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# TRANSMITTAL OF FINAL REMOVAL ACTION NO. 17 WORK PLAN

01/05/96

DOE-0371-96
DOE-FN EPAS
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WORK PLAN

E-7411

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JAN 05 1996

DOE-0371-96

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Dear Mr. Saric and Mr. Schneider:

**TRANSMITTAL OF FINAL REMOVAL ACTION NO. 17 WORK PLAN**

The purpose of this letter is to transmit the enclosed comment response package which provides responses to both the U.S. Environmental Protection Agency (U.S. EPA) and Ohio Environmental Protection Agency (OEPA) comments that were received for the initial submittal of the Removal Action No. 17 Work Plan, Revision Three. Included with this submittal is the revised final Removal Action No. 17 Work Plan, which incorporates the changes made as a result of these comments.

If you have any questions, please contact Pete Yerace at (513) 648-3161.

Sincerely,

Johnny Reising

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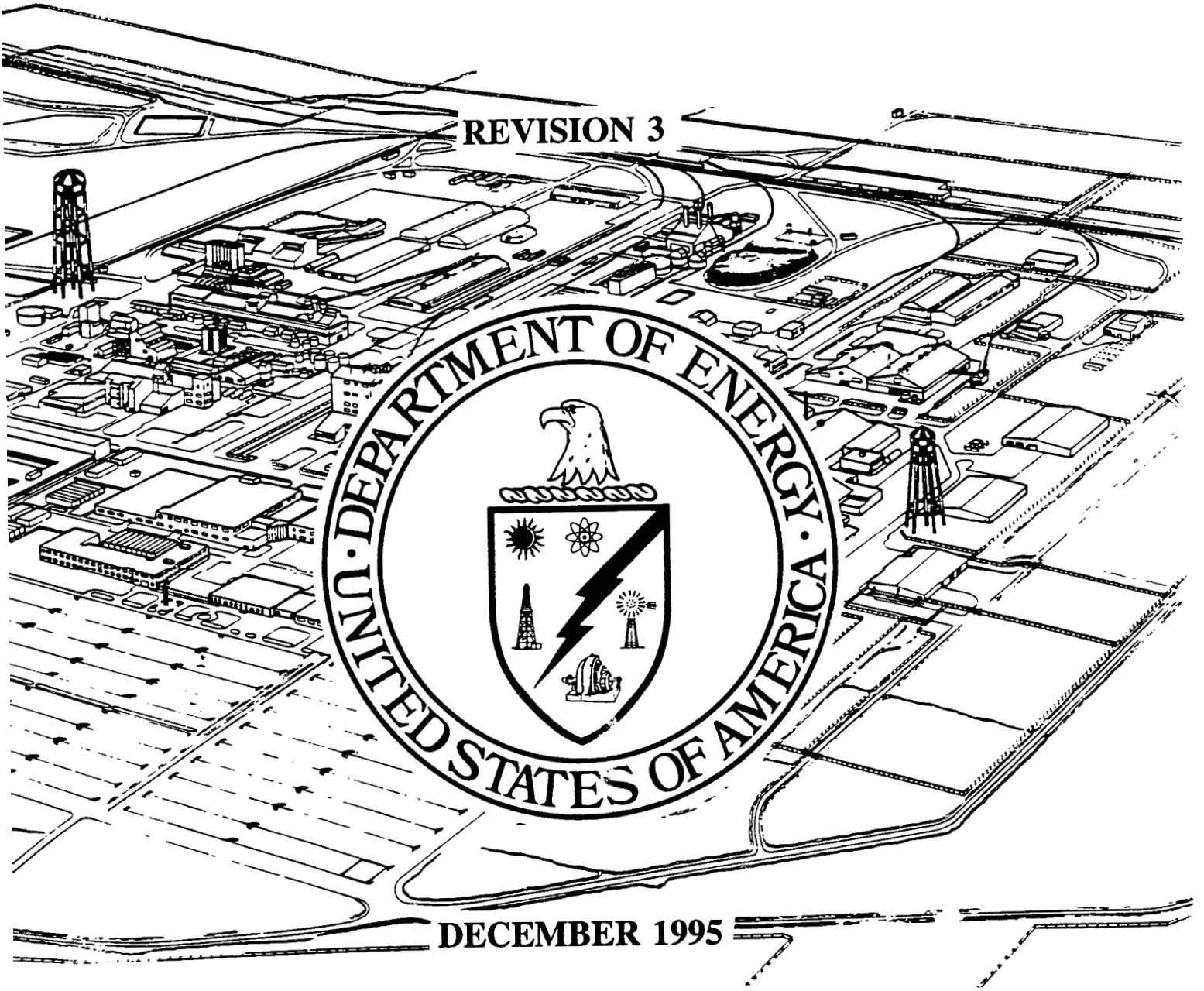
# REMOVAL ACTION 17 WORK PLAN




REVISION 3

DECEMBER 1995

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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FINAL

DOCUMENT CONTROL NO. 2503-WP-0004

7411

# REMOVAL ACTION 17 WORK PLAN
## (REVISION NO. 3)

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

FERNALD, OHIO

DECEMBER 1995

U.S DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

DOCUMENT CONTROL NO. 2503-WP-0004

FINAL

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**Acknowledgement**

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## LIST OF ACRONYMS

| | |
|---|---|
| ALARA | As Low As Reasonably Achievable |
| ARARs | Applicable or Relevant and Appropriate Requirements |
| AWWT | Advanced Wastewater Treatment |
| BTVs | biological toxicity values |
| CAMU | Corrective Action Management Unit |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| COC | constituent of concern |
| D&D | decontamination and dismantlement |
| DOE | United States Department of Energy |
| DOE-FN | United States Department of Energy-Fernald Area Office |
| EPA | Environmental Protection Agency |
| FEMP | Fernald Environmental Management Project |
| FRL | final remediation level |
| FS | Feasibility Study |
| $ft^3$ | cubic feet |
| HEPA | high efficiency particulate air |
| HQ | hazard quotient |
| IDW | investigation-derived waste |
| ILCR | incremental lifetime cancer risk |
| IROD | Record of Decision for Interim Remedial Action; a.k.a., Interim Record of Decision |
| MCLs | maximum contaminant levels |
| mg/kg | milligrams per kilogram |
| NTS | Nevada Test Site |
| OAC | Ohio Administrative Code |
| OEPA | Ohio Environmental Protection Agency |
| PCBs | polychlorinated biphenyls |
| pCi/g | picoCuries per gram |
| PPE | personal protective equipment |
| ppm | parts per million |
| PRL | preliminary remediation level |
| QC | Quality Control |
| RA | Remedial Action |
| RCRA | Resource Conservation and Recovery Act |
| RDWP | Remedial Design Work Plan |
| RI | Remedial Investigation |
| RI/FS | Remedial Investigation/Feasibility Study |
| ROD | Record of Decision |
| RSE | Removal Site Evaluation |
| RTLs | Regulatory Threshold Levels |
| RvA | removal action (Note: The "v" is used to differentiate from remedial action (RA) pursuant to a ROD.) |
| RvA 17 | Removal Action No. 17 |
| RvAWP | Removal Action Work Plan |
| SCQ | Sitewide CERCLA Quality Assurance Program Specific Plan |
| SMP | Scrap Metal Pile |
| SRP | Soil and Rubble Pile (North of Third Street) |
| SWIFTS | Sitewide Waste Information, Forecasting, and Tracking System |
| TBC | other criteria to be considered |

| | |
|---|---|
| TCLP | Toxicity Characteristic Leaching Procedure |
| TSS | tension support structure |
| TU | temporary unit |
| WAC | waste acceptance criteria |
| U.S. | United States |
| U.S. EPA | United States Environmental Protection Agency |
| VOC | Volatile Organic Compounds |

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# EXECUTIVE SUMMARY

In February 1993, Revision 2 of the Removal Action (RvA) 17 Work Plan, Improved Storage of Soil and Debris, was issued. This plan provided a sitewide management concept and implementation strategy for improved storage and management of excess soil and debris over the period required to design and construct improved storage facilities. Since that time, several events have occurred:

- With the concurrence of the regulatory agencies, DOE has determined that the new storage facilities are not needed.
- The Records of Decision (RODs) for each of the Operable Units have either been issued or are to be issued within the near term.

Because of this, the RvA 17 Work Plan is being revised to:

- Amend current RvA 17 management concepts to be consistent with current Fernald Environmental Management Project (FEMP) response actions, and
- Develop an interim site-wide soil and debris management concept that will integrate implementation of RODs or anticipated RODs and individual remedial action plans, including use of the CAMU Rule.

The objectives of the RvA 17 revised work plan are to identify the practical means of soil and debris management prior to disposal in the on-property disposal facility or at an approved off-site treatment/disposal facility, and to define the necessary means to transfer soil and debris managed under the existing RvA 17 document into the remedial management requirements specified in this document. The intent is to assure these actions are field-implementable and are protective of human health and the environment. In accordance with U.S. Department of Energy (DOE) policy, National Environmental Policy Act (NEPA) values have been incorporated into Sections 3.0 and 4.0 of this work plan.

Under the interim soil management plan being implemented here, efficient soil management practices for the site are being developed while allowing the flexibility to perform remedial actions within the realm of the respective operable unit selected remedy. The goals of the plan are to minimize the total number of soil staging areas for the FEMP by providing an integrated implementation strategy for all operable units, and to set guidelines for management practices for staging/storage facilities, based on regulatory guidelines and protection of health and the environment.

The interim debris management plan addresses the management of construction debris that will be generated mainly from the decontamination and dismantlement activities that may require on-property storage/staging. The projected staging needs were developed based on estimated volumes of materials that will need to be dispositioned upon building dismantlement compared to the schedule for availability of the on-property disposal facility.

The prerequisites for staging locations are addressed in the respective sections of the Interim Soil Management Plan (Section 3.0) and the Interim Debris Management Plan (Section 4.0). The guidelines are based on the final remediation levels (or preliminary remediation levels where final remediation levels are not yet available) contained in the appropriate operable unit RODs and the waste acceptance criteria for the potential receiving facility. Additionally, run-on/run-off control and erosion control needs are identified.

There are two actions that were to be accomplished under Phase II of the existing RvA 17 Work Plan (Revision 2). Summary information for the Soil and Rubble Pile North of Third Street and for the Scrap Metal Pile Residue/Debris Removal is being provided within this work plan to serve as the final report for these RvA 17 field activities; a final report was to have been submitted to the Agencies on December 5, 1995. Incorporating this information into this revision of the RvA 17 Work Plan streamlines the reporting process.

This work plan will be in effect until the on-property disposal facility is in operation and the appropriate remedial action plans are implemented. It is anticipated that the remedial action plans could utilize this work plan as the bases for soil and debris management actions. Upon approval, the operable unit-specific remedial action plans will suffice as that operable unit's lead documentation for material storage and staging with appropriate transition time. Within the operable unit-specific remedial action plans, modifications to the approach taken in the RvA 17 Work Plan can occur. However, where the RvA 17 Work Plan approach is considered to be appropriate for the remedial action, then the work plan would be incorporated into the design documentation by reference.

# 1.0 INTRODUCTION

## 1.1 PURPOSE

The purposes of the *Revised* Removal Action No. 17 (RvA 17) Work Plan (Revision No. 3) are to:

- Provide for the interim management of debris and like material generated before the establishment of approved remedial design documentation that will otherwise address this issue.
- Provide for ongoing management of existing soil piles prior to their ultimate disposition as provided for in the Operable Unit 5 Remedial Design.
- Provide for interim management of any soil or soil-like material to be generated before the establishment of approved remedial design documentation that will otherwise address this issue.
- Establish a comprehensive policy for management of solid investigation-derived waste.
- Satisfy reporting requirements related to activities already completed under Removal Action 17.

Per the above, this document is an interim measure to manage soil and debris between the approval of this revised Work Plan and the time that approved design documentation issued pursuant to an operable unit ROD is established which otherwise addresses a related issue. A schedule of operable unit Final RODs and associated Remedial Design and Remedial Action Work Plan(s) has been provided as Appendix A. In accordance with DOE policy, National Environmental Policy Act (NEPA) values have been incorporated into Sections 3.0 and 4.0 of this Work Plan.

It is important to note that the need for soil and debris management areas (e.g., stockpiles, staging areas) during remedial activities will be kept to a minimum as remedial activities will be sequenced such that direct placement (in the on-property disposal facility) or shipment (off-site) will be performed to the extent possible. Again, the main function of this Revised Work Plan is to guide the management of soil and debris occurring prior to operation of the on-property disposal facility and/or remedial transportation activities (i.e., transportation of remedial action-generated waste to an off-site disposal facility).

## 1.2 CONTENT

This removal action work plan is structured as follows:

- Section 2.0 provides background information about previous RvA 17 activities (including final reports for previous RvA17 activities), justification for revisions to the current RvA 17 Work Plan (Revision No. 2, February 1993) and the scope of this *Revised* Work Plan, and general soil and debris management concepts.
- Section 3.0 discusses the general management strategy for soils while addressing contaminant and category determinations. Additionally, Section 3.0 addresses the management of existing stockpiles.
- Section 4.0 discusses general debris management.

- Section 5.0 presents an overview of the sampling and analysis requirements to determine if soil piles and debris meet waste acceptance criteria (WAC) and/or FRLs.

- Section 6.0 discusses the management of non-aqueous Investigation-Derived Waste (IDW).

- Appendix A presents Final ROD milestones and associated Remedial Design and Remedial Action Work Plan(s) schedules.

- Appendix B includes a table of the ARARs. This appendix also includes a general statement regarding permitting requirements (i.e., crosswalks within operable unit Remedial Design or Remedial Action Work Plans).

- Appendix C contains estimated quantities of soil piles and debris.

- Appendix D contains support and reference documentation.

- Appendix E contains the final remediation levels for soil and the waste acceptance criteria for the on-property disposal facility.

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# 2.0 BACKGROUND AND JUSTIFICATION FOR REVISION

## 2.1 SUMMARY OF PREVIOUS RvA 17 (REVISION NO. 2) ACTIVITIES

The current version (Revision No. 2) of RvA 17 is divided into two phases. Phase I addresses soil and debris management from the conceptual design of improved storage facilities through construction of these facilities. Phase II addresses soil and debris management from the time the construction of these facilities is completed until the selection of operable unit final remedial alternatives or selected remedies.

None of the improved storage structures, scoped as a part of RvA 17, have been constructed at the FEMP to date. As a result (and in accordance with the RvA 17 Work Plan, Revision No. 2), all excess soil and debris generated since the inception of RvA 17 have been managed in accordance with the policies established in Phase I of the RvA 17 Work Plan, Revision No. 2. A summary of Phase I methodologies as presented in the RvA 17 Work Plan, Revision No. 2, is located in Appendix D.

As anticipated, most of the excess material managed under Phase I management policies of RvA 17 has been radiologically contaminated soil. Only a small amount of debris and excess soil containing hazardous material has required Phase I management policies.

As a result of the evolving soil and debris management policy at the FEMP and through discussions and written correspondence between the DOE and the U.S. and Ohio Environmental Protection Agency (Ohio EPA) [see "Proposed Actions for RvA 17" letter dated November 18, 1994 in Appendix D], the U.S. and Ohio EPAs concurred with the FEMP proposal to revise the scope of the RvA 17 Work Plan (Revision No. 2) to exclude construction of three tension support structures (TSSs) (see letter, HRE-8J, dated January 4, 1995 in Appendix D). A summary of the scope changes approved January 4, 1995 is provided below:

- Delete construction of two (2) improved storage structures or TSSs; namely the scrap metal pile (SMP) structure and the decontamination facility pad structure;
- Defer construction of the Central Storage Facility and evaluate its need as new soil and debris management strategies evolve and waste acceptance criteria for on-property disposal are established;
- Complete remaining field actions in the RvA 17 scope which include regrading and seeding (including runon/runoff controls) the Soil and Rubble Pile (SRP) North of Third Street (SRP) and the removal of the residues/debris remaining in the former SMP area;
- Revise milestone date for the completion of the above two field actions from May 31, 1995 to August 31, 1995; and
- Continue utilizing Phase I methodologies for soil and debris management (e.g., utilizing improved storage facilities as they become available) until further details regarding on-property disposal are known.

Due to the exclusion of construction of the three (3) new improved storage structures, or TSSs, most Phase II activities of the RvA 17 Work Plan, Revision No. 2 (e.g., placement of soil and debris into improved storage facilities) could no longer be implemented as presented in the Work Plan. However,

two of the field actions, as indicated in the third bullet above, were a part of the original Phase II activities and have been implemented.

## 2.2 CLOSEOUT OF PHASE II FIELD ACTIVITIES

The following information summarizes the two field actions performed as part of the Phase II field activities scope identified in Revision No. 2. This summary information is being provided within this revision (No. 3) of the RvA 17 Work Plan to serve as the final report and close-out for the two RvA 17 field activities discussed below. According to Revision No. 2 of the RvA 17 Work Plan, a final report was to be submitted to the U.S. and Ohio EPA on December 5, 1995. As a result of discussions and a meeting held with the DOE and the EPAs on May 23, 1995, the closeout information is incorporated into this revision (No. 3) of the RvA 17 Work Plan, thus streamlining the reporting process.

### 2.2.1 Soil and Rubble Pile (SRP) North of Third Street

The SRP is located in the northwest corner of the FEMP former production area and consists of approximately 23,000 cubic yards of material primarily consisting of uncompacted soil and construction debris rubble. The pile, which served as a construction soil and rubble staging/stockpile area for nonhazardous, radiologically-contaminated soil and debris (including large slabs and blocks of concrete, piping, and rock from the Laboratory Upgrade, Rotary Kiln, Drum Reconditioner, Tank Farm, Derby Breakout Milling Slag, and Plant 1 Pad Extension projects), was vulnerable to water and wind erosion. Following completion of a Removal Site Evaluation on June 18, 1990, the DOE issued an Action Memorandum stating the need for a removal action and an evaluation of proposed methods to mitigate any release of contamination from the pile.

