestricted), treatment and disposal of decontamination washwater, environmental monitoring, treatment of mixed wastes, and waste certification for disposal of Low-Level Waste (LLW) offsite. The FEMP currently has in place the following sampling programs and associated procedures to address each of the above-listed activities:

- Off-site Release of Materials: *Radiological Requirements for the Release of Materials at the FEMP*, Procedure No. RP-0009. This plan has been included in its entirety in Appendix C of the OU3 Integrated RD/RA Work Plan.

- Decontamination Washwater/Rinse Water Sampling: For discharge of decontamination washwater; *Liquid Sampling*, Procedure No. SMPL-02. This procedure is provided in Appendix K of the SCQ.

- Environmental Monitoring:
  **Radiological:** *High Volume Air Monitoring*, Procedure No. SRS-REM-001. Although the actual project-specific radiological environmental monitoring plan is developed during design and reported in project implementation plans, the procedures for sampling and analysis are provided in Appendix K of the SCQ.

  **Asbestos:** An asbestos air monitoring plan must be prepared by the remediation subcontractor pursuant to Specification 01516, and will be subject to DOE approval.

- Treatment of Mixed Wastes: This activity is governed under the procedures developed for Removal Action 9 (Removal of Waste Inventories). Sampling and analysis depends on type of treatment applied. Lead sheeting and acid brick are considered the only mixed wastes in OU3 that will be subject to Land Disposal Restrictions (LDRs), which would require treatment be applied. Per the OU3 RI/FS Report, both lead sheeting and acid brick would be treated by encapsulation. Encapsulation has been identified as a treatment methods that is not amenable to sampling using the Toxicity Characteristic Leachate Procedure (TCLP) method.

- Waste Certification for LLW disposition Off-site: *Waste Certification Program Plan for Low Level Waste Characterization and Certification*, Procedure No. RM-0040, (DOE 1996c). Program designed and approved for the certification of LLW to be shipped to the DOE Nevada Test Site. For materials that may be shipped for disposal at the Envirocare of Utah permitted commercial disposal facility located in Clive, Utah, the Envirocare Material Process Manual specifies the appropriate sampling program.

Although procedures have been identified and are in use at the FEMP for disposition of decontamination washwater and verification of decontamination of HWMU surfaces closed under the Resource Conservation and Recovery Act (RCRA), project-specific SAPs will be developed during project design or prior to the subject activity. The remaining activities will not require project-specific SAPs since those activities are established and approved FEMP programs that are available to support OU3 projects. The preparation of project-specific SAPs are discussed in Section 4.1.3 of the OU3 Integrated RD/RA Work Plan and Section 2.5 of this SAP. Although each of the potential sampling activities identified above are discussed in this SAP, the primary focus of the guidance will be on the sampling and analysis for those activities that do not have, or will not have (in the case of asbestos sampling), approved sampling program plans. This SAP will provide the basis for preparation of project-specific SAPs.

## 2.2 Data Needs and Data Quality Objectives

Data needs and data quality objectives required to meet the sampling program objectives discussed in Section 2.1 are defined by activities outlined in Section 3 of the OU3 Integrated RD/RA Work Plan. Since the remedial design for each of the decontamination and dismantlement projects will define specific data requirements in project-specific SAPs, this section can only generally discuss the data needs and quality levels.

### 2.2.1 Data Needs

Table 2-1 lists the anticipated data needs identified for each of the objectives identified in Section 2.1. For each of those data needs, the table identifies the expected media to be sampled, the intended use of the data, and the general availability of the data.

Data availability is the primary issue regarding whether or not project-specific SAPs are needed. Since the OU3 RI/FS characterization effort conservatively identified the nature and extent of contamination in major media within most of the components, the data needs for initially evaluating material handling and disposition requirements have been satisfied. Based on available data or process knowledge, any supplemental sampling would focus on specific contaminants of concern.

For the major media in most OU3 components, samples were taken and analyzed for the United States Environmental Protection Agency (U.S. EPA) Target Analyte List (TAL) for inorganic compounds, and a conservative list of radiological parameters. For liquids and loose media, samples were taken and analyzed for the TAL list, the radiological list, and the U.S. EPA Target Contaminant List (TCL) for organic compounds. Certain media were also analyzed for the TCL list of polychlorinated biphenyls (PCBs) when process knowledge or screening identified a potential for their existence. The OU3 RI/FS database will be used, as necessary, to provide the following support to each project remedial design:

- to develop the safety assessment documentation;
- to develop the project-specific Health and Safety Plan and Health and Safety Matrix;
- to provide the prospective remediation subcontractors with expected contamination levels for components within a project;

## TABLE 2-1 Summary of Data Needs for the OU3 Integrated Remedial Action

| Data Need | Media | Data Use | Data Availability |
|---|---|---|---|
| **I. ENVIRONMENTAL MONITORING DURING SURFACE DECONTAMINATION AND DISMANTLEMENT:** | | | |
| 1. Identification of airborne contaminants to estimate discharges of regulated substances from air emission sources during remediation. | Air | Used to detect on-site releases and determine off-site concentrations of and exposures to airborne contaminants attributable to remedial activities. Also used to assess compliance with FEMP limits set for project and site, and Applicable or Relevant and Appropriate Requirements (ARARs). | To be collected during remediation activities. |
| 2. Identification of decontamination water (surface water) contaminants to determine treatment requirements and for National Pollutant Discharge Elimination System (NPDES) compliance decisions. | Surface Water | Used to determine surface water treatment requirements. Also used to assess compliance with ARARs. | Data to be collected during remediation activities, when storage tanks are full. |
| **II. OFF-SITE SHIPMENT/DISPOSAL OPTIONS (LANDFILLS, RECYCLE/REUSE FACILITY, etc.):** | | | |
| 1. Landfill Options: | | | |
| 1.A. Shipment to municipal solid waste landfill; characterization of material to certify release to an approved landfill. | Material that meet free-release criteria and additional guidance established in Section 3.3.6.1 of the OU3 Integrated RD/RA WP. | Used to determine free release criteria and compliance with landfill requirements, including 40 CFR 261.2, 262.11, 268, and DOE Order 5400.5. Allow for segregation of waste streams determined to be "clean." | RI data on most major media, other existing analytical data, process knowledge, etc., should provide a significant amount of information. Screening/sampling may be necessary to further define the extent of contamination. Sampling/screening may also be needed where the nature of contamination is unknown. |
| 1.B. Shipment to the DOE Nevada Test Site (NTS); characterization of contaminated materials | LLW Debris Categories C, E, and F that meet NTS WAC (*refer to* Section 3.3 of RD/RA Work Plan). | Used to determine the regulatory status of the waste materials and to ensure compliance with NTS requirements outlined in DOE NTS procedure - NVO-325. Segregation of waste *streams/low level wastes.* | RI data on most major media, other existing analytical data, process knowledge, etc., should provide a significant amount of information. Screening/sampling may be necessary to further define the extent of contamination. Sampling/screening may also be needed where the nature of contamination is unknown. |
| 1.C. Shipment to Envirocare of Utah; characterization of contaminated materials. | Mixed waste in OU3 Debris Categories D and F that meet Envirocare WAC. | Used to determine the regulatory status of waste materials and to ensure compliance with Envirocare waste acceptance criteria specified in their Material Acceptance Process Manual. Segregation of mixed waste streams. | RI data on most major media, other existing analytical data, process knowledge, etc., should provide a significant amount of information to identify mixed wastes. |
| 1.D. Shipment to other commercial disposal facilities: Characterization *of contaminated* materials.*<br><br>* As other facilities are selected, they will be added to the list of potential facilities to be considered. Disposal facilities are subject to DOE procurement policies and National Environmental Protection Act (NEPA) approval. | All approved waste streams. | Used to determine the regulatory status of the waste materials, and to ensure compliance with facilities WAC. Segregation of waste streams for *separate packaging.* | RI data on most major media, other existing analytical data, process knowledge, etc., should provide a significant amount of information. Screening/sampling may be necessary to further define the extent of contamination. Sampling/screening may also be needed where the nature of contamination is unknown. |

**TABLE 2-1 Summary of Data Needs for OU3 Interim Remedial Action (Cont'd)**

| Data Need | Media | Data Use | Data Availability |
|---|---|---|---|
| 1.E. Shipment to recycle/reuse facility; characterization of material to be sent to DOE approved facility; surface or bulk contamination. | Categ. A - Accessible Metals, Categ. I - Misc. Materials | To determine if materials meet radiological release requirements required by procedure RP-0009 (Appendix D of OU3 RD/RA Work Plan). | RI data on most major media, other existing analytical data, process knowledge, etc., should provide supplemental information only. Screening/sampling per RP-0009 may be needed to define the extent of contamination at the time of release. |
| **III. TREATMENT:** | | | |
| 1. TCLP characteristics and any other prospective receiving facility WAC. | Categ. F - Acid Brick, Categ. D - Lead Sheeting | Used to determine if materials achieved desired treatment standards to meet prospective receiving facility WAC and TCLP limits. | Not applicable - materials are subject to TCLP analysis following treatment unless not amenable to sampling. |

- to supply data needed for radiological environmental air emissions modeling;
- to identify and label Category C (Process-Related Metals);
- to identify specific materials containing potentially mixed waste and PCB-contaminated material; and
- to identify expected contaminants in wash or rinse water effluents.

### 2.2.2 Data Quality Objectives

Data quality objectives (DQOs) specify the quality and quantity of data required to fulfill one or more of the purposes or uses for which the data are being collected. DQOs are presented in this document to ensure that all data collected pursuant to this plan are appropriate to meet the data needs. The level of data quality and detail may vary depending on the intended use of the data. As target values for data quality, the DQO specified is not necessarily criteria for acceptance or rejection of data collected.

The SCQ presents a structured eight-step process for the development of DQOs. This structured process provides the rationale for deciding what data are necessary, what quality and type of data are required, how the data will be technically defensible, and how risk is comprehended and minimized to ensure sound decisions throughout the remediation process. The process will help to identify areas of concern, the selection of equipment, quality assurance requirements, and ASLs. DQO development will include the following steps:

- statement of the problem;
- identification of a decision that addresses the problem;
- identification of data/information that affect the decision;
- specification of the domain of the decision;
- development of a logic statement;
- establishment of constraints on uncertainty;
- optimization of design for obtaining data; and
- DQO summary.

A DQO summary form, intended to provide a quick overview of the major aspects of the data collection effort and the associated objectives, will be generated for each DQO. The summary form translates the development of DQOs into a concise field document that identifies media-specific ASLs and sampling and analysis procedures. The form summarizes the analytical and sampling requirements contained in DOE Orders, environmental regulations, the Federal Facility Compliance Act (FFCA), the Ohio Environmental Protection Agency (Ohio EPA) Director's Findings and Orders (DF&O) (OEPA 1996), and the ACA. A sample DQO summary form is provided in Appendix B of the SCQ.

One of five FEMP-defined ASLs will be assigned to all data to be collected, depending on the intended use of the data and the quality assurance/quality control (QA/QC) methods required to achieve the desired level of quality. The specific definitions of the five ASLs (A through E) are provided in the SCQ and are summarized in Table 2-2. FEMP ASLs A through E are defined in the SCQ and parallel the U.S.EPA DQO Levels I through V for chemical analysis, but also include analysis of radionuclides, which comprise a large proportion of the analyses supporting the FEMP project. ASLs were designed to maintain consistency with U.S.EPA in the definitions of DQO levels and to avoid confusion between U.S.EPA and DOE programs.

Using information from Table 2-1 and any new information developed under DQO's, it will be determined if there are any unaddressed data needs. Table 2-3 considers previous data that have been collected, including ASLs used, and identifies the data collection approach needed to meet sampling objectives during the OU3 integrated remedial action. DQOs have been written general enough in this SAP to cover all data need contingencies.

## TABLE 2-2 Analytical Support Levels

| Support Level | Description | Typical Data Uses |
|---|---|---|
| A | *Qualitative Field Analysis* — This level is characterized by the use of portable instruments that can provide real-time data to assist in the optimization of sampling point locations and in providing health and safety support. Data can be generated regarding the presence or absence of contaminants (e.g., radionuclides, volatiles) at sampling locations. Analogous to U.S. EPA analytical level 1. | Site characterization, monitoring during implementation |
| B | *Qualitative, Semi-Quantitative, and Quantitative Analyses* — This level may include the use of more sophisticated screening techniques, such as portable analytical instruments that can be used on-site or in mobile laboratories stationed near a site (close-support laboratories). Depending upon the types of contaminants, sample matrix, and QC checks applied, qualitative and quantitative data can be obtained. Analogous to U.S. EPA analytical level 2. | Site characterization, evaluation of alternatives, engineering design, monitoring during implementation |
| C | *Quantitative with fully defined QA/QC* — Laboratory analyses generated with full QA/QC checks of types and frequencies specified for ASL D according to FEMP-specified analytical protocols for radiological and non-radiological parameters. The analytical methods are identical to ASL D for QA/QC sample analysis and method performance criteria. However, the data package does not typically contain raw instrument output but does include summaries of QA/QC sample results. ASL C may be used when analyses require a rigid, well-defined protocol, but where other information is available, so that a complete raw data package validation effort is not required. Laboratories are required to retain, in the project file, raw instrument data to upgrade ASL C reports to ASL D. Analogous to U.S. EPA analytical level 3. | Risk assessment, site characterization, evaluation of alternatives, engineering design, monitoring during implementation |
| D | *Conformational with complete QA/QC and reporting* — Provides data generated with a full complement of QA/QC checks of specified types and frequencies according to FEMP-specified analytical protocols for radiological and non-radiological parameters. The data package includes raw instrument output for validation. These data may be used to confirm data gathered at ASLs B and C, and when full validation of raw data is required. Analogous to U.S. EPA analytical level 4. | Risk assessment, evaluation of alternatives, engineering design |
| E | *Nonstandard* — Analyses by nonstandard protocols that often require method development or validation (e.g., when exacting detection limits or analysis of an unusual chemical compound are required). New methods may be developed for ASL E data to allow for parameters or matrices that cannot be analyzed by existing standard methods. Analogous to U.S. EPA analytical level 5. | Site characterization, evaluation of alternatives, engineering design, monitoring during implementation |

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## TABLE 2-3 Data Collection Approach

| Data Need | Media | Data Use | Data Objective | Data Collection Approach to Meet Objectives | Proposed ASL |
|---|---|---|---|---|---|
| **I. ENVIRONMENTAL MONITORING DURING SURFACE DECONTAMINATION AND DISMANTLEMENT:** | | | | | |
| 1. Identification of airborne contaminants; to estimate point source discharges of regulated substances from air emission sources during remediation. | Air | Used to detect on-site releases and determine off-site concentrations of and exposures to airborne contaminants attributable to remedial activities. Also used to assess compliance with the FEMP limits set for project and site, and ARARs. | Maximum concentrations of airborne contaminants at specified locations during remedial activities. Dependent upon established baseline conditions and specific needs of project. | Use of existing monitoring equipment. Air monitoring approach is discussed in Section 3.4. | B |
| 2. Identification of decontamination water (surface water) contaminants to determine treatment requirements and for NPDES compliance decisions. | Surface Water | Used to determine surface water treatment requirements. Also used to assess compliance with ARARs and criteria-to-be-considered (TBCs): | Type and average concentrations of contaminants for decontamination wash water collection points. | Judgmental, grab or composite. Collection approach based on routine monitoring. Requires coordination with WWTS coordinator during design to determine sampling approach. | B |
| **II. OFF-SITE SHIPMENT/DISPOSAL OPTIONS (LANDFILLS, RECYCLE/REUSE FACILITY, etc.):** | | | | | |
| 1. <u>Landfill Options:</u> | | | | | |
| 1.A. Shipment to municipal solid waste landfill; characterization of material to be sent to an approved landfill. | Materials that meet free-release criteria and additional guidance established in Sect. 3.3.6.1 of the OU3 Integ. RD/RA Work Plan. | Used to determine free release criteria and compliance with landfill requirements, including 40 CFR 261.2, 262.11, 268, and DOE Order 5400.5. Allows for segregation of waste streams determined to be "clean." | To show absence of contamination above release levels with a very high level of certainty. Levels specified in listed ARARs and in receiving facilities waste acceptance criteria requirements. | Sampling/screening to determine presence below established contamination levels as prescribed by Site Procedure RP-0009: "Radiological Requirements for Release of Materials at the FEMP" and by the receiving facility's WAC. | TBD |

TABLE 2-3 Data Collection Approach (Cont'd)

| Data Need | Media | Data Use | Data Objective | Data Collection Approach to Meet Objectives | Proposed ASL |
|---|---|---|---|---|---|
| 1.B. Shipment to NTS; characterization of contaminated materials. | All approved waste streams. Currently, LLW Debris Categories: C, E, and F that meet NTS WAC. (Refer to Section 3.3 of the RD/RA Work Plan. | Used for confirmation sampling to ensure compliance with NTS requirements outlined in NVO-325. Segregation of prohibited waste streams from LLW packaged for NTS shipment. | Presence/absence of certain contaminants as defined by NVO-325. | Sampling/screening as required. | TBD |
| 1.C. Shipment to Envirocare of Utah; characterization of contaminated materials. | Mixed waste in OU3 Debris Categories D and F that meet Envirocare WAC. | Used to determine the regulatory status of waste materials and to ensure compliance with Envirocare of Utah's WAC specified in their Material Acceptance Process Manual. Segregation and packaging of mixed waste streams. | Presence/absence of certain radioactive and hazardous contaminants as defined by Envirocare's Material Acceptance Process Manual. | Sampling/screening to determine presence below established contamination levels as prescribed by LDRs and other applicable regulations. Specific data requirements are stipulated in Envirocare of Utah's Material Acceptance Process Manual. | B |
| 1.D. Shipment to other commercial disposal facilities: Characterization of contaminated materials.* | All approved waste streams. | Used to determine whether material meet disposal facility WAC and the regulatory status of the waste materials. Segregation of waste streams for separate packaging. | Presence/absence and levels of certain contaminants as defined by disposal facility WAC. | Sampling/screening to determine presence below established contamination levels as prescribed by the waste acceptance procedures defined by accepting facility. | TBD |

* As other facilities are selected, they will be added to the list of potential facilities to be considered. Disposal facilities are subject to DOE procurement policies, Orders, and NEPA approval.

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## TABLE 2-3 Data Collection Approach (Cont'd)

| Data Need | Media | Data Use | Data Objective | Data Collection Approach to Meet Objectives | Proposed ASL |
|---|---|---|---|---|---|
| 1E. Shipment to DOE-approved recycle/reuse facility; surface or volumetric contamination. | OU3 Debris Categ. A - Accessible Metals, and Categ. I - Misc. Materials. | Used to determine if materials meet radiological release requirements per Site Procedure RP-0009 (Appendix D of OU3 RD/RA Work Plan). | Presence/absence of certain contaminants. General levels of Radiological TCLP contaminants, etc. Screening to determine contaminant levels. | Sampling/screening to determine if contamination levels meet or exceed criteria for recycle/reuse option chosen for particular materials. | B or C |
| **III. TREATMENT:** | | | | | |
| 1. TCLP Characteristics and any other prospective receiving facility WAC. | Category F - Acid Brick, Category D - Lead Sheeting | Used to determine if materials achieved desired treatment standards to meet disposal facility WAC and LDRs. | Type and conservative estimates of concentrations of potential contaminants in materials that have potential for exceeding TCLP limits and facility WAC. | If performed on-site, sampling requirements will meet TCLP testing methods; any additional sampling needed would be dependent on the waste acceptance procedures specified by a prospective receiving facility. | B or C |

## 2.3 Representativeness, Analytical Support Levels, and Sensitivity Requirements

This section discusses requirements for sample representativeness and the resultant sampling approach, including proposed ASLs. This section also presents sensitivity requirements for the sample analysis.

### 2.3.1 Representativeness and Sampling Approach

The data collection approach, as identified in Table 2-3 for each of the data needs, will be performed in a manner (i.e., sample types, location, and frequency) that is consistent with DQOs. Constituents of concern (COCs) will be the key element in developing an appropriate project-specific SAP so that sampling is limited for meeting stated objectives only. Since the OU3 RI/FS satisfied most of the sampling needed for treatment and disposition of OU3 materials, sampling in support of decontamination and dismantlement and waste management will be minimal. Sampling will be conducted only when information from other sources is insufficient.

Representativeness for sampling of materials or wastes will be based on the assumption that the composition of contaminants is uniform or homogenous in a given media. Based on this assumption, the following sampling approach was devised:

- The data collected must be complete and accurate to be useful. New data for characterization of materials will only be called for if the existing data is determined to be inadequate for stated data use. It is anticipated that sampling for treatment and disposal of materials will be required primarily for confirmatory testing to ensure that off-site WAC are met or a specific in situ treatment method (e.g., scabbling or high pressure wash) was effective in removing contamination to desired levels. Sampling for environmental monitoring purposes will be continuous throughout a project as warranted.

- If process knowledge or previous analytical data exists but is insufficient to meet the contaminant determination needs for a particular component, then supplemental (additional) intrusive and/or non-intrusive sampling will be performed to meet the data needs. Types and frequency of sampling will be outlined in the project-specific SAP, as appropriate.

### 2.3.2 Analytical Support Levels

The ASLs are determined by the project DQOs and the analytical options needed to support data use. Table 2-3 assigns the proposed ASL to each of the data uses identified earlier in this section. The QA/QC requirements for ASLs are provided in Volume II, Appendix A, Table 2-2 of the SCQ. Analytical methods and/or performance based criteria to be used for each ASL are also defined in Appendix G of the SCQ. Various analytical options for each ASL are identified in Table 2-4. Table 2-4 limits the selection of analytical options for each measurement type to ensure that the quality of the measurements achieved will support the intended data uses.

### 2.3.3 Sensitivity Requirements

Sensitivity goals for sample analysis are necessary to ensure that contaminants are detected at sufficiently low levels to be meaningful for the intended uses of the data. Sensitivity requirements are set for each type of measurement, including field and laboratory measurements. Table 2-5 presents a listing of all the major laboratory and field parameters that may be evaluated during OU3 remediation and gives the corresponding analytical technique, source protocol or method, method detection limits, and the basis for the selection of the method in terms of sensitivity requirements. Analytical data exceeding the sensitivity requirements will be retained and utilized as supplemental information to analytical data that meets the sensitivity requirements and/or process knowledge for the respective area.

Detection sensitivity limits have to be properly determined to provide useful results. Detection limits vary between field and lab. Analytical data exceeding sensitivity limitations will be retained and utilized as supplemental information to analytical data that is appropriate to the detection limit and/or process knowledge for the area.

Appendix G of the SCQ contains the methods and performance criteria for all analyses performed for the FEMP. For organic and inorganic analytes, standard methods such as the U.S. EPA Statement of Work for the Contract Laboratory Program (CLP), as well as SW-846, are listed. For radiological analyses, performance-based standards are employed. The field method procedures have been developed specifically for environmental monitoring at the FEMP and are currently in the SCQ or have been submitted for inclusion. New field method procedures may be utilized prior to inclusion into the SCQ if they are approved prior to use.

The detection limits listed for both the radiological and chemical laboratory analyses are the required detection limits in Appendix G of the SCQ. In the case of VOCs and semi-volatile organic compounds (SVOCs), the limits in the table are actually contract required quantitation limits (CRQLs). Detection limits for these analytes would actually be somewhat lower.

The basis for requiring the sensitivity of the selected methods is given in the last column of Table 2-5. In the case of analysis of specific radionuclides or chemicals (listed as VOCs, SVOCs, PCBs, and metals), a separate basis is provided for either solid or liquid media. For solid and liquid media, all sensitivity requirements listed are currently based on either U.S. EPA methods (SW-846 methods) or current SCQ performance specifications. Actual sensitivity requirements will be dependent on unrestricted (free) release criteria or WAC identified at the time of sampling.

Required detection limits for field radiological procedures are based on the corresponding Nuclear Regulatory Commission (NRC) surface contamination limits for release without radiological restrictions (NRC 1974). For field screening for PCBs, the required detection limits are based on the requirements of the Toxic Substances Control Act (TSCA) for bulk and surface contamination spill cleanup levels. The detection limit set for organic vapor detection by photoionization detector (PID) or portable gas chromatography is based on general background levels found in industrial buildings and is readily achieved with commercial instruments.

## TABLE 2-4 Analytical Options Under Various ASLs

| ASL | Parameters | Analytical Options | Media to be Sampled |
|---|---|---|---|
| A | Alpha surface contamination screening | • Thin ZnS (Ag) scintillator<br>• Gas flow proportional counter<br>• Thin-face Geiger-Mueller (GM) detector | • Surface of major media<br>• Bulk media<br>• Sediments, uncharacterized solids/loose media |
| | Beta and gamma surface contamination screening | • GM detector<br>• Gas flow proportional counter<br>• Beta scintillator<br>• Plastic scintillator | • Surface of major media<br>• Bulk media<br>• Sediments, uncharacterized solids/loose media |
| | Removable alpha surface contamination | • Low background counting (Tennelec) | • Surfaces of major media or supplemental sampling locations |
| | Removable beta-gamma surface contamination | • Low background counting (Tennelec) | • Surfaces of major media or supplemental sampling locations |
| | Total organic vapors | • Photoionization Detector (PID)<br>• Flame ionization detector (FID) | • Bulk media<br>• Sediments, uncharacterized solids/loose media |
| B | Low-level gamma screening | • Field investigation for the detection of low energy radiation (FIDLER) scintillator<br>• NaI (Tl) scintillator | • Surfaces of major media or supplemental sampling locations |
| | Higher-level beta and gamma screening | • Gamma-compensated GM probe<br>• Ionization chamber | • Surfaces of major media or supplemental sampling locations |
| B | Gamma exposure rates | • Pressurized ionization chamber<br>• NaI (Tl) scintillator<br>• Plastic scintillator | • At locations of elevated gamma activity where individuals may be exposed |
| | Metals | • Portable X-ray fluorescence (XRF) spectrometer | • Surfaces of major media or supplemental sampling locations<br>• Bulk media<br>• Sediments, uncharacterized solids/loose media, liquids |
| | Polychlorinated biphenyls (PCBs) | • Field test kit<br>• Immunoassay field test kit | • Sediments, uncharacterized solids/loose media, liquids (field test kits)<br>• Surfaces (immunoassay test kit) |

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## TABLE 2-4 Analytical Options Under Various ASLs (Cont'd)

| ASL | Parameters | Analytical Options | Media to be Sampled |
|---|---|---|---|
| | Organic vapors | • Portable Gas Chromatography (GC) | • General component air sampling |
| | TCLP | • SCQ protocol based on standard RCRA procedure | • Suspected hazardous waste materials not previously identified and managed at the site<br>• Suspected mixed waste containing both radiological and chemical contaminants<br>• Used for determining leaching potential of materials subject to weathering |
| B/C/D | Radiological Suite | | |
| | U, Th, Pu isotopes | • Radiochemistry by SCQ performance based criteria | • Intrusive samples from major media and supplemental sampling locations |
| | Cs-137 | (Applies to entire radiological suite) | • Bulk media |
| B/C/D (Cont'd) | Ra-226<br>Sr-90, Tc-99, Pb-210<br>Po-210, Ra-228, Np-237, Pu-241, Am-241 | | • Sediments, uncharacterized solids/loose media, liquids<br>(All apply to entire radiological suite) |
| | Chemical Suite | | |
| | Volatile organic compounds (VOCs) | • Gas chromatography/mass spectrometry (GC/MS) by SCQ protocol | • Intrusive samples of sediments, uncharacterized solids/loose media, liquids |
| | Semi-volatile organic compounds (SVOCs) | • GC/MS by SCQ protocol | • Intrusive samples of sediments, uncharacterized solids/loose media, liquids |
| | PCBs | • GC by SCQ protocol | • Intrusive samples from major media and supplemental sampling locations<br>• Intrusive samples of sediments, uncharacterized solids/loose media, liquids |

**TABLE 2-4 Analytical Options Under Various ASLs (Cont'd)**

| ASL | Parameters | Analytical Options | Media to be Sampled |
|---|---|---|---|
| | Trace metals | • Furnace Atomic Absorption spectrometry (FAA), inductively coupled plasma atomic emission spectrometry (ICP) by SCQ protocol and Cold Vapor Atomic Absorption (CVAA) | • Intrusive samples from major media and supplemental sampling locations<br>• Intrusive samples of sediments, uncharacterized solids/loose media, liquids |

**TABLE 2-5 Analytical Sensitivity Requirements**

| Parameter | Technique | Protocol/Method | Method Detection Limits | | Basis for Method Selection |
|---|---|---|---|---|---|
| | | | Solids (pCi/g) | Liquids (pCi/L) | |
| Isotopic U | Radiochemistry | SCQ | 0.2 | 0.5 | WAC |
| Isotopic Th | Radiochemistry | SCQ | 0.2 | 0.5 | WAC |
| Isotopic Pu | Radiochemistry | SCQ | 0.2 | 0.5 | WAC |
| Cs-137 | Radiochemistry | SCQ | 1.0 | 4.0 | WAC |
| Sr-90 | Radiochemistry | SCQ | 0.5 | 1.0 | WAC |
| Tc-99 | Radiochemistry | SCQ | 10 | 30 | WAC |
| Pb-210 | Radiochemistry | SCQ | 1.0 | 3.0 | WAC |
| Po-210 | Radiochemistry | SCQ | 0.5 | 1.0 | WAC |
| Ra-226 | Radiochemistry | SCQ | 0.2 | 1.0 | WAC |
| Ra-228 | Radiochemistry | SCQ | 0.5 | 3.0 | WAC |
| Np-237 | Radiochemistry | SCQ | 0.2 | 0.5 | WAC |
| Pu-241 | Radiochemistry | SCQ | 0.5 | 1.0 | WAC |
| Am-241 | Radiochemistry | SCQ | 1.0 | 4.0 | WAC |

**TABLE 2-5 Analytical Sensitivity Requirements (Cont'd)**

| Parameter | Technique | Protocol/Method | Method Detection Limits: Solids | Method Detection Limits: Liquids | Basis for Method Selection |
|---|---|---|---|---|---|
| | | | (µg/kg) | (µg/L) | |
| VOCs | GC/MS | CLP/SW-846/SCQ | 10 | 10 | WAC |
| SVOCs | GC/MS | CLP/SW-846/SCQ | 330 | 10 | WAC |
| PCBs | GC | CLP/SW-846/SCQ | 33 | 1 | WAC |
| Metals | FAA/ICP | CLP/SW-846/SCQ | (TAL contract required detection limits (CRDLs)) | | WAC |
| TCLP | ICP and GC/MS | SW-846/SCQ | (See Note 1) | | WAC |
| Removable alpha | Low-background counting | SCQ | 20 dpm | | NRC limits |
| Removable beta-gamma | Low-background counting | SCQ | 1,000 dpm | | NRC limits |
| Organic vapors | PID or portable GC | SCQ | 1 ppm | | Background |
| PCB screen | Field test kits<br>Immunoassay Field Kit | SCQ | 50 ppm (bulk)<br>10 ug/100 cm² (surface) | | TSCA |
| Metals screen | XRF | SCQ | 100-200 ppm | | Instrument performance |
| | | | Maximum Allowable Total Surface Contamination[2] | | |
| Total alpha | Thin Window Scintillation Probe | SCQ | 300 dpm/100cm² | | NRC limits |
| Total beta-gamma | GM | SCQ | 15,000 dpm/100 cm² | | NRC limits |
| Low-level gamma | NaI (Tl) | SCQ | background | | Background |
| Gamma exposure rate | PIC | SCQ | background +20 µR/h | | DOE Order 5400.5 |

Note 1: Should be equal to total analyses method detection forms (MDLs) for water matrices, unless there is matrix interference.
Note 2: MDLs do not apply to field equipment. The operational efficiency of field equipment is very instrument specific.

## 2.4 Sample Numbering and Tracking System

In order to facilitate sample management, sample numbers, which will be used by field crews to track samples and their data, consist of the component alpha-numeric designation, as shown in Table A-1 of the OU3 RI/FS Work Plan Addendum (WPA) (DOE 1993), followed by a sequential number. For example, the ninth sample taken from the Incinerator Building (39A) would have the corresponding sample number 39A-009. This unique number, along with all pertinent data and sampling information, will be entered into a project-specific database (see Section 2.7) to support tracking of the samples.

The sample numbers will be determined at the time of project-specific SAP development to the extent possible; however, field sampling personnel will be equipped to add to the list of samples. Additionally, the database will be pre-loaded with sample numbers to the extent practical to allow for automated sample label and form printing.

Sample labels will include all necessary cross references to correlate them to daily field activity logs, requests for analysis forms, and chain-of-custody records described in the SCQ. Additional requirements dealing with various media and specific types of samples that may affect the information included on the sample labels are also contained in the SCQ.

Sample numbers will not be applied to field screening (i.e., radiological swipes, radiological screening, XRF screening, etc.). A screening tracking system currently in use for radiological screening will be employed, using area maps to number and mark the locations of sequential screening and cross-references to describe each.

## 2.5 Project-Specific SAPs

This section provides a general discussion of project-specific SAPs which may be developed for a project depending on data needs. The strategy for project-specific SAP preparation is to follow the requirements provided in this programmatic level SAP for each project, as appropriate.

### 2.5.1 Description

Using the general SAP approach provided in this document, a project-specific SAP will be developed based on the data needs of a project. The project-specific SAP will be developed preferably during design but may be prepared during project implementation as time permits. The project-specific SAP identifies sampling purpose, scope, location, and analytical requirements and provides a description of specific components to be sampled, the means/methods of sampling, and logistics control for field personnel.

The project-specific SAP will specify sample numbers according to sample locations previously identified in the request for site sampling services. Total sample volume needs are discussed relative to laboratory requirements to perform the relevant analyses for each location and media.

A typical project-specific SAP will follow the outline provided below:

*Signature/Authorization Block*: This includes authorizations from the OU3 Management, Quality Assurance, and Environmental Programs.

*Section 1 - Introduction*: This section provides a purpose statement, short description of the components within the project, a location drawing showing all pertinent components, scope that includes analytical requirements, and highlights any logistical issues or special requirements for field crews.

*Section 2 - Responsibilities:* Describes key project personnel for coordinating and reporting sampling and analysis.

*Section 3 - Sampling Program:* This section describes the manner in which samples will be taken and references appropriate procedures that apply. It also specifies locations for sampling.

*Section 4 - Quality Assurance/Quality Control Requirements:* Describes requirements for self assessments, surveillances, and field changes.

*Section 5 - Equipment Decontamination:* Discusses use of disposable equipment and references procedures to be used for equipment decontamination.

*Section 6 - Health and Safety:* References are included in this section for appropriate health and safety requirements for sampling activities.

*Section 7 - Disposition of Investigation-Derived Wastes:* Statement which identifies the requirements for proper disposition of investigative-derived wastes.

*Section 8 - Data Management Plan:* References applicable requirements of the SCQ for data management.

*Appendix A - Data Quality Objective:* This appendix includes the site DQO established for the sampling activities addressed in the project-specific SAP. The DQO provides a logic flow of the sampling and analysis process, identifies analytical support levels that apply, equipment, methods, etc.

*Appendix B - Job Safety Analysis:* Provided is a table which identifies the sampling steps, the hazards that can be anticipated, and the recommended safe job procedures.

Provided with this SAP as Attachment 1 is the project-specific SAP developed for supporting management of wastewaters generated from the washdown of Building 4A. This project-specific SAP has been attached to this SAP to provide a typical example of such documents.

2.5.2 Procedure for Preparing Project-Specific SAPs

A project-specific SAP will be prepared based on a review of the information discussed in Section 3.1. The following steps are provided as guidelines for preparing project-specific SAPs:

- review the analytical data from the OU3 RI/FS Report and database to determine COCs and data completeness;
- evaluate changes in sample matrix that may have occurred since OU3 RI/FS sampling by performing a visual inspection to verify that information is current;

- develop text sections of the project-specific SAP in accordance with requirements contained in the SAP and SCQ;
- submit project-specific SAP for formal review and approval in accordance with functional area procedures;
- perform logistics walk-down inspection to determine if non-intrusive screening locations and numbers are correct;
- review field screening results to determine if intrusive sampling locations and numbers are correct; and
- revise project-specific SAP to reflect final intrusive sampling locations, if applicable.

Field logs will be maintained by field sampling personnel to record any deviations to the project-specific SAP and any other relevant information.

## 2.6 Changes to Documents

This SAP or project-specific SAP may be modified as necessary to address new findings, variations in field conditions, or unanticipated events. The SCQ, which provides guidance on such modifications, is a flexible document which will allow modifications/additions to both this SAP and project-specific SAP while maintaining the intent of project sampling objectives. The vehicle to be used for initiating a variance will be the Variance/Field Change Notice (VFCN) form. The field sampling representative will communicate SAP variations to the project manager.

A SAP Document Change Request (SDCR) will be a means of initiating a revision to the approved SAP if substantive changes need to be made regarding programmatic issues or sampling strategies. Internal review and approval of the SDCR will be conducted before implementing the document change to ensure that the content of the SDCR is in accordance with the intent of the OU3 integrated remedial action.

## 2.7 Data Management Plan

The overall FEMP data management plan is described in Appendix F of the SCQ. The following discussion is to summarize the data management plan with respect to important interfaces with field sampling anticipated during the OU3 integrated remedial action.

As described in Section F.1.2 of the SCQ, the seven steps, or activities, in the life cycle of environmental data after the approval of a project-specific SAP are as follows:

- collection of samples (or field measurements);
- transfer and handling of samples;
- laboratory analysis and reporting;
- data verification and validation;
- data repository;
- data analysis; and
- data archiving and storage.

There are three main system elements of the data management system developed to support these activities: Fernald Analytical Computerized Tracking System (FACTS); Environmental Resource Management and Analysis (ERMA); and the Sitewide Environmental Database (SED). The centerpiece of the system is the Oracle-based SED, which includes the site-wide environmental database and is the central repository for all FEMP environmental data. The other systems interface with the SED to support data input/output, sample tracking and scheduling, and graphical representations and mapping, among other activities.

FACTS is the main sample data entry system, as well as the main sample tracking system, and is therefore important to field sampling teams. FACTS contains a subsystem for sample tracking that issues sample identification numbers unique to each analytical sample generated. This identification number is used in all other FEMP environmental data base systems to cross reference sample analysis results data. The SED and ERMA systems are primarily involved in data storage and access and data analysis, respectively.

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# 3.0 SPECIFIC SAMPLING PROGRAMS

This section provides further detail and background regarding the approach to sampling in support of the potential applications discussed in Section 2: release of materials, secondary waste (washwater) treatment, environmental monitoring, treatment of potentially mixed wastes to meet LDRs, and certification of wastes for off-site disposal.

## 3.1 Available Data/RI/FS Sampling Data/Process Knowledge

One major aspect of the sampling approach for the OU3 integrated remedial action is to identify if existing data and process knowledge are sufficient to meet data needs. Most existing data and process knowledge will be obtained from the following sources: OU3 RI/FS field sampling program, radiation surveys, and data that is generated from the completion of removal actions (Asbestos Removals, Safe Shutdown, Removal of Waste Inventories). Pertinent existing data and process knowledge will be compiled and disseminated to the project Design-Engineering-Construction (DEC) Team for use in developing various project plans. Among the project plans, as discussed in Section 4.1.3 of the OU3 Integrated RD/RA Work Plan, are the Waste Management Plan, Radiation Protection Plan, Health and Safety Plan, Safety Analysis, and Sampling and Analysis Plan (as needed). If it is determined that the data is sufficient to meet the data needs of those projects, then no additional sampling to support the development of those project plans will be proposed, which would therefore eliminate the need for project-specific SAPs. If it is determined that the data is insufficient or of uncertain quality, as might be the case with disposition of decontamination washwater, then a project-specific SAP will be prepared to provide for data collection. As mentioned in Section 2, existing sampling program plans for release of unrestricted/restricted materials, off-site disposal of materials, and environmental monitoring will provide the necessary documentation for any supplemental data gathering.

Site records, which were maintained for various purposes, have been used as a source of process knowledge. Individually, these records may not provide sufficient information to support all determinations, but when combined with information from other sources, such as RCRA reports, these records may reduce the scope of future data needs.

The OU3 RI/FS sampling database, summarized in the OU3 RI/FS Report, is expected to be the primary source of data for OU3 remediation. The basic sampling approach used in the OU3 RI/FS sampling program involved taking a single sample from the location of maximum contamination level and/or depth for each major medium (concrete, masonry, or steel) in each process area, plus supplemental samples of liquids and loose media. The data represents non-intrusive and intrusive sampling, chemical and radiological, of materials as described in the WPA. The data is available from the following sources:

- The SED, which contains all radiological and chemical field survey data and all analytical data from the laboratory analyses of intrusive samples gathered for the OU3 RI/FS;

- Section 3 of the OU3 RI report, summarizes the contamination by media on a component-specific basis. The summaries are compiled from the OU3 RI/FS analytical data information in the SED; and

- Hard copies of the data from component-specific radiological and chemical field screening data is available from two sources: 1) completed field screening forms; and 2) the accompanying field logbook information compiled during the RI/FS field characterization.

## 3.2 Disposition Sampling

Disposition sampling includes the preliminary step of evaluating materials for each of the disposition routes, identifying sampling requirements needed to obtain necessary data for disposition approval, and identifying analytical requirements to meet data objectives.

### 3.2.1 Material Evaluation

The process of evaluating material during project design includes the preparation of the MEF, which is the primary document used to qualify materials for all disposition routes. Section 3.3 of the OU3 Integrated RD/RA Work Plan describes the process of material evaluation and criteria that must be met for treatment and disposition of materials according to decisions made in the OU3 Record of Decision for Final Remedial Action (DOE 1996d).

Existing MEFs will be used when possible to classify material types that are approved for disposition at specific disposal locations. If an existing MEF is not available, the following steps will be taken: 1) assess the contaminants reported for a particular material according to Tables provided in Section 3.3.1 of the OU3 Integrated RD/RA Work Plan; 2) determine if the waste stream is RCRA or non-RCRA; 3) determine if the waste stream is potentially recyclable or reusable, either restricted or unrestricted; and 4) classify the material for proper waste segregation.

A list of existing MEFs and their corresponding waste stream classifications may be found in Attachment B of site procedure SSOP-0044. Based on evaluation of OU3 material during the OU3 RI/FS, which is summarized in Section 3.3.1 of the OU3 Integrated RD/RA Work Plan, new MEFs were prepared to cover most OU3 waste streams. Although most waste streams now have MEFs prepared for their disposition, the possibility remains that some materials generated from a project might not meet the MEF classifications and, therefore would necessitate development of a new MEF. The MEF assessment will include a review of existing analytical data and a review of historical and process operation knowledge to identify potential constituents of concern. It should be noted that pre-1989 analytical data may not include analyses of toxicity characteristic organics such as benzene (for more information see 40 CFR 261.24). If these constituents are present in the material at concentrations that exceed regulatory levels, the materials will be classified as hazardous waste and managed according to the RCRA hazardous waste regulations. This should be noted when reviewing existing data.

If necessary, when existing data is insufficient to qualify material for disposition, sampling and analysis will be performed for potential contaminants that are identified in the assessment. A contaminant assessment will be completed and documented in an MEF prior to disposition of materials.

### 3.2.2 Sampling Determinations

The paragraphs below describe the basic analytical sampling requirements for performing contaminant assessments for the following classifications: hazardous, radiological, PCB, and asbestos.

Determination of Hazardous Waste Characteristics

To determine the extent of contamination of hazardous constituents, the TCLP may be performed. TCLP is designed to determine the mobility of both organic and inorganic contaminants present in liquid, solid, and multi-phasic wastes and is used to determine whether a material is hazardous waste under RCRA and subject to land disposal restrictions. The TCLP analyte list consists of 8 metals, 10 volatile organics, 13 semi-volatile organics, 7 pesticides, and 2 herbicides for a total of 40 analytes. U.S. EPA SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition (U.S.EPA 1987) methods are implemented for TCLP determinations.

The COCs for a given material will be determined based on process knowledge and other information. Based on the COCs, the material will be evaluated using he following protocol:

1) The debris will be analyzed using the constituent concentrations in solid waste (CCW); and

2) If CCW results are 20 times the constituent concentrations in the waste extracts (CCWE) limit, then the material will be subject to a RCRA-determination as specified 40 CFR 261.24.

When intrusive data is not required by the WAC of the disposal facility, field screening using XRF, PID, FID, and/or GC may be utilized. Descriptions of these field instruments may be found in the SCQ.

Other SW-846 methods may be used to determine the ignitability, corrosivity, and/or reactivity of OU3 media. These analyses will be added to a project-specific SAP if process knowledge identifies a concern for either characteristic.

Determination of Radiological Characteristics

Depending on the intended data use, radiological contamination may be characterized using either field screening or intrusive sampling and analysis methods.

Radiological screening measurements and instrumentation are identified in Section 4.1.1. Action levels for radiological parameters can be found in the DOE Radiological Control Manual (Table 2-2) (DOE 1992b) and in DOE Order 5400.5 (DOE 1990b). Action levels are listed for removable (dpm/100 $cm^2$) and total, fixed and removable contamination, (dpm/100 $cm^2$).