Originally, a TSS was proposed as the management strategy for the SRP, based on the assumption that portions of the pile were radiologically-contaminated and periodic access to portions of the pile would be necessary. In October 1992, however, the pile was secured with a fence to discontinue acceptance of material and to control access. Because of the large increase in size of the pile from previous years, a letter addendum to Revision No. 2 of the Removal Action 17 Work Plan (see Appendix D, letter dated November 23, 1993) was submitted to the EPAs. The addendum proposed that a TSS should not be constructed and that selection of the best management option should be based on analytical results from sampling the pile.

Results from previous sampling and analyses and process knowledge indicated that the SRP contained no hazardous waste and was below the existing Removal Action 17 radiological disposition limits for a controlled stockpile. Additional sampling and analysis was conducted to determine the nature and extent of the contamination contained within the pile; forty-two (42) samples were collected. A 95-percent confidence level was used to determine whether the sample mean of each constituent exceeded the regulatory threshold or disposition limit. Regulatory Threshold Levels (RTLs) for non-radiological constituents were taken from the Ohio Administrative Code 3745-51-24, Table 1. RTLs for radiological constituents were taken from the approved Work Plan. A statistical summary of data is presented in Table 2-1.

Based on the data summarized below in Table 2-1, the following conclusions were made:

- The stockpile waste materials are nonhazardous based on statistical analysis and evaluation of toxicity characteristic leaching procedure (TCLP) and total concentration analytical data;

- The levels of radiological activity concentrations for uranium, thorium, and radium are significantly below the prescribed threshold levels established in the Work Plan for RvA 17, Revision No. 2; and

- TCLP selenium and lead results indicate that additional samples are not required.

The above conclusions are supported by the Sitewide Characterization Report (1993) indicating that the pile does not contain Resource Conservation and Recovery Act (RCRA) regulated hazardous waste and the radiological activity concentration levels are below the RvA 17 (Revision 2) management policy limits of 100 pCi/g total uranium, 5 pCi/g total radium, and 50 pCi/g total thorium. Therefore, the SRP satisfied the controlled stockpile criteria and an engineered impermeable cover (TSS or tarped fabric) would not be required. A proposal was then submitted to the U.S. and Ohio EPAs for the pile to be regraded, removing accessible and exposed debris and rubble, and seeded to form a vegetative cover that would be maintained until the pile contents were remediated under the Operable Unit 5 ROD (for the soils) and the Operable Unit 3 ROD (for the debris). The regrading of the pile slopes and vegetative cover reduced the vulnerability of the pile to wind and water erosion. In a January 14, 1994 letter (Appendix D), the U.S. EPA approved the vegetative cover approach and emphasized that the pile material was not to be used as backfill.

The SRP has been regraded and seeded with a vegetative cover to prevent erosion and to mitigate airborne migration of soil. A concrete curb and gutter berm has been constructed around the pile that prevents water from running onto the pile (run-on) and ensures that precipitation (run-off) flows through the gutter trench system to the controlled stockpile storm catch basins (see Figure 2-1 for a photograph of the SRP). The berm begins in the southwest corner, encloses the dirt pile on three sides, and ends in the southeast corner. Run-off from the south edge of the pile flows into existing catch basins which flow directly to the FEMP stormwater retention basin.

The drainage control systems were designed to accommodate a minimum of a 25-year, 24-hour storm event. A chain-linked fence was reinstalled around the perimeter of the pile to control access. All field construction activities for the SRP were completed on May 18, 1995. This pile will be managed similar to a controlled stockpile as defined according to the RvA 17 (Revision 2) Work Plan with the exception that no soil will be removed from or added to this pile. This exception (to not use the SRP material for backfill) is being implemented in order to comply with the U.S. and Ohio EPA's conditional acceptance of the vegetative cover approach. Furthermore, not adding or removing material from this pile will preserve the vegetative and grass cover over this soil pile.

### 2.2.2 Scrap Metal Pile (SMP) Residue/Debris Removal

The SMP at the FEMP had been used for storage of contaminated scrap metal awaiting decontamination/disposal. It is located in the northeastern part of the FEMP former process area and is adjacent Building 69. A photograph of the SMP, prior to the residue/debris removal, has been included in Figure 2-2). The pile of scrap metal was removed from the concrete pad and recycled in 1993 as part of RvA 15.

Residues and small debris had remained from the former SMP on portions of the Building 69 outdoor pad. The removal and containerization of this remaining material was to be a part of initial activities conducted in order to construct the new SMP TSS. Although the SMP TSS was deleted from the scope of RvA 17, it was determined that the remaining residues should be removed as part of the RvA 17 scope to mitigate the potential for airborne radiological contamination release and clear this pad area for possible future staging.

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# TABLE 2-1 STATISTICAL SUMMARY OF DATA - SRP NORTH OF 3RD ST.

| Analyte (Units) | RTL* | Number of Samples | Mean | Standard Deviation | Sample Variance | Standard Error | Upper Limit of CI (95%) | COV | COV | # Required Samples |
|---|---|---|---|---|---|---|---|---|---|---|
| TCLP Metals - Actual + Derived | | | | | | | | | | |
| Arsenic (mg/L) | 5 | 41 | 0.1992 | 0.2300 | 0.0529 | 0.0359 | 0.2597 | 0.1803 | 3.7657 | 0 |
| Barium (mg/L) | 100 | 41 | 2.3364 | 1.8404 | 3.3869 | 0.2874 | 2.8204 | 0.1230 | 0.6898 | 0 |
| Cadmium (mg/L) | 1 | 41 | 0.0229 | 0.0157 | 0.0002 | 0.0024 | 0.0270 | 0.1069 | 93.2078 | 0 |
| Chromium (mg/L) | 5 | 41 | 0.4506 | 0.3467 | 0.1202 | 0.0541 | 0.5417 | 0.1202 | 3.7490 | 0 |
| Lead (mg/L) | 5 | 41 | 0.6392 | 1.0444 | 1.0908 | 0.1631 | 0.9138 | 0.2552 | 0.5860 | 0 |
| Mercury (mg/L) | 0.2 | 41 | 0.0066 | 0.0150 | 0.0002 | 0.0023 | 0.0106 | 0.3535 | 29.3955 | 0 |
| Selenium (mg/L) | 1 | 41 | 0.0923 | 0.1206 | 0.0146 | 0.0198 | 0.1240 | 0.2041 | 6.3412 | 0 |
| Silver (mg/L) | 5 | 41 | 0.0637 | 0.1028 | 0.0106 | 0.0161 | 0.0908 | 0.2520 | 6.0289 | 0 |
| Transformed Actual + Derived | | | | | | | | | | |
| Barium (mg/L) arcsine transformation | 0.0001 | 41 | 1.992 E-7 | 6.03 E-8 | 3.634 E-15 | 9.4 E-9 | 2.151 E-7 | 0.04727 | 5.483 E7 | 0 |
| Lead (mg/L) arcsine transformation | 0.000005 | 41 | 6.392 E-7 | 7.11 E-8 | 5.06 E-15 | 1.11 E-8 | 6.579 E-7 | 0.017373 | 1.263 E8 | 0 |
| Total Metals | | | | | | | | | | |
| Arsenic (mg/kg) | 100 | 31 | 5.1356 | 4.7476 | 22.5398 | 0.8527 | 6.5827 | 0.1660 | 0.2278 | 0 |
| Barium (mg/kg) | 2000 | 31 | 58.9561 | 34.0661 | 1160.4995 | 6.1185 | 69.3391 | 0.1038 | 0.0508 | 0 |
| Cadmium (mg/kg) | 20 | 31 | 0.5894 | 0.2401 | 0.0577 | 0.0431 | 0.6625 | 0.0732 | 10.2201 | 0 |
| Chromium (mg/kg) | 100 | 31 | 11.8863 | 5.3972 | 29.1297 | 0.9694 | 13.5313 | 0.0816 | 0.4080 | 0 |
| Lead (mg/kg) | 100 | 26 | 27.3296 | 40.0192 | 1601.5372 | 7.8484 | 40.7347 | 0.2872 | 0.0171 | 1 |
| Mercury (mg/kg) | 4 | 31 | 0.1748 | 0.3361 | 0.1130 | 0.0604 | 0.2773 | 0.3453 | 1.5478 | 0 |
| Selenium (mg/kg) | 20 | 31 | 7.0274 | 25.5078 | 650.6453 | 4.5813 | 14.8019 | 0.6519 | 0.0108 | 11 |
| Silver (mg/kg) | 100 | 31 | 1.0694 | 0.2690 | 0.0724 | 0.0483 | 1.1513 | 0.0452 | 14.7797 | 0 |
| TCLP Metals - Actual Only | | | | | | | | | | |
| Arsenic (mg/L) | 5 | 10 | 0.0209 | 0.0236 | 0.0006 | 0.0075 | 0.0345 | 0.3575 | 37.5298 | 0 |
| Barium (mg/L) | 100 | 10 | 0.4402 | 0.3131 | 0.0980 | 0.0990 | 0.6217 | 0.2249 | 4.4916 | 0 |
| Cadmium (mg/L) | 1 | 10 | 0.0025 | 0.0000 | 0.0000 | 0.0000 | 0.0025 | 0.0000 | ERR | 0 |
| Chromium (mg/L) | 5 | 10 | 0.0053 | 0.0018 | 0.0000 | 0.0006 | 0.0063 | 0.1111 | 1542.8571 | 0 |
| Lead (mg/L) | 5 | 16 | 0.0045 | 0.0068 | 0.0000 | 0.0017 | 0.0075 | 0.3748 | 98.5502 | 0 |
| Mercury (mg/L) | 0.2 | 10 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0002 | 0.1667 | 30000.0000 | 0 |
| Selenium (mg/L) | 1 | 11 | 0.0074 | 0.0109 | 0.0001 | 0.0033 | 0.0134 | 0.4453 | 61.8823 | 0 |
| Silver (mg/L) | 5 | 10 | 0.0055 | 0.0017 | 0.0000 | 0.0005 | 0.0065 | 0.0975 | 1899.8628 | 0 |
| TCLP Volatile Organics | | | | | | | | | | |
| MEK (mg/L) | 200 | 41 | 0.1512 | 0.0412 | 0.0017 | 0.0064 | 0.1620 | 0.0426 | 89.0205 | 0 |
| Tetrachloroethylene (mg/L) | 0.7 | 41 | 0.0314 | 0.0130 | 0.0002 | 0.0020 | 0.0348 | 0.0648 | 185.1218 | 0 |

## TABLE 2-1 STATISTICAL SUMMARY OF DATA - SRP NORTH OF 3RD ST. (Cont'd)

| Analyte (Units) | RTL* | Number of Samples | Mean | Standard Deviation | Sample Variance | Standard Error | Upper Limit of CI (95%) | COV | COV | # Required Samples |
|---|---|---|---|---|---|---|---|---|---|---|
| Radiological | | | | | | | | | | |
| Total U (ppm dry) | | 39 | 43.2308 | 43.9091 | 1928.0108 | 7.0311 | 55.0894 | 0.1626 | 0.0244 | 0 |
| Total U (pCi/g dry) | 100 | 39 | 29.2100 | 29.6683 | 980.2092 | 4.7507 | 37.2226 | 0.1626 | 0.0332 | 0 |
| U-234 (pCi/g dry) | | 38 | 14.3038 | 14.2849 | 204.0593 | 2.3173 | 18.2152 | 0.1620 | 0.0701 | NA |
| U-235 (pCi/g dry) | | 38 | 0.7477 | 0.7119 | 0.5068 | 0.1155 | 0.9426 | 0.1545 | 1.4752 | NA |
| U-236 (pCi/g dry) | | 39 | 0.2568 | 0.3631 | 0.1318 | 0.0581 | 0.3548 | 0.2264 | 1.9476 | NA |
| U-238 (pCi/g dry) | | 39 | 17.5590 | 19.6003 | 384.1698 | 2.3186 | 22.8525 | 0.1787 | 0.0457 | NA |
| Total Th (ppm dry) | | 39 | 11.4872 | 10.6891 | 114.2564 | 1.7116 | 14.3740 | 0.1490 | 0.1005 | NA |
| Total Th (pCi/g dry) | 50 | 41 | 5.4685 | 2.8711 | 8.2433 | 0.4484 | 6.2236 | 0.0820 | 0.6634 | 0 |
| Th-228 (pCi/g dry) | | 41 | 1.5578 | 0.5058 | 0.2558 | 0.0790 | 1.6908 | 0.0507 | 6.0890 | NA |
| Th-230 (pCi/g dry) | | 41 | 2.6939 | 2.7779 | 7.7169 | 0.4338 | 3.4245 | 0.1610 | 0.3491 | NA |
| Th-232 (pCi/g dry) | | 40 | 1.2473 | 0.4566 | 0.2085 | 0.0722 | 1.3689 | 0.0579 | 5.9814 | NA |
| Total Ra (pCi/g dry) | 5 | 39 | 1.3897 | 0.8613 | 0.7418 | 0.1379 | 1.6224 | 0.0992 | 1.8734 | 0 |
| Ra-226 (pCi/g dry) | | 39 | 0.9679 | 0.8655 | 0.7491 | 0.1386 | 1.2017 | 0.1432 | 1.2922 | NA |
| Ra-228 (pCi/g dry) | | 39 | 0.4218 | 0.1872 | 0.0350 | 0.0300 | 0.4723 | 0.0711 | 12.0375 | NA |
| Alpha Activity (pCi/g) | | 41 | 28.8207 | 28.6516 | 820.9150 | 4.4746 | 36.3560 | 0.1553 | 0.0351 | NA |
| Beta Activity (pCi/g) | | 41 | 25.6829 | 26.2410 | 688.5876 | 4.0981 | 32.5842 | 0.1596 | 0.0373 | NA |

* Regulatory Threshold Levels (RTLs) for non-radiological constituents were taken from Table 1 of Chapter 3745-51-24 of the Ohio Administrative Code. RTLs for radiological constituents were taken from Removal Action 17, Improved Storage of Soil and Debris.





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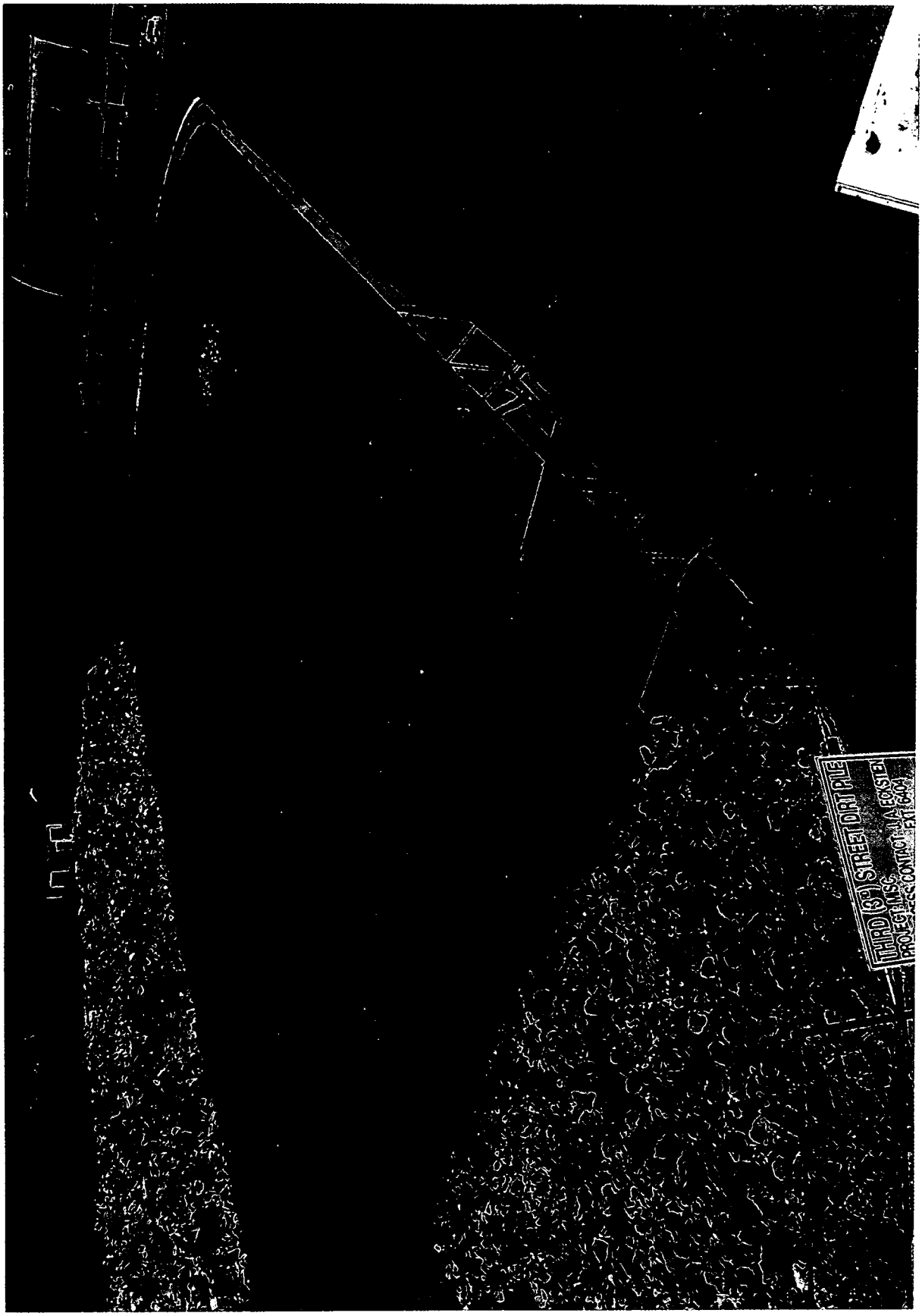


FIGURE 2-1 PHOTOGRAPH OF THE SRP

FIGURE 2-2 PHOTOGRAPH OF SMP PRIOR TO RESIDUE/DEBRIS REMOVAL

The residue and debris material was composed of soil, rust, small metal fragments/residue, asphalt chunks, and reinforcing steel pieces (most less than two inches long). Because of the fine particle size of some of this material, it presented a potential for airborne radiological contamination, although none of the existing air monitoring stations within this area had indicated an increased airborne activity. The suspected contaminants, reflected in the original sampling and analysis request, were: uranium, thorium, and their associated isotopes; heavy metals; Volatile Organic Compounds (VOCs), semi-VOCs, and PCBs. The analytical data from this sampling effort indicated that the debris and residue are nonhazardous. A material evaluation form (MEF) No. 2384 has been completed for the material and is part of the documentation that is now maintained with the small white metal containers in which the material is stored.