Intrusive sampling will be required in instances when the WAC of a prospective disposal site will not accept field screening data. The radionuclides to be analyzed will depend on the requirements of the WAC. Examples of radionuclide determinations routinely required include: total and isotopic uranium, and total and isotopic thorium. All radioanalytical determinations shall be performed to meet the SCQ performance based specifications in Appendix G of the SCQ.

PCB Determination
Depending on the intended use of the data, potential PCB media contamination field screening and/or intrusive sampling may be required.

Field screening test kits for soil, oil, and surfaces are currently used at the FEMP. These kits provide qualitative and semi-quantitative data that may be best used to determine the presence or absence of PCBs.

Intrusive sampling will be required in instances when the WAC of a prospective disposal site will not accept field screening data or the field screening kits do not offer enough sensitivity. All analytical determinations in such instances are to be performed at ASL B and are to follow the SW-846 methods and performance criteria outlined in Appendix G of the SCQ.

Asbestos Determination
Asbestos containing material (transite, pipe insulation, etc.) in OU3 components has been identified and either removed or maintained intact under Removal Action 26. Remaining asbestos will be removed from components during OU3 remedial action. If necessary, sampling for asbestos in media will be performed following 40 CFR 763 for bulk asbestos. Asbestos greater than 1 percent by volume in a media will require special handling, segregation, and disposal.

### 3.2.3 Analytical Requirements for Off-Site Disposition Options

The ability to dispose of materials under any of the off-site disposition options depends largely on meeting the receiving facility's WACs. Section 3.3.6 of the OU3 Integrated RD/RA Work Plan describe the criteria and decision process for disposition of materials via recycle/reuse options, and on-site and off-site disposal locations. Although WAC are known for NTS, Envirocare of Utah (representing an off-site commercial disposal facility), and the On-Site Disposal Facility, vendor-specific WAC for materials that may be recyclable/reusable will be determined on a case-by-case basis during project design. Since the recycle/reuse option requires contractual arrangements typically on a project-specific basis, WAC and any resulting sampling and analytical requirements will not be certain until that time.

Shipment to NTS
Current WAC for NTS are referenced in Section 3.3.6.3 the OU3 Integrated RD/RA Work Plan. As stated in that section, waste acceptance criteria for NTS is stipulated by The Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements (NVO-325). NVO-325 establishes procedures, requirements, and criteria for sampling, containerization, RCRA determination, certification, and safe transfer of low-level and mixed waste, and storage of transuranic and transuranic mixed waste at the NTS. At this time, however, the FEMP only has approval for shipment and disposal of LLW to NTS. Mixed waste, transuranic (TRU) and transuranic mixed waste are excluded. NVO-325 requirements include making radiological and RCRA determinations. For TRU waste, the NTS license application for the FEMP states that contaminated construction/removal action wastes may exhibit a TRU concentration of less than 100 nCi/g (i.e., shall not be regulated as TRU waste). Material Control and Accountability (MC&A) records at the FEMP indicate there are no materials at the FEMP with TRU concentrations above the 100 nCi/g level. All wastes are considered mixed waste until the generator can document through process knowledge or analysis that the LLW contains no hazardous waste as defined in the RCRA regulations. The FEMP is required to report the following radioactive constituents from dry solid demolition materials from maintenance,

construction, remedial and/or removal actions which generate soils, gravel, concrete, scrap wood, scrap metal, plastic, paper, glass and asphalt:

- U-238: 0.1% to 1.0% total U
- U-235: 0.2% to 1.0% on a total U basis
- U-234: 0.001% to 0.01% on a total U basis

The chemical forms of these radionuclides at the FEMP are Uranium oxides and salts (typically $UO_3$, $U_3O_8$, and $UF_4$).

PCBs are not allowed in the waste stream for NTS unless the concentration meets the municipal solid waste disposal levels of 50 ppm or less. All regulated (friable) asbestos waste must be segregated into a separate stream and meet all requirements of regulated asbestos (see 40 CFR 61.140 through §61.157). NTS is not accepting asbestos materials from the FEMP. This discussion only highlights specific criteria from NVO-325 that are of most concern for OU3 materials. All waste streams considered for shipment to NTS must have a SAP generated for that waste stream, and it must be submitted to and approved by DOE-NV prior to sampling the waste stream. SAPs developed for NTS shipments will be developed under existing waste management operations at the FEMP as material is staged for disposal rather than as a project design task.

NTS NVO-325 procedures requires that one percent of each waste stream be sampled for confirmatory purposes and, for each container that is sampled, three samples are required. For example, if a total of 475 containers are generated from a project that has three waste streams, with 158 containers per waste stream, then one percent confirmatory sampling requires that two samples be taken per waste stream and three samples per container. This example would require that a total of 18 samples be taken for NTS confirmatory sampling. NVO-325 allows the categorization of waste streams according to specific radiological and RCRA classifications. Since the total number of containers for each disposition route will be estimated during design, the number of samples for NTS confirmatory testing may be determined.

Shipment to Other Commercial Disposal Facilities

For other commercial facilities, as with NTS, the data collection approach will depend on each facilities' waste acceptance criteria. At this time, Envirocare of Utah has been identified as the only commercial disposal facility for OU3 material. As discussed in Section 3.3.6.3 of the OU3 Integrated RD/RA Work Plan, Envirocare has been contracted to accept waste from OU1 at the FEMP and that OU3 waste will be included in the OU1 contract under a task order. In addition, DOE has an existing nationwide contract with Envirocare of Utah for treatment and disposal of mixed waste from DOE complexes that meet the waste acceptance criteria established under Envirocare of Utah's Material Acceptance Process Manual.

The Envirocare Material Acceptance Process Manual establishes procedures, requirements, and criteria for safe transfer and disposal of naturally occurring radioactive material/low activity radioactive waste (NORM/LARW) and mixed waste material. Envirocare's Material Acceptance Process Manual requirements set forth specific radiological and RCRA determinations. Envirocare will not accept material that is classified only as hazardous waste.

To initiate Envirocare's acceptance and shipment process, per the Material Acceptance Process Manual, the FEMP must send all results of required lab analyses for each waste

stream, completed forms, and pre-shipment samples of each waste stream to Envirocare. Analytical requirements for pre-shipment samples and information required for completion of the Mixed Waste Profile Form are outlined in the above-referenced manual.

All RCRA analysis must be performed by a Utah Certified laboratory. Pre-shipment analysis includes, but is not limited to the following parameters: full TCLP, Metals, VOCs, SVOCs, PCBs, Herbicides, and Pesticides. For radiological analyses required by the manual, FEMP analyses may be used if the FEMP on-site lab and the Utah certified lab are identical in their procedures, instrumentation, and DOE Quality Assurance Program requirements, and if the FEMP lab operates independently of site remedial actions.

The on-site lab must be involved in the selection of a Utah-certified Laboratory. All waste streams require gamma spectral analysis for evaluation of all naturally occurring and all man-made radionuclides. It is not necessary to report concentration of the daughters of Th-232, Ra-226, and Ru-106. If a waste stream cannot be readily quantified by gamma spectral analysis, for example, Sr-90 or Th-232, it must also be analyzed by radiochemical analysis for the radionuclides expected. Radiological analysis can be performed on-site at the FEMP if at least 10 percent of the samples are sent to a Utah-Certified Laboratory for quality assurance purposes.

The facility's radioactive material license, granted by the Utah Department of Environmental Quality, Division of Radiation Control, establishes maximum average concentrations permissible in the waste that is to be dispositioned. Concentrations are considered by individual isotope. If the waste is natural or depleted uranium, it must be under a specified activity level.

The facility is permitted by the Utah Bureau of Solid and Hazardous Waste to accept NORM/LARW and MW for disposal. Hazardous waste on the permit includes all D-characteristic waste and most F-, P-, U- and K-listed wastes. The facility is not permitted to accept any F-listed dioxins for disposal (refer to 40 CFR 261.21 through 261.33 for waste code definitions). The waste profile forms that must be completed before shipment provide the facility with the appropriate information to ensure compliance with these requirements prior to shipment. The generator is also required to send a waste sample to verify that all WAC are met.

The Envirocare of Utah facility is responsible for waste certification under the terms of its license. The facility maintains a waste characterization plan that establishes the procedures for characterizing, sampling, and accepting incoming shipments at the facility. The first step is the generator's waste characterization, as explained above.

In order for Envirocare to determine the range of tolerances or parameters for a particular waste stream, the generator must send five two-pound samples of the waste stream to be shipped. Ideally, these samples should represent the high and low ranges for all radiological and RCRA constituents for this waste stream. For example, these samples should include two (2) high range, two (2) low range and one (1) middle range. The next step requires Envirocare to analyze the pre-shipment samples of the incoming waste for radiological and chemical parameters. The results of the analyses will be used to establish the range of tolerance, or parameters (High/Low range) for the FEMP's incoming waste shipments to Envirocare. These ranges are based on current LDRs per 40 CFR 268, Envirocare's current RCRA Part B permit, and current radioactive materials license (UT # 2300249). The facility then accepts or rejects

the shipment based on the analytical results and its determined range of tolerances, regulated by current LDRs and Envirocare's radiological and RCRA license, which will serve as this particular waste stream's WAC for this particular shipment. If all required analyses fall within acceptable tolerance ranges, Envirocare approves shipment and sends a notice of transport to the generator.

Before the waste is unloaded at the facility, Envirocare will visually inspect the incoming shipments and take samples for "fingerprinting" analysis and independent third party analysis. Fingerprint analyses of the random samples must fall within the pre-determined parameters (High/Low range) or tolerance ranges set forth as discussed previously. Once fingerprint parameters are verified, unloading and final disposition takes place. If fingerprint analyses fall outside these parameters, Envirocare may require written and/or verbal explanation as to the reasons for this occurrence and/or may require a complete characterization. Envirocare will then determine if rejection of the shipment is necessary.

Shipment to a Municipal Landfill

The shipment of material considered for release to a municipal landfill currently depends on the FEMP Material Release Policy and resulting procedures for release of materials from the FEMP (provided in Appendix C of the OU3 Integrated RD/RA Work Plan), which is based on DOE Order 5400.5, and the waste acceptance requirements of the receiving facility. Office trash shipments to a local municipal landfill are currently released by radiological screening. Completion of the MEF, radiological determinations, and any other testing deemed necessary (per the facilities requirements), will be performed to identify all potential contaminants of concern. Though it is not intended to supply all essential information, the data collected through identification of contaminants and by completion of the above-outlined contaminant determinations will provide sufficient supporting information for material segregation purposes and potentially for future disposition at municipal landfills.

Shipment to Recycle/Reuse Facility

Analytical evaluation of material considered for recycle/reuse will depend on the material acceptance criteria of the receiving facility. If a material is potentially a hazardous waste, the regulations concerning recycling of material need to be followed specifically according to its intended end-use to determine whether or not that material is regulated as a hazardous waste.

### 3.3 Decontamination/Washwater Sampling

Sampling is potentially needed for disposition (discharge) of decontamination washwater and filtered solids generated during remediation activities.

Decontamination water/solids may be generated as a result of decontaminating component surfaces and sampling and treatment equipment. Decontamination water generated from the decontamination and dismantlement activities will be collected through either an existing sump in a component or via other collection means. The strategy for managing secondary waste is discussed in Section 3.3.3 of the OU3 Integrated RD/RA Work Plan.

The decontamination water is collected, filtered, and sampled prior to discharge into the site WWTS. Wastewater sampling parameters will be determined by the WWTS compliance manager based on the COCs identified through process knowledge and OU3 RI/FS characterization data. The site procedure for sampling and analysis of decontamination

wastewater is described in Appendix K of the SCQ. All wastewater is stored pending review of analytical results. Wastewater discharges are subject to site WWTS requirements which are governed by the FEMP NPDES permit.

For planning purposes, it will be assumed that one (1) decontamination washwater sample will be taken per component during the decontamination washdown activities; however, this assumption may apply differently to those components that have multiple and distinct process areas that may have different COCs.

For those decontamination solids that do not already have an approved MEF or if one cannot be completed based on process knowledge or existing data, the solids will be containerized and placed in a centralized location for interim storage until the containers can be sampled. Sampling results will identify compatibility for normal wastewater treatment at the FEMP or whether additional treatment is necessary. For those components where PCBs and/or asbestos are expected, the decontamination solids may be sampled for these analytes also. All sampling will be performed at ASL A (e.g., radiological screening) or ASL B (e.g., TCLP metals). For decontamination water/solids collected from a Hazardous Waste Management Unit (HWMU), a centralized storage location is established for each project to fulfill requirements for a Satellite Accumulation Area (SAA) under RCRA. Washwaters/rinsewaters generated from decontamination of HWMUs containing F-listed constituents will be containerized in batches and, if decided by FEMP WWTS managers, sampled to determine appropriate treatment and disposal requirements.

## 3.4 Environmental Sampling

This section discusses the sampling approach as it applies to environmental monitoring sampling during OU3 remedial action. As discussed in Section 3.6 of the OU3 Integrated RD/RA Work Plan, existing environmental monitoring programs performed under the Aquifer Restoration Project will support the sampling needs for surface water and groundwater if the need arises. Therefore, OU3 has identified that its primary environmental monitoring task is environmental air monitoring for asbestos and radiological concerns. The approaches described below are subject to change based on the development of new technologies (e.g., real-time monitoring devices), changes in FEMP policies concerning environmental monitoring, trending from data obtained from decontamination and dismantlement of early components, and new or updated U.S. EPA and/or DOE requirements.

The following sections discuss the FEMP approach to meeting environmental air monitoring needs during the OU3 integrated remedial action. Environmental air monitoring consists of sampling specific volumes of air around the project-perimeter for asbestos and radiological contaminants to ensure the project engineering controls (containments) are effective. Occupational air monitoring is not covered in this document but is addressed in Section 8 of the OU3 HASP, which is contained in Appendix E of the OU3 Integrated RD/RA Work Plan.

### 3.4.1 Asbestos Monitoring

Asbestos air monitoring will be used for work that will potentially release asbestos fibers from non-friable asbestos. General area air samplers will be collected outside the asbestos work area to evaluate the effectiveness of control measures used during asbestos work activities. See Section 4.1.3 for further information on asbestos air measurements and instrumentation.

Project-specific environmental asbestos air sampling is anticipated to be based on the following:

- for interior decontamination and dismantlement activities (within an enclosed environment), four (4) exterior perimeter monitoring stations will be placed with a sampling event of four (4) samples collected per week;

- for exterior decontamination and dismantlement activities, six (6) exterior perimeter monitoring stations will be placed with a sampling event of seven (7) samples collected per week (including one (1) background sample).

Any resulting sample indicating greater than (>) .01 fibers/cc will be sent to an off-site laboratory for analysis. The number and location of perimeter stations will be determined on a component-specific basis or per design project. The estimated quantity of samples stated above were based on the Plant 7 decontamination and dismantlement project.

### 3.4.2 Radiological Monitoring

Environmental radiological air monitoring during the OU3 integrated remedial action will consist of radiological air monitoring efforts from two programs: the current site-wide monitoring program, which is detailed in the FEMP Integrated Environmental Monitoring Plan (Draft, DOE 1996e); and project-specific air monitoring, which is addressed in Section 3.6.2.1 of the OU3 Integrated RD/RA Work Plan, this section, and strategies developed and reported in the project implementation plans.

The project-specific environmental air monitoring program will provide air monitoring support for one or more (if in close proximity to each other) projects to determine effectiveness of contaminant release control measures. Project-specific air monitoring programs will be developed during the remedial design based on the considerations and modeling strategy discussed in Section 3.6.2.1 of the OU3 Integrated RD/RA Work Plan.

The project-specific air monitoring program will require that continuous emissions monitoring at optimal receptor locations be implemented in response to either of the following issues: 1) if the potential exists for radiological air emissions to exceed $1.0 \times 10^{-1}$ millirem (0.1 mrem)/year at the project boundary; or 2) to address public concern.

Environmental radiological air monitoring procedures are provided in Appendix K of the SCQ. Project-specific monitoring relies on the establishment of a representative background uranium concentration during pre-project (open building) conditions. To establish a background or baseline level for which to compare project results, supplemental air monitors will be set up and operated continuously 24 hours/day for a representative period prior to the dismantlement activities. The representative period will be determined based in part on an evaluation of preliminary radiological air monitoring from previous decontamination and dismantlement projects; however, background monitoring may not be feasible or its results reliable due to multiple upwind remediation activities being performed at the site.

In order to verify that control measures adequately minimize fugitive emissions, samplers will be installed in the vicinity of the facility being decontaminated or dismantled. Samplers will

be placed in locations determined through modeling to most likely receive the greatest level of emissions based on meteorological factors and adjacent structures.

Due to current technology limitations, "real-time" monitoring for airborne uranium and thorium will not be performed anytime in the near future at the FEMP. This is due to naturally occurring and/or process enhanced radon and thoron (short-lived) daughters that are present in ambient air. These short-lived daughters have been found to interfere with the spectra in the specified region of interest for long-lived uranium and thorium, when utilizing state-of-the-art alpha spectroscopy Continuous Air Monitors.

For air monitoring to be useful in evaluating engineering controls, results from air monitoring will be reported as expeditiously as possible. Preliminary results will provide the data, albeit unvalidated at that point, needed to evaluate project concentrations against the baseline concentration. Validated data will be compiled, reported monthly, and used to trend sample results and to further evaluate the effectiveness of engineering controls.

All air samples collected for long-lived thorium must be "decay counted" for a period long enough to ensure that all radon and thoron daughters are no longer present on the air sample filter when the sample count analysis is performed. Counting is performed on a laboratory alpha/beta low background counter, analyzed for gross alpha and beta, corrected for background and system efficiency, and the results recorded in microcuries per cubic centimeter. Verification of radionuclide(s) present is performed by alpha or gamma spectral analysis, after the decay count is performed, but only when there is reason to believe that isotopes other than uranium may be present.

Uranium is the primary radiological airborne hazard at the FEMP and is analyzed on-site at the low level laboratory using Kinetic Phosphorescence Analysis (KPA). KPA is a wet chemical analysis which is used to measure individual uranium atoms (U-234, U-235, U-236, and U-238) or total uranium. This measurement is usually expressed in subunits of grams per sample media (i.e., micrograms per filter). Once the weight of uranium has been determined, ratios can be used to proportion the uranium isotopes, which can then be converted into units of radioactivity (picocuries).

Under the current site-wide program, the FEMP off-site ambient air quality is monitored by high-volume air samplers designated by the Integrated Environmental Monitoring Plan for site-wide radiological air emissions monitoring.

### 3.5 Sampling Approach Implementation

The following paragraphs consider the sampling approach identified in Sections 3.2 through 3.4 and show how this sampling is expected to fit into the stages of the design/remediation process. For the purposes of the following discussion, the term sampling is used to identify both field screening and intrusive sampling.

<u>Pre-Design</u>
Efforts will be made early in the design process (i.e., during pre-design) to identify the data gaps that exist and the sampling needed to meet data objectives. In this way, the process will facilitate sampling as early as possible to fulfill as many data needs as possible. This early sampling is intended to reduce coordination efforts (i.e., having to coordinate sampling

activities with those activities of the remediation subcontractor). This in return reduces the chance that there will be for delays/changes necessitated by uncertainties.

If any baseline monitoring is needed to support assessment of the environmental monitoring during decontamination and dismantlement, as discussed in Section 3.4, this sampling should be included at this stage, depending on timing of project implementation.

During Design

During design, sampling will most likely consist of efforts to supplement data identified through the pre-design phase of a project. Sampling during design would consist of re-sampling to fill data gaps, as necessary.

During Remediation

During project implementation, there are various data needs which will need to be addressed through sampling, which could not have been addressed through earlier sampling efforts. These include environmental monitoring, decontamination washwater sampling, and sampling of materials for confirmatory purposes prior to off-site disposal.

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# 4.0 PROCEDURES

This section references potentially applicable procedures and sample management strategies for the OU3 integrated remedial action. Applicable procedures address instrument measurement, field sampling, and laboratory analysis. All procedures referenced in this section can be found in the SCQ Appendices.

The following documents provide the most current procedures that will be used to perform instrument measurements, field sampling, and laboratory analysis:

- FEMP SCQ (September 22, 1992 version);
- Standard Operating Procedures and Quality Assurance Manual (U.S.EPA 1991b);
- Environmental Investigations and Site Characterization Manual (DOE 1989);
- Environmental Restoration Program, Standard Operating Procedures (DOE 1988);
- Fernald Site Integrated Environmental Monitoring Plan (Draft Final, 1997).

It should be noted that procedures listed in this section are subject to revision in accordance with DOE-FEMP protocol.

## 4.1 Field Instrument Measurement Procedures

Procedures for the use of the following field instruments have been identified as potentially applicable for OU3 remediation activities:

Radiological

- NaI detector (cylindrical and FIDLER);
- MicroR meter;
- Pressurized Ion Chamber (PIC);
- alpha scintillation detector;
- Pancake GM (Geiger-Müller) detector;
- gas flow proportional detector;
- radon/thoron monitor;
- environmental high volume air sampler;
- particulate air sampler - Personal Air Monitor;
- particulate air sampler - Breathing Zone Monitor;
- particulate air sampler - General Area Monitor;
- track etch cups (radon and thoron);
- special grab sampling techniques (radon and thoron);
- work level monitors (radon and thoron); and
- other scintillation detectors (radon and thoron);

Chemical

- combustible gas indicator;
- Photovac MicroTIP (PID) monitor;
- Sensidyne portable flame-ionization detector;

- Photovac 10-S Plus portable gas chromatograph;
- Millipore PCB field test kit;
- colorimetric indicator tubes (e.g., Draeger - $NH_3$ vapors);
- Spectrace-9000 XRF analyzer; and
- water quality measurement instruments.

## 4.2 Field Sampling Procedures

The sampling procedures that are potentially applicable to OU3 remediation were identified in Section 2.1. Those procedures are detailed in Appendix K of the SCQ.

## 4.3 Analytical Procedures

Analytical procedures required for samples taken during OU3 remediation are also listed in the SCQ. Radiological methods will be chosen by laboratories based on their ability to meet the performance based criteria listed in the SCQ. Copies of the performance criteria for all radionuclides are found in Appendix G of the SCQ.

## 4.4 Sample Management

Requests for sample analysis, sample shipment, holding by the laboratory, and disposal shall be performed in accordance with SCQ requirements for those activities. The laboratory manager is responsible for assigning priorities to samples to ensure that holding times will not be exceeded during the time allowed to process the samples.

# 5.0 QUALITY ASSURANCE AND QUALITY CONTROL

The U.S. EPA requires that environmental monitoring and measurement programs performed under its mandates contain a centrally managed QA program. Parties generating data under such a program shall be required to implement procedures that ensure precision, accuracy, completeness, and representativeness of the data and documentation thereof.

Collection and analysis of environmental samples is an integral part to fulfill the site mission and compliance with environmental regulations. A single sample of a specific medium from a specific location may be capable of providing data for a number of investigation, restoration, waste management, and regulatory uses. Therefore, it is necessary that investigation sampling and analysis be conducted to provide useable, valid data of known quality so that use across programs is possible and the level of uncertainty associated with such use is known.

The SCQ program was developed for FEMP environmental sampling and analysis with a two-fold purpose: (1) to establish minimum standards of performance for operational and analytical activities; and (2) to ensure that standards are followed by parties covered by the program.

The SCQ is a revision of the Quality Assurance Project Plan prepared for the FEMP RI/FS, which fulfills requirements of the 1986 Federal Facilities Compliance Agreement between the DOE and the U.S. EPA. Inclusion of the FEMP on the National Priority List resulted in a subsequent decision to modify the RI/FS Quality Assurance Project Plan to encompass all site programs generating environmental data. This revision was performed to ensure the reliable use the data for FEMP CERCLA activities. The SCQ integrates CERCLA requirements into applicable sampling activities at the FEMP, consistent with U.S. EPA recommendations to consolidate QA requirements and documents whenever possible.

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# 6.0 IMPLEMENTATION STRATEGY

This section describes the implementation strategy for managing the OU3 sampling program. Key areas included in this effort are logistical planning, program management, personnel resources, and laboratory contracting.

## 6.1 Logistical Planning

As discussed in Section 2, the sampling strategy basically involves the performance of two activities:

- a preliminary evaluation of a project design scope to identify data needs and how any data gaps will be filled; and
- supplemental screening and/or sampling, if necessary.

As a program management tool, OU3 sampling requirements will be determined during preliminary design when the scope of a remediation project is well defined. The SAP will consider the data needs and data quality objectives to determine sample quantity and quality. The timing of the sample estimate early in the design is important since sampling and analysis may have an impact on scheduling remediation activities. One particular sampling event that will usually have some bearing on project schedule is that of sampling decontamination rinse water from a HWMU containing RCRA-listed constituents. In that instance, appropriate storage of batched rinsewater must be arranged to allow WWTS managers to determine proper treatment requirements before discharge. The amount of time expected for sampling and analysis for each sampling event should be communicated to the project manager to account for that time in their project planning.

## 6.2 Program Management

The following organizations and their responsibilities are based on those currently established by FEMP management and are presented in a generalized manner which sets forth the functional requirements necessary to support field sampling activities. Since sampling activities have been established in the previous sections of the SAP, they will not be repeated in this section. Although DOE responsibilities are not specifically identified in the following subsections, DOE will be represented by a project manager that oversees project performance, including any sampling activities. Section 7 of the OU3 Integrated RD/RA Work Plan further describes responsibilities of organizations involved in the project management of RD/RA activities. The following subsections include only the primary organizations that will be involved in sampling activities and purposely does not include many of the administrative organizations which support the organizations identified.

### 6.2.1 Engineering

The overall planning, integration, and management of sampling during the decontamination and dismantlement phase of a project is the responsibility of the Engineering function. This function will be responsible for the following items: evaluation of available data including RI/FS characterization data and radiological and chemical field screening data to determine

data needs; development and implementation of this SAP and any project-specific SAPs; and management of project sampling activities to ensure that necessary data is provided. The sampling activities included under Engineering's management responsibility include radiological environmental monitoring, and decontamination washwater/rinsewater sampling.

### 6.2.2 Waste Management

The waste management function within the OU3 project organization will be responsible for sampling and analysis of materials during the material management phase of a project. This phase includes waste characterization needed to disposition materials off-site, including recycling/reuse and disposal. The Waste Characterization discipline within Waste Management will declare extracts, leachates, acid digests, excess sample materials, and contact wastes returning from off-site laboratories after analytical procedures have been conducted, as low-level radioactive waste (non-RCRA) or mixed waste (containing RCRA hazardous waste properties) before those wastes are returned to the FEMP. It will also notify contract analytical laboratories when approval is given to return wastes to the FEMP.

### 6.2.3 Other Support Organizations

The Health and Safety function will develop project-specific Health and Safety Plans to address health and safety requirements for sampling activities to ensure that the requirements established in the plans are followed in the field. The Radiological Engineering discipline within Health and Safety will monitor radiological conditions in the work area and perform clearance (release cleaning) surveys. The Industrial Hygiene discipline within Health and Safety will oversee the asbestos monitoring performed by the remediation subcontractor.

The Environmental Monitoring function will perform the actual field radiological environmental monitoring and report results in a timely manner to construction and engineering managers.

The Site Sampling and Data Management function will provide the Engineering design project manager with OU3 RI/FS data during design and validate any field characterization data taken during the project, as necessary, in accordance with the approved SCQ data validation procedures.

The Quality Assurance function will verify that all field QA samples meet the intent and requirements of the SCQ.

Managers with the Aquifer Restoration Project will be responsible for any groundwater and soil sampling requirements. If an event occurs during the OU3 integrated remedial action that results in a potential release to the soil or groundwater and could potentially affect the groundwater quality, then appropriate sampling would be initiated.

## 6.3 Laboratory Contracting

The laboratory contract for inorganic and organic analyses references the standard U.S. EPA methods identified in the SCQ. The radioanalytical laboratory services task order subcontract also references the performance based criteria currently in the SCQ. Task orders will be placed for radioanalytical services on an as needed basis.

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# PROJECT SPECIFIC PLAN

# FOR

# PLANT 4 DISMANTLING - DECONTAMINATION WATER SAMPLING

**RI/FS WBS 04.112**

**REVISION 0**

**SEPTEMBER 19, 1995**

Prepared by

Fernald Environmental Restoration Management Corporation

Prepared for

U.S. Department of Energy
Fernald Field Office

Under Contract DE-AC05-92OR21972

**PROJECT SPECIFIC PLAN**
**PLANT 4 DISMANTLING - DECONTAMINATION WATER SAMPLING**
**RI/FS WBS 04.112, REVISION 0**
**SEPTEMBER 19, 1995**

APPROVAL:

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# 1.0 INTRODUCTION

## 1.1 PURPOSE

This Project Specific Plan (PSP) describes the field sampling activities to be performed by Environmental Technical Services (ETS) Division, Environmental Field Operations (EFO) field personnel. This PSP also identifies analyses to be performed by FEMP and contract laboratories. Sampling and Analysis shall be consistent with the SCQ and DQO WW-011, Revision 0 (Appendix A).

The Remedial Design/Remedial Action (RD/RA) Work Plan for the "Operable Unit 3 Draft Interim Remedial Action", Revision 0, March 1995, outlines the strategy for decontaminating, decommissioning and dismantling activities at Plant 4. Such planned activities will generate large volumes of waste water resulting from the washing and decontamination of various equipment to be removed from Plant 4.

## 1.2 SITE DESCRIPTION

Plant 4 is the former Hydrofluorination Processing Plant where Uranium Tetrafluoride was processed from Uranium Trioxide. Plant 4 is located at the north end of the block bordered by 2nd Street on the north side, 1st Street on the south side, "B" Street on the west side, and "C" Street on the east side, in the former process area. Babcock & Wilcox/Nuclear Environment Services, Inc. shall conduct dismantling and decontamination activities inside Plant 4. Waste water generated during these activities shall be temporarily stored in 4 bermed 6,500 gallon temporary storage tanks (10 feet in diameter by 12 feet high) located on the west side of Plant 4 (see Figure 1).

## 1.3 SCOPE

The decontamination waste water shall be sampled one tank at a time. One sample shall be collected from one of the four tanks as the tanks are filled in order to characterize the waste water for discharge into the FEMP Wastewater Treatment System. An expected total of two decontamination waste water sampling events (samples collected from two tanks) shall be conducted. Following receipt of the analytical results, additional samples may be collected at the discretion of the CERCLA/RCRA 3 (CRU 3) Project Engineer. The samples shall be analyzed for the parameters listed in Table 1-1. Trip blanks shall accompany samples for volatile organic compound (VOC) analysis.

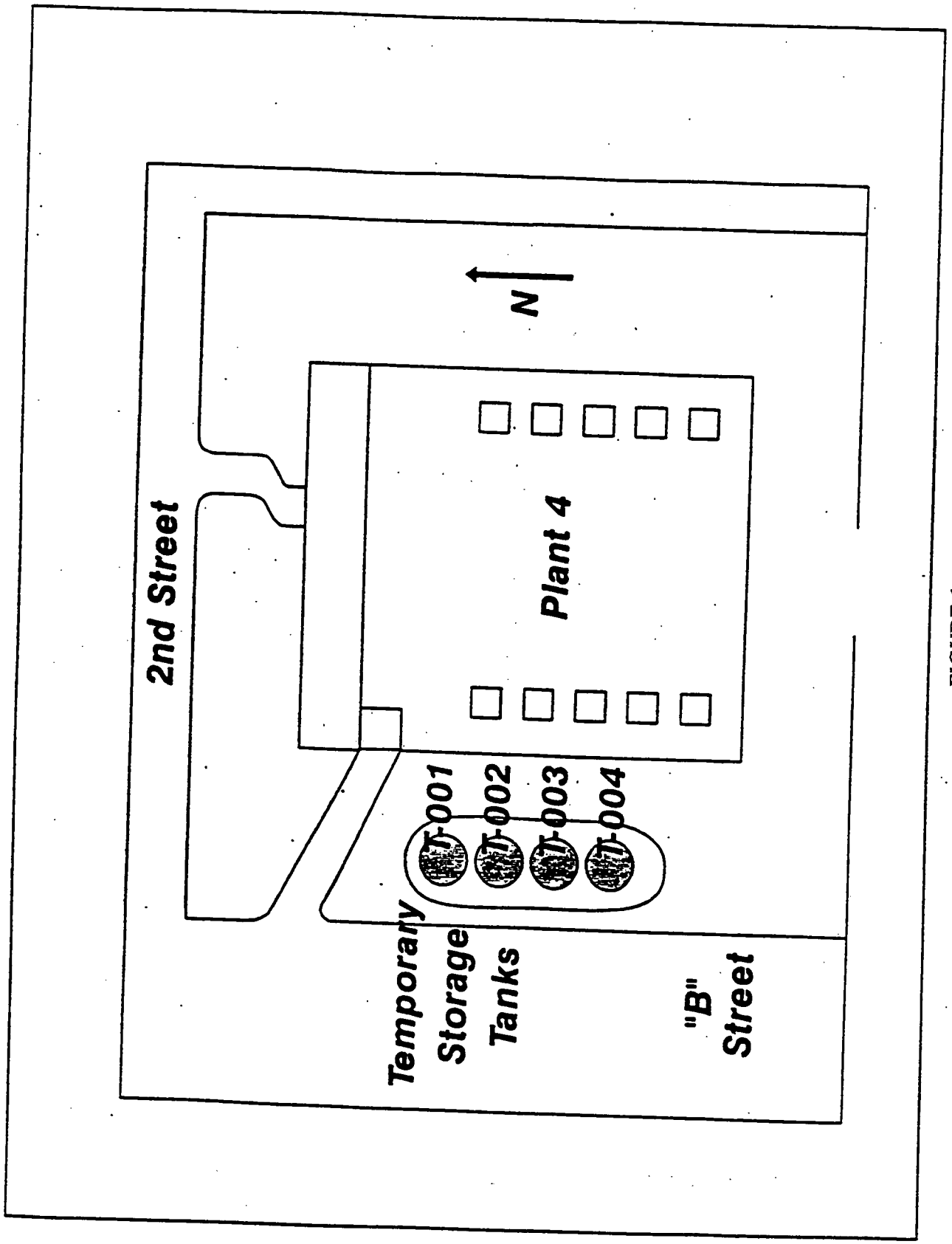


FIGURE 1

TEMPORARY STORAGE TANK LOCATION, PLANT 4

# TABLE 1-1

## ANALYTICAL PROGRAM REQUIREMENTS - WASTE WATER

| MEDIA/ MATRIX CODE | ANALYSIS | COC CODES ANALYSIS, UNIT, PRESERVATIVE | CONTAINER | NO. X VOL. | HOLDING TIMES | PRESERVATIVE |
|---|---|---|---|---|---|---|
| | | | | | | |
| Decon Water M325 | Total Volatiles | 2300, U02, P01 | amber glass | 4 X 40 ml | 7 | Cool to 4° C |
| | Oil and Grease | 1054, U, P08 | glass | 1 L | 28 | $H_2SO_4$,pH<2 Cool to 4°C |
| | Total Metals* | 2402,2057,2060,2065, 2071,2076,2078,U06, P11 | poly | 1 X 1 L | 180/28 Hg | $HNO_3$ to pH < 2 |
| | Fluoride | 2045,UO2,POO | poly | 1 X 4 oz. | 28 | None |
| | Isotopic Uranium | 2026-2029,UOO,P11 | glass or poly | 1 X 1 L | 180 | $HNO_3$ to pH < 2 |
| | Total Uranium | 2001,UO6,P11 | glass or poly | 1 X 4 oz | 180 | $HNO_3$ to pH < 2 |

* Total Metals include: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.
** Add 1064 = "Total Petroleum Hydrocarbons" to Remarks Section.

## 2.0 RESPONSIBILITIES

The personnel of CRU3, Environmental Programs Development (EPD), Environmental Field Operations (EFO), and Performance/Quality Assurance (P/QA) listed below are key project personnel to the performance of this project.

**TABLE 2-1**

**KEY PROJECT PERSONNEL**

| TITLE | PRIMARY | ALTERNATE |
|---|---|---|
| Project Engineer, CRU3 | Todd Weese | Don Luken |
| Project Coordinator, EPD | Cliff Lee | Karen Voisard |
| Manager, EFO | Mike Frank | Mike Schley |
| Field Supervisor, EFO | Mike Schley | June Love |
| Project Manager, P/QA | Reinhard Friske | Harold Swiger |
| Project Contact, ACS | Lee Ann Stroud | Jenny Vance |

## 3.0 SAMPLING PROGRAM

Babcock & Wilcox/Nuclear Environmental Services Inc. shall conduct dismantling and decontamination operations inside Plant 4 and pump waste water into four 6,500 gallon temporary storage tanks. The four 6,500 gallon temporary storage tanks shall be utilized for containment of the decontamination waste water and provide adequate temporary storage capacity between sampling events.

EFO Sampling Technicians shall collect waste water samples in accordance with Standard Operating Procedure EP-SMS-009 "Sediment/Sludge Sampling", Section 6.7.1 through Section 6.7.6.C., "Sediment/Sludge Sampling with a Sludge Judge". The Sludge Judge shall be lowered to the bottom of the tank and the sample shall be collected from the entire height of the tank contents. The bottom check valve of the sampling device shall be closed as the device rests on the bottom of the tank. The top of the Sludge Judge shall be above the waterline. A peristaltic pump shall then be used to pump the contents of the Sludge Judge directly into the sample containers (see Table 1-1) at the top of the tank. One additional 120 mL container of waste water shall be collected in a glass container and measured for pH using a Horiba Water Quality Meter; the pH measurement shall be recorded on the Sample Collection Log. The water for pH measurement shall then be returned to the tank from which it was collected.

## 4.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

EFO sampling events follow Quality Assurance/Quality Control (QA/QC) protocol established in Section 4 and Appendix K of the SCQ.

### 4.1 PROJECT REQUIREMENTS FOR SELF-ASSESSMENTS, SURVEILLANCES

Self-assessment and independent assessments of work processes and operations shall be undertaken to assure quality of performance. Self-assessment shall be performed by the Environmental Technical Services Division, shall encompass technical and procedure requirements, and may be conducted at any point in the project.

Independent assessment shall be performed by the FEMP QA organization by conducting surveillances. As a minimum, one surveillance shall be conducted, consisting of monitoring/observing on-going project activity and work areas to verify conformance to specified requirements. Surveillances shall be planned and documented in accordance with Section 12.3 of the SCQ.

### 4.2 FIELD CHANGES TO THE PROJECT SPECIFIC PLAN

Prior to the implementation of field changes, the EPD Project Coordinator and EFO Manager or EFO Supervisor shall be informed of the proposed field changes and the circumstances requiring them. Once the EPD Project Manager has obtained approval (verbal or written) from the CRU3 Project Engineer and QA representative for the field changes to the PSP, the field changes may be implemented Field changes to the PSP shall be noted in the field activity log and on a Variance Request form. QA must receive the completed Variance Request, which includes the minimum signatures of the CRU3 Project Engineer, the requestor, and QA, within one week of the granting of the verbal approval.

## 5.0 EQUIPMENT DECONTAMINATION

Disposable equipment shall be used to collect the samples; therefore, no decontamination is required. In the event that any piece of reusable equipment is suspected of having become contaminated, and as a precaution to protect worker safety and health, any such items shall be isolated and decontaminated in accordance with Level II Decontamination, Section K.11 of the SCQ and as described in the Standard Operating Procedure EP-SMS-003, "Equipment Decontamination."

## 6.0 HEALTH & SAFETY

EFO Sampling Technicians shall conform to precautionary surveys performed by the personnel representing, Industrial Hygiene, and Radiological Control. Concurrence to applicable safety permits (indicated by the signature of each EFO Sampling Technician assigned to this project) is expected by EFO Sampling Technicians in the performance of their assigned duties.

The EFO Lead Sampling Technician shall insure that each EFO Sampling Technician performing sampling related to this project has read the applicable permits and Job Safety Analysis (Appendix B) to protect worker safety and health. EFO Sampling Technicians who do not sign the applicable health and safety survey forms shall not participate in the execution of sampling activities related to the completion of assigned project responsibilities. A copy of applicable safety permits/surveys issued for worker safety and health shall be posted at the exclusion zone boundary of the sample location and, at the completion of the project, the completed forms shall be submitted for incorporation into the project files.

## 7.0 DISPOSITION OF INVESTIGATION-DERIVED WASTES

During completion of sampling activities, EFO Sampling Technicians may generate contact wastes. Following completion of sampling, the EFO Sampling Technicians shall place contact wastes into properly labeled bags and disposition in accordance with appropriate FEMP waste management policies.

Any excess unpreserved sample shall be returned to the tank from which it was collected. All decontamination water shall be containerized and transported to Plant 8 for disposal.

## 8.0 DATA MANAGEMENT PLAN

This data management plan will be implemented so information collected during the investigation will be properly managed following completion of the field activities. As specified in Section 5.1 of the SCQ, sampling teams shall describe daily activities on the Field Activity Log (FAL) sufficient for the sampling team to reconstruct a particular situation without reliance on memory. Sample Collection Logs shall be completed according to instructions specified in Appendix B of the SCQ.

### 8.1 VERIFICATION

To assure proper documentation was completed during field activities and that documentation was completed correctly, field documentation shall be validated by EFO. Analytical data shall be verified by the CRU3 Project Engineer.

### 8.2 DATA ENTRY

Analytical data shall be entered into the FEMP Site-Wide Environmental Database (SED) by Analytical Data Management. Manual, double keyed, data entry shall be performed and the entered data shall be compared to the original data sheets; corrections shall be initialed and data, and made as necessary. Hard-copy documents are kept in permanent storage in the project files and the electronic database is permanently archived in a neutral ASCII file format.

# Fernald Environmental Management Project

## Data Quality Objectives

**Title:** Disposition of OU 3 Remedial Action Decontamination Waste Water

**Number:** WW-011

**Revision:** 0

**Effective Date:** September 19, 1995

**Contact Name:** Cliff Lee

Approval: Richard Fiske Date: 9-19-95
DQO Coordinator

| | | | | | |
|---|---|---|---|---|---|
| Rev. # | 0 | | | | |
| Date | 09/19/95 | | | | |

# DATA QUALITY OBJECTIVE LOGIC FLOW

## Disposition of OU 3 Remedial Action Decontamination Waste Water

### 1 Problem Statement

Planning team consists of:

- Todd Weese, CRU3 Environmental Engineering-oversight
- Cliff Lee, Environmental Programs Development-writer
- Steve Witters, Environmental Programs Development-guidance
- Frank Johnston, Environmental Compliance-guidance

Planned decontaminating, decommissioning and dismantling activities of former processing plant buildings within Operable Unit 3 (OU 3) will generate large quantities of waste water resulting from the washing and decontamination of various parts and appurtenances in the buildings. The identity and amounts of hazardous or controlled constituents in decontamination waste water must be determined to maintain proper handling and system control. Waste water analyses must be completed in a timely manner in order to protect the environment and ensure timely processing.

Characterization of waste is required under the Resource Conservation and Recovery Act (RCRA) as promulgated in 40 CFR 261 and Ohio Administrative Code 3745. RCRA must be followed as an Applicable, Relevant, or Appropriate Requirement (ARAR) to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process at the Fernald Environmental Management Project (FEMP).

Sampled waste waters from the decontamination of FEMP OU 3 Decontamination and Decommission (D&D) complexes are anticipated to contain suspected contaminants of concern (as listed in the OU 3 Interim Remedial Design/Remedial Action (RD/RA) Work Plan and in the OU 3 complex-specific Implementation Plans. Clean Water Act/SEC. 402 [33 U.S.C. 1342] and 40 CFR 122 National Pollutant Discharge Elimination System (CWA and NPDES) discharge limits and treatment efficiency monitoring, in addition to treatment facility process controls, provide the regulatory drivers beyond the scope of the RCRA and RD/RA requirements noted above.

The specific problem to be addressed by this Data Quality Objective is to confirm the presence and amounts of hazardous or controlled constituents in decontamination waste water, based on process knowledge. The logic continues with a comparison of the amounts of these constituents with the limits established in the RCRA/CWA/NPDES permitting regulations, and established process controls defining acceptable constituent levels for the Plant 8 VOC Treatment Sump. If the concentration of any hazardous or controlled contaminants of concern (COCs) from a waste water sample of a given temporary storage tank exceeds the limits published in the above mentioned regulations or limits established for the treatment facility, the material is considered hazardous or controlled waste.

*NOTE: THIS DQO DOES **NOT** PERTAIN TO DRUM SAMPLING.*

## 2 Identification of a Decision that Addresses the Problem

The major decisions that must be resolved in this DQO are:

1. Does the decontamination waste water contain hazardous or controlled waste and what are the hazardous or controlled waste constituents of concern?

In order to determine whether or not the decontamination waste water is hazardous or controlled waste, process knowledge will be utilized to confirm the process function of the unit. If the material within the unit cannot be fully characterized using process knowledge, samples will be taken and analyzed to confirm the identity and/or to determine if the material is a hazardous or controlled waste. A full list of suspected contaminants of concern is shown in the OU 3 Interim RD/RA Work Plan and in the OU 3 complex-specific Implementation Plans. Sampling and laboratory analysis will determine the presence/absence and amounts/concentrations of such suspected contaminants of concern.

2. Is the decontamination waste water acceptable to the treatment facility so as not to hinder facility operation or established facility procedure ?