Residue and debris removed from the area (approximately 200 feet by 112 feet) filled 115 small white metal boxes (approximately 3 ft. x 4 ft. high x 6 ft. long). The equipment used to remove the residue and debris included a front-end loader, a Bobcat (small front-end loader for filling boxes), forklifts, high efficiency particulate air (HEPA) wet/dry vacuums, personal protective equipment (PPE), poly film, tarps. Barricade fencing and radiological contamination/caution signs were utilized at the east edge of the work area around the decontamination pad to segregate the construction/removal work area from the ongoing decontamination operations work area adjacent to Building 69. Any dust-like residues were kept damp to minimize radiological airborne contamination. HEPA-filtered vacuum systems were also used to remove the fine residue. High-pressure washers (using biodegradable detergent) were used to wash the pad once the bulk of the material was removed. Wet vacuums and squeegees were used to control runoff. Wash water and rinseate was controlled and directed into the sump drain located at the southeast corner of the pad. This sump drain is tied into an existing dedicated decontamination rinse water system that is piped to the FEMP wastewater treatment system.

Removal and containerization of this residue and debris was completed on August 4, 1995. A photograph of the cleaned pad is shown in Figure 2-3. The containers filled with this material have been placed in storage on the Plant 1 pad until final disposition. Since this material is a mixure of soil and OU3 RI/FS material categories B and E, all of which we currently anticipated (pending approval of the OU3 final remedial action ROD) to be dispositioned in the on-property disposal facility, the commingled mixture is considered acceptable for on-property disposal.

In 1984, a concrete pad extension was placed adjacent to and west of the old decontamination pad area where the scrap metal was once located. This concrete section of the pad is free of embedded debris and residue and is in structurally sound condition. The older portion of the pad (once covered by the residue and debris), is considered marginally intact in terms of structural integrity based on visual inspections. A radiological survey was conducted to measure the loose and fixed radiological contamination since the debris and residue were removed and water-washed from the pad. The results of the radiological survey indicated that the area can now be down-posted from a "High Contamination Area" to a "Contamination Area". Furthermore, high-volume boundary air samplers (also utilized in the radiological survey) indicated that this area no longer presents a radiological airborne hazard. The newly cleaned pad could potentially be used for container storage contingent upon the structural integrity of the pad and according to FEMP waste management strategies.

## 2.3 RvA 17 REVISION JUSTIFICATION

The U.S. and Ohio EPA's January 1995 concurrence (Appendix D) on the proposed changes to the RvA 17 Work Plan, Revision No. 2, deleted a large portion of the scope of RvA 17. This reduction in scope, however, effected Phase II field/construction activities only. This reduction in scope did not alter the sitewide management strategies and concepts currently being utilized at the FEMP. All Phase I soil and

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debris management concepts adopted in the RvA 17 Work Plan, Revision No. 2, were to continue to be applicable regardless of the reduced scope.

It is necessary to expeditiously revise the strategy utilized for soil and debris currently managed under the existing RvA 17 Work Plan (Revision No. 2) into soil and debris management concepts that reflect consistency with the final RODs or anticipated RODs. This revision (No. 3) of the RvA 17 Work Plan is being provided as an interim measure to manage soil and debris until Final RODs and associated remedial action work plans supersede this work plan.

## 2.4 REVISED REMOVAL ACTION SCOPE

The revised RvA 17 Work Plan (i.e., Revision No. 3) will not implement a two-phased approach. The work plan will, however, retain its basic format that devises a separate soil management plan and a debris management plan as in the revision No. 2 of the work plan. Components of the interim soil management plan include criteria for stockpiles, storage areas, and management strategies. Components for the debris management plan include the method used for determining whether debris will meet the on-property disposal facility WAC, the type of process and material that certain equipment (process vs. non-process) originated from, and the ability to remove contamination from equipment or debris. Below is a listing of these components and principles that provide the conceptual framework and discuss the major changes incorporated into the revised (rev. No. 3) RvA 17 Work Plan scope. Additionally, a flowchart of general soil and debris management strategies has been included as Figure 2-4.

### 2.4.1 Soil Management

The contaminant concentrations currently in the RvA 17 Work Plan (Revision No. 2), which serve as criteria dictating interim soil management practices, are being replaced with the criteria defined in the final approved Operable Unit 2 ROD and the Operable Unit 5 Proposed Plan (e.g., Waste Acceptance Criteria (WAC), FRLs). Upon finalization of the Operable Unit 5 ROD, the criteria contained therein will be incorporated into this document by reference, replacing those in the Proposed Plan. With respect to the FRLs, this revised Work Plan (Revision No. 3) discourages interim management of soil containing contaminant concentrations below these soil remediation (cleanup) levels established in the appropriate RODs. With respect to the on-property disposal facility and associated WACs, the revised Work Plan (Revision No. 3) categorizes soil designated for interim management based on either meeting or not meeting the on-property WACs. Details of this soil management plan are provided in Section 3 of this Work Plan. The revised Work Plan also addresses (see Section 6.0) management of Investigative Derived Waste (IDW) which is not addressed in the current revision (No. 2) of the RvA 17 Work Plan.

### 2.4.2 Debris Management

The current RvA 17 Work Plan (Revision No. 2) establishes the management of debris based on whether the material is recoverable (able to be decontaminated for recycle, reuse, or sale) or nonrecoverable (disposal required). The revised Work Plan (Revision No. 3) manages debris based on the ability of the material to meet the WAC for the on-property disposal facility, although recycle/reuse is not precluded if it is economically feasible (consistent with the draft Operable Unit 3 RI/FS Proposed Plan).

Additionally, the current RvA 17 Work Plan (Revision No. 2) utilizes the disposition criteria (recoverable or nonrecoverable) as the only categorization criteria for debris generated. The revised RvA 17 Work Plan (Revision No. 3) introduces the categorization philosophy presented in the draft Operable Unit 3 Remedial Investigation and Feasibility Study (RI/FS) Report. These categories (which are presented in Section 4.3.1) are primarily determined from the type of contamination (process vs. non-process) and the physical/dimensional aspects as it relates to the ability to decontaminate debris (e.g., accessible vs. inaccessible metals) in order to meet the on-property disposal facility WAC.

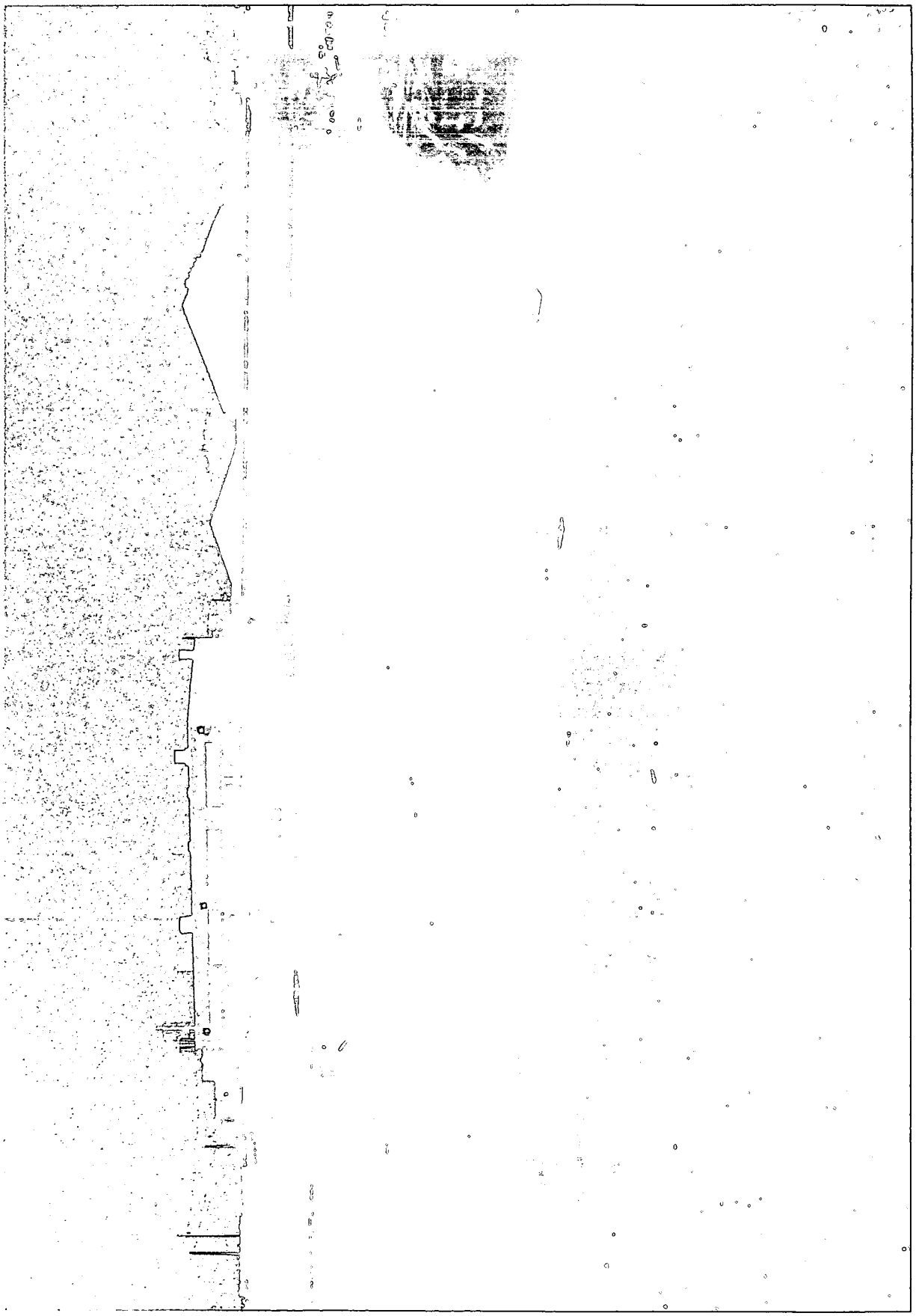

FIGURE 2-3 PHOTOGRAPH OF SMP AFTER DEBRIS/RESIDUE REMOVAL

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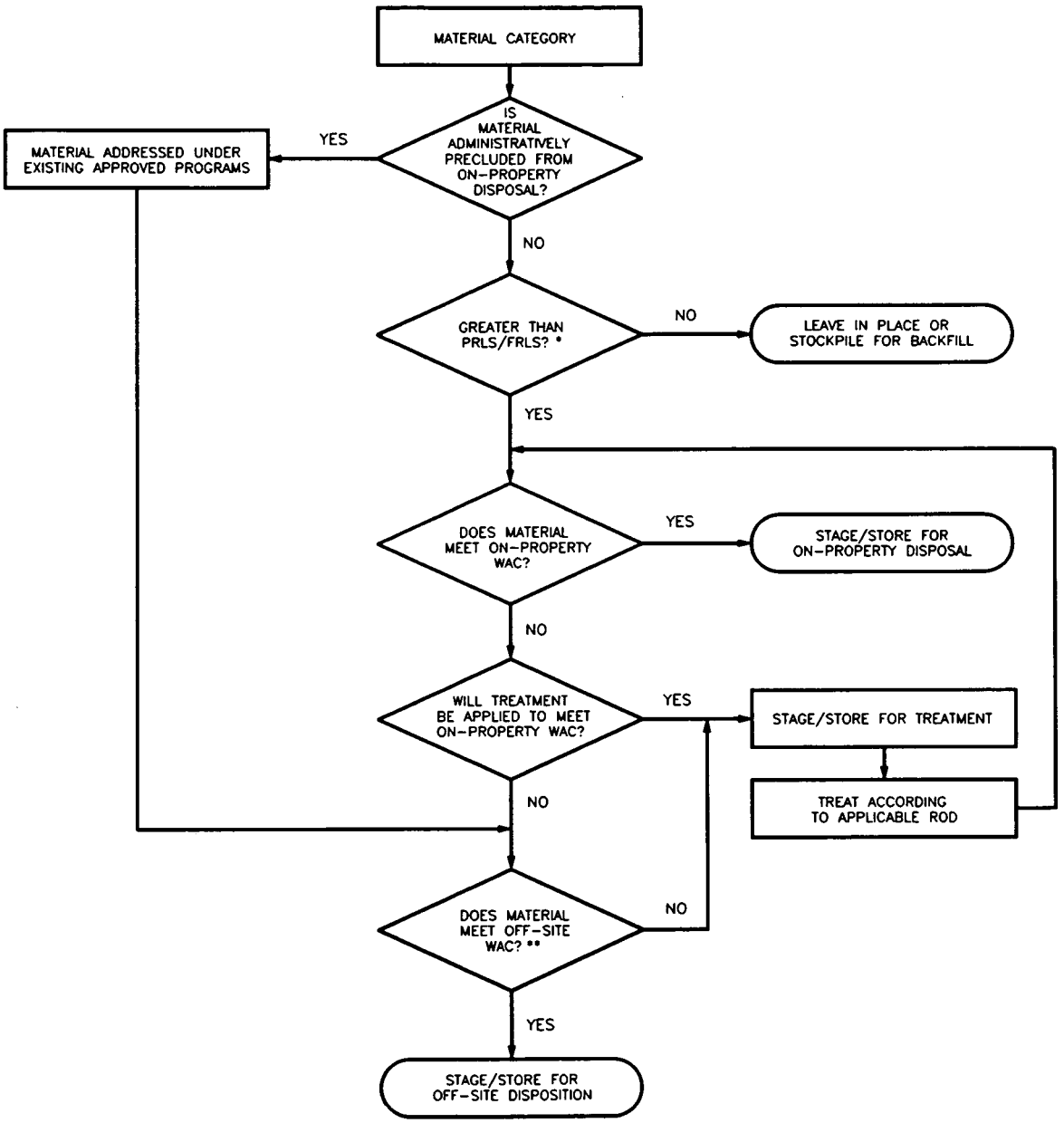


* EVALUATE DIVERGENT FRLS AND BTVS AS WELL
** DISPOSAL AND RECEIPT CRITERIA, INCLUDING LDRS

**FIGURE 2-4 FLOWCHART OF GENERAL SOIL & DEBRIS MANAGEMENT STRATEGIES**

### 2.4.3 Sources and Quantification of Soil and Debris

Many activities at the FEMP have generated soil and debris requiring controlled staging/storage. Activities to date have produced several soil piles that will likely require additional handling, possible real-time verification sampling, laboratory analysis, and temporary storage until final disposition is determined. These existing piles are primarily radiologically contaminated (determined through limited sampling results, field screening, and process knowledge), yet some materials (by process knowledge) may also be contaminated with petroleum products, PCBs, hazardous waste, or other mixed wastes.

Appendix C provides estimated quantities and sources of soil and debris on site as well as their locations on the FEMP site. These quantities represent soil and debris that either currently exist in some managed pile configuration at the FEMP or are currently being generated as part of field activities. Future sources and estimated quantities of soil and debris are identified to the extent possible.

Although is it difficult to identify all future soil and debris sources, the information presented in Appendix C is an estimate of the volume of soil and debris that may be created and the potential storage that may be needed for planning purposes. The generation schedule for these quantities will vary as additional structures may become available as waste inventories are removed. It should be noted that future-generated materials not identified in Appendix C should be managed according to the concepts presented in this Work Plan.

## 2.5 BACKFILL POLICY

The FEMP has established a backfill policy to: (1) minimize the amount of soil excavated during a construction project; (2) to minimize the need to bring soils from off-site locations; and (3) to identify criteria for the construction of new facilities. The backfill policy is effected by the determination of whether a facility is temporary or permanent.

Temporary facilities are defined as those that will be removed during remedial activities. Temporary facilities may be constructed without prior detailed characterization if the site is not expected to pose a significant risk to health or the environment. During construction, soil will be returned to the excavation or the surrounding area when possible. If it is not possible to reuse the soil at the point of excavation, the excess soil will be managed in accordance with the selected remedy in the Operable Unit 5 ROD. Should soil be required as backfill for construction of a temporary facility, the feasibility of using soil from a controlled stockpile or another area on site will be evaluated. This evaluation will be based on the amount of soil required and the project location. These temporary facilities may also be considered TUs under the CAMU rule. Design and operation of any constructed TU will be in compliance with 40 CFR 264.553. The design details of these TUs, as needed, will be designated in the appropriate remedial design and/or remedial action documentation.

Permanent structures (i.e., structures that will remain after the completion of final remedial action) will require that any contaminated soil under the proposed building be excavated and the area clean-backfilled prior to construction of that facility. Excavation of soil will generally occur to meet FRLs for that area. If soil is required for the construction of a permanent building, fill materials below the FRLs may be brought in from a non-contaminated borrow area (potentially off-site). However, the quantity of clean soil brought on site from off-site sources will be minimized. Hydraulic barriers may be utilized to prevent contamination of clean soils. Few permanent buildings are expected to be constructed at the FEMP during remedial activities.

There will be early coordination with both U.S. EPA and Ohio EPA prior to any decision on use of stockpiled material as backfill.

# 3.0 INTERIM SOIL MANAGEMENT PLAN

## 3.1 INTRODUCTION

The intent of this interim soil management plan is to provide a policy on efficient soil management practices for the FEMP during the period between approval of this plan (Revision No. 3) and availability of approved design documentation issued pursuant to an operable unit ROD which otherwise addresses a related issue. Concurrently this management plan is intended to be consistent with the anticipated remedial action plans. The goals of this interim management plan are to:

- Define the scope of this plan;
- Minimize the total number of soil staging areas for the FEMP by providing an integrated implementation strategy for all operable units (which can be achieved through the application of soil staging criteria); and
- Set guidelines for management practices of staging facilities, such as buildings and stockpiles, that are based on ARARs and protection of health and the environment.

## 3.2 SCOPE

This integrated soil management plan is limited to the on-site interim management of soil. This plan should be considered relevant upon excavation of soil, and inclusive of soil management activities until the soil is properly stockpiled or disposed. Pertinent soil management activities are based on the staging criteria established in Section 3.4 of this plan, and the knowledge of the anticipated staging needs for each of the operable units where soil will be managed.

## 3.3 INTEGRATION OF OPERABLE UNIT REQUIREMENTS

Information from the selected remedies or preferred alternatives for each operable unit will determine the potential to combine and reduce soil staging or storage areas, which includes knowledge of:

- Planned final disposition (e.g., on-property or off-site disposal);
- Location and mode of transport to off-site disposal facility(ies) as applicable;
- Total number of soil staging/storage areas projected during remediation;
- Projection of on-site treatment requirements for on-property/off-site disposal; and
- Types of staging areas required (e.g., stockpiles, container storage areas, construction of new facilities, use of existing facilities/structures).

The intent of this interim plan is to employ methodologies from the pertinent remedy descriptions to maintain consistency from this transition period into remedial action. The soil staging criteria presented below were developed on this basis.

## 3.4 SOIL STAGING CRITERIA

Guidelines for creating staging areas require several general criteria. The strategy for segregating or combining soil within an operable unit (or from several operable units) creates a commitment to manage

each staging area according to the common planned disposition of the soil in that staging area. The general criteria are discussed below. In addition, several criteria will be required for management practices for all soil stockpiles, such as run-on and run-off controls. These criteria will be developed in more detail after approval of this plan. In the event that new staging areas are created, moved, or consolidated, appropriate coordination will be conducted in advance with the U.S. EPA and Ohio EPA.

### 3.4.1 Location Restrictions for Staging Areas

Areas to be avoided for staging locations include designated wetlands and floodplains, areas that will not require remediation by any operable unit, habitats of endangered species, or areas where combining soil from other operable units would exceed the FRLs of that location. Appendix B includes a table of location-specific ARARs.

### 3.4.2 Staging Area for On-Site Treatment

Selected remedies where on-site treatment technologies are to be employed to meet the on-property WAC should combine the use of the treatment facilities and soil staging areas where common treatment technologies are being considered. The anticipated locations, facilities/staging requirements, and treatment technologies planned during remedial action have been included in Section 3.5.

### 3.4.3 Staging Area for On-Property Disposal

Soil that meets the on-property WAC may be combined into one designated central staging area for the on-property disposal facility if direct transport into the on-property disposal facility is not possible. Once soil is placed in this staging area, it will be managed in accordance with the on-property WAC. The on-property disposal facility WAC are provided in Section 5.0.

### 3.4.4 Staging Areas for Off-Site Disposal

Two off-site disposal facilities are currently designated to receive soil from the FEMP; others may become available at a future date. These include Nevada Test Site (NTS) and a representative licensed commercial disposal facility in Clive, Utah. Each of these facilities has specific WAC and transportation options that must be met in order to receive the FEMP's remediation waste. NTS can only receive shipments by truck. NTS accepts low-level radioactive waste, but will not accept waste regulated under RCRA or waste containing 55 parts per million (ppm) or more of PCBs under the Toxic Substance Control Act. Sampling and analysis plans must be submitted prior to acceptance at NTS. Therefore, at least one staging area is anticipated for soil, pending analysis for acceptance at NTS, based on the ability to ship material directly to the off-site disposal facility.

The representative licensed commercial disposal facility will accept both low-level mixed waste and low level radioactive waste. Hazardous wastes on its permit include D-characteristic waste, and most F-, P-, U-, and K-listed wastes. The licensed commercial disposal facility is not permitted to accept F-listed dioxins. Waste profiles must be submitted prior to shipment. Therefore, a minimum of two staging areas is assumed for shipment to the licensed commercial disposal facility, based on the presence/absence of RCRA constituents in the soil. Transportation options to the licensed commercial disposal facility include rail and truck. Remedial actions that may include on-site treatment to meet the licensed commercial disposal facility WAC prior to off-site shipment by rail should combine the use of the staging/treatment areas and manage soil in conjunction, or perform these activities separately in the same treatment/staging facilities (if operable unit ownership is necessary to maintain). Similarly, soil to be shipped by truck should be combined in another staging area when direct transport is not possible.

## 3.5 SUMMARY OF OPERABLE UNIT REMEDIAL ACTIVITIES THAT REQUIRE SOIL STAGING

The anticipated soil-related remedial activities for each operable unit relative to soil staging is summarized below. Specifics will be provided in subsequent remedial design packages and remedial action plans.

- OU1 - Soil excavated from beneath the pits will be stockpiled near the excavation area. The soil will be transferred to an on-site treatment facility. It is anticipated that the soil will be staged at two locations within this treatment facility: 1) preparation for feeding the materials into the treatment system, and 2) preparation for loading rail cars for shipment to an off-site disposal facility.

- OU2 - Staging areas are currently being considered for remedial action, and will be developed as needed. These areas will support OU2 waste excavation activities. Soil that does not meet the on-property WAC will be directly loaded and transported to the staging area planned for rail transportation activities. No treatment will be applied to OU2 remediation waste.

- OU3 - No soil staging areas are within the scope of this remedial action.

- OU4 - Two soil staging areas are anticipated during these remedial activities : 1) soil staging for on-property disposal (i.e., meets the WAC), and 2) soil for treatment prior to disposal (i.e., does not meet the WAC). The first staging area mentioned will be constructed through the OU2 selected remedy; hence, only one soil staging area (if necessary) is anticipated for OU4. Backfill soil will be managed as discussed in Section 2.5 of this plan.

- OU5 - Four types of areas are being considered for soil staging, as follows: 1) remediation wastes to be excavated during the winter may have to be stockpiled when the on-property disposal facility is closed during inclement weather conditions; 2) soil that contains vegetation in excess volumes for the on-property WAC may have to be staged or treated until the WAC is met; 3) soil that must be treated prior to on-property disposal will require a staging area; and 4) soil to be shipped off-site.

## 3.6 SOIL MANAGEMENT

Soil staging requirements apply to drummed soils, pads, buildings, or any structures or containers that may be used to hold soil. Some of these units may serve as Temporary Units (TUs) under the CAMU rule, as documented in the Operable Unit 3 Remedial Investigation (RI)/FS Report and the Operable Unit 5 FS and ROD. TUs are defined in 40 CFR §264.553(a) as temporary tanks and container storage areas which are used for treatment or storage of hazardous remediation wastes, during remedial activities. The U.S. EPA may allow for an applicable design, operating, or closure standard to be replaced by alternative requirements which are protective of human health and the environment. TUs or existing facility design standards must be designated in the remedial design or remedial action plan of the operable unit that intends to incorporate them. Many of the soil staging requirements are driven by action-specific ARARs, which are documented in Appendix B. It is the intent to use these designated units when necessary to facilitate interim soil management practices. Application of the CAMU and the designated criteria are designated in the Operable Unit 5 ROD and described in the Operable Unit 5 Feasibility Study.

Two generations of soil stockpiles from the FEMP will be managed differently: 1) stockpiles to be created during the interim period, and 2) existing stockpiles.

### 3.6.1 Soil Stockpiles to be Created During the Interim Period

Stockpiles to be created during the interim period will be segregated by their final disposition (e.g., on-property disposal or off-site disposal) and by their need for treatment and proposed method of shipment. The number of potential stockpiles needed for off-site disposal will be dependent on the number of facilities to receive waste from the FEMP, method of transport, and possible delays in being able to ship waste. Section 3.5 discusses *potential* stockpiles to be created during remedial activities.

### 3.6.2 Existing stockpiles

Currently there are several soil stockpiles, containing either Category I or Category II soil (per the RvA 17 Work Plan, Revision No. 2), which are staged at various locations across the FEMP. The contaminant concentrations from these categorized stockpiles will be compared to the on-property WAC to determine the potential disposition of the soil. Disposition confirmation of the soil stockpiles will be completed based on currently available sampling and analytical results from the stockpiles, as appropriate. The three options for soil disposition are: 1) on-property disposal, 2) treatment of soil to meet the on-property WAC, or 3) off-site disposal of soil.

## 3.7 WASTE MINIMIZATION

Waste minimization principles will be applied during FEMP remedial activities and within the scope of this plan. The FEMP will minimize the generation of waste soil by returning excavated soil to the environment, when appropriate (i.e., contamination levels do not exceed approved FRLs for that location). The combination of returning soil to the excavation and using soil from a controlled stockpile as backfill (see Section 2.5), when appropriate, will reduce the amount of clean backfill that is brought on site and potentially mixed with contaminated soils that would require treatment/disposal during the remedial action. Additionally, any material brought to the FEMP will be handled in accordance with the provisions of this work plan.

# 4.0 INTERIM DEBRIS MANAGEMENT PLAN

## 4.1 INTRODUCTION

This section addresses the interim management of FEMP construction debris that may require on-property storage/staging until approved design documentation issued pursuant to an operable unit ROD is established which otherwise addresses a related issue. This debris will be generated primarily from the decontamination and dismantlement (D&D) of OU3 structures; however, small amounts of debris may be generated during the remediation of other operable units. Interim storage of construction debris to be generated during the OU3 interim remedial action currently falls within the scope of the OU3 Record of Decision for Interim Remedial Action (IROD), but will be integrated into the OU3 ROD for Final Remedial Action. In order to integrate the scope of this work plan into the current scope of forthcoming OU3 activities, a brief discussion of the OU3 scope is presented in Section 4.2.

The majority of information contained within Section 4.0 relates primarily to OU3 activities. However, small volumes of debris will be generated during the remedial actions selected in the respective RODs for OUs 1, 2, 4, and 5. The sizing and packaging specifications, based on final disposition, will be incorporated into the waste management plan for the on-property disposal facility. These specifications will also be incorporated into remedial action plans. In addition, the staging of this debris will also be managed according to this revised RvA 17 Work Plan, until it is superseded by remedial action plans.

In addition to integration between remedial actions for debris management, the integrated remediation of below-grade materials (e.g., soil, below-grade piping, concrete foundations, etc.) is currently planned between the remedial actions for OUs 3 and 5 in order to reduce overall remediation schedules and costs, and to prevent double-handling of contaminated materials. This integrated approach includes utilizing one subcontractor to excavate the subgrade debris and soil from the former production area. The integration approach will be detailed in the planning documents to be developed to implement the OU5 ROD-selected remedial action.

## 4.2 OPERABLE UNIT 3 SCOPE

The OU3 IROD provides that the final remedial action ROD for OU3 will establish the strategy for the final disposition of the debris generated during the interim remedial action. The OU3 IROD specifies that all buildings, equipment and other above- and below-grade improvements undergo D&D. The IROD also specifies that only ten percent of the total volume of debris to be generated during the OU3 interim remedial action may be dispositioned off-site with the remaining portion of OU3 debris to be placed in interim storage until a final remedial decision is approved. The interim and final remedial actions will be coordinated to provide a unified remediation approach to OU3.

The forthcoming OU3 Proposed Plan for Final Remedial Action will identify the preferred remedial alternative that considers the disposal of a majority of the OU3 remediation debris in an on-property disposal facility along with OU2 and OU5 materials, as discussed in their respective RODs. Any debris removed from buildings and structures, as well as any debris generated during the interim and final remedial actions that requires storage will be supported by the debris management criteria/requirements discussed in the following sections. Again, the focus of this section is OU3 debris as the D&D of site structures will be the main generator of such debris.

## 4.3 DEBRIS DESCRIPTION

As with soil, guidelines for combining staging areas require several general criteria. The strategy for segregating or combining debris within an operable unit (or from several operable units) creates a

commitment to manage each staging area according to the common disposition of the debris in that staging area.

### 4.3.1 OU3 Debris Categories

OU3 RI/FS debris categories were developed as a management strategy to handle the diverse debris generated in OU3 as a result of ongoing and proposed D&D activities. The categorization of OU3 construction debris into nine debris categories was based on potential treatment and disposition options (including the ability to recycle and recover materials), possible dismantling techniques, and existing debris management strategies, as well as the regulatory drivers for segregation and disposition of debris. The estimated weights and volumes of debris, analytical characterization data, and process knowledge were also considered in the definition and categorization of debris. The debris categories provide a cross-walk to link volume estimates in the Sitewide Waste Information, Forecasting, and Tracking System (SWIFTS) database, RI/FS characterization data, WAC development, and potential process options.

Estimates of the weights and volumes of OU3 construction debris were compiled in the SWIFTS database. Details of the assumptions and methodology used in determining these estimates are provided in the draft OU3 Estimated Material Quantities Report, June 1995. A summary of the OU3 debris categories and their respective estimated volumes (in unbulked cubic feet) are provided in Table 4-1.

### 4.3.2 Staging Sub-Categories

Within each debris category, sub-categories have been defined to facilitate effective staging. For most of the debris categories, several potential dispositions exist contingent upon level of contamination and types of contaminants (e.g., disposal in the proposed on-property disposal facility, disposal at an off-site permitted facility, free release of non-contaminated material to a public landfill, recycling/reuse off-site, or requiring treatment prior to disposition). These sub-categories are important facets of debris management, as they identify future disposition, and will help in the determination of staging needs. For example, Category E (Concrete) debris will typically exhibit a variety of levels of fixed radiological contamination and may be destined for on-property disposal. This debris may be bulk staged to facilitate disposal operations. However, some concrete may be encountered with hazardous constituents, indicating off-site disposal or the potential need for treatment prior to disposal. This debris would be staged separately from the concrete acceptable for on-property disposal. Typically, this debris would be containerized according to the requirements for its ultimate disposition.

Based on current approaches incorporated into the draft OU3 RI/FS Report, debris will be segregated for on-property or off-site disposal. Debris remaining for on-property disposal will be placed in interim storage until such time that permanent disposal is possible. Debris that are to be sent off-site for disposal will be containerized at the point of generation for immediate shipment off-site. Interim on-property storage of these debris will be minimized to the extent practical.

## 4.4 DEBRIS MANAGEMENT

Given the nature of OU3 debris, the most efficient segregation of debris will be identified prior to the D&D based on current RI/FS data, process knowledge, and other supporting information. Given the nature of production activities at the FEMP, it is logical to attempt to segregate debris prior to removal. In its current state, RI/FS data and process knowledge can be used to determine the extent of contamination, the type of contaminants, and the condition of contamination (e.g., fixed or removable). Once the debris from the D&D efforts are bulk-stored or containerized, the traceability of the RI/FS data and process knowledge, as applied to the specific debris, will essentially be lost. Additionally, due to the extreme heterogeneity of the OU3 debris, any sampling approach implemented would not be

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## TABLE 4-1 OU3 DEBRIS CATEGORIES

| Category Designator | Category Title | Category Description | Estimated Unbulked Volume ($ft^3$) |
|---|---|---|---|
| A | **Accessible Metals** | Structural steel and steel decking having large accessible surface areas and thicknesses which are greater than one-quarter inch. The surface of accessible metals can be easily decontaminated using physical surface decontamination techniques and subsequently surveyed prior to disposition. | 63,400 |
| B | **Inaccessible Metals** | Non-process piping, equipment in non-process areas, decontaminated process equipment, conduit/wire, electrical fixtures, miscellaneous electrical items, doors, and other miscellaneous metals are included in this category. These debris have surfaces which cannot be easily decontaminated or surveyed, and thus are considered inaccessible. | 1,740,000 |
| C | **Process-Related Metals** | Process equipment, electrical equipment not included in Category B, and process piping which are assumed to be highly contaminated. Treatment of these debris is not expected to be cost-effective. | 151,000 |
| D | **Painted, Light-Gauge Metals** | Ductwork, louvers, metal wall and roof panels, and sheet lead (painted metals less than one-eighth inch thick) are included in this category. Metals in this category are assumed to be painted with lead-based paint, or in the case of lead sheeting, to be made of lead themselves. | 7,150 |
| E | **Concrete** | Concrete, masonry, asphalt, and clay piping are all porous construction debris. | 4,700,000 |
| F | **Acid Brick** | Acid brick was used extensively to line floors, drain areas, and trenches in process areas utilizing corrosive chemicals, and thus is expected to be highly contaminated. | 20,700 |
| G | **Non-Regulated Asbestos-Containing Materials (ACM)** | Transite walls and roofs, refractory (fire brick and insulating brick) debris, ceiling demolition, floor tile, and feeder cable are debris which are non-friable. | 71,300 |
| H | **Regulated ACM** | Piping insulation, ductwork insulation, and personal protective equipment (PPE), which are classified as regulated ACM because either the debris matrix is potentially friable ACM (e.g., insulation), or in the case of PPE, contaminated with asbestos fibers during asbestos abatement activities. | 80,200 |
| I | **Miscellaneous Debris** | Other miscellaneous items present in the structures and buildings in OU3 including windows, wood, built-up roofing, building insulation (non-ACM), drywall, process area and non-process area trailers, polyvinyl chloride (PVC) pipe, fabric roofs and walls, PPE, and other miscellaneous debris. | 704,000 |
| **TOTAL** | | | **7,540,000** |

NOTE: The source of Table 4-1 is the December 1995 draft of the OU3 Proposed Plan; however, Category J (Product, Residues, and Special Materials) is not included as it is excluded from the scope of RvA 17.

representative of potential residual contamination. The sub-categories established to facilitate effective staging of debris are further discussed below with respect to effect on the staging process.

Within the interim remedial action, all materials will be evaluated to determine its disposition in accordance with the proposed final disposition. As stated earlier, all materials to be dispositioned off-site will be containerized at the point of generation and staged under RvA 17 until shipment off-site can occur. All other materials will be staged under RvA 17 for potential on-property disposal under the final remedial action. Similar segregation decision will be made within the remedial action scopes of each operable unit generating debris at or before the time of generation.

A variety of other disposition options are available for debris depending on characterization and economic factors. Debris that meets radiological criteria for unrestricted release may be staged separately from debris acceptable for on-property disposal to facilitate unrestricted release actions. Also, based on levels/types of contamination and economic considerations, recycling of some debris streams may be feasible. These streams would generally be identified prior to execution of a D&D action to facilitate separate staging of this debris from others.

### 4.4.1 Implementing Debris Staging

For each separately identified debris stream, a variety of specific requirements will apply to assure environmental compliance and efficient management. Debris identified as acceptable for on-property disposal will be segregated from those destined for off-site disposal. Debris to be dispositioned off-site will be containerized at the point of generation and shipped off-site as soon as practical. For debris proposed to be disposed on-property, 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. These 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 include accessible metals, inaccessible metals, painted light-gauge metals, concrete, and transite. All debris will be staged as detailed in Table 4-2. Container selection would be accomplished as a function of appropriateness based on debris sizing and containment needs. Debris determined to be RCRA characteristic or listed hazardous waste would require continued management as hazardous debris until actual disposal occurs.