Grease and oils present a process control issue because these materials can hinder the operation of the Plant 8 Sump. Such waters would be unacceptable for delivery and would require alternative control measures. Additionally, current FEMP procedure requires waters with above 48 mg/l Uranium to be filtered through the Plant 8 Sump. In order to determine whether or not the decontamination waste water is or is not acceptable to the treatment facility, process knowledge will be utilized to confirm the use or presence of such materials.

If the materials within the temporary storage tank(s) cannot be fully characterized using process knowledge, samples (or representative aliquots of samples) will be taken and analyzed to confirm the identity and/or to determine if grease/oil is present in the decontamination waste water. Also, laboratory analysis will confirm the amounts of Uranium present in the decontamination waste water.

3. Do analytical results provide ample data to determine compliance with the NPDES Permit ?

In order to demonstrate that current Plant 8 Sump operations are being performed in compliance with NPDES Permit, Section III, 3. B., upstream waste water sampling will be conducted to determine the measurable amounts of contaminants/levels of pollutant concentrations to be introduced into the Plant 8 Sump and to monitor said treatment facility efficiency.

## 3 Identification of Inputs that Affect the Decision

The inputs (analytical sampling) needed to effect the decisions listed above will be based on process knowledge (to include any previous waste characterization sampling). The decontamination waste water samples will be analyzed for all contaminants of concern identified based on process knowledge as listed in the OU 3 Interim RD/RA Work Plan and in the OU 3 complex-specific Implementation Plans.

The materials to be sampled are all liquid materials that are water-based mixtures that may contain some product and metals. Note that all decontamination washwaters are run through both 20 and 5 micron filters prior to accumulation in the temporary storage tanks. Liquids can be further broken down into an waters containing acid, organics (chlorinated solvents, petroleum or related products etc.) or an unknown liquid. Any of these three liquid categories can contain little or no percentage of suspended particles or solids after filtration.

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Also, analyte lists may be reduced or expanded based on process knowledge or preliminary waste water laboratory analysis. A list of the inputs to these decisions are also described below.

If the contaminant(s) of concern also include radionuclides, then the analysis performed will be for Total Uranium and Isotopic Uranium only, based on process knowledge.

If the contaminant(s) of concern is metals, then analysis will be performed for any one or all of the metal analytes as listed in the OU 3 Interim RD/RA Work Plan and in the OU 3 complex-specific Implementation Plans.

Of particular concern in the delivery of decontamination waste water to the Plant 8 Sump are the metals chromium, copper, and nickel: Analytical results will be used for determining compliance with downstream NPDES Permit effluent limitations. The most conservative limitation defined in the NPDES Permit, for the specific contaminants is one hundred micrograms per liter (100 $\mu$g/l) (of any one metallic analyte).

If the contaminant(s) of concern is a hazardous characteristic (i.e., corrosivity), then the analytical testing will be specific to the characteristic and will include testing such as pH.

If aqueous solvent residues (i.e. 1,1,1 trichloroethane) and dissolved low-grade residues (i.e. fluorides) are suspected to be present in decontamination waste water (as would be expected at Plant 4), then laboratory analysis for such materials would be required to ensure downstream compliance with NPDES permits prior to discharge.

If the material is determined not to be a hazardous waste and if the contaminants of concern were petroleum-based (e.g., grease and oil), then analysis will be done to determine acceptability for delivery to the Plant 8 Sump and to ensure compliance with NPDES permits prior to discharge.

## 4 Specification of the Domain of the Decision

Spatial boundary: the spatial boundaries are to be distinctly specified as a bermed area surrounding (typically) four 6,500 Gallon Plastic Tanks. These are currently located on the west side of Plant 4A, the former Hydrofluoridation facility, for the Plant 4 D&D Project.

Temporal boundaries will depend on the location of the unit. As the unit is located outside, the collection of decontamination waste water will be weather dependent. Additionally, the timing of sample delivery will be essential if holding times are to be met.

## 5 Development of Logic Statements

1. Characteristic Hazardous Waste (potentially applicable characteristics)

If the concentration of the contaminants of concern in the decontamination waste water sample is above the regulatory limits as specified in 40 CFR 261.24, then the substance is characterized hazardous for toxicity.

If an aqueous solution has a pH of less than or equal to 2 or greater than or equal to 12.5, then the substance is characterized hazardous for corrosivity.

If a substance has been classified as characteristically hazardous for reactivity, then a representative sample of the waste has at least one of the properties discussed in 40 CFR 261.23.

2. Controlled Effluent Wastes

If the concentration of the contaminants of concern in the decontamination waste water sample is above the regulatory limits in 40 CFR 122 (as specified in the site-specific NPDES permit and renewal), then the facility owner must document and report such concentrations in a timely and forthright manner. A NPDES "notification level" of One hundred micrograms per liter (100 $\mu$g/l) is generally considered to be the acceptance limit for the Plant 8 Sump (of any one metallic analyte). Intake process control provides some of the information required for NPDES permit compliance and renewal.

3. Listed Hazardous Wastes

The listing of hazardous wastes is specified in 40 CFR 261.31 through 40 CFR 261.33.

## 6 Establish Constraints of Uncertainty

A false negative error would occur when analytical results do not confirm the presence of hazardous or controlled waste, rejecting process knowledge claims that there was hazardous or controlled waste; when in actuality, the material does exhibit hazardous or controlled waste characteristics or contain a listed hazardous waste. The consequence of this type of error would be to treat the material as non-hazardous (or non-controlled), rather than hazardous (or controlled). This error has possible health and political consequences, as well as economic and social.

False positive error would occur when the analytical results of the decontamination waste water sampling were incorrectly identified as exceeding the characteristics described in Section 5 (or being a listed hazardous waste), showing that the material contained hazardous or controlled waste and needed to be treated as such when in fact no such treatment was needed. The consequence of this type of error would be to increase both the processing time and the expenses associated with either treatment, storage and/or disposal of large volumes of this material. The major consequence would be economic with political and social consequences being secondary.

The major concern for this DQO would be the false negative errors. These errors can be reduced by the analysis of laboratory duplicate and matrix spike analyses.

## 7 Development of a Cost-Effective Design for Obtaining Data

In order to obtain a representative sample, a visual inspection of the temporary storage tank contents or may be required. Examples of sampling techniques used for expected homogenous and heterogeneous liquids would be grab and coliwasa samplers respectively. Multiple samples may be collected depending on the heterogeneity of the material per the guidelines of the SCQ. The analyte lists may be reduced or expanded based on process knowledge or preliminary waste water laboratory analysis.

In some instances, percent composition and/or acid-base normality will be performed in order to confirm if the identity of the waste water material is consistent with process knowledge claims.

Holding times for raw and product materials may differ from the listed SCQ holding times for environmental samples. Holding times and preservation techniques will be chosen to insure the integrity of the samples and appropriate cost benefits. Variations from the SCQ holding times will be described in the individual Project Specific Plan (PSP).

**Summary of DQO Logic Flow**

Samples are collected along with the field QA/QC samples as per Appendix A of the SCQ. Specific requirements will be specified in the PSP. Trip blanks are not required because the sample is process water rather than an environmental sample. Only certified sampling containers shall be used, eliminating the need for a container blank. Performance evaluation samples will be provided by the QC department, as needed.

The analyses requested is dependent on process knowledge of the COCs as described in Attachment C. Field monitors such as Photoionization Detectors (PIDs), X-ray Fluorescence (XRF) and Flame Ionization Detectors (FIDs) used to support process knowledge claims will use Analytical Support Level (ASL) A. For the majority of the sampling program though, ASL B (SW-846 methods, Vol. II) is required. The radiological samples will also be collected at ASL B.

**1.A. Task/Description:** OU #: 3

**Decontamination Waste water Sampling**

**1.B. Project Phase:** (Put an X in the appropriate box.)

RI ☐ FS ☐ RD ☒ RA ☒ OTHER ☐ Specify: _____

1.C. DQO No.: WW-011 DQO Reference No.: _____

---

2. Media Characterization: (Put an X to the right of the appropriate box.)

Air ☐ Biological ☐ Groundwater ☐ Sediment ☐ Soil ☐

Waste ☐ Waste water ☒ Surface water ☐ Other (specify)

---

**3. Data Use with Analytical Support Level (A-E):** (Put an X in the appropriate box. Analytical Support Level (ASL) selection(s) should be marked to the right of each applicable Data Use.)

Site Characterization
A ☐ B ☐ C ☐ D ☐ E ☐

Risk Assessment
A ☐ B ☐ C ☐ D ☐ E ☐

Evaluation of Alternatives
A ☐ B ☐ C ☐ D ☐ E ☐

Engineering Design
A ☐ B ☐ C ☐ D ☐ E ☐

Monitoring during remediation activities
A ☐ B ☐ C ☐ D ☐ E ☐

Other (Explain) Waste Characterization
A ☒ B ☒ C ☐ D ☐ E ☐

---

**4.A. Drivers:** **CERCLA Amended Consent Decree, Resource Conservation and Recovery Act, Ohio Administrative Code 3745.51; 40 CFR 261.23 and 261.24, Clean Water Act (SEC. 402 [33 U.S.C. 1342]), 40 CFR 261.31 through 40 CFR 261.33, and 40 CFR 122, the National Pollutant Discharge Elimination System.**

**4.B. Objective:** **To show, through the use of decontamination waste water sampling, the presence of hazardous or controlled waste.**

---

**5. Site Information (Description):** **Operable Unit 3 (OU3) Plants and buildings are located in the former production area at the Fernald Environmental Restoration Project. It incorporates all above- and below-grade improvements, including, but not limited to, the facility structure, equipment, utilities, tanks, waste waters, product, and effluent lines.**

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DQO Number: WW-011

**6.A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference:** (Put an X in the appropriate box or boxes selecting the type of analysis or analyses required. Then select the type of equipment to perform the analysis if appropriate. Please include a reference to the SCQ Section.)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | pH | X | 2. Uranium | X | 3. BTEX | X |
| | Temperature | ☐ | Full Radiologic | ☐ | TPH | X |
| | Specific Conductance | ☐ | Metals | X | Oil/Grease | X |
| | Dissolved Oxygen | ☐ | Cyanide | ☐ | | |
| | Silica | ☐ | | | | |
| 4. | Cations | ☐ | 5. VOA | X | 6. Other (specify) | X |
| | Anions | ☐ | ABN | ☐ | Isotopic Uranium | |
| | TOC | ☐ | Pesticides | ☐ | Fluorides | |
| | TCLP | ☐ | PCB | ☐ | | |
| | CEC | ☐ | COD | ☐ | | |

**6.B. Equipment Selection and SCQ Reference:**

| Equipment Selection | | Refer to SCQ Section |
|---|---|---|
| ASL A | XRF, PID, FID, etc. | SCQ Section: K |
| ASL B | Per SCQ | SCQ Section: G |
| ASL C | | SCQ Section: |
| ASL D | | SCQ Section: |
| ASL E | | SCQ Section: |

**7.A. Sampling Methods:** (Put an X in the appropriate selections.)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Biased | ☐ | Composite | X | Environmental | ☐ | Grab | X | Grid | ☐ |
| Intrusive | ☐ | Non-Intrusive | ☐ | Phased | ☐ | Source | ☐ | | |

Other (specify):

DQO Number: WW-011

7.B. Sample Work Plan Reference: (List the samples required. Reference the work plan or sampling plan guiding the sampling activity, as appropriate.)

Background samples: **Individual projects will have a PSP or similar approved sampling plan outlining all sampling to be performed.**

7.C. Sample Collection Reference: (Please provide a specific reference to the SCQ Section and subsection guiding sampling collection procedures.)

Sample Collection Reference: **SCQ Appendix K, Section K.5.5 and EPA SW-846,Chapter 9.**

---

8. Quality Assurance/Control Samples: (Place an "X" to the right of the appropriate selection(s).)

8.A. Field Quality Assurance Samples:

| | | | |
|---|---|---|---|
| Trip Blanks | X | Container Blanks | |
| Field Blanks | | Duplicate Samples | |
| Equipment Rinsate Samples | | Split Samples | |
| Preservative Blanks | | Performance Evaluation Samples | |

Other (specify) _____ Refer to the sampling plan for additional QA samples, if requested

8.B. Laboratory Quality Control Samples:

| | | | |
|---|---|---|---|
| Method Blank | X | Matrix Duplicate/Replicate | X |
| Matrix Spike | X | Surrogate Spikes | X |
| Other (specify) | | | |

9. Other: Please provide any other germane information that may impact the data quality or gathering of this particular objective, task or data use.

**Analyte lists may be reduced or expanded based on process knowledge or previous analytical results. Lists are expected to be typical requirements. Coordination with waste compliance and treatment facility personnel will ensure NPDES compliance.**

# APPENDIX B

# JOB SAFETY ANALYSIS

JSA:number to be assigned

| JOB: Wastewater Sampling | | | DATE: 8-28-95 |
|---|---|---|---|
| JOB TITLE: Plant 4 Dismantling - Decontamination Water Sampling (RI/FS WBS 04.112) | DEPARTMENT: Site Restoration Services | SECTION/GROUP: Environmental Field Operations | |
| SUPERVISOR: M. Schley | ANALYZED BY: | REVIEWED BY: Lawrence Love | APPROVED BY: |

REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT: Hard hat, Safety glasses w/rigid side shields, Goggles, Steel-toed safety boots, Safety Harness and Lanyard; Refer to PPE page of FERMCO Work Permit.

| SEQUENCE OF BASIC JOB STEPS | POTENTIAL ACCIDENT OR HAZARD | RECOMMENDED SAFE JOB PROCEDURE |
|---|---|---|
| 1. Preplan | 1a. Radiation and volatile vapor exposure to the contents of wastewater tanks. | 1a. Maintain minimum time and maximum distance from source<br>1b. Baseline and incident urinalysis samples.<br>1c. Monitor tanks for radiation. Set action levels, engineering controls.<br>1d. Contact IH to monitor area and tanks for organic vapors, $NO_2$, and $HNO_3$ prior to entering zone.<br>1e. Eye wash/safety shower within 100 feet and 10 seconds. |
| 2. Access to top of tank | 2a. Unsecured ladder falling over.<br>2b. Unsecured personnel falling from ladder or top of tank. | 2a. Set ladder base flush and ladder at proper angle, secure to holdfast eye (located at top of 12 foot high tank), have spotter securely holding base of ladder when climbing/carrying sampling equipment. Ladder must be extended 2 feet above top of tank (and 16 feet or greater in length).<br>2b. Tie sampling personnel's safety harness and lanyard off to other holdfast eyes (located at top of tank). |
| 3. Fill sample jars by using the Sludge Judge inserted into the tank. A peristaltic pump and tygon tubing will then be used to pump water from the Sludge Judge to the sample jar. | 3a. Radiation and volatile vapor exposure to the contents of wastewater tanks.<br>3b. Splash hazard.<br>3c. Potential for skin/clothing contamination of radioactive materials. | 3a. Nitrile gloves (inner).<br>3b. Nitrile gauntlet gloves (outer).<br>3c. Water-resistant coveralls.<br>3d. Goggles.<br>3e. Refer to FERMCO Work Permit for additional requirements. |

| SEQUENCE OF BASIC JOB STEPS | POTENTIAL ACCIDENT OR HAZARD | RECOMMENDED SAFE JOB PROCEDURE |
|---|---|---|
| 3. Add $HNO_3$ preservative. | 3a. Radiation and volatile vapor exposure to the contents of wastewater tanks.<br>3b. Splash hazard.<br>3c. Potential chemical contamination.<br>3d. Potential for skin/clothing contamination of radioactive materials. | 3a. Nitrile gloves (inner).<br>3b. Nitrile gloves (outer).<br>3c. Water-resistant coveralls.<br>3d. Goggles.<br>3e. Refer to FERMCO Work Permit for additional requirements. |
| 4. Cap and dry sample bottle. | 4a. Radiation and volatile vapor exposure to the contents of wastewater tanks.<br>4b. Splash hazard.<br>4c. Potential chemical contamination<br>4d. Potential for skin/clothing contamination of radioactive materials. | 4a. Nitrile gloves (inner).<br>4b. Nitrile gloves (outer).<br>4c. Water-resistant coveralls.<br>4d. Goggles.<br>4e. Refer to FERMCO Work Permit for additional requirements. |
| 5. Dispose of contact waste as instructed by site procedures for waste disposition and the radiological technician covering the activity. | 5a. Radiation and volatile vapor exposure to the contents of wastewater tanks.<br>5b. Potential chemical contamination.<br>5c. Potential for skin/clothing contamination of radioactive materials. | 5a. Nitrile gloves (inner).<br>5b. Nitrile gloves (outer).<br>5c. Water-resistant coveralls.<br>5d. Refer to FERMCO Work Permit for additional requirements. |

Appendix E

# APPENDIX E

## OPERABLE UNIT 3
## INTEGRATED REMEDIAL ACTION
## HEALTH AND SAFETY PLAN

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**OPERABLE UNIT 3**
**INTEGRATED REMEDIAL ACTION HEALTH AND SAFETY PLAN**
**FINAL**
**MAY 1997**

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A Project-Specific Health and Safety Plan (Table of Contents) for the Decontamination and Dismantlement of the Thorium/Plant 9 Complex
B Health and Safety Requirements Matrix

## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AEDO | Assistant Emergency Duty Officer |
| ALARA | as low as reasonably achievable |
| BZ | Breathing Zone |
| CGI | Combustible Gas Indicator |
| CFR | Code of Federal Regulations |
| DOE | United States Department of Energy |
| EMT | emergency medical technician |
| FEMP | Fernald Environmental Management Project |
| FERMCO | Fernald Environmental Restoration Management Corporation |
| GA | General Area |
| GET | general employee training |
| GFCI | ground fault circuit interrupters |
| GM | Geiger-Müeller |
| HASP | health and safety plan |
| HEPA | High Efficiency Particulate Air |
| HSO | Health and Safety Officer |
| MSDS | material safety data sheets |
| NFPA | National Fire Protection Association |
| NIOSH | National Institute of Occupational Safety and Health |
| OSHA | Occupational Safety and Health Administration |
| OU3 | Operable Unit 3 |
| PAS | personal air sampling |
| PCB(s) | polychlorinated biphenyl(s) |
| PCM | Personnel Contamination Monitor |
| PEL | permissible exposure limit |
| PID | photo-ionization detector |
| PPE | personal protective equipment |
| PSHSP | Project-Specific HASP |

| | |
|---|---|
| RCT | Radiological Control Technician |
| RD/RA | Remedial Design/Remedial Action |
| RWP | Radiation Work Permit |
| S&H | Safety and Health |
| TLD | Thermoluminescent Dosimeter |
| TLV(s) | threshold limit value(s) |
| UNH | uranyl nitrate |
| WBGT | wet bulb globe temperature index |
| WLM | Working Level Monitors |



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# 1.0 BACKGROUND INFORMATION

## 1.1 FEMP Site History

The Fernald Environmental Management Project (FEMP) is located in Southwestern Ohio, approximately 17 miles northwest of downtown Cincinnati near the communities of Miamitown and Ross, Ohio. Of the total site area of 1,050 acres, 850 acres are in Crosby Township of Hamilton County and 200 acres are in Ross and Morgan Townships of Butler County, Ohio.

The FEMP is owned by the United States Department of Energy (DOE) and currently managed by the Fernald Environmental Restoration Management Corporation (FERMCO).

The FEMP was built in 1951 and full operation began in 1953. The purpose of the facility was to establish an in-house integrated production complex for processing uranium and thorium and its compounds from ore concentrates for use in government defense programs. A wide variety of chemical and metallurgical process steps were used. The present mission focuses on waste management and environmental restoration.

## 1.2 Operable Unit 3 History

Operable Unit 3 (OU3) encompasses all structures, utilities, roads, railroads, fences, etc. located above- and below-grade at the FEMP. The production area contained all of the buildings and machinery used to produce uranium and its products from the raw materials. Processes conducted included conversion of Uranyl Nitrate to Uranium Tetrafluoride and conversion of Uranium Hexafluoride to Uranium Tetrafluoride. The Uranium Tetrafluoride was then reduced by heating it in the presence of Magnesium. Uranium metal resulted. The metal was then cast and machined into the shapes which were used by the Department of Defense and DOE.

Because of the similarities in general activities, original construction materials and processes at the FEMP, a base group of potential contaminants applicable to all process-related components has been identified: uranium, asbestos, lead, polychlorinated biphenyls (PCBs), and mercury. The same base group of potential contaminants applies to most non-process related components also. However, administrative buildings are not expected to contain significant levels of hazardous substances.

## 1.3 OU3 Integrated Remedial Action Health and Safety Plan

The OU3 Integrated Remedial Action Health and Safety Plan (HASP) complies with the United States Occupational Safety and Health Administration (OSHA) requirements of 29 Code of Federal Regulations (CFR) 1910.120 as it discusses the general health and safety issues related to performance of remedial design/remedial action activities. This is a programmatic health and safety plan is representative of the Project Specific Health and Safety Plan for each project. Specifically, this plan provides the following:

- controls for the prevention of occupational accidents and injuries;

- communication to all employees involved with the project with regard to foreseeable safety and/or health hazards; and

- the mechanism(s) necessary for minimization of exposure risk to hazardous substances and unsafe conditions.

For the OU3 integrated remedial action, activity-specific health and safety information will be contained within a Project-Specific HASP (PSHSP) and health and safety requirements matrices developed for each PSHSP. Attachment A provides the PSHSP Table of Contents for the Thorium/Plant 9 complex decontamination and dismantlement project. The health and safety requirements matrix for the remediation of the Thorium/Plant 9 complex is included with this HASP as Attachment B. For illustrative purposes, Attachment B provides only the first two pages of the health and safety requirements matrix.

### 1.4 Scope of OU3 Integrated Remedial Action

The activities included in the scope of the OU3 integrated remedial action are as follows:

- sampling for pre-design, design-support, and remediation;

- surface decontamination;

- dismantlement of components;

- removal of all above and below-grade components within OU3;

- size reduction of materials;

- Transportation of materials to on-site interim storage facilities and off-site disposal facilities.

- Unrestricted release of materials by recycling, reuse, or disposal at an off-site landfill;

- Dispose of acid brick and process related metals off-site (NTS or Envirocare);

- Remove specified amounts of Tc-99 from certain concrete through scabbling during D&D and dispose off-site;

- Dispose of all remaining wastes in the on-site disposal facility;

- Treat materials (hazardous wastes: acid brick and lead flashing) to meet the off-site disposal facility waste acceptance criteria; and

- Adopt administrative and access controls provided by OU2 and OU5 and incorporate post-remediation monitoring activities by reference as they pertain to the on-site disposal facility and groundwater monitoring network to evaluated performance of the on-site disposal facility.

# 2.0 HEALTH AND SAFETY RESPONSIBILITIES

## 2.1 Vice President of Safety and Health

The Vice President of Safety and Health is responsible for radiological, health, and safety-related activities and issues for the site.

## 2.2 Manager of Occupational Safety and Health

The Manager of Occupational Safety and Health is responsible for overall health and safety-related activities and issues for the site.

## 2.3 Manager of Radiological Control

The Manager of Radiological Control is responsible for all radiological related safety and health issues for the site.

## 2.4 Construction Safety and Health Manager

The Construction Safety and Health Manager is responsible for oversight of D&D construction activities in safety and health compliance.

## 2.5 Health and Safety Officer

The Health and Safety Officer acts as the single point of contact for all environmental, safety, health, fire, and radiological issues for a project.

## 2.6 Remedial Design and Remedial Action Health and Safety Personnel

The health and safety representatives assigned to the project-specific remedial design and remedial action activities will oversee project activities associated with remedial design and remedial action (RD/RA), respectively. Their responsibilities are to ensure compliance with all regulations, standards and requirements as they affect the project.

## 2.7 Integrated Remedial Action Personnel

Personnel that perform tasks under the OU3 integrated remedial action will be responsible for the following:

- knowing and understanding the PSHSP as, as is evidenced by the signing of the acknowledgement sheets contained within each PSHSP;

- complying with all safety requirements necessary to protect themselves, other workers, and the environment as directed by the Health and Safety Officer; and

- seeking guidance from their immediate supervisor or field lead in the event there is any question or uncertainty about the safety of a remediation activity.

# 3.0 GENERAL SAFETY REQUIREMENTS

## 3.1 Permits and Postings

### 3.1.1 Permits

Permits shall be posted in accordance with policies in Radiological Performance Requirements (RPR) 3-2 found in RM-0020, FERMCO Radiological Control Requirements Manual, and Safety Performance Requirements (SPR) 2-8, found in RM-0021, Safety Performance Requirements Manual.

Prior to the implementation of project-specific work, issuance of any one or a combination of the following site permits may be required:

- FERMCO Work Permit (Form FS-F-2939);
- Penetration Permit (Form FS-F-3959);
- Radiological Work Permit (RWP) (Form FS-F-1372);
- Confined Space Evaluation/Permit (FS-F-2745-1);
- Chemical Hazardous Materials Work Permit (FS-F-2745);
- Asbestos Work Permit (FS-F-2940); and
- Open Flame and Welding Permit (FS-F-0362).

Permits required for specific remediation activities will be identified within the PSHSP developed for each design package.

### 3.1.2 Postings

The following areas shall be clearly defined and posted:

- Radiological Area(s);
- Exclusion area(s); and
- Confined Space(s).

The following areas shall be clearly defined and posted by the subcontractor according to site procedures:

- asbestos abatement area(s);
- construction area(s);
- hazardous noise area(s); and
- lead work areas.

Entrances to, and perimeters of, radiological areas are defined by yellow and magenta rope or, where practical, are defined by physical structures, such as fences or buildings. All radiological areas can be identified by signs having the standard radiation symbol, the trefoil, on a yellow background. Signs state the type of area and general entry requirements. Radiological area boundaries may change at any time based on changing work activities and posting requirements.

Anyone entering a Controlled Area of the FEMP are required to wear a Thermoluminescent Dosimeter (TLD) as directed by Radiological Control.

Posting of radiological areas is based primarily on contamination and airborne limits for uranium. However, limited amounts of more restrictive radionuclides, most notably thorium, are present at the FEMP. Appendix D of RM-0020, FERMCO Radiological Control Requirements Manual, contains posting limits for the various radionuclides. Documented contamination, radiation, and airborne radioactivity measurements, or the potential to meet or exceed the values listed in RM-0020, are the basis for posting Contamination, Radiation, and Airborne Radioactivity Areas.

Step-off-pads are used at each control point to radiological areas, for the purpose of contamination control. Control points are also equipped with whole-body Personnel Contamination Monitors (PCMs). Short duration work areas may be equipped with hand-held portable instruments for personnel to perform whole-body survey. PPE donning/doffing areas are established for each control point and are maintained with the proper amounts and types of PPE or anti-contamination garments.

## 3.2 Safety Equipment List

In addition to standard personal equipment (e.g., dosimeters) the safety equipment to be available for use may include, but not be limited to, any of the following: gloves made of latex, nylon, natural rubber, nitrile, neoprene, viton, cotton or leather; latex shoe covers; caution tape; back belts; safety glasses, cover goggles, face shields; hard hats; cool vests; Saranex anti-contamination clothing (or equivalent); coated Tyvek and/or other types of disposable coveralls (if conditions permit use); eye wash stations; ear plugs; winter coveralls; steel toed boots; fire extinguishers; safety harnesses; respirators; shin guards; one piece leather aprons; Ground Fault Circuit Interrupter (GFCI) extension and equipment cords; dust containment cloth; men working signs; traffic cones; and radiation survey equipment and industrial hygiene survey equipment.

## 3.3 Material Safety Data Sheets (MSDS) Locations

Material Safety Data Sheets (MSDSs) shall be available to employees according to RM-2086. Industrial Hygiene keeps a copy of all site MSDSs in a centralized location. MSDSs for building-specific chemicals and compounds are kept in binders in the respective buildings. The location of such manuals and identification of potential chemical hazards for each activity during the OU3 integrated remedial action will be reviewed with the field team prior to initiation of activity.

MSDSs for all products or chemicals to be used during the job by the subcontractors shall comply with the subcontractor's written hazard communication program and shall be provided to the FEMP Industrial Hygiene Department (Industrial Hygiene) for review prior to the product or chemical arriving on-site. Submittal of MSDSs are to be at least one week prior to planned use. A complete set of MSDSs for all chemicals used shall be maintained by the subcontractor in a central location on FEMP property. Additional FEMP MSDSs are available through the Health and Safety Officer as needed.

### 3.4 Illumination

Activity work areas shall be lighted to not less than five (5) footcandles per $ft^2$. Any portable lighting shall be arranged as not to create a personnel burn hazard. In areas of suspected insufficient lighting, Industrial Hygiene shall be contacted prior to implementation of work activities and temporary lighting will be provided as needed.

### 3.5 Sanitation at Temporary Worksites

For this project, portable toilets may not be available in some locations. Personnel shall be provided a means to travel to a toilet facility when required. The sanitation requirements found in RM-0021, SPR 12-2 shall be followed. The PSHSP will specify the requirements for subcontractors to provide additional sanitation facilities. An adequate supply of potable water shall be provided on the site. The containers used to dispense drinking water shall be capable of being closed and equipped with a tap. Any container used to distribute water shall be clearly marked for this purpose and not used for any other purpose. Site Radiological Control Department shall approve all drinking water locations within a Radiologically Controlled area and shall post approved locations as designated break areas.

### 3.6 Operating Procedures and Other Requirements

All work conducted on-site shall comply with all the safety and health procedures in the Safety Performance Requirements Manual (RM-0021), the Radiological Control Requirements Manual (RM-0020), associated functional area procedures manuals, and those proposed by the subcontractor and approved by FEMP project managers.

# 4.0 SITE ACCESS CONTROL

## 4.1 FEMP Requirements

Each activity of the OU3 integrated remedial action area will be clearly identified by barrier tape, (or more substantial barriers if deemed necessary by the Health and Safety Officer), and signs. Visitors to the areas will be restricted to outside of the work area unless the Health and Safety Officer determines that access is necessary and allowed and proper escort is maintained.

The FEMP requirements for access to a controlled area are as follows:

- a thermoluminescent dosimeter shall be worn;
- a respirator shall be worn when required in all areas of known or areas which have the potential for airborne contamination;
- medical requirements (bioassay and general physical) shall be met as determined by FEMP Medical Services; and
- any component-specific requirements as defined in this Health and Safety Plan and PSHSP shall be adhered to.

## 4.2 Defining Exclusion Zones

An exclusion zone is defined as an exclusion zone or radiological contamination area (based on survey results) that is a pre-established area of high potential hazard due to physical, radiological, or chemical dangers. Access to an exclusion zone or radiological contamination area is restricted to employees who are required to enter in order to perform their job functions. An exclusion zone or radiological contamination area will be marked with easily recognizable devices such as ropes, tape or fence. Signs posted indicating the type of exclusion zone or radiological contamination areas may be expanded or upgraded as airborne hazards, contamination, or radiation levels increase due to work activities. Radiological areas will be established, controlled and marked as required by the RM-0020. For OU3 Remedial Design/Remedial Action (RD/RA) activities, each activity area will be an exclusion zone.

Exclusion zones shall be defined by Industrial Hygiene or Radiological Control on a changing schedule to be determined by survey results. Exclusion zones will be delineated at the time of project initiation. Each area will have a designated entrance and exit, as determined by Industrial Hygiene and Radiological Control. All such areas will have their own decontamination lines, as appropriate or directed by necessary work permits.

# 5.0 TRAINING

## 5.1 Required Training for Entry to Site

To conduct work in an area not designated as a radiological controlled area or an exclusion zone, the employee will receive the 4-Hour General Employee Training (GET).
In order to meet the requirements of OSHA 1910.120, occasional site workers will also complete the following training: 12-Hour Site Worker Training, 8-Hour supervised field experience, and 8-Hour Radiation Worker I Training.

All site and subcontractor personnel assigned to the various tasks associated with the OU3 integrated remedial action will require the following additional training requirements:

- 20-Hour Radiation Worker II (in place of Radiation Worker I Training);
- 4-Hour FEMP Respirator Training and quantitative fit test;
- 24-Hour supervised field experience (in place of 8 hr.);
- Subcontractors with proof of successful completion of current OSHA 29 CFR 1910.120 (e)(3)(i) training are required to take GET, Site Worker and Radiation Worker I or II as determined by the site training department on a case-by-case basis to comply with site requirements.

Supervisors will, in addition to the training requirements listed above, receive the following training:

- 8-Hour Training for Supervisors involved in the project required by OSHA 29 CFR 1910.120 (e) (4). 30-hour OSHA Construction Outreach meets the requirements of this training. (Note: Subcontractors shall be responsible for certifying that their employees meet the requirements of pre-assignment training and all OSHA training.)

Additional health and safety training required may include the following:

- confined space training required to enter permit-required confined spaces;
- asbestos training to comply with OSHA and Ohio Department of Health requirements necessary for any personnel working with asbestos; and
- lead worker training as required by 29 CFR 1962.62 for any personnel with potential for exposure to airborne lead.

## 5.2 Required Training To Work In The Defined Work Zones

All procedure training for the various RD/RA tasks and equipment associated with the work will comply with site requirements for training. The training must cover job analysis and task assignment as required to develop and implement job and task-specific training. The training department will maintain records indicating successful completion of training.

All personnel will be trained to the information contained within the Project Specific Health and Safety Plan. The Acknowledgement Form contained within each PSHSP will document the training and understanding of the PSHSP.

Special training requirements for each design package will be identified in the PSHSP and the health and safety requirements matrix contained within it. .

## 5.3 Required Safety Meetings

Remediation personnel will be required to attend short safety ("tailgate") meetings on a regular basis. These meetings may be conducted daily during field operations, when there is a change in scope of work, or when individuals not previously briefed on the activities join the field team. These meetings will be conducted by the Subcontractor Health and Safety Officer or designee and will be documented on form FSF-F-470 ("Minutes of Safety Meeting"). Documentation of all health and safety meetings will be maintained by the Subcontractor Health and Safety Officer and will be provided upon request to the FEMP Health and Safety Officer for the project. Such meetings will include but not be limited to:

- review of potential chemical/radiological/health hazards;
- review of applicable material safety data sheets (MSDSs);
- briefing on other activities which will be underway in the same area (e.g. safe shutdown);
- review of the information contained within each PSHSP;
- signing of the Acknowledgement Form contained within the PSHSP; and,
- health and safety issues for subcontractors and construction personnel.

## 6.0 MEDICAL MONITORING AND SURVEILLANCE

In accordance with 29 CFR 1910.120, all site and subcontractor personnel assigned to the Site and performing actual remedial action field tasks, will participate in the FEMP's medical monitoring program which includes:

- a baseline medical examination;
- periodic medical examination (within one year of previous exam);
- respirator medical approval;
- medical-bioassay examinations (may be required after potential exposures);
- exit (from project) medical examination; and
- any required monitoring denoted in the PSHSP.

If examinations conducted by medical personnel other than FEMP personnel are planned, then the subcontractor must receive prior authorization relative to protocols and a list of providers must be obtained from FEMP Medical Services.

All personnel who enter contamination or airborne radioactivity areas must participate in the bioassay program. The radiation surveillance must be conducted by the FEMP according to the following frequency:

- baseline;
- periodic;
- following an incident;
- upon an individual's request; and
- exit (end of project or termination).

Bioassay urine samples are required once every 60 days for class W soluble uranium, which is the predominant occupational radiation hazard at the FEMP. Uranyl Nitrate (UNH), which is class D soluble (more soluble than class W), requires monthly urine sampling and will be required on a task-specific basis (UNH handling activities). Fecal sampling is required when thorium is the isotope of concern as outlined by the task-specific information.

Personnel medical records will be maintained by the site medical department. Personnel involved in a contamination event will report to bioassay at the end of their shift, or as directed by the personnel performing the decontamination. A follow-up evaluation may be required depending on the type of contamination.

## 7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIREMENTS

Protective clothing and equipment will be tailored to the specific task(s) being performed. The equipment requirements will be determined by the Radiological Control, Industrial Hygiene, and Fire & Safety departments. Personal protective equipment will be worn in accordance with SPR 2-2 in RM-0021 and RCR 3-4 in RM-0020.

Personal protective equipment specific to activities of each design package will be identified in the PSHSP and health and safety matrices.

## 8.0 REQUIRED MONITORING AND ACTION LIMITS

It is the policy of the FEMP to maintain radiation exposures and exposures to toxic substances and combustible gases As Low As Reasonably Achievable (ALARA). Air monitoring will be performed to ensure that contaminant concentrations in the breathing zone do not exceed established exposure levels. Personnel will be monitored when appropriate in compliance with the radiation protection standards, in order to estimate the dose equivalents received from external and internal sources of radiation.

Personnel dosimetry programs will be adequate to demonstrate compliance with the radiation protection standards and will be performed by the Dosimetry Department personnel. Personnel dosimeters will be routinely calibrated and maintained by the FEMP dosimetry Department.

External radiation hazards are identified by site personnel as they perform the survey required for a radiation work permit. Stay times will be measured and assigned for all activities by a Radiological Control Technician. Measures such as increasing shielding, increasing distance, or reducing exposure time will be taken to minimize exposures.

### 8.1 Air Monitoring

Air monitoring will be conducted in accordance with SPR 5-1 in RM-0021 and RCR 2-3 in RM-0020.

Occupational air monitoring needs will be determined for each project and will be located in Attachment B of the PSHSP. Occupational air monitoring will be performed using a combination of Personal Air Sampling, Breathing Zone, and General Area sampling methods to assess personal exposure to airborne radioactivity. Initial counts will be performed to evaluate raw count data, anomalies from historical "base-line" samples, and to ensure containment of airborne radioactivity to the immediate worker area. Seven-day decay analysis (retrospective air sampling) of the collected filters will be used for formal documentation of occupational exposures to airborne radioactivity. Project perimeter air samples may be collected on a daily basis for the purpose of ensuring proper area posting and control.

In order to verify that control measures adequately minimize fugitive emissions, a project-specific supplemental radiological air monitoring plan will be developed during remedial design for each project in accordance with the criteria outlined in Section 3.6.2.1 of the OU3 Integrated RD/RA Work Plan.

Asbestos air monitoring will be used for work that will potentially release asbestos fibers from asbestos containing materials. A thirty-minute breathing zone air sample will be collected where the potential for releasing asbestos fibers is greatest. General area air samplers will be collected outside the asbestos work area to evaluate the effectiveness of control measures used during asbestos work activities. See Section 3.4.1 of the OU3 RD/RA Sampling and Analysis Plan for further information on asbestos air monitoring. The proposed sampling for project-specific occupational asbestos monitoring is an average of 4 - 10 breathing zone samples collected and analyzed daily, sampling 25% of workers performing asbestos work. This may be per component or per group of components, depending on the established work zone. Samples are sent to off-site labs for analysis or to the on-site lab if available.

Personal Air Sampling (PAS) for airborne radioactivity will be emphasized for monitoring personnel per the guidelines listed below. Personal air sampling shall be conducted whenever the work permit specifies personal respiratory protection be worn, or when personnel are expected to perform any of the following activities:

- the opening or breaching of any closed system which has the potential for containing radioactive materials or uranyl nitrate solution;
- drum/waste container sampling, filling, or dumping activities associated with construction activities;
- miscellaneous waste material compaction, crushing, or shredding in support of construction activities;
- decontamination and/or demolition activities; and
- burning, welding, or weld cutting on contaminated surfaces which contain levels greater than either of the values (removable or total) specified in RM-0020.

At least twenty-five percent of the individuals present in those areas where the above work activities are being performed will be equipped with a PAS sampling device.

General Area (GA) and Breathing Zone (BZ) high volume "grab" samples will be collected at select locations of each project area to supplement the collected PAS air data and monitor ambient and work area airborne concentrations.

A Photoionization Detector (PID) may be used periodically to test for organic vapors and measure breathing zone contaminants. Its use as well as monitoring frequency will be based upon recommendation of the Industrial Hygiene Section. If organic vapors are detected, process knowledge will be used to identify them; when process knowledge is not available, organics will be treated as unknowns. Colorimetric indicating detector tubes may be used to measure levels of specific organic vapors as well as inorganic vapors, such as $NO_2$, Nitric Acid, etc. The MIE RAM-1 may be used to monitor for airborne particulates.

Combustible Gas Indicator (CGI)/Oxygen meters will be used to check the atmosphere of confined spaces prior to entry. Personnel working in these spaces will be required to wear the appropriate PPE, as directed by Industrial Hygiene.

Personal air monitors may be used to determine employee exposures to airborne contaminants in the work area.

## 8.2 Radiation Monitoring

### 8.2.1 Contamination

Radiological Control Technicians (RCT) will perform routine surface contamination surveys in the affected work areas to confirm the effectiveness of contamination control practices and to ensure proper area posting. Measurements are taken with field portable alpha and beta-

gamma instruments to assess total (fixed plus removable) contamination levels. Swipes samples are collected to determine removable (or transferable) levels of contamination present. The swipes are analyzed on a low background gas proportional alpha/beta-gamma counting system.

### 8.2.2 Radiation

The RCT will perform radiation surveys of the work area and determine maximum allowable stay times for the workers to remain in the affected project areas. This information will be documented and posted on the Radiation Work Permit (RWP). A copy of the radiation survey will also be posted, along with the RWP, at access control points to each of the project areas.

Routine radiation surveys will be performed to ensure proper area posting, to confirm radiological conditions have not changed, and to ensure compliance with ALARA principles. Tissue equivalent air ionization chambers are used to determine external radiation exposure rates.

### 8.2.3 Airborne Radioactivity

Occupational air monitoring, specific to a particular project, will be performed as specified in each Project Specific Health and Safety Plan. A combination of PAS, BZ, and GA sampling methods will be used to assess personnel exposure to airborne radioactivity. Working Level Monitors (WLMs), track etch cups, scintillation detectors, and special grab sampling techniques have been used to assess and characterize radon and thoron gas/progeny concentrations in all affected project areas.

### 8.2.4 Radiological Work Permits

The RWP is an administrative mechanism used to establish radiological controls, document radiological conditions, and to communicate special radiological work requirements for each work activity.

The function of an RWP is:

- to limit exposure to workers
- to prevent the spread of contamination
- to provide for augmented monitoring and surveillance
- to inform workers of radiological conditions and entry requirements
- to provide a mechanism for relating worker exposure to individual work activities.

RWPs will be posted for all work activities and general entries at the project area control points. PPE requirements, driven by the RWP, will be integrated with Industrial Hygiene and Safety PPE requirements and will be clearly posted at all access control points to the project area.

### 8.2.5 Routine Area Monitoring

Routine monitoring of the work area will be performed to ensure that radiological conditions have not changed and that the current controls are adequate. The frequency of radiological

surveys in the individual work areas will depend on the degree of hazard as determined by Radiological Control personnel. If surface contamination, dose-rates, or airborne radioactivity levels indicate that radiological conditions have changed to the point that controls are deemed inadequate, Radiological Control Technicians will issue a verbal stop work order and notify the Manager of Radiological Control (or designee). Posted RWPs place limiting values on radiological conditions and if those values are equalled or exceeded, work shall not resume until proper controls are in place and a new RWP is issued.

### 8.2.6 Personnel Monitoring

All personnel entering the Controlled Area will require a TLD and will be required to participate in site medical and bioassay programs.

Personnel shall exit radiologically controlled work areas through established control points. Upon exit from the controlled work area, each individual is required to perform a personal whole-body contamination survey through an automated PCM. Additional survey requirements may apply, depending on area configuration at a specific control point. Personnel found to be contaminated above the levels specified in Table 2-2 of the DOE Radiological Control Manual will be detained until Radiological Control personnel investigate the source of personnel contamination and perform appropriate measures for containment and isolation of the contamination. If emergency or other hazardous conditions are present which put individuals at risk, or immediate medical treatment is required, personnel monitoring will be waived until such time affected individuals can be monitored safely.

### 8.2.7 Equipment and Material Monitoring

All materials and equipment that is removed from radiologically controlled areas shall be monitored by a RCT before it is removed from the controlled work zone. Direct frisk with a field portable Geiger-Mueller (GM) or alpha scintillation probe, and swipes for removable contamination, will be used to release materials and equipment from affected project areas. All equipment and materials and will be limited to the surface contamination and release guidelines given in RM-0020.

Criteria for free release of materials and equipment from the project areas (for unrestricted use) are based primarily on the potential presence of uranium and uranium daughters.

## 8.3 Action Limits

The action limits, or levels, for activities conducted under each design package will be determined by Industrial Hygiene and/or Radiological Control and will be presented in the PSHSP and on the radiological work permit for each activity.

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# 9.0 DECONTAMINATION

## 9.1 Equipment and Area Decontamination

Asbestos-contaminated clothing is removed and placed in plastic bags labelled as asbestos-contaminated. Respirators have their cartridges discarded with other labelled asbestos contaminated wastes. The respirator face pieces and rubber shoe covers are bagged with asbestos labels so that the FEMP Laundry can identify them during washing.

Area/equipment decontamination of radiological, and some chemical contaminants, may be done with a combination of High Efficiency Particulate Air (HEPA) filtered vacuum units and wet-wiping techniques (using non-hazardous detergents or soaps). In most cases for radiological contamination, low to high pressure wash with water is all that is needed to remove surface contamination. All water and rinseates generated from decontamination activities within a project area are collected and treated through the existing water treatment facilities. The use of sealants, fixatives, wrapping, and/or area specific controls is used if immediate decontamination is not feasible or practical.