**TABLE 4-2 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 | Stockpile | On-Property |
| F | Acid Brick | Containerize | Off-Site |
| G | Non-Regulated ACM [2,3] | Stockpile/Containerize | On-Property |
| H | Regulated ACM | Containerize | On-Property |
| I | Miscellaneous Materials [3] | Containerize | On-Property |

Notes:
[1] Typical approach for storage of predominant materials. All hazardous and mixed waste debris will be containerized.
[2] Transite will be handled separate from other Non-Regulated ACM. Transite is to be band-wrapped to pallets and stored in stockpile configuration.
[3] Miscellaneous Materials can be containerized with other Non-Regulated ACM materials.

The following sections provide further detail relative to implementing the debris management strategy, including decontamination activities, interim storage, and monitoring/sampling issues. These sections are written to reflect the management of OU3 debris, in that OU3 is expected to be the primary source of debris during the effective period for this interim plan. The practices reflected in the following sections will be similarly imparted on any debris generated by other operable units during this effective period.

### 4.4.2 Operable Unit 3 Decontamination Activities

The categories that were introduced in Section 4.3 have been established for segregation of debris during the OU3 interim remedial action that are consistent with the potential disposition options available. Segregation of debris will occur during the interim remedial action according to potential disposition options. The segregation will be based on OU3 RI/FS sampling program data, process knowledge, and the results of the Safe Shutdown and the interim remedial action decontamination efforts. The decontamination activities to take place under Safe Shutdown and the interim remedial action will include removal of residues, vacuuming loose media, water washing, and scabbling of concrete to remove localized contamination "hot spots." The anticipated levels of contamination after the Safe Shutdown and interim remedial action activities should allow for the interim storage of OU3 debris in various configurations, as needed. Figure 4-1 shows the debris flow from post-interim remedial action to final disposition.

### 4.4.3 Interim Storage of Debris

As shown in Figure 4-1, debris that will be staged in stockpiles include structural steel, equipment, miscellaneous metals, painted light-gauge metals, and concrete. In addition, transite panels used for building roofing and siding would be stacked on pallets to an appropriate height. The stacked transite panels would then be banded to the pallet and placed in interim storage. The interim staging would be required since current and forthcoming OU3 D&D activities are expected to generate the aforementioned debris prior to the completion of the FEMP on-property disposal facility. It is currently expected that the D&D activities of Plant 4A, Plant 1A, Plant 9A, and Plant 10A will generate debris that will require interim staging until the on-property disposal facility is completed and functioning (currently scheduled for late 1997). Once the on-property facility is functional, the interim-staged materials would be placed in the facility in a sequential manner. Until such time, debris requiring interim staging will be placed on the Plant 1 Storage Pad (74T), other existing storage pads, and/or foundations of dismantled buildings.

The combination of the OU3 decontamination efforts and stormwater runoff collection systems would address potential leachate of fixed contamination from the stockpiled debris. Loose contamination is anticipated to be minimal due to the water wash that will be performed as part of the OU3 component D&D activities. Although all materials to be considered for stockpiling will have been water washed during D&D operations and subsequently inspected, it is assumed that because these materials may be staged uncovered for up to approximately four years, weathering conditions may cause small amounts of residual contaminants to be released.

To protect the environment from the migration of contaminated leachate, a polymer sealant has been applied to the surface of the Plant 1 Pad to create an impermeable barrier between the concrete and stormwater runoff. The runoff from these debris piles will be collected and treated, as necessary, in the site wastewater treatment system.

Likewise, airborne contaminant concentrations from the stockpiled debris are expected to be negligible based on reduced surface contamination after high-pressure water washing. However, if a determination is made that the debris requires additional treatment, the FEMP possesses the capability to treat the stockpiled debris with an amended water spray. The amended water would consist of ordinary water

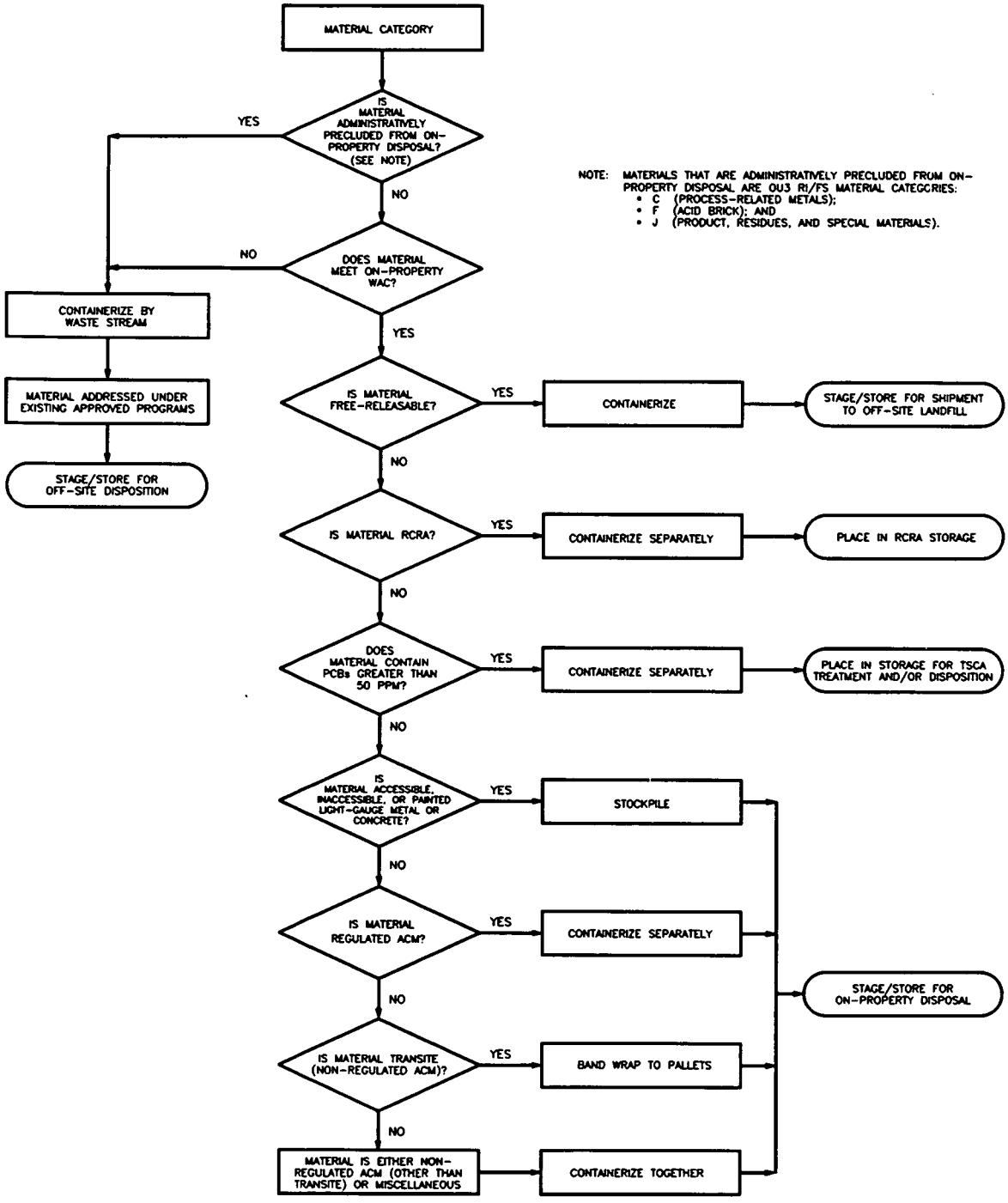


**FIGURE 4-1 MATERIAL FLOWCHART FOR DEBRIS CATEGORIES**

mixed with a commercial surfactant. The amended water could be applied to the stockpiles using fire-fighting equipment. This application would create a thin coating on the surfaces of the stockpiled debris to reduce the potential for airborne releases. This practice is common at uranium mill-tailing sites to suppress airborne emissions.

Worker protection (e.g., individuals involved with stockpiling of OU3 debris, etc.) requirements will be addressed by the site health and safety plan, which implements engineering and administrative controls to ensure that the inhalation and radiation doses received will not exceed occupational standards and are kept as low as reasonably achievable. Therefore, no significant impacts to human health (either on-site worker or off-site resident) or the environment are anticipated as a result of stockpiling debris.

#### 4.4.4 Monitoring/Sampling Issues

Since OU3 debris has been characterized based on conservative, biased sampling approaches ("hot spot" identification), the resulting disposition of the debris, represented by the OU3 RI sampling data, can be identified in advance of the OU3 D&D efforts. Further characterization to support disposition should generally not be necessary. However, any additional monitoring/sampling that may be required, will be defined in project-specific D&D implementation plans.

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# 5.0 MATERIAL CHARACTERIZATION

Prior to excavation of soil and segregation of debris, existing analytical data (i.e., analytical data resulting from RIs, safe shutdown activities, legacy waste characterization, and interim remedial action decontamination efforts) will be assessed to determine whether the soil or debris contains constituents greater than FRLs or WAC, as applicable. If analytical data and process knowledge does not exist to make this determination, sampling and analysis and/or field screening shall be performed. This section discusses the methods and activities necessary to collect that data.

## 5.1 OBJECTIVES

The primary objective of this sampling and analysis plan is to guide the collection of representative samples that will allow both accurate and precise measurements of the chemical and radiological contaminants in the soil and debris. The analytical data will be used to determine if material meets the requirements for waste management and disposal in the on-property disposal facility and at off-site facilities.

This sampling and analysis plan provides a general framework for sampling soil and debris, and describes the procedures that will be undertaken to obtain analytical data and/or field screen results of sufficient quality and quantity to characterize the soil and debris generated at the FEMP. Sampling and analysis shall only be performed when sufficient quality and quantity of data do not exist. All sampling and analysis (including field screening) will be conducted to determine if the soil/debris meets or exceeds the established WACs for the on-property disposal facility and to segregate into staging areas. Debris shall be dispositioned using data presented in the OU3 RI.

Project-specific sampling and analysis plans, developed in accordance with the Site-Wide CERCLA Quality Assurance Plan (SCQ), shall be prepared to provide details of the sampling effort (e.g., the number of samples to be collected, analytical requirements, and sampling procedures.) The project-specific sampling and analysis plans shall be submitted to the regulatory agencies for approval within or as a supplement to operable unit remedial action plans.

## 5.2 ANALYTICAL PARAMETERS

Process knowledge and analytical results generated during RI, safe shutdown activities, and legacy waste characterization will be relied upon to determine disposition and the need for staging; however, if existing analytical data are not of sufficient quality or quantity, additional sampling will be required. Analytical parameters will be consistent with Constituents of Concern (COCs) listed in the final RODs. This section discusses the COCs and sampling requirements for each operable unit. The list of analytes may be changed based on the specific requirements of each project.

Sampling and analysis requirements associated with operable unit remediation have not yet been developed, and will not be until the remedial action plans are developed; however, the soil cleanup levels (i.e., PRLs, FRLs, primary/secondary cleanup levels) for each operable unit are identified in discussions below.

### 5.2.1 Operable Unit 1

The levels identified in Tables E-1 and E-2 in Appendix E, are appropriate only to OU1 waste remediation activities. For disposal, sampling will be conducted to adhere to the WAC for the on-property or off-site disposal facility.

5.2.2 Operable Unit 2

The OU2 cleanup levels, or FRLs, have been divided into primary and secondary cleanup levels, which are presented in Table E-3 and Table E-4 in Appendix E, respectively. The COCs for the primary cleanup levels contribute over 90 percent of the risk from OU2 and over 99 percent of the volumes to be excavated under the selected alternative. The COCs for the secondary cleanup levels pose risks that are close to the $10^{-6}$ point of departure and contribute a small percentage to the overall risk from OU2. Based on existing analytical results from the RI and the volume calculations from the FS, secondary cleanup levels will most likely be achieved by remediation to the primary levels; however, this will be confirmed through post-remediation sampling.

OU2 material with concentrations at or below 346 pCi/g of uranium-238, or 1,030 (mg/kg) ppm of total uranium, will be accepted at the on-property disposal facility.

5.2.3 Operable Unit 3

Within OU3, 60 COCs were identified in the OU3 RI/FS Report consisting of 20 radioactive constituents, 16 inorganics, 15 semivolatile organics, three volatile organics, and six pesticides/PCBs. The listing of these COCs is included in Appendix E as Table E-5. Because none of the OU3 material will remain "in place" after completion of the interim and final remedial actions, remediation levels have not been developed for OU3 materials.

5.2.4 Operable Unit 4

Table E-5 in Appendix E provides FRLs for soil cleanup in the soils. Specific details on the development of these FRLs are provided in the FS Report for OU4. Based on the contaminant concentrations found in OU4 soils, FRLs were not required for non-radionuclide (chemical) contaminants.

5.2.5 Operable Unit 5

The WAC were derived to establish mass-based or activity-based operation limits for soil or sludge contaminant concentrations to ensure the long term protection of the Great Miami Aquifer underlying and downgradient of the on-property disposal facility. The OU5 on-property WAC were derived to ensure that the water quality in those portions of the aquifer potentially impacted by the on-property disposal facility do not exceed the groundwater FRLs over the long term. The OU5 on-property disposal facility WAC are provided in Table E-8 in Appendix E.

The proposed remediation levels for the individual carcinogenic contaminants for on-property soil represent the 1 x $10^{-6}$ Incremental Lifetime Cancer Risk (ILCR) level to a hypothetical undeveloped park user. For the noncarcinogenic constituents, the final remediation levels for each constituent present in on-property soil represent a concentration equivalent to an Hazard Quotient (HQ) of 0.2 to a hypothetical undeveloped park user. As identified in Table E-6 and E-7 in Appendix E, FRLs are presented for soil and sediment for uranium present in both leachable and relatively nonleachable forms. Soil exhibiting relatively leachable forms of uranium have been detected within the former production area beneath the retired processing buildings. For on-property soil exhibiting less leachable forms of uranium, the proposed OU5 remedy has adopted an As Low As Reasonably Achievable (ALARA) goal of 50 ppm (mg/kg) of uranium in soil. The FEMP will apply available hand-held instrumentation to help guide excavation and assist in identifying any isolated areas of higher contamination to help attain this ALARA goal.

The FRLs for off-property soil represent the 1 x $10^{-5}$ ILCR level (3.5 x $10^{-5}$ for uranium to the resident farmer receptor) for individual carcinogenic constituents. The FRLs for the Great Miami Aquifer represent the Safe Drinking Water Act maximum contaminant levels (MCLs) or, in the absence of MCLs, the 1 x $10^{-5}$ ILCR or HQ of 0.2 values for individual constituents to recreational users of surface water resources.

## 5.3 SOIL AND DEBRIS SAMPLING

The characterization process for soil and debris will rely heavily on existing data and field surveying results. Supplemental verification sampling may be completed to increase the confidence levels of the field surveying results. Guidelines for soil and debris sampling protocols are contained in Section 6 and Appendix K of the SCQ. Project specific sampling and analysis plans will be developed to define the actual sampling and analytical needs.

Sampling equipment shall be decontaminated following use at each sampling location to prevent the transfer of contaminants from equipment to sampled media and to limit cross-contamination between sampling locations. Equipment shall be decontaminated according to requirements outlined in Appendix K.11 of the SCQ.

Sample collection documentation shall be completed for all sampling activities. Required documentation include a daily field activity log and sample collection log. Pertinent information contained on these forms include activities and measurements conducted in the field by the sampling team, unique sample location identifier, collector initials, sample volumes, sample preservation, equipment calibration information, sample data and time, and chain-of-custody information.

Soil samples shall be collected using trowels, shovels, hand augers, or hydraulically operated soil probing equipment composed of inert material relative to the analytes of interest. Intrusive sample collection methodology for debris differs depending upon the sampled media. Collection methods include needle scaler, coring devices, rotary drill and coring bit, and paint scrapers. Samples shall be carefully transferred to the appropriate sample containers and sealed with custody tape. The samples will be preserved according to the requirements of the analytes of interest. Samples requiring compositing shall be composited according to the guidelines specified in Appendix K of the SCQ. Samples collected for volatile organics analyses shall not be composited. IDW generated from sampling activities will be handled per Section 6.0.

## 5.4 FIELD SCREENING

Real-time field instrumentation may be utilized for chemical and radiological screening of the soil. Concentrations for some contaminants may required determination in the laboratory as field instruments may not detect the FRL and WAC concentrations with the high level of confidence and accuracy needed. Specific instrumentation shall be outlined in the applicable operable unit Remedial Action Work Plans or Project Specific Sampling Plans. Field screening instrumentation will be calibrated according to manufacturer's specifications. Any equipment that fails calibration shall be tagged and removed from service.

## 5.5 FIELD AND LABORATORY QUALITY ASSURANCE

Duplicate samples and trip, field, and rinseate blanks may be collected during sampling for Quality Assurance/Quality Control (QA/QC) purposes. Frequency and applicability of field and laboratory QC sample collection are in Section 4.0 and Appendix G of the SCQ. The field and laboratory QC samples

shall be collected consistent with the on-property and off-site facility WACs and the requirements for the collection of field QC samples shall be documented in the project specific sampling and analysis plans.

The following types of laboratory QC samples shall be analyzed as applicable for analytical methods: laboratory control samples, method blanks, matrix spikes, matrix spike duplicates, surrogate spikes, blind and double blind QC samples, and interlaboratory comparison study samples. Guidelines for laboratory QC are contained in Appendices A and G of the SCQ.

## 5.6 CHAIN-OF-CUSTODY

An essential component of the soil and debris sampling and analysis plan is ensuring the integrity of the sample from collection and analysis to data reporting. A chain-of-custody procedure will be utilized to ensure this traceability. The chain-of-custody program is presented in Section 7.0 of the SCQ.

## 5.7 ANALYTICAL METHODS

When field screening methods are not feasible, hazardous waste constituents will be analyzed according to the U.S. EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846) procedures. Additionally, when field screening methods are not feasible radionuclide activities will be performance-based as specified in Appendix G of the SCQ.

## 5.8 DATA VALIDATION, MANIPULATION, AND MANAGEMENT

Guidelines for analytical data validation, consisting of an independent review of all sampling and analytical information and qualifying the data results (if necessary), are contained in Appendix D of the SCQ and as otherwise required to meet disposal facility WAC.