Equipment for decontamination of radiological and chemical contaminants will be kept available in the immediate work area exclusion zone, or at contamination reduction zone, as appropriate. Decontamination equipment or agents utilized for radioactive surface contamination will be kept near the radiological control point.

If additional decontamination methods are required (for removing radioactive surface contamination), affected items are to be wrapped in plastic (of 2-mil thickness or greater) for transport to the FEMP Decontamination Facility.

## 9.2 Personnel Decontamination

In case of body contact with an acid or caustic stream, non-permeable (moisture resistant) PPE should be doffed with extreme caution to prevent cross-contamination of the skin when doffing PPE. Contaminated inner clothing shall be removed and the affected body area shall be washed thoroughly (15 minutes, minimum) in a safety shower or eye bubbler. Involved personnel shall report immediately to Medical Services or summon aid (phone 648-6511, fire alarm or radio CONTROL) as needed. Notification shall also be made to the appropriate supervisor as soon as possible.

When performing a personal survey, radioactive contamination detected by an alarming PCM or hand-held instrument "frisker") shall be reported to a Radiological Control Technician (RCT) immediately. Incidents involving personnel contamination on the skin, "clean" company issued clothing, or personal clothing, shall be reported by the RCT to the Assistant Emergency Duty Officer (AEDO) (Radio 202, frequency 2, as soon as practical) to initiate investigation of source of contamination and to report the levels and contaminated locations on the affected individual. Personnel are limited to 1,000 DPM/100 $cm^2$ of total (fixed plus removable) activity on their person when exiting radiological areas controlled for uranium contamination.

FERMCO S&H procedure SP-P-35-017, Procedure for Personnel Contamination, is to be used in cases when simple decontamination methods (i.e. removing contaminated clothing article, or using mild soap and water for contaminated skin) are not adequate.

When personnel exit a lead regulated area, they shall wash their face and hands prior to breaks/lunch, and shall shower at the end of their shift.

For some asbestos jobs where potential for skin contact is high, a mandatory shower is specified.

## 9.3 Asbestos Decontamination Requirements

### 9.3.1 Class I Work

For Class I asbestos abatement work covered by this HASP, an asbestos hygiene facility will be located at the exit of the construction area. All personnel performing asbestos abatement activities and any individual who enters an asbestos regulated area shall be required to exit the construction area through the asbestos hygiene facility. The asbestos hygiene facility consists of a clean side locker area, shower area, buffer area (where the PCM and respirator rinse sink are located), and dirty side equipment area.

When personnel exit an asbestos regulated area, they shall vacuum their disposable coveralls with a HEPA filtered vacuum cleaner and proceed to the equipment room of the asbestos hygiene facility. Workers that are wearing a double layer of protective clothing shall remove their outer rubber shoe covers, outer disposable protective clothing, booties, hood, and their outer gloves at the asbestos regulated area exit point before proceeding to the asbestos hygiene facility.

Upon entering the asbestos hygiene facility, the following procedure is to be used by Class I (friable insulation removal) asbestos workers: upon entering the dirty change area of the hygiene facility, workers will remove their rubber shoe covers, disposable protective clothing and gloves, and place them into appropriately labeled plastic bags for disposal. With the respirator still being worn, workers will wipe the outside of their respirator with a "wet wipe" to remove any possible asbestos contamination. They will be instructed to concentrate on the areas where the respirator seals to the skin. After the respirator has been wet wiped, the worker will step onto the step off pad in the buffer area which separates the radiological contamination area from the controlled area. While in the buffer area, the worker will cover the inlets of their respirator cartridges with tape and then rinse their facepiece of their respirator at the sink located in the buffer area. After the respirator has been rinsed off, the worker shall remove the respirator and place it and the cartridges in appropriately labeled plastic lined containers. The worker will remove their inner surgical gloves and dispose of them in an appropriately lined container for disposal. Using a "wet wipe", the worker will wet wipe his/her face in the respirator-face sealing area to ensure any potential asbestos fibers are removed. (The worker will use a different wet wipe than that used to clean the respirator.) The worker will step into a PCM to ensure that they have not been radiologically contaminated.

If no radiological contamination is detected, the worker will remove any re-usable undergarments (if worn) and place them into labeled plastic bags for later cleaning and shall enter the shower area.

If radiological contamination is detected, the worker or his/her supervisor shall contact a Radiological Control Technician prior to entering the shower area. After completing their

shower, the worker shall proceed to the clean room where they can change back into their clean area clothing.

The shower and sink must be drained through a filtration system with a minimum of a 5 micron final filter. If waste water is inadvertently released outside the shower area, it shall be cleaned up using wet vacs or wet mops to prevent any asbestos in the water from drying and becoming airborne in areas outside the work area. After clean up, the waste water shall be processed through the asbestos waste water filtration system.

9.3.2 Class II and Class III Work

The following decontamination procedure shall be used to exit asbestos regulated areas within radiological areas when a negative asbestos exposure assessment has not been completed:

When exiting an asbestos regulated area, workers will HEPA vacuum any gross contamination from their respirator and protective clothing in the equipment area, and then proceed to the radiological (contamination) control point.

When workers are required to wear two layers of protective clothing for radiological contamination control, workers will remove their outer gloves, coveralls, rubber shoe covers and disposable shoe covers in the equipment area (adjacent to the asbestos regulated area), place them in a labeled container for disposal or cleaning and then proceed to the radiological control point. Workers will remove their hood, remove their respirator and then remove the cartridges from their respirator. The hood and respirator cartridges shall be placed into containers for disposal and the respirator placed into a respirator recycling receptacle. Workers shall continue removing their protective clothing, shoe covers and inner gloves and dispose of in labeled containers for disposal or cleaning.

The worker will step into a personal contamination monitor to ensure that they have not been radiologically contaminated. If no radiological contamination is detected, the worker may exit the radiological contamination area. If radiological contamination is detected, radiological control technicians will take measures to remove the contamination from the worker's skin, prior to the worker exiting the radiological contamination area.

At the radiological control point, workers will remove their outer gloves and rubber shoe covers and place them into labeled containers for disposal or cleaning.

When performing Class II and Class III asbestos abatement activities for which a negative asbestos exposure assessment has been completed, workers will follow the procedure for exiting a radiological controlled area (asbestos decontamination will not be required).

# 10.0 HAZARD ASSESSMENT

Specific hazard assessment and identification for each design package will be presented in the PSHSP and health and safety requirements matrices. The sections that follow provide a general overview of potential hazards for the project.

## 10.1 Industrial Hygiene Issues

### 10.1.1 Chemical Contaminants

Asbestos
Asbestos can be found in transite siding and pipe insulation. Asbestos is a human carcinogen which mainly affects the respiratory system. Only trained personnel with proper personal protective equipment (PPE), respiratory protection, and an Asbestos Work Permit, will work with asbestos-containing materials.

Carcinogens
A carcinogen is a chemical substance that causes or is suspected of causing cancer. When work with a carcinogen is conducted, the requirements found in SPR 12-12 of RM-0021.

Chemical Contaminants
A variety of chemicals used in remediation activities may present a potential hazard to employees. Copies of all chemical MSDSs will be maintained by Industrial Hygiene for review and determination of PPE requirements.

Inorganic Lead
Paints containing lead oxide pigments have been used in many locations at the FEMP. Lead has also been used in its metallic form in some construction applications (e.g. building flashings, plumbing work, transite fasteners, and shielding blocks). Inorganic lead is harmful if ingested, or when dust or fumes containing lead are inhaled.

Thorium
Thorium is a silvery-white, air stable, soft, ductile metal and a radioactive element. Most thorium present at the FEMP can be round in thorium hydroxide or thorium oxalate chemical forms. The physical form of these compounds may vary from the consistency of clay to that of a fine powder and may be soluble or non-soluble. When working with thorium and thorium bearing compounds, proper air monitoring, engineering controls, and bioassay requirements must be specified on the RWP.

Uranium
Uranium contamination can be found in many of the buildings and the soil on site. Uranium is a radioactive material and in its soluble form is also toxic. Soluble uranium is absorbed through the skin and affects the kidneys. Non-soluble uranium is an inhalation and radiation hazard. When working in areas where uranium contamination is present, proper PPE, respiratory protection, and a radiological work permit (RWP) will be required.

### 10.1.2 Physical Hazards

Noise

Operations being performed may present a potential noise hazard. Excessive noise can occur during the operation of drilling equipment, pneumatic tools, generators, and other machinery. The Health and Safety Officer will request that the site industrial hygiene department evaluate suspect hazardous noise operations.

Confined Space

A "confined space" is an area not designed for continuous human occupancy, is large enough for a human to bodily enter, and has limited means for entry and exit. All such operations which involve entry and work in a confined space are required to be evaluated by the site industrial hygiene department prior to entry to determine if a Confined Space Entry Permit is required for the work task. See RM-0021, SPR 12-3.

As part of the evaluation, all confined spaces will be monitored, as a minimum, for oxygen, carbon monoxide, hydrogen sulfide, and explosive atmosphere. If a hazardous atmosphere or safety hazard exists within the space, the space will be classified as a permit-required confined space and a Confined Space Entry Permit will be required.

Heat Stress

All personnel could potentially be affected by heat stress. In addition to the overall physical condition of workers, other factors such as temperature, relative humidity, work function, intake of fluids, PPE and duration of time exposed to elevated temperatures can greatly affect the degree of heat stress on an individual.

Controls will be implemented to reduce the potential for heat stress which are consistent with FERMCO requirements. These require control measures (cool vests, or work-rest regimen stay times, or physiological monitoring) be instituted when criteria are exceeded which consider environmental measurements (temperature, humidity, radiant heat, air movement), work rate and clothing worn. The heat stress program includes worker training, use of a buddy system, worker review, drinking water and rest areas, and environmental temperature monitoring. When environmental temperature monitoring indicates that temperatures of concern have been reached, additional measures to be taken are a work/rest schedule based on physiological monitoring or environmental temperature monitoring, personal cooling measures such as ice vests, and review of work activities, schedule, and PPE. Workers are to know the signs and symptoms of heat related illnesses and preventative measures. Workers are to notify medical of pregnancy, illness or use of prescription drugs. Workers are to notify their supervisor or medical of any conditions that may affect performance when working in a hot environment.

The heat stress requirements and guidelines found in SPR 12-10 of RM-0021. Protective clothing requirements when heat stress is a concern are found in RP-0013. Furthermore, it is the policy of FEMP personnel to contact Industrial Hygiene to conduct a heat stress evaluation for a given project, whenever the ambient temperature exceeds 80°F.

Cold Stress

The cold stress TLVs are intended to protect workers from the most severe effects of cold stress (hypothermia) and cold injury, and to describe exposures to cold working conditions under which it is believed that nearly all workers can be repeatedly exposed without adverse effects. The TLV objective is to prevent the deep body temperature from falling below 35°C

(95°F) and to prevent cold injury to body extremities (deep body temperature is the core temperature of the body). In cold weather personnel will wear several light layers of clothing that can be removed or added as the weather changes. Cold weather clothes (coats, sweaters, etc.) will be worn under anti-contamination clothing. Because extremities must be protected in cold weather, gloves and hats are most important. Shoes should be kept dry. As in the case of heat stress, the requirements and guidelines cited in SPR 12-9 of RM-0021 will be followed at all times.

Remediation management will contact Industrial Hygiene for protective measures when the ambient air temperature falls below 20°F.

## 10.2 Radiological Safety Issues

Uranium, thorium, uranium- and thorium-bearing materials are stored or have been processed in almost all parts of the former production area, waste storage area and laboratory building. Uranium-bearing materials have been found buried at several locations outside the former production area, and the potential for contamination should be considered before digging into any surface or soils on the FEMP property by arranging with the Radiological Control Work Permit Group to obtain a Work Permit, RWP, and an Excavation/Trenching/Penetration Permit.

Worker training, contamination control practices, and personal protective equipment are used to control inhalation and ingestion of radioactive particles. ALARA principles are used to control worker exposure to radiation fields in all radiation areas. At the FEMP, policies and objectives for controlling personnel exposure to ionizing radiation are implemented through the issuance of RWPs.

## 10.3 Nuclear Safety Issues

The FEMP currently has fissile material both in storage and as hold-up from former processing. This material is in many forms of uranium compounds and uranium metal and is located in the FEMP nuclear facilities.

Each storage area or activity involving enriched material above the threshold amount for criticality is monitored by a Radiation Detection Alarm (RDA) system. This system provides for notification of criticality events and facilitates the evacuation of on-site personnel.

The FEMP Nuclear Criticality Safety (NCS) program consists of various controls, training, and surveillance methods to maintain subcriticality in the handling and storage of the remaining fissile material on site. Appropriate NCS controls will be provided for operations involving enriched restricted fissile materials. These controls will be identified in the Project Specific Health and Safety Plan or other guidance documents provided by NCS personnel.

## 10.4 Industrial Safety Issues

### 10.4.1 Electric Power

GFCIs are required on all 15 and 20 ampere, 120 volt circuits at all work sites. The GFCI will be placed at the source of the electrical service to protect both the cord and the devices connected.

All flexible cords (extension cords) will be approved (UL listed) cord sets and rated for hard usage and damp location. Only purchased cord assemblies will be permitted; field made cord sets are not permitted. All cords will run overhead to avoid damage from being on the ground.

All temporary wiring and lighting will conform to the requirements of the latest edition of the National Electric Code, except Article 305-4(B) which will not apply.

No work will be permitted within 10 feet of any live exposed electrical device, unless approved by the Health and Safety Officer or the personnel involved are qualified for such work.

### 10.4.2 Fall Protection

A positive means of fall protection is required for any fall of six feet or more. This can be accomplished using appropriate barricades, guardrails, full body harnesses, lanyards, etc. All work tasks will have 100 percent fall protection. All work requiring fall protection will be performed in accordance with OSHA requirements. See RM-0021 SPR 2-17 for additional information.

### 10.4.3 Heavy Equipment

The number of people working around heavy equipment will be minimized at all times. All mobile equipment will be supplied with an electronic back-up alarm. All operators will be qualified to operate their machine. Equipment will be inspected at the beginning of each shift by the equipment operator, prior to use, and the inspection results will be recorded on a daily check sheet to ensure that all safety equipment and devices are fully operational. See RM-0021, SPR 7-1 and 7-3.

### 10.4.4 Hidden and Underground Utilities

Project activities involving digging/excavation into the surrounding earth, roof, floors and walls of the facility will require a site permit. Due to serious injury potential from contacting or breaching existing utilities, a site Penetration Permit with a complete mapping/drawing of all utilities and other potential hazards is required prior to start of excavation.

### 10.4.5 Lifting

Lifting is the most common task associated with lower back pain. Many injuries do not result from a single incident, but develop over a period of time. This type of injury may result from repetitive lifting. Personnel should know their lifting limits, the proper way(s) to lift, and the object to be lifted should be limited by factors such as; the route and distance to be traveled, the amount of time required and the center of gravity necessary to handle the load safely.

A person will not lift more than 50 pounds without assistance from another person or mechanical help. See RM-0021, SPR 2-5.

10.4.6 Lockout and Tagout

Subcontractor personnel working at the FEMP will follow and be fully trained for the FEMP Energy Control Plan. Before commencing work on any energized system or circuit, a lockout/tagout is to be completed in accordance with the FEMP Energy Control Procedures. See OP-0004 .

10.4.7 Material Handling Equipment

All equipment used for hoisting and rigging operations will be tested, inspected, and tagged with current annual test dates. All operators will be qualified to operate the equipment. Equipment will be inspected at the beginning of each shift by the equipment operator, prior to use, to ensure it is in proper operating condition and all safety equipment is in place and functional. The inspection results will be recorded on a daily check list.

All material handling equipment, mobile personnel lifts (both powered and manual), and specialized hand-operated powered equipment will have the factory operator safety manual for use by the operator. This manual will be either with the equipment at the time of use or will be on file, available for reference when requested. All material handling equipment will only be used as the manufacturer intended and with the loading limits defined by the manufacturer. Safety requirements within the manual will be followed.

All rigging operations will be performed only by qualified persons. The supervisor in charge will evaluate the training of all personnel involved in rigging operations and provide a letter to the FEMP Construction Manager and the Construction Safety and Health Manager, stating who has been verified to be a competent rigger.

Any critical lift will have an approved lift plan prior to the start of the lift. This plan will be written by the remediation subcontractor and approved by the rigging engineer. See the "Hoist and Rigging Manual," DOE/ID-10500-Section 12.0 and RM-0030 FEMP's Supplement to DOE's Hoisting and Rigging Manual, for additional information on the Critical Lift Requirements.

10.4.8 Overhead Hazards

Before any activity is to take place, all overhead obstructions must be identified by the supervisor in charge. Where possible, the activity should be moved away from the obstruction. If the site cannot be moved and the obstruction contains electrical lines, then the overhead lines should be moved, de-energized, or guarded so as to protect against contact.

10.4.9 Power Tools

All power tools will be inspected before use, and personnel will wear proper eye and face protection during operation. Only the proper tools and those of the proper strength will be used for each job. Handle extenders or cheater bars are prohibited.

Tools and machines will be unplugged before making adjustments or attachment changes. Guards or safety devices will not be removed. All fuel powered tools will be shut off before refueling. Air powered tools must have safety clips or retainers on all hose connections. All portable electrically connected power equipment will be protected by GFCIs (RM-0021 SPR 5-3).

10.4.10 Slips, Trips, and Falls

All personnel should always walk where firm footing is assured, taking short steps in slippery places. Carrying anything bulky that will obstruct vision will be avoided. Personnel will be aware of falling, slipping and tripping hazards. Climbing over equipment to get to other items and falling off/down steep slopes can cause serious and sometimes fatal accidents.

All work paths and work areas will be kept clear of slip and trip hazards. If workers must work in or near areas where these hazards exist and the hazard cannot be removed, then proper barricades and signs will be used to route personnel away from the hazards.

## 10.5 Fire Protection Issues

The potential for fires and explosions may occur during tasks. Explosions and fires can result in intense heat, open flames, smoke inhalation, flying objects and release of toxic chemicals. To protect against explosion and fires, the environment will be monitored for explosive atmospheres and flammable vapors; all potential ignition sources will be kept away from areas where explosive or flammable environments may occur; and work practices that will minimize the agitation or release of chemicals will be used.

Storage, use or transfer of flammable and/or combustible liquids will be in accordance with National Fire Protection Act (NFPA) 30, Flammable and Combustible Code, or approved by the site fire protection department.

Any task that involves impairment of a sprinkler system or fire alarm system requires an Outage Permit issued by site fire and safety inspectors and signed-off by the fire protection department.

## 10.6 Natural Occurrence Issues (Weather)

Natural occurrences thought to affect the remediation activities include, but are not limited to: extreme temperatures, snow, rain, thunderstorms, earthquakes, tornados, etc. See Section 11.4.6 for additional information on inclement weather. Any outside work will be suspended if warnings for high winds, lightning, or tornados are sounded. Any operations utilizing cranes, or personnel working on elevated steel type work will be suspended if wind velocity reaches 25 mph.

# 11.0 EMERGENCY/CONTINGENCY PLANS

In the event of injuries, site personnel will try to reduce or eliminate the consequences whenever possible. The process of determining what is appropriate requires that each situation be evaluated on a case-by-case basis. All injuries will be reported immediately to the site medical department for treatment/evaluation. The injured employee's supervisor will be notified as soon as possible and must accompany the employee to the site medical department. The Health and Safety Officer and the Construction Contracts Manager will be notified as soon as possible. Minor injuries (sprains, strains, and cuts) are to be controlled by on-site medical personnel using standard first-aid practices. Injuries complicated by chemical contamination will be evaluated after hazards associated with contamination are considered. Injuries of persons contaminated with acutely toxic chemicals will be treated so as to minimize the hazard to both the rescuer and the victim. Refer to Section 11.4.4 for more information on employee contamination by chemical agents. Note: In all cases, if a worker cannot safely attempt rescue, the rescue shall not be attempted.

All injuries within the process area will be assumed to involve radioactive contamination until proven otherwise. The injury is to be given the highest priority and the contamination reduced as soon as practical. See Section 11.4.5 for more information on employee contamination by radiological agents.

The nearest medical facility is the site medical facility and is the primary choice for on-site injuries. The site ambulance will transport the injured employee to the nearest hospital, if necessary. The site maintains an emergency response capability which includes an ambulance and Emergency Medical Technician (EMT) personnel.

## 11.1 Reporting

Table 11-1 lists the emergency phone and radio numbers to be used in the event of an on-site emergency.

**TABLE 11-1 Emergency Numbers**

| Name | Phone | Radio |
|---|---|---|
| Ambulance/Fire | 648-6511 | N/A |
| Communication Center | 648-6511 | Control |
| AEDO | 648-4749/4444 | 202/587/Control |
| Accountability Center | 648-6411 | N/A |

### 11.1.1 Site Notification Procedure

Site notification will be consistent with EM-0010 - Event Notification and Occurrence Reporting and DOE Order 5000.3B - Occurrence Reporting and Processing of Operations Information.

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11.1.2 What/How to Report

In case of an emergency the FEMP Communication Center shall be notified of the following:

- known chemical and/or radiologic involvement;
- extent of injuries;
- treatment that has been performed (including decontamination);
- number of victims;
- names and badge numbers of the victims;
- location of the accident; and
- telephone number.

Events that must be reported are as follows:

- serious injury;
- injury complicated by contamination;
- chemical / Radiological release;
- chemical splash (Eye & Skin);
- any fire; and
- major property damage.

It is important to remember to stay on the phone until the Communications Officer hangs up. The Communications Officer is trained to be calm and ask for the appropriate information in the order that it appears on the form. Additional information such as cross streets or an escort from the entrance to the site, may be required.

## 11.2 Evacuation Routes / Plant Wide Accountability

During a Plant Wide Accountability all personnel will either report to their Rally Points or report to their supervisor as per directions from the Emergency Notification System.

11.2.1 Rally Point Accountability

Eight rally points are located around the FEMP for assembly of and communication with personnel during an evacuation. After personnel have assembled, the rally point coordinator, designated by an orange vest, will take a head count. The coordinator will then forward the results of the accountability to the Accountability Center using the rally point telephone.

The building-specific emergency plans give details as to the location of primary and alternate rally points in addition to the evacuation route. Rally points specific to each design package operation will be identified within the PSHSP.

In the event of a building evacuation alarm or direction from the emergency message system, alerted personnel will report to their assigned rally points.

## 11.3 Available Emergency Equipment

### 11.3.1 Site-wide Equipment

Fire and rescue equipment at the FEMP includes several vehicles with forcible entry tools, communication equipment, electric lights and generators, portable pumps, and protective equipment.