Statistical analysis between the calculated mean value and the limit may be required to determine whether there is a significant difference at a 95 percent confidence level. If that is the case, a student's "t" test will be used to perform the statistical analysis and the analytical results will be entered into a computerized database.

# 6.0 NON-AQUEOUS IDW MANAGEMENT PLAN

This section establishes the site-wide principles for management of all non-aqueous IDW. The non-aqueous IDW includes drilling muds and cuttings from soil borings and well installation; soil, debris, and other materials from the collection of samples; residues (e.g., ash, spent carbon) from testing of treatment technologies and treatment systems; and contaminated PPE used during investigations. This section addresses IDW that is currently stored in containers and stockpiles, as well as IDW that will be generated during field activities.

The non-aqueous IDW includes waste materials generated from CERCLA field investigation activities, (e.g., RI/FS and Remedial Designs), that may pose a risk to human health and the environment. The RvA17 implementation and Remedial Action (RA) phases of the FEMP cleanup, although not an investigative phase, will likely generate investigative wastes (e.g., verification and certification samples, drill cuttings from installing pumping wells) similar to the IDW-wastes covered by this policy. The removal action or remedial action plans will therefore incorporate these waste management principles for IDW-type wastes generated during the removal or remedial action (e.g., PPE, excess verification samples, etc.).

The management principles identified in this Section should be considered for any IDW generated during CERCLA activities conducted at the FEMP. All removal or remedial action plans that involve IDW should specify the methods for managing IDW. These methods should be consistent with the IDW management principles included in this section.

## 6.1 BACKGROUND

Two FEMP policies currently exist for non-aqueous IDW: the OU2 plan for soil and waste drill cuttings, and the OU5 plan for soil drill cuttings (Attachment D).

The OU2 plan is for managing soil and waste drill cuttings generated from the OU2 RI Phase II sampling program. The plan specifies areas within OU2 where cuttings are to be placed. The OU5 policy involves drummed soil drill cuttings from previous OU5 field investigations conducted in 1993. The plan states that the drummed soil is to be placed in a shallow surface depression near the sampling location or is to be managed per (previous) RvA 17 methodologies, depending on the nature and amount of contamination. Both the OU2 and OU5 plans are superseded by this non-aqueous management plan.

Note that a policy currently exists for aqueous IDW — the FEMP's Policy for Management of Aqueous IDW. The FEMP's aqueous IDW which includes purge water from sampling monitoring wells, development water from the installation of monitoring wells, and wastewater from decontaminating PPE and sampling equipment, will be treated through the Advanced Wastewater Treatment (AWWT) facility. The policy should be used for all aqueous IDW generated during the RI/FS and RD phases of cleanup, and its principles should be incorporated into all removal and remedial action plans, as appropriate.

## 6.2 NON-AQUEOUS IDW MANAGEMENT

Non-aqueous IDW should be managed in a manner to: 1) minimize the generation of new waste-streams, 2) be consistent with the management of the source waste, and 3) be consistent with the remedial action for the site. The preferred management options for non-aqueous IDW is to return the IDW to or near its source, if possible, or to manage it in accordance with Sections 3.0 and 4.0 of this work plan.

The management method of the IDW is dependent on the type and amount of contamination in the source material from which the IDW is generated. Knowledge of the type and amount of contamination can be

based on one of the following information sources: existing data from the RI Reports and other projects, data from field screening performed while the IDW is generated, or laboratory analytical data. This information is sufficient to determine the type and amount of contamination in the IDW, including whether or not the IDW contains a listed hazardous waste and/or has the potential to exhibit a hazardous waste characteristic.

### 6.2.1 RCRA-Hazardous Non-Aqueous IDW

Any IDW from investigations of known or suspected RCRA-hazardous soil, debris, or waste should be identified. If the IDW contains a listed hazardous waste or exhibits a characteristic it should be managed in the manner described in this sub-section. If the IDW does not contain a listed hazardous waste or exhibit a characteristic then it should be handled according to Sections 6.2.2 through 6.2.5 of this Plan.

RCRA-hazardous soil/debris/waste is subject to regulation under RCRA (and Ohio Hazardous Waste rules) if: (1) the soil/debris/waste contains a listed hazardous waste, or (2) the soil/debris/waste is contaminated enough to exhibit a hazardous waste characteristic such as corrosivity, reactivity, ignitability, or toxicity. Mixed waste/soil/debris is both RCRA-hazardous and radioactive.

To contain a listed hazardous waste, the IDW must be contaminated with a hazardous constituent that resulted from contact with or leakage of RCRA-hazardous waste from a Hazardous Waste Management Unit (HWMU), or must be from sampling waste within a HWMU. Merely containing contamination of a hazardous substance that is listed in RCRA does not render a soil, debris, or waste RCRA-hazardous. The source of the hazardous substance must be from a HWMU that managed listed hazardous waste in order to be considered a listed hazardous waste. Any IDW associated with soil/debris/waste containing a listed hazardous waste to be disposed in the on-property disposal facility should be handled in the same manner as non-RCRA hazardous IDW, per Sections 6.2.2 through 6.2.6 of this plan. IDW containing listed hazardous waste that will be disposed off-site should be containerized and stored on-site in a RCRA storage area until it is disposed.

To be characteristically hazardous, the IDW must be contaminated enough to exhibit a hazardous waste characteristic. The source of the contamination that causes the soil/debris/waste to exhibit the characteristic is not relevant, unlike listed hazardous wastes. IDW that may be contaminated enough to exhibit a hazardous waste characteristic (regardless of the source of contamination) will be considered to be potentially characteristically hazardous and should be containerized until the source material and/or the IDW has been sampled. If the IDW or its source material exhibits one or more of the four aforementioned characteristics, then it should continue to be containerized and stored in an approved RCRA storage facility on-property for subsequent treatment and/or disposal. If the IDW does not exhibit one or more of the four characteristics then it should be managed in the same manner as non-hazardous IDW, per Sections 6.2.2 through 6.2.6.

Note that some hazardous waste may meet regulatory exclusions for management as a hazardous waste. IDW from investigations of such excluded waste would also be excluded from management as a hazardous waste.

### 6.2.2 Soil From Drilling Boreholes and Soil and Debris From Field Sampling

Drilling boreholes for subsurface geotechnical investigations and/or for monitoring well installation will generate IDW in the form of soil drill cuttings and excess soil from split spoon samples. Shallow hand augers and surface soil sampling will generate IDW in the form of excess soil sample material. Such IDW should be returned to the source if the contaminant concentration in the IDW meets or is less than the FRL for that area. If the IDW contaminant concentration is greater than the FRL for the source area,

the IDW can be returned to the source area only if the IDW contaminant concentration does not exceed or significantly differ from the average surface soil contamination at the source location. If the IDW contaminant concentration exceeds or significantly differs from the average surface soil contamination at the source location, then the IDW should be placed in an appropriate stockpile in accordance with Section 3.0 of this Plan.

IDW generated from excess field samples of debris should be returned to the sample source, if possible, or in appropriate debris stockpile in accordance with Section 4.0.

6.2.3 Waste From Drilling Boreholes and Field Sampling

Investigations of wastes in the units to be remediated (e.g., waste pits, landfills, etc.) will result in excess waste samples and waste drill cuttings. Where possible, such IDW should be returned to the source unit under investigation provided that the returned IDW will not pose an increased risk to human health and the environment.

6.2.4 Sample Material for Laboratory Analysis

Soil/debris/waste samples will be taken to verify the extent and nature of contamination and to certify that cleanup goals have been achieved. Such sampling will generate IDW (from both on- and off-site laboratories) in the form of unused samples and sample fractions, used sample fractions, contact wastes from laboratory analysis, and residues from sample analysis.

*Unused and unpreserved* soil/debris/waste samples and sample fractions that are no longer needed may be returned to the samples' source or to an adjacent location, if possible. If the source has since been excavated or removed, then the sample material should be managed in accordance with Sections 3.0 and 4.0 of this Plan.

The IDW from soil/debris/waste sample fractions that have been analyzed in the laboratory include associated sampling equipment and containers (contact waste), used lab samples, and associated residues (extracts, leachates, acid digests) from sample analysis. Such IDW from laboratory analysis may be often contaminated with chemicals after the laboratory analysis (e.g., the sample may be purged with organics to extract the analytes, and should be containerized and managed separately.) Therefore, IDW from both on-site and off-site (if sent back to the FEMP) should be collected in drums and sampled for waste characterization and to determine appropriate disposition.

6.2.5 PPE

The PPE (e.g., respirators and clothing articles) used during field activities will be decontaminated to allow re-use, if possible. If contaminated PPE are to be disposed, they should be containerized and stored on-site pending disposition either in the on-site disposal cell or at an off-site facility. Decontaminated and uncontaminated PPE will be baled and placed in site dumpsters for disposal off-site at a solid waste landfill.

6.2.6 Treatment Technology Testing Waste

Testing treatment technologies for treating contaminated soil/debris/waste will generate IDW in the form of excess unused sample material, treated sample material, and non-aqueous residues such as ash or spent carbon. Treated and unused soil/debris/waste samples should be returned to the source or an adjacent location, where possible, or managed according to Sections 3.0 and 4.0 of this Plan.

Some waste might come to the FEMP from another site for treatability study. Treatability samples and other wastes resulting from treatability testing of such waste are not covered under this section. Management of such waste must be defined in the appropriate plan for the treatability study.

# APPENDIX A

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# RvA 17 REVISED WORK PLAN SCHEDULE & ASSOCIATED OPERABLE UNIT (OU) MILESTONES/DATES

| 1994 | | | 1995 | | | 1996 |
|---|---|---|---|---|---|---|
| DEC. 7 | MAR. 1 | JUN. 8 | JUL. 23 | OCT. 23 | OCT. 31 | NOV. 25 |
| OU4 FINAL ROD[1] | OU1 FINAL ROD | OU2 FINAL ROD | DRAFT RvA 17 WORK PLAN TO EPA | FINAL RvA 17 WORK PLAN TO EPA | OU5 FINAL ROD | OU3 FINAL ROD |

[1] Draft RD Work Plan submitted to EPA 0 to 60 days following Final ROD. Draft RA Work Plan(s) submitted to EPA 2 to 7 months from Draft RD Work Plan submittal





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# APPENDIX B

## APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

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**TABLE B-1 RvA17 ARARs**

## CHEMICAL SPECIFIC ARARs/TBCs

| | |
|---|---|
| **AIR** | |
| 40 CFR 61 Subpart H | National Emission Standards for Emissions of Radionuclides Other Than Radon From DOE Facility |
| 40 CFR 61 Subpart Q | National Emission Standard for Hazardous Air Pollutants, Radon - 222 Emissions |
| **TOXIC SUBSTANCE CONTROL ACT** | |
| 40 CFR 761.125 | Requirements for PCB Spill Cleanup |
| OSWER Dir. No. 9355.4-01 | Guidance for Remedial Actions for Superfund Sites with PCB Contamination |
| **RADIATION LIMITS** | |
| DOE Order 5400.5 (proposed 10 CFR 834) | Radiation Protection of the Public and the Environment |

## LOCATION-SPECIFIC ARARs/TBCs

| | |
|---|---|
| **THREATENED AND ENDANGERED SPECIES** | |
| 16 USC §1531 et seq. | Endangered Species Act |
| 50 CFR 17.21, 17.31, 17.61, 17.71 and 17.94 | Endangered and Threatened Wildlife and Plants |
| 50 CFR 402.01 | Interagency Cooperation - Endangered Species Act |
| **FLOOD PLAINS AND WETLANDS** | |
| 10 CFR 1022.3(a)(b)(1),(2),(3),(5),(6),(c)(d)(e) | DOE Compliance with Flood Plains/Wetlands Environmental Review Requirement |

**TABLE B-1 RvA17 ARARs (Cont'd)**

## ACTION-SPECIFIC ARARs/TBCs

| | |
|---|---|
| **GENERAL** | |
| 40 USC §4901 et seq. | Noise Control Act |
| 42 USC §7641 | Noise Pollution and Abatement Act |
| | Hamilton County Earthwork Regulations Erosion Control Specifications |
| **HAZARDOUS WASTE MANAGEMENT (GENERAL FACILITY STANDARDS)** | |
| 40 CFR 262.11<br>OAC 3745-52-11 | RCRA Hazardous Waste Determination |
| 40 CFR 265.13 - .16<br>OAC 3745-65-13 - 16 | Interim Status: Treatment, Storage, and Disposal General Facility Standards |
| 40 CFR 265.31 - .35, .37<br>OAC 3745-65-31 - 35, 37 | Interim Status: Treatment, Storage, and Disposal Facility Preparedness and Prevention |
| 40 CFR 265.51, .52 and .55 - .56<br>OAC 3745-65-51, -52, and -55 through -56 | Interim Status: Treatment, Storage, and Disposal Facility Contingency Plan and Emergency Procedures |
| 40 CFR 264.251 through .259<br>OAC 3745-56-51, 54, 58 | RCRA Waste Piles |
| **HAZARDOUS WASTE MANAGEMENT (CORRECTIVE ACTION)** | |
| 40 CFR 264.552, .553 | Subpart S: Corrective Action Management Unit 58 FR 865829 (16 FEB 93) - (See Table C-5 for additional discussion) |
| **ASBESTOS** | |
| 40 CFR 264.552, .553 | Asbestos Waste Handling |
| **RADIOACTIVE** | |
| | Occupational Radiation Protection Standards for Protection |
| 10 CFR 835 | |
| 10 CFR 20 | |
| **SURFACE WATER RUN-OFF** | |
| 40 CFR 122.26 | Discharge of Stormwater Run-off |
| OAC 3745-38 | Discharge of Stormwater Run-off |
| **AIR** | |
| OAC 3745-15-07 | General Provisions on Air Pollution Control Prevention of Air Pollution Nuisance |
| OAC 3745-17-08 | Restriction of Emission of Fugitive Dust |

**TABLE B-2 RvA 17 OTHER REQUIREMENTS**

| | |
|---|---|
| 29 CFR 1904 and 1910 | Occupational Safety and Health Act (OSHA) Worker Protection Requirements |
| DOE Order 5440.1E | NEPA Compliance Program |
| DOE Order 5480.1B | Environmental, Safety, and Health Program for DOE Operations |
| DOE Order 5480.4 | Environmental Protection, Safety, and Health Protection Standards |
| DOE Order 5483.1A | Occupational Safety and Health Programs for DOE Employees at Government Owned, Contractor Operated Facilities |
| DOE Order 5700.6C | Quality Assurance |

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# APPENDIX C

# FEMP SOIL PILE AND DEBRIS QUANTITY ESTIMATES

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# APPENDIX C
# FEMP SOIL PILE AND DEBRIS QUANTITY ESTIMATES

This appendix summarizes the in situ soil volumes generated at the FEMP during various removal actions, maintenance, and construction projects. Table C-1 lists these projects, the locations where the soil was excavated and stored, the operable unit responsible for the generation, the associated category (i.e., I or II), and the volume in cubic yards.

This appendix also provides summary information concerning unbulked and bulked volumes and their associated weights for materials (i.e., debris) to be generated from the dismantlement of OU3 components during the OU3 interim remedial action. Estimates for the OU3 FS material categories, as defined during the development of the OU3 RI/FS Report, are provided for each component and are summed to provide complex totals. The complexes are listed in the same order as the sequence for the base schedule provided in the final OU3 Remedial Design Prioritization and Sequencing Report (June 1995).

Table C-2 lists unbulked volumes of OU3 materials for each component and complex. These volume estimates have been taken from the FEMP Sitewide Waste Information, Forecasting, and Tracking System (SWIFTS) database, which is the official FEMP database for material estimates and is constantly being updated with improved, more detailed volume estimates.

Table C-3 provides bulked volume estimates for OU3 materials. These numbers were calculated by multiplying media-specific bulking factors with the unbulked volume estimates provided in Table C-2. These bulking factors originated during the development of the OU3 Proposed Plan/Environmental Assessment for the Interim Remedial Action (December 1993) and have been further refined from data gathered from Removal No. 19 (Plant 7 Dismantling) and from construction industry standards.

The estimates of OU3 material tonnage in Table C-4 are calculated by multiplying unbulked material densities to unbulked volume estimates provided in Table C-2. These material densities are either generally well-known chemical properties (e.g., the density of steel is 490 pounds per cubic foot) or were provided by the manufacturer of the material (e.g., the density of transite is 112 pounds per cubic foot).

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# TABLE C–1 Volumes of FEMP Soil Piles

| Project | Location Generated | OU | Category | Location Moved From Longitude | Location Moved From Latitude | Location Moved To Longitude | Location Moved To Latitude | Volume (CY) |
|---|---|---|---|---|---|---|---|---|
| AWWT Area | North Side | 5 | I | 84° 41' 32.5" | 39° 17' 46.5" | 84° 41' 25" | 39° 17' 30" | 190 |
| AWWT Area IV | East Side of Building 51 | 3 | I | 84° 41' 29.5" | 39° 17' 46.5" | 84° 41' 31" | 39° 17' 59.5" | 200 |
| AWWT Area III | South Ammonia Tank Farm | 5 | I | 84° 41' 29.5" | 39° 17' 46.3" | 84° 41' 25" | 39° 17' 30" | 2,667 |
| AWWT Area II | Pipeline from Building 51 to SWRB | 5 | I | 84° 41' 25" | 39° 17' 42" | 84° 41' 25" | 39° 17' 30" | 150 |
| Checkpoint Awning Project | West Side of T–50 | 3 | I | 84° 41' 10.4" | 39° 17' 47.5" | 84° 41' 31" | 39° 17' 59.5" | 10 |
| Laundry Sump Project | North of Services Building | 3 | I | 84° 41' 16.3" | 39° 17' 49.5" | 84° 41' 31" | 39° 17' 59.5" | |
| Lab Hoist Installation Project | Northwest Corner of Northern Lab Courtyard | 3 | I | 84° 41' 23.4" | 39° 17' 48.7" | 84° 41' 31" | 39° 18' 00.5" | 5 |
| Site Consolidation Parking Lot | West of Building 45 | 5 | I | 84° 41' 25" | 39° 17' 20" | Along the road base from: | | 4,500 |
| EDR Trailer Project | South Side of Building 20B (West Tank H) | 3 | I | 84° 41' 16" | 39° 18' 03" | 84° 41' 25" | 39° 17' 59" | 2 |
| Horizontal Grout Project Soils | North of Sewage Treatment Plant | 5 | I | 84° 40' 50" | 39° 18' 05" | 84° 41' 25" | 39° 17' 20" | 1,243 |
| Waste Plant Brine Pit | Northwest Corner of Building 10A | 3 | I | 84° 41' 17.3" | 39° 18' 06" | | | 8 |
| South Plume Recovery Well Cutting | Floodplain | 5 | I | | | 84° 41' 25" | 39° 17' 30" | 39 |
| Building 10 Excavation | Building 10 Northwest of Boiler Plant | 3 | I | 84° 41' 18" | 39° 18' 07" | 84° 41' 15.5" | 39° 18' 00.5" | 4 |
| Container Staging Area | Northeast of Building 82 (Buffer Zone) | 5 | I | Area Bounded on E and W by: | | 84° 41' 25" | 39° 17' 30" | 7,407 |
| Building 78 Southeast | Southeast of Building 78 | 3 | I | 84° 41' 03" | 39° 18' 03.3" | 84° 41' 17" | 39° 18' 15.5" | |
| Nitric Acid Tank Car | Rail Siding Northeast of Building 64 | 3 | I | 84° 41' 09.8" | 39° 18' 10.8" | 84° 41' 29.2" | 39° 17' 48" | 1 |
| Nitric Acid Tank Car | Rail Siding Northeast of Building 64 | 3 | I | 84° 41' 09.8" | 39° 18' 10.8" | 84° 41' 12" | 39° 18' 09" | 3 |
| Great Miami River Chr. Project | 18 Sample Points at Outfall | 5 | I | | | 84° 41' 25" | 39° 17' 30" | 3 |
| RvA 14 | Sewage Treatment Plant | 3 | I | 84° 40' 43" | 39° 17' 55" | 84° 41' 25" | 39° 17' 30" | 2,257 |
| Common Carrier Staging | Southeast of Building 82 | 5 | I | 84° 41' 01.9" | 39° 17' 49.9" | 84° 41' 25" | 39° 17' 30" | 500 |
| BDN Pipe Repair | West Side of Building 18H | 3 | I | 84° 41' 26.8" | 39° 17' 52.6" | 84° 41' 29.9" | 39° 17' 57.6" (9yd) | 14 |
| Water Main Repair at Laundry | North Side of Building 11 (Laundry) | 3 | I | 84° 41' 16.3" | 39° 17' 49.7" | 84° 41' 07.4" | 39° 18' 01.6" | 10 |
| SPIT Project | Northwest Corner of SWRB (18E) | 5 | I | 84° 41' 21.5" | 39° 17' 39" | 84° 41' 25" | 39° 17' 30" | 100 |
| Electrical Sub–Station | Main Electrical Station (16A) | 3 | I | 84° 41' 04" | 39° 17' 48" | 84° 41' 31" | 39° 17' 59" | 14 |
| UST #5 | Northwest Corner of Building 46 | 3 | I (UST) | 84° 41' 07.7" | 39° 17' 49.9" | 84° 41' 17" | 39° 18' 09" | 3 |
| Oil Spill at Building 53A | South Side of Building 53A | 3 | PCS I | 84° 41' 14" | 39° 17' 48" | 84° 41' 16" | 39° 18' 10" | 2 |
| AWWT Area IV | East Side of Building 51 | 3 | II | 84° 41' 31" | 39° 18' 00.5" | 84° 41' 31" | 39° 18' 00.5" | 198 |
| AWWT Area VI | Pipeline from BDN to Building 51 | 3 | II | 84° 41' 19"–29" | 39° 17' 50.5" | 84° 41' 31" | 39° 17' 00.5" | 30 |
| AWWT Area VI (cont.) | | | | 84° 41' 19" | 39° 17' 49.3"–55" | | | |
| Laundry Sump Project | North of Services Building | 3 | II | 84° 41' 16.3" | 39° 17' 49.5" | 84° 41' 31" | 39° 18' 00.5" | 3 |
| Fuel Loading Station Project | Northwest Corner of Building 82 | 3 | II | 84° 41' 03" | 39° 17' 52" | 84° 41' 31" | 39° 17' 00.5" | 17 |
| Building 78 Soils North Side | North Side of Building 78 | 3 | II | 84° 41' 03.5" | 39° 18' 05" | 84° 41' 25" | 39° 17' 30" | 100 |
| Plant 7 Utilities Capping | West Side of Plant 7 | 3 | II | 84° 41' 91" | 39° 17' 53" | 84° 41' 12" | 39° 18' 09" | 5 |
| Waste Water Sump Pump | South Side of Building 20B and Piping | 3 | II | 84° 41' 90" | 39° 17' 53" | 84° 41' 31" | 39° 18' 00.5" | 2 |
| Lab Upgrade | Northwest Side of Building 15A | 3 | II | 84° 41' 25" | 39° 17' 49" | 84° 41' 31" | 39° 17' 00.5" | 1,200 |
| EPA/Parsons Trailer Project | East Side of Building 46 | 3 | II | 84° 41' 06.5" | 39° 17' 48" | 84° 41' 12" | 39° 18' 09" | 86 |
| Plant 1 Pad Upgrade | North of Plant 1 | 3 | II | Trench E to W : | | 84° 41' 31" | 39° 18' 00.5" | 140 |
| RvA 14 | Sewage Treatment Plant | 3 | II | 84° 40' 53" | 39° 17' 50" | 84° 41' 12" | 39° 18' 09" | 400 |
| Storm Sewer Upgrade | A Street West of BDN Faciliy | 3 | II | | | | | 100 |
| Storm Sewer Upgrade | Intersection of A and 101st | 3 | II | | | | | 309 |
| Storm Sewer Upgrade | Northwest Corner of Plant 6 | 3 | II | 84° 41' 09" | 39° 17' 57.5" | Pending Relocation | | 341 |
| Waste Pit 5 Construction Activity | Waste Pit 5 | 1 | II Th | 84° 41' 45" | 39° 18' 10" | 84° 41' 35" | 39° 18' 13" | 3 |
| Water Supply Tie–In Project | | | | | | 84° 41' 25" | 39° 17' 30" | |
| RvA 14 | | | | | | Currently stored in WMB at FEMP | | 500 |
| ISA #3 | Southeast of Plant 5 | 3 | | 84° 41' 13" | 39° 17' 50.5" | Pending Characterization and Relocation | | 10 |
| SWRB Excess | | | | | | | | 17,000 |
| **Total** | | | | | | | | **39,775** |

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# TABLE C-2 Operable Unit 3 Unbulked Material Volume Estimates (in cubic feet)

| Component | Component Designation | OU3 FS Material Category A Accessible Metals | B Inaccessible Metals | C Process-Related Metals | D Painted Light-Guage Metals | E Concrete | F Brick | G Non-Regulated ACM | H Regulated ACM | I Misc. Materials | Component/ Complex Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Building 4A** | | | | | | | | | | | |
| Green Salt Plant | 4 A | 5,844 | 82,467 | 8,873 | 195 | 0 | 0 | 5,017 | 866 | 11,907 | 115,168 |
| **Thorium/Plant 9 Complex** | | | | | | | | | | | |
| Special Products Plant | 9 A | 2,010 | 63,984 | 6,816 | 441 | 233 | 0 | 3,599 | 1,011 | 13,365 | 91,460 |
| Plant 9 Sump Treatment Facility | 9 B | 33 | 852 | 92 | 4 | 81 | 0 | 161 | 46 | 524 | 1,794 |
| Plant 9 Dust Collector | 9 C | 6 | 46 | 0 | 3 | 0 | 0 | 0 | 14 | 32 | 102 |
| Plant 9 Substation | 9 D | 18 | 112 | 0 | 0 | 0 | 0 | 221 | 10 | 700 | 1,060 |
| Plant 9 Cylinder Shed | 9 E | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 3 | 16 | 26 |
| Electrostatic Precipitator | 9 F | 4 | 65 | 3 | 3 | 0 | 0 | 12 | 15 | 48 | 152 |
| Magnesium Storage Building | 32 A | 99 | 311 | 0 | 2 | 5,023 | 0 | 0 | 40 | 1,791 | 7,267 |
| Building 32 Covered Loading Dock | 32 B | 17 | 19 | 0 | 0 | 0 | 0 | 0 | 3 | 293 | 332 |
| Thorium Warehouse | 64 | 197 | 1,423 | 0 | 106 | 1,200 | 0 | 25 | 74 | 1,489 | 4,514 |
| (Old) Plant 5 Warehouse | 65 | 269 | 640 | 0 | 72 | 0 | 0 | 0 | 54 | 789 | 1,824 |
| Decontamination Building | 69 | 156 | 401 | 28 | 17 | 5,625 | 0 | 0 | 116 | 1,513 | 7,855 |
| D & D Building | 78 | 239 | 4,333 | 418 | 49 | 8,160 | 0 | 44 | 88 | 4,961 | 18,291 |
| Plant 9 Warehouse | 81 | 81 | 376 | 0 | 40 | 0 | 0 | 0 | 49 | 120 | 665 |
| **Thorium/Plant 9 Complex Total** | | 3,130 | 72,561 | 7,357 | 738 | 20,323 | 0 | 4,068 | 1,522 | 25,642 | 135,341 |
| **Boiler Plant/Water Plant Complex** | | | | | | | | | | | |
| Boiler Plant | 10 A | 1,800 | 55,837 | 6,006 | 117 | 5,480 | 0 | 4,612 | 378 | 2,951 | 77,180 |
| Boiler Plant Maintenance Building | 10 B | 41 | 174 | 4 | 21 | 580 | 0 | 43 | 21 | 138 | 1,023 |
| Wet Salt Storage Bin | 10 C | 7 | 19 | 2 | 0 | 1,598 | 0 | 0 | 25 | 123 | 1,775 |
| Utilities Heavy Equipment Building | 10 E | 12 | 109 | 1 | 13 | 0 | 0 | 0 | 10 | 381 | 526 |
| Pump Station & Power Center | 20 A | 56 | 622 | 58 | 4 | 0 | 0 | 202 | 87 | 780 | 1,809 |
| Water Plant | 20 B | 224 | 5,032 | 540 | 23 | 328 | 0 | 165 | 265 | 1,612 | 8,188 |
| Cooling Towers | 20 C | 23 | 177,399 | 0 | 268 | 0 | 0 | 434 | 85 | 4,971 | 183,181 |
| Process Water Storage Tank | 20 H | 0 | 47 | 0 | 0 | 8,100 | 0 | 0 | 182 | 928 | 9,257 |
| Railroad Scale House | 24 A | 0 | 4 | 0 | 0 | 360 | 0 | 0 | 3 | 67 | 433 |
| Coal Pile[1] | P-005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Boiler Plant/Water Plant Complex Total** | | 2,163 | 239,243 | 6,611 | 446 | 16,446 | 0 | 5,457 | 1,054 | 11,952 | 283,371 |
| **Tank Farm Complex** | | | | | | | | | | | |
| Main Tank Farm | 19 A | 221 | 21,241 | 0 | 0 | 2,430 | 0 | 0 | 140 | 327 | 24,358 |
| Tank Farm Control House | 19 C | 12 | 323 | 29 | 2 | 1,300 | 0 | 28 | 14 | 545 | 2,254 |
| Old North Tank Farm | 19 D | 0 | 12,000 | 0 | 0 | 486 | 0 | 0 | 59 | 311 | 12,856 |
| Tank Farm Lime Slitter Building | 19 E | 28 | 585 | 60 | 6 | 0 | 0 | 0 | 22 | 104 | 805 |
| **Tank Farm Complex Total** | | 261 | 34,149 | 89 | 9 | 4,216 | 0 | 28 | 234 | 1,286 | 40,273 |
| **Plant 1 Complex** | | | | | | | | | | | |
| Preparation Plant | 1 A | 1,647 | 40,300 | 4,325 | 339 | 5,019 | 0 | 2,757 | 1,290 | 9,924 | 65,600 |
| Plant 1 Storage Shelter | 1 B | 124 | 69 | 0 | 32 | 0 | 0 | 0 | 40 | 336 | 602 |
| Chemical Warehouse | 30 A | 620 | 1,156 | 0 | 1 | 320 | 0 | 1,871 | 167 | 3,144 | 7,279 |
| Drum Storage Warehouse | 30 B | 8 | 80 | 0 | 5 | 0 | 0 | 0 | 21 | 129 | 242 |
| CP Storage Warehouse | 56 A | 134 | 301 | 0 | 53 | 0 | 0 | 11 | 71 | 933 | 1,503 |
| Storage Shed (West) | 56 B | 0 | 17 | 0 | 4 | 0 | 0 | 0 | 31 | 303 | 355 |
| Storage Shed (East) | 56 C | 0 | 17 | 0 | 6 | 0 | 0 | 0 | 24 | 323 | 370 |
| Quonset Hut # 1 | 60 | 46 | 148 | 0 | 17 | 0 | 0 | 0 | 9 | 54 | 274 |
| Quonset Hut #2 | 61 | 25 | 106 | 0 | 14 | 0 | 0 | 0 | 11 | 70 | 226 |
| Quonset Hut #3 | 62 | 25 | 106 | 0 | 14 | 0 | 0 | 333 | 6 | 43 | 527 |
| KC-2 Warehouse | 63 | 371 | 899 | 0 | 0 | 9,146 | 0 | 50 | 106 | 7,211 | 17,782 |
| Drum Reconditioning Building | 66 | 51 | 5,463 | 580 | 24 | 0 | 0 | 21 | 127 | 619 | 6,884 |
| Plant 1 Thorium Warehouse | 67 | 117 | 157 | 0 | 24 | 0 | 0 | 0 | 52 | 411 | 760 |
| General In-Process Warehouse | 71 | 231 | 569 | 0 | 0 | 5,376 | 0 | 0 | 104 | 6,565 | 12,845 |
| Drum Storage Building | 72 | 51 | 64 | 0 | 0 | 0 | 0 | 113 | 48 | 280 | 556 |
| Tension Support Structure #4 | TS-004 | 408 | 764 | 0 | 0 | 0 | 0 | 0 | 33 | 335 | 1,541 |
| Tension Support Structure #5 | TS-005 | 408 | 797 | 0 | 0 | 0 | 0 | 0 | 33 | 335 | 1,574 |
| Tension Support Structure #6 | TS-006 | 45 | 129 | 0 | 0 | 0 | 0 | 0 | 11 | 74 | 259 |
| **Plant 1 Complex Total** | | 4,312 | 51,138 | 4,905 | 534 | 19,860 | 0 | 5,156 | 2,184 | 31,089 | 119,179 |
| **Maintenance Complex** | | | | | | | | | | | |
| Main Maintenance Building | 12 A | 1,454 | 8,855 | 718 | 82 | 26,554 | 0 | 5,426 | 295 | 19,214 | 62,598 |
| Cylinder Storage Building | 12 B | 13 | 41 | 0 | 83 | 1,556 | 0 | 0 | 29 | 542 | 2,264 |
| Lumber Storage Building | 12 C | 24 | 28 | 0 | 12 | 0 | 0 | 0 | 16 | 196 | 276 |
| Maintenance Building Warehouse | 12 D | 53 | 257 | 0 | 34 | 0 | 0 | 0 | 53 | 1,634 | 2,031 |
| Railroad Engine House | 24 B | 12 | 141 | 7 | 0 | 1,733 | 0 | 0 | 30 | 470 | 2,395 |
| Propane Storage | 38 A | 11 | 415 | 38 | 0 | 1,421 | 0 | 0 | 93 | 288 | 2,266 |
| Cylinder Filling Station | 38 B | 2 | 2,022 | 0 | 1 | 0 | 0 | 0 | 57 | 279 | 2,361 |
| **Maintenance Complex Total** | | 1,570 | 11,760 | 763 | 212 | 31,264 | 0 | 5,426 | 574 | 22,623 | 74,191 |
| **East Warehouses Complex** | | | | | | | | | | | |
| Elevated Potable Storage Tank | 20 D | 521 | 224 | 0 | 0 | 0 | 0 | 0 | 35 | 347 | 1,127 |
| Finished Products Warehouse (4A Warehouse) | 77 | 205 | 762 | 0 | 84 | 0 | 0 | 0 | 88 | 144 | 1,284 |
| Plant 6 Warehouse | 79 | 171 | 696 | 0 | 74 | 0 | 0 | 0 | 64 | 96 | 1,101 |
| Receiving/Incoming Materials Inspection | 82 | 122 | 791 | 33 | 64 | 2,400 | 0 | 55 | 63 | 427 | 3,956 |
| **East Warehouses Complex Total** | | 1,020 | 2,474 | 33 | 222 | 2,400 | 0 | 55 | 251 | 1,014 | 7,469 |
| **Plant 3 Complex** | | | | | | | | | | | |
| Ozone Building | 3 B | 31 | 45 | 1 | 0 | 0 | 0 | 119 | 36 | 193 | 425 |
| NAR Control House | 3 C | 71 | 8,012 | 0 | 0 | 0 | 0 | 407 | 89 | 1,637 | 10,217 |
| NAR Towers | 3 D | 380 | 42,257 | 0 | 2 | 0 | 0 | 18 | 331 | 637 | 43,626 |
| Hot Raffinate Building | 3 E | 195 | 22,790 | 2,479 | 17 | 5,940 | 0 | 543 | 229 | 928 | 33,121 |
| Harshaw Digestion Fume Recovery | 3 F | 122 | 1,140 | 0 | 1 | 0 | 0 | 0 | 55 | 195 | 1,514 |
| Refrigeration Building | 3 G | 21 | 914 | 98 | 6 | 0 | 0 | 130 | 30 | 531 | 1,730 |
| Combined Raffinate Tanks | 3 J | 100 | 16,516 | 0 | 0 | 0 | 0 | 0 | 138 | 454 | 17,208 |
| Old Cooling Water Tower | 3 K | 0 | 36 | 0 | 0 | 78 | 0 | 0 | 37 | 195 | 347 |
| Incinerator Building | 39 A | 186 | 365 | 18 | 0 | 0 | 0 | 568 | 94 | 1,007 | 2,239 |
| Incinerator Sprinkler Riser House | 39 C | 2 | 316 | 6 | 0 | 241 | 0 | 0 | 17 | 90 | 672 |
| **Plant 3 Complex Total** | | 1,109 | 92,392 | 2,603 | 25 | 6,259 | 0 | 1,786 | 1,057 | 5,866 | 111,098 |
| **Plant 2 Complex** | | | | | | | | | | | |
| Ore Refinery Plant | 2 A | 3,718 | 139,030 | 14,842 | 252 | 8,869 | 400 | 4,061 | 813 | 11,592 | 183,597 |
| Metal Dissolver Building | 2 D | 134 | 8,733 | 912 | 4 | 0 | 0 | 347 | 142 | 1,855 | 12,127 |
| NFS Storage and Pump House | 2 E | 3 | 7,232 | 0 | 0 | 518 | 0 | 0 | 120 | 255 | 8,128 |
| Cold Side Ore Conveyor | 2 F | 44 | 6,171 | 0 | 1 | 0 | 0 | 91 | 42 | 207 | 6,557 |
| Hot Side Ore Conveyor | 2 G | 39 | 8,038 | 0 | 0 | 0 | 0 | 62 | 41 | 178 | 8,357 |
| Waste Oil Decant Shelter | 39 B | 24 | 18 | 1 | 3 | 0 | 0 | 0 | 14 | 64 | 124 |
| **Plant 2 Complex Total** | | 3,963 | 169,221 | 15,755 | 260 | 9,407 | 400 | 4,561 | 1,172 | 14,150 | 218,891 |