### 11.3.2 Plant Equipment

Fire protection and extinguishing equipment at the FEMP includes building sprinkler systems (both wet-pipe and dry-pipe), fire and smoke alarm systems, hand-held fire extinguishers, and fire hydrants.

The plant also has the following safety/emergency systems:

- Radiation Detection Alarm (RDA) - an oscillating train airhorn sounded in the case of a nuclear criticality accident;
- Evacuation System - a siren sounding alarm;
- Plant Alarm System - short tones distinguished by repeated signals (i.e., 2-2 for emergency events; 3-3 for supervisory alerts; and
- Manual Fire Alarm System - silent alarm.

Upon activation of any one of these systems, personnel are to respond according to instructions provided by their supervisor.

## 11.4 Emergency Response

### 11.4.1 Confined Spaces

All operations which involve entry and work in a confined space are required to be evaluated by Industrial Hygiene prior to entry to determine if a Confined Space Entry Permit is required for the work task. As part of the evaluation, all confined spaces will be monitored, as a minimum initially for oxygen, carbon monoxide, hydrogen sulfide, and explosive gases. If the potential for development of a hazardous atmosphere exists, continuous monitoring shall be required. All personnel entering a permit-required confined space, including the authorized confined space entrant(s), standby person, backup, and entry supervisor are required to have attended Confined Space Training and to have been medically evaluated for the duty. Standby/attendant personnel must have a radio or telephone to contact Control in the event of an emergency situation. See RM-0021, SPR 12-3, Permit Required Confined Space.

### 11.4.2 Medical Emergencies

The site medical facility maintains an emergency life squad crew and ambulance for all shifts, seven days a week. Immediately notify the Communication Center by phone at 648-6511 or radio (call CONTROL) to contact them of any serious injury. The RD/RA personnel may (if

trained) use standard first aid procedures to stabilize the injury pending arrival of response personnel. The Communication Center should be immediately notified by phone, or radio, in case of any serious injury.

11.4.3 Fire Emergencies

Resources such as water, a fire extinguisher, and soil may be used to contain or extinguish small fires. Workers are only to attempt to extinguish an incipient fire if they feel comfortable with and capable of doing so. All fires must be reported immediately to the Communication Center by phone at 648-6511 or radio (CONTROL).

11.4.4 Chemical Emergencies

Release
If a release in the form of a spill, leak or vapor cloud is observed, personnel should immediately move at least 300 feet upwind and immediately notify authorities. Radio to CONTROL or call 648-6511. CONTROL will dispatch the necessary personnel to handle the situation.

Employee Contamination
In case of employee contamination, the victim should be moved into an uncontaminated area and perform a preliminary decontamination. A more thorough decontamination can be performed later. Radio to CONTROL or call 648-6511 for assistance. Preliminary decontamination generally consists of flushing with water to dilute and remove most of the chemical or contamination using such devices as a safety shower. Contaminated clothing should be removed and the affected skin areas flushed for 15-30 minutes. The employee should then report immediately to the site medical department. Minimize the spread of contaminant run off by use of dikes and other engineered controls. As soon as the chemical hazard has been reduced to an acceptable level, the victim should be stabilized.

In the event of chemical contamination to the eyes, the victim should be moved to an uncontaminated area if possible. The victim's eyes should be held open and flushed for fifteen minutes with water (or isotonic saline solution). Flushing solution should be maintained near body temperature because it can cause extreme discomfort if it is too hot or too cold.

11.4.5 Radiologic Emergencies

Release
The release area (or suspected release area) shall be evacuated. The supervisor in charge, Assistant Emergency Duty Officer (AEDO), RCTs, and the FERMCO Health and Safety Officer shall be notified of the release.

Employee Contamination
Contamination should be avoided where possible by making minimal contact with the contaminant. All instances of personnel radiological contamination must be reported to Radiological Control, FERMCO Health and Safety Officer, Construction Contracts Manager, and the Assistant Emergency Duty Officer.

### 11.4.6 Weather Limitations / Adverse Conditions

Weather guidelines and warnings will be followed as given by the Emergency Message System. Any outside work will be suspended if warnings for high winds, lightning, or tornados are sounded. Any operations utilizing cranes, or personnel working on elevated steel type work will be suspended if wind velocity reaches 25 mph. Supervision will contact the Health and Safety representatives of the FEMP Occupational Safety and Health Department to obtain additional direction on appropriate response(s) to the situations and/or to obtain any special operating requirements during severe weather.

### 11.4.7 Occurrence Investigation

Accidents will be investigated according to Event Notification and Occurrence Reporting, EM-0010.

## 12.0 CHANGES/AMENDMENTS TO HEALTH AND SAFETY PLAN

This Health and Safety Plan is based on information available at the time of preparation. Remedial design/remedial action-specific information will be routinely reassessed by supervision and the Construction Safety and Health Technical Support representative. In addition, unexpected conditions/events may arise which require reassessment of the health and safety issues. Upgrading or downgrading of precautions, personal protective equipment, etc. identified in this plan must be approved by the Construction Safety and Health Manager, or designee, and can be implemented without an amendment.

Unplanned activities and/or changes in work scope will require a review and may require an amendment to this Health and Safety Plan. All amendments must be approved by the Construction Safety and Health Manager.

The PSHSP and health and safety requirements matrices developed for each project under the OU3 integrated remedial action can be changed in response to changing worksite conditions by the Safety and Health divisions which are responsible for the change with the written approval of the Health and Safety Officer. The divisions are Radiological Control and Occupational Safety and Health.

## REFERENCES

U.S. Department of Energy, 1992, *Radiological Control Manual,* prepared by Fernald Environmental Restoration Management Corporation, Cincinnati, Ohio.

U.S. Department of Energy, 1993, *Occurrence Reporting and Processing of Operations Information,* DOE Order 5000.3B, Office of Nuclear Energy, Washington, D.C.

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**ATTACHMENT A**

PROJECT-SPECIFIC HEALTH & SAFETY PLAN
(TABLE OF CONTENTS)
FOR THE DECONTAMINATION AND DISMANTLEMENT
FOR THE THORIUM/PLANT 9 COMPLEX

APRIL 1996

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# ATTACHMENT B
## HEALTH AND SAFETY REQUIREMENTS MATRIX
### PROJECT: DECONTAMINATION AND DISMANTLING OF THE THORIUM/PLANT 9 COMPLEX

*The requirements listed in Section 1.0 of this matrix apply to all activities addressed in this matrix*

| ACTIVITY (TASKS) | HAZARD IDENTIFICATION | FREQUENCY & TYPE OF AIR AND PERSONNEL MONITORING REQUIRED | PERSONAL PROTECTIVE EQUIPMENT | TRAINING REQUIREMENTS | MEDICAL MONITORING & SURVEILLANCE REQUIREMENTS | ADMINISTRATIVE & ENGINEERING CONTROL MEASURES | PERMIT(S) | DECONTAMINATION & DISPOSAL PROCEDURES |
|---|---|---|---|---|---|---|---|---|
| 1.0 General Project minimum requirements to access work site (continued)<br><br>NOTE: *These general* requirements apply to all sections of this matrix. | Work in Radiological Contamination Area | General Area (GA) air sampling by FERMCO<br><br>Breathing Zone (BZ) air sampling for at least 25% of the workers by FERMCO<br>Radon/thoron lapel sampling on at least 25% of the workers in Building 9A and Building 65. Monitors supplied by FERMCO. | Minimum: smock, shoe covers, and gloves (inspections only, no activity)<br><br>Visitors to wear PPE specified by work permit<br><br>Full anti-Cs will be necessary for hands-on work and any entry into an Airborne Area. Double anti-Cs will be required for many activities surrounding actual dismantling or interior transite removal. (See Radiological Protection Plan).<br><br>Full-face APR with magenta (HEPA) cartridge(s) or powered air-purifying respirator (PAPR) as required by RWP (see Radiological Protection Plan) | Rad Worker II<br><br>24 hr. supervised field experience<br><br>Respirator training and fit-test<br><br>PAPR Training<br><br>Visitors<br><br>Rad Worker II training or escort with all required training | Medical approval for respirator use<br><br>Initial, annual, special, and termination in-vivo exam<br><br>Initial, every 60 days, special, annual, and termination urine sample | Local HEPA ventilation when process lines removed<br><br>HEPA ventilation in area of waste container.<br><br>Dust suppression techniques (including use of a surfactant) to be implemented.<br><br>Visitors who are not Rad Worker II trained are to obtain authorization from the Manager of Radiological Compliance | RWP | Dispose of contaminated material (anti-c, waste, etc) in supplied bags or containers.<br><br>Spill control kits to be present if water/liquid is used as a dust suppressant during work activities.<br><br>Personnel and material monitoring required to exit Contamination Area |

The requirements of this document are based upon current conditions and/or operations in areas near the planned construction zone. This document is to be used as an aid in conjunction with the Project Specific Health and Safety Plan to assist the subcontractor in understanding the safety requirements of the project. The PSHSP will provide more detail for certain aspects of this document. This document does not relieve the subcontractor of planning for or providing a safe work site. This document does not relieve the subcontractor from recognizing and complying with other appropriate state, federal and FEMP regulations. (April 9, 1996, REV. 2, DLG)

# ATTACHMENT B
# HEALTH AND SAFETY REQUIREMENTS MATRIX
## PROJECT: DECONTAMINATION AND DISMANTLING OF THE THORIUM/PLANT 9 COMPLEX

***The requirements listed in Section 1.0 of this matrix apply to all activities addressed in this matrix***

| ACTIVITY (TASKS) | HAZARD IDENTIFICATION | FREQUENCY & TYPE OF AIR AND PERSONNEL MONITORING REQUIRED | PERSONAL PROTECTIVE EQUIPMENT | TRAINING REQUIREMENTS | MEDICAL MONITORING & SURVEILLANCE REQUIREMENTS | ADMINISTRATIVE & ENGINEERING CONTROL MEASURES | |
|---|---|---|---|---|---|---|---|
| **1.0 General Project minimum requirements to access work site**<br><br>**NOTE: These general requirements apply to all sections of this matrix** | Work in a radiological Controlled Area<br><br>Work at a hazardous waste site<br><br>Work at a construction/ demolition site | Thermoluminescent Dosimeter (TLD)<br><br>FERMCO Radiological Control Technician (RCT) Periodic Monitoring as required. | FERMCO issued clothing<br><br>Steel toed, leather safety shoes (ANSI Z41)<br><br>Hard hat<br><br>Safety glasses w/rigid side shields (ANSI Z87.1)<br><br>Personal clothing allowed only for inspections in Controlled Areas<br><br>Visitors are permitted to wear personal clothing for inspections in Controlled Areas | General Site Worker<br>• Site GET Training<br>• Site Worker Training<br>• Rad Worker I<br>• 8 hr. supervised field experience<br>• Construction Rules & Regulations<br>• Orientation on the PSHSP (including matrix)<br>• Orientation on Project Specific MSDSs.<br><br>Additional for supervisors<br>• OSHA Out Reach<br><br>Visitors<br>• Rad Worker I or II training or have an escort with all required training<br>• Briefing on PSHSP and matrix<br>• Briefing by site supervisor on current activities and hazards | Medical surveillance exam: baseline, annual, and termination<br><br>Report all injuries to FERMCO Medical Department<br><br>Initial and termination urine sample | Attend a pre-work kickoff/safety meeting,<br><br>Daily specific task review of matrix<br><br>FERMCO to inspect all equipment prior to entering site<br><br>Weekly safety meeting | F<br>P<br><br>R<br>W<br>(F |

The requirements of this document are based upon current conditions and/or operations in areas near the planned construction zone. This document is to be used as an aid in conjunction with the Project Specific Health and S
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Appendix F

# APPENDIX F

## OPERABLE UNIT 3
## INTEGRATED REMEDIAL ACTION
## CONSTRUCTION QUALITY ASSURANCE PLAN CRITERIA

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# APPENDIX F

## CONSTRUCTION QUALITY ASSURANCE PLAN CRITERIA SITE QUALITY ASSURANCE PROGRAM DESCRIPTION

This appendix to the OU3 Integrated Remedial Design/Remedial Action Work Plan contains a general discussion of the Fernald Environmental Management Project (FEMP) Quality Assurance (QA) Program and contains an attachment which lists the QA Plan criteria that will be provided to remediation subcontractors performing OU3 decontamination and dismantlement projects. The attached QA Plan criteria specifies the minimum requirements for a remediation subcontractor's QA plan.

The QA Plan criteria were developed based on the current version of the site Quality Assurance Program manual (FERMCO 1994), identified as RM-0012. The Quality Assurance Program manual is an internal document that is by the current Environmental Restoration Management Contractor, Fluor Daniel Fernald (referred to in the manual by its former name, FERMCO) for the FEMP to address all appropriate quality assurance criteria specified in 10 CFR Part 830.120 *Quality Assurance Requirements*, ANSI/ASME NQA-1 *Quality Assurance Program Requirements for Nuclear Facilities*, ANSI/ ASQC-E4 (draft) *Quality Assurance Program Requirements for Environmental Programs*, (which was written to meet the guidance contained in QAMS-005/80 *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans* by the U.S. EPA), DOE Orders 4700.1 *Project Management System*, 5400.1 *General Environmental Protection Program*, and other DOE orders specifying quality assurance related requirements.

As discussed in Section 4.1 of the OU3 Integrated RD/RA Work Plan, quality assurance provisions for decontamination and dismantlement are specified in the remediation subcontract. The remediation subcontractor is responsible for developing a QA plan that will be approved by DOE for the activities addressed in the subcontract Scope of Work.

The QA plans for waste management have already been established in accordance with the provisions of this QA Program plan for material handling, inspection, certification, tracking, treatment, and disposition. These QA plans are referenced in the text of the work plan for the respective material management activities.

The requirements of QAMS-005/80 and DOE Order 5400.1 apply to all environmental monitoring and measurement efforts mandated by the U.S. EPA. The Federal Facilities Compliance Agreement and the Amended Consent Agreement require that an approved Quality Assurance Project Plan (QAPjP) be established in accordance with U.S. EPA requirements for QA Plans to address data generation activities. The Sitewide CERCLA Quality Assurance Project Plan (SCQ), as the principal QAPjP for the FEMP, has been developed to cover the EPA QAMS requirements for environmental sampling and analysis to support ultimate remediation of the site. The SCQ describes the QC procedures to be followed by DOE and its contractors during the course of remediation of the FEMP. The SCQ also describes the QC acceptance criteria used to determine the precision, accuracy, representativeness, comparability, and completeness of environmental measurements. Basic requirements for sampling, sample handling and storage, chain-of-custody records, and laboratory and field analysis are specified in the sections and appendices of the SCQ. The SCQ is referenced as appropriate in Section 1 of the OU3 Integrated Remedial Action Sampling and Analysis Plan.

FEMP Quality Assurance Program Description

The standard QAP will be organized into three functional categories: Management, Performance, and Assessment. Each of these functional categories are divided into specific criteria as follows:

MANAGEMENT

- CRITERION 1 - PROGRAM
- CRITERION 2 - PERSONNEL TRAINING AND QUALIFICATION
- CRITERION 3 - QUALITY IMPROVEMENT
- CRITERION 4 - DOCUMENTS AND RECORDS

PERFORMANCE

- CRITERION 5 - WORK PROCESSES
- CRITERION 6 - DESIGN
- CRITERION 7 - PROCUREMENT
- CRITERION 8 - INSPECTION AND ACCEPTANCE TESTING

ASSESSMENT

- CRITERION 9 - MANAGEMENT ASSESSMENT
- CRITERION 10 - INDEPENDENT ASSESSMENT

Within the three functional categories are the QA criteria that provide the basic requirements of a QA Program. Each criterion also identifies responsibilities and outlines the procedural approach that will be followed.

The scope and depth of the management system's application of requirements to a specific activity shall be determined by the use of a grading process. The grading process provides the flexibility to design controls that best suit the facility or activity. The graded approach process shall determine the appropriate level of effort necessary to attain and document the requirements established through the consideration of prescribed factors.

This process is based on prescribed facility-specific or activity-specific factors such as the:

- level of risk;
- age, status, and condition of a facility or process;
- history of problems at a site or facility;
- adequacy of existing safety documentation; and
- complexity of products or services involved.

A graded approach and the establishment of Quality Levels are used to determine the appropriate level of effort necessary to implement the requirements of 10 CFR 830.120. A graded approach shall be used to ensure that the resources applied are commensurate with the importance of the result to the achievement of site goals.

The documents that are attached to this appendix are included to provide examples of how the site QA Program is implemented on the OU3 project level. Future remediation subcontracts issued for the OU3 integrated remedial action will use the same or improved criteria which are presented in the attachment.

In the event that the QA Plan criteria listed in this appendix change significantly, the revised set of criteria will be provided to the regulatory agencies for review.

ATTACHMENT 1

# PART-9

## QUALITY ASSURANCE

**SUBCONTRACT NO. FSC - ###**
**[XYZ] COMPLEX D&D PROJECT**

| Rev | Date | Description | AUTHOR | QA | CM | T.Serv. |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 0 | | Initial Issue | | | | |

| | |
|---|---|
| **Subcontract Number FSC-###**<br>**[XYZ] D&D Project** | QA:CONS/ |
| | SHEET 1 OF 1 |

(CONS:003:05/02/94)

## PART 9

## QUALITY ASSURANCE REQUIREMENTS
## SUBCONTRACT NUMBER FSC -###
## [XYZ] COMPLEX D&D PROJECT

### A. General Requirements

Refer to the General Provisions, Part 3, Quality Assurance Program which requires that the subcontractor comply with Fluor Daniel Fernald's Quality Assurance Program. Fluor Daniel Fernald's Quality Assurance Program Description (RM-0012) satisfies the requirements of ANSI/ASME NQA-1, EPA QAMS - 005/80, DOE Order 5700-6C and 10 CFR Part 830.120.

Fluor Daniel Fernald has incorporated quality requirements throughout the subcontract documents. Those quality issues not identified in other sections are incorporated within this Part 9.

By complying with all requirements of this contract including those contained in this section, the subcontractor will comply with parts of Fluor Daniel Fernald's Quality Assurance Program applicable to this subcontract.

### B. Subcontractor Quality Plan Requirements

Within 10 calendar days after Notice to Proceed, the subcontractor shall submit a Quality Plan, for Fluor Daniel Fernald Compliance review, meeting the following requirements:

#### 1. ORGANIZATION

1.1 Describe, and show with an organization chart, the company organizational structure from the company's top manager through the lowest level of field management/supervision, including those responsible for assessing the adequacy of work on this project.

1.2 Provide an orientation outline for an orientation to be given by subcontractor managers/supervisors to employees on the necessity and expectation of performing quality work. Maintain on-site records and names of persons oriented.

#### 2. DOCUMENTS AND RECORDS

2.1 Describe how and by whom subcontractor documents and records are reviewed, approved, issued, used, revised and stored by the subcontractor. This should address internal subcontractor procedures not Fluor Daniel Fernald review, etc. of subcontractor submittals.



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2.2 Describe how and by whom Fluor Daniel Fernald and subcontractor issued drawings, specifications, procedures, etc. are controlled to assure that only current revisions are used.

2.3 Describe how subcontractor will document the completion of designated process steps and how these records will be reviewed by subcontractor management.

2.4 Describe what organizational position has the responsibility and how the following requirements will be met:

A. Ensure controlled documents issued by Fluor Daniel Fernald are controlled by the subcontractor when reproduced and issued to lower tier subcontractors such that only current, controlled revisions are in the field and used for work.

B. Fluor Daniel Fernald Transmittal forms shall be signed, indicating receipt of documents, and returned to Fluor Daniel Fernald Construction Document Control (CDC).

C. Certified for Construction (CFC) Engineering documents received by the subcontractor which do not have a "CDC/Controlled Copy" stamp with red control numbers shall be returned to CDC.

D. Superseded and canceled controlled documents shall either be destroyed or, if required for reference, marked "VOID" and removed from the field or work area. "VOID" drawings shall only be maintained in the subcontractor's field office.

E. Controlled documents reproduced by the subcontractor shall have a subcontractor control number designated on the document in red. The subcontractor shall maintain a log of their control numbers showing to whom they were issued.

F. No work shall be performed from documents other than those marked "CDC/Controlled."

G. Upon receipt of a Fluor Daniel Fernald Transmittal of controlled documents, the subcontractor shall verify that the document numbers and revision numbers correspond with those on the transmittal. Deviations shall be reported to CDC.

H. Approved Design Change Notices (DCN) containing the

"CDC/Controlled" stamp shall be annotated by the subcontractor on the affected documents.

I. The subcontractor shall routinely review documents used in the work to assure that current, controlled documents are in use, that DCNs are properly noted on the affected documents, and that work is performed to all applicable design documents.

2.5 Control of Subcontractor Submittals

2.5.1 Describe how and by what subcontractor organizational position the following requirements are met:

A. Submittals are made in accordance with the "Subcontractor Submittal Records Technical Specification" in Part 7.

B. Submittals are reviewed for accuracy, completeness and compliance with contract requirements and so marked in accordance with Part 3, General Provision, Specifications and Drawings for Construction.

C. Assure that QA records are not erased or obliterated when revised. Revisions shall be made using a line through the error or items deleted and initialed and dated by the person making the revision.

3. DESIGN CONTROL (Applicable only when subcontractor provides Design.)

3.1 Describe how you control designs produced by you or a lower tier subcontractor. Include the following:

- How you assure that sound engineering/scientific principles and standards are used.
- How design criteria are transmitted from subcontractor to the designers.
- How you control the design process using design inputs/outputs, processes, changes, verifications, interfaces, records and organization interfaces.
- How you assure that revisions to the final design (including "Use-As-Is" and "Repair" dispositions) are subjected to the design control process and original review/approval process.
- Describe how you control issuance of documents to ensure that the

correct revisions are used for the work.

3.2 Describe how and by whom As-Built Drawings are maintained for both Fluor Daniel Fernald and subcontractor Drawings. Include provisions for assuring that changes, including "Use as is" or "Rework/Repair" dispositions of nonconforming items, are subjected to the design and control and review/approval process as the original design. The subcontractor is not required to incorporate Fluor Daniel Fernald Design Change Notices (DCNs) in the red line marking. Redlined documents must be clarly identified as containing As-Built information. They must be a clear, concise, up-to-date, legible representation of the changes.

C. RESOLUTION OF QUALITY PROBLEMS

1. Quality problems identified by subcontractor personnel shall be identified, in writing, to Fluor Daniel Fernald's Technical Representative immediately after discovery. The Technical Representative may require that the subcontractor use Fluor Daniel Fernald forms to report quality problems.

2. Fluor Daniel Fernald shall have the right of rejection of any "rework", "repair" or "accept as is" disposition.

3. The subcontractor shall identify and, where applicable, segregate non-conforming items so that they will not be used prior to resolution of the non-conformance.