# TABLE C–2 Operable Unit 3 Unbulked Material Volume Estimates (in cubic feet)

| Component | Component Designation | OU3 FS Material Category A Accessible Metals | B Inaccessible Metals | C Process-Related Metals | D Painted Light-Guage Metals | E Concrete | F Brick | G Non-Regulated ACM | H Regulated ACM | I Misc. Materials | Component/ Complex Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Plant 8 Complex** | | | | | | | | | | | |
| Recovery Plant | 8 A | 2,349 | 63,634 | 6,768 | 181 | 7,104 | 0 | 3,409 | 1,409 | 16,786 | 101,639 |
| Plant 8 Maintenance Building | 8 B | 34 | 122 | 2 | 0 | 2,450 | 0 | 117 | 60 | 785 | 3,571 |
| Rotary Kiln/Drum Reconditioning | 8 C | 1,557 | 34,468 | 3,760 | 189 | 3,800 | 0 | 0 | 132 | 6,817 | 50,724 |
| Plant 8 Railroad Filter Building | 8 D | 4 | 45 | 4 | 1 | 0 | 0 | 0 | 13 | 48 | 115 |
| Drum Conveyor Shelter | 8 E | 24 | 29 | 0 | 3 | 0 | 0 | 0 | 9 | 48 | 113 |
| Plant 8 Old Drum Washer | 8 F | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 10 | 32 | 44 |
| Plant 8 Warehouse | 80 | 102 | 304 | 0 | 53 | 0 | 0 | 0 | 92 | 386 | 937 |
| **Plant 8 Complex Total** | | 4,070 | 98,602 | 10,534 | 430 | 13,354 | 0 | 3,526 | 1,725 | 24,902 | 157,142 |
| **General Sump Complex** | | | | | | | | | | | |
| General/Refinery Sump Control Building | 2 B | 113 | 6,464 | 703 | 9 | 177 | 0 | 172 | 77 | 1,316 | 9,030 |
| Bulk Lime Handling Building | 2 C | 31 | 2,126 | 233 | 0 | 0 | 0 | 91 | 41 | 248 | 2,770 |
| Maintenance Building | 3 A | 96 | 8,623 | 959 | 10 | 0 | 0 | 440 | 84 | 1,728 | 12,139 |
| Refinery Sump | 3 H | 65 | 13,106 | 0 | 0 | 0 | 0 | 0 | 136 | 370 | 13,677 |
| Electrical Power Center Building | 3 L | 51 | 5,518 | 578 | 0 | 0 | 0 | 277 | 69 | 1,160 | 7,654 |
| General Sump | 18 B | 65 | 1,876 | 0 | 2 | 0 | 0 | 0 | 230 | 713 | 2,886 |
| Biodenitrification Towers | 18 D | 557 | 6,003 | 585 | 70 | 0 | 0 | 107 | 192 | 4,032 | 11,545 |
| BDN Effluent Treatment Facility | 18 H | 9 | 34,217 | 3,790 | 14 | 0 | 0 | 0 | 68 | 758 | 38,855 |
| **General Sump Complex Total** | | 986 | 78,133 | 6,848 | 104 | 177 | 0 | 1,087 | 896 | 10,325 | 98,555 |
| **Plant 5 Complex** | | | | | | | | | | | |
| Plant 4 Warehouse | 4 B | 166 | 458 | 0 | 66 | 0 | 0 | 0 | 89 | 424 | 1,203 |
| Metals Production Plant | 5 A | 5,088 | 174,751 | 18,916 | 477 | 19,243 | 0 | 6,693 | 1,653 | 16,797 | 243,620 |
| Plant 5 Ingot Pickling | 5 B | 59 | 2,597 | 277 | 12 | 0 | 0 | 0 | 65 | 239 | 3,248 |
| Plant 5 Electrical Substation | 5 C | 8 | 776 | 78 | 3 | 0 | 0 | 0 | 48 | 150 | 1,063 |
| West Derby Breakout/ Slag Milling | 5 D | 1,553 | 22,336 | 2,410 | 83 | 223 | 0 | 0 | 267 | 777 | 27,648 |
| Plant 5 Filter Building | 5 E | 38 | 93 | 0 | 20 | 0 | 0 | 0 | 27 | 264 | 442 |
| Plant 5 Covered Storage Pad | 5 F | 143 | 219 | 0 | 27 | 0 | 0 | 0 | 30 | 280 | 699 |
| Plant 5 Ingot Storage Shelter | 5 G | 26 | 33 | 0 | 7 | 0 | 0 | 0 | 8 | 69 | 143 |
| Slag Recycling Building | 55 A | 310 | 6,193 | 660 | 16 | 0 | 0 | 501 | 116 | 2,149 | 9,945 |
| Slag Recycling Pit/Elevator | 55 B | 56 | 482 | 50 | 5 | 0 | 0 | 100 | 40 | 143 | 877 |
| **Plant 5 Complex Total** | | 7,446 | 207,938 | 22,390 | 716 | 19,466 | 0 | 7,294 | 2,343 | 21,293 | 288,888 |
| **Plant 6 Complex** | | | | | | | | | | | |
| Metals Fabrication Plant | 6 A | 5,453 | 187,559 | 20,184 | 518 | 8,652 | 0 | 10,793 | 1,288 | 6,830 | 241,278 |
| Plant 6 Covered Storage Area | 6 B | 44 | 19 | 0 | 9 | 0 | 0 | 0 | 32 | 104 | 207 |
| Plant 6 Electrostatic Precipitator (South) | 6 C | 12 | 67 | 5 | 12 | 0 | 0 | 0 | 49 | 155 | 300 |
| Plant 6 Electrostatic Precipitator (Central) | 6 D | 6 | 34 | 0 | 8 | 0 | 0 | 0 | 40 | 123 | 211 |
| Plant 6 Electrostatic Precipitator (North) | 6 E | 12 | 568 | 61 | 12 | 0 | 0 | 0 | 48 | 155 | 856 |
| Plant 6 Salt Oil Heat Treat Building | 6 F | 20 | 2,211 | 242 | 11 | 0 | 0 | 0 | 251 | 274 | 3,010 |
| Plant 6 Sump Building | 6 G | 369 | 9,343 | 1,009 | 42 | 216 | 0 | 57 | 219 | 1,901 | 13,156 |
| **Plant 6 Complex Total** | | 5,917 | 199,801 | 21,500 | 613 | 8,868 | 0 | 10,851 | 1,927 | 9,543 | 259,019 |
| **Liquid Storage Complex** | | | | | | | | | | | |
| Methanol Tank | 18 J | 18 | 48 | 0 | 0 | 324 | 0 | 0 | 9 | 20 | 419 |
| Low Nitrate Tank | 18 K | 8 | 459 | 0 | 0 | 0 | 0 | 0 | 5 | 20 | 492 |
| High Nitrate Tank | 18 L | 8 | 459 | 0 | 0 | 0 | 0 | 0 | 6 | 24 | 497 |
| Well House #1 | 20 E | 0 | 61 | 6 | 0 | 299 | 0 | 0 | 20 | 147 | 533 |
| Well House #2 | 20 F | 0 | 72 | 7 | 0 | 301 | 0 | 0 | 20 | 147 | 546 |
| Well House #3 | 20 G | 2 | 340 | 37 | 2 | 395 | 0 | 0 | 18 | 180 | 974 |
| Gas Meter Building | 22 A | 2 | 41 | 3 | 0 | 579 | 0 | 0 | 20 | 134 | 779 |
| Storm Sewer Lift Station | 22 B | 2 | 252 | 27 | 2 | 255 | 0 | 0 | 25 | 98 | 661 |
| Scale House & Weigh Scale | 22 D | 3 | 14 | 0 | 0 | 0 | 0 | 16 | 18 | 96 | 147 |
| Pump House-HP Fire Protection | 26 A | 168 | 547 | 54 | 4 | 5,813 | 0 | 0 | 38 | 496 | 7,121 |
| Elevated Water Storage Tank | 26 B | 1,763 | 480 | 0 | 0 | 540 | 0 | 0 | 66 | 135 | 2,985 |
| Rust Engineering Building | 45 A | 169 | 2,396 | 0 | 111 | 3,026 | 0 | 513 | 188 | 489 | 6,891 |
| Utility Shed East of Rust Trailers | 45 B | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 18 | 170 | 194 |
| **Liquid Storage Complex Total** | | 2,144 | 5,177 | 134 | 119 | 11,532 | 0 | 528 | 451 | 2,154 | 22,240 |
| **Pilot Plant Complex** | | | | | | | | | | | |
| Pilot Plant Wet Side | 13 A | 170 | 16,754 | 1,809 | 13 | 10,429 | 0 | 407 | 457 | 3,958 | 33,997 |
| Pilot Plant Maintenance Building | 13 B | 12 | 237 | 12 | 0 | 3,366 | 0 | 16 | 27 | 682 | 4,350 |
| Sump Pump House | 13 C | 4 | 306 | 33 | 1 | 333 | 0 | 0 | 35 | 135 | 848 |
| Pilot Plant Thorium Tank Farm | 13 D | 0 | 9,692 | 0 | 0 | 0 | 0 | 0 | 65 | 215 | 9,972 |
| Pilot Plant Annex | 37 | 144 | 10,610 | 1,137 | 0 | 6,200 | 0 | 0 | 100 | 1,834 | 20,026 |
| Six to Four Reduction Facility #1 | 54 A | 566 | 25,624 | 2,815 | 110 | 10,478 | 0 | 391 | 485 | 5,560 | 46,030 |
| Pilot Plant Shelter | 54 B | 24 | 113 | 0 | 14 | 0 | 0 | 0 | 141 | 741 | 1,034 |
| Pilot Plant Dissociator Shelter | 54 C | 24 | 1,525 | 164 | 47 | 0 | 0 | 0 | 21 | 20 | 1,801 |
| Pilot Plant Warehouse | 68 | 154 | 372 | 0 | 6 | 810 | 0 | 366 | 52 | 439 | 2,199 |
| **Pilot Plant Complex Total** | | 1,100 | 65,233 | 5,970 | 190 | 31,616 | 0 | 1,180 | 1,383 | 13,585 | 120,256 |
| **Laboratory Complex** | | | | | | | | | | | |
| Laboratory | 15 A | 893 | 33,073 | 3,126 | 561 | 84,815 | 0 | 4,363 | 2,220 | 27,054 | 156,105 |
| Laboratory Chemical Storage Building | 15 B | 13 | 541 | 0 | 10 | 869 | 0 | 0 | 10 | 4 | 1,448 |
| **Laboratory Complex Total** | | 906 | 33,614 | 3,126 | 572 | 85,684 | 0 | 4,363 | 2,230 | 27,058 | 157,552 |
| **Electrical Station Complex** | | | | | | | | | | | |
| Main Electrical Station | 16 A | 98 | 4,152 | 0 | 0 | 1,836 | 0 | 0 | 23 | 414 | 6,523 |
| Electrical Substation | 16 B | 3 | 1,785 | 97 | 21 | 884 | 0 | 0 | 0 | 210 | 3,000 |
| Electrical Panels & Transformer | 16 C | 0 | 96 | 0 | 0 | 0 | 0 | 0 | 23 | 138 | 257 |
| Main Electrical Switch House | 16 D | 3 | 492 | 51 | 0 | 758 | 0 | 16 | 23 | 120 | 1,462 |
| Main Electrical Transformers | 16 E | 0 | 9,847 | 0 | 0 | 0 | 0 | 0 | 23 | 120 | 9,990 |
| Trailer Substation #1 | 16 F | 3 | 204 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 208 |
| Trailer Substation #2 | 16 G | 2 | 208 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 211 |
| Main Electrical Strainer House | 26 C | 1 | 61 | 6 | 0 | 267 | 0 | 5 | 26 | 120 | 485 |
| Engine House/Garage | 31 A | 127 | 794 | 43 | 0 | 4,527 | 0 | 0 | 40 | 2,312 | 7,843 |
| Heavy Equipment Building | 46 | 220 | 502 | 15 | 62 | 1,040 | 0 | 48 | 60 | 784 | 2,731 |
| **Electrical Station Complex Total** | | 456 | 18,140 | 211 | 85 | 9,312 | 0 | 70 | 217 | 4,216 | 32,708 |
| **Sewage Treatment Plant Complex** | | | | | | | | | | | |
| Chlorination Building | 25 A | 0 | 100 | 8 | 0 | 462 | 0 | 0 | 8 | 92 | 669 |
| M.H.#175/Effluent Line/Sampling Building | 25 B | 0 | 159 | 15 | 1 | 0 | 0 | 0 | 8 | 40 | 223 |
| Sewage Lift Station Building | 25 C | 4 | 99 | 10 | 2 | 529 | 0 | 0 | 9 | 123 | 776 |
| U.V. Disinfection Building | 25 D | 0 | 139 | 13 | 0 | 335 | 0 | 0 | 10 | 40 | 538 |
| Digester & Control Building | 25 E | 30 | 392 | 37 | 2 | 3,828 | 0 | 0 | 39 | 261 | 4,590 |
| Skeet Range Building | 26 F | 0 | 22 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 24 |
| Sewage Treatment Plant Incinerator | 39 D | 10 | 643 | 0 | 0 | 203 | 0 | 189 | 23 | 112 | 1,179 |
| **Sewage Treatment Plant Complex Total** | | 44 | 1,554 | 83 | 8 | 5,356 | 0 | 189 | 98 | 667 | 7,998 |

# TABLE C–2 Operable Unit 3 Unbulked Material Volume Estimates (in cubic feet)

| Component | Component Designation | OU3 FS Material Category A Accessible Metals | B Inaccessible Metals | C Process-Related Metals | D Painted Light-Guage Metals | E Concrete | F Brick | G Non-Regulated ACM | H Regulated ACM | I Misc. Materials | Component/ Complex Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Administration Complex** | | | | | | | | | | | |
| Service Building | 11 | 164 | 29,479 | 0 | 286 | 147,952 | 0 | 1,011 | 994 | 18,599 | 198,485 |
| Administration Building | 14 A | 54 | 10,669 | 0 | 37 | 42,656 | 0 | 2,048 | 167 | 9,990 | 65,641 |
| Building 14 EOC Generator Set | 14 B | 0 | 271 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 271 |
| Security Building | 28 A | 10 | 695 | 0 | 16 | 8,176 | 0 | 0 | 29 | 3,730 | 12,659 |
| Human Resources Building | 28 B | 235 | 1,097 | 0 | 30 | 3,198 | 0 | 554 | 57 | 3,727 | 8,897 |
| Health & Safety Building | 53 A | 334 | 6,972 | 0 | 157 | 47,337 | 0 | 3,247 | 446 | 20,196 | 78,691 |
| In-Vivo Building | 53 B | 24 | 1,347 | 0 | 26 | 0 | 0 | 141 | 25 | 1,719 | 3,282 |
| **Administration Complex Total** | | 622 | 50,730 | 0 | 553 | 249,521 | 0 | 7,000 | 1,740 | 57,961 | 368,326 |
| **Miscellaneous Complex** | | | | | | | | | | | |
| 10-Plex North Substation | 16 H | 0 | 640 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 640 |
| 10-Plex South Substation | 16 J | 0 | 640 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 640 |
| Clearwell Pump House | 18 G | 2 | 115 | 8 | 0 | 0 | 0 | 23 | 1 | 195 | 345 |
| Meteorological Tower | 23 | 8 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 |
| 10-Plex Sewage Lift Station | 25 J | 0 | 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 |
| Guard Post on West End of 2nd Street | 28 D | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 23 | 214 | 247 |
| Guard Post East of T-61 | 28 E | 2 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 51 | 61 |
| Guard Post South of Building 51 | 28 G | 1 | 9 | 0 | 1 | 0 | 0 | 0 | 0 | 50 | 61 |
| Utility Lines | G-004 | 0 | 16,282 | 312 | 0 | 0 | 0 | 0 | 10,284 | 0 | 26,878 |
| Process Trailers | G-006 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 71,136 | 71,136 |
| Non-Process Trailers | G-007 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 305,136 | 305,136 |
| Pipe Bridges | G-008 | 2,262 | 0 | 0 | 0 | 351 | 0 | 0 | 0 | 0 | 2,613 |
| **Miscellaneous Complex Total** | | 2,275 | 18,220 | 320 | 3 | 351 | 0 | 23 | 10,308 | 376,782 | 408,281 |
| **Below Grade Components** | | 9,752 | 43,576 | 13,949 | 0 | 3,952,270 | 20,292 | 3,373 | 19 | 27,421 | 4,070,652 |
| **Operable Unit 3 Total** | | 59,289 | 1,576,124 | 132,054 | 6,033 | 4,497,682 | 20,692 | 71,038 | 32,249 | 701,436 | 7,096,598 |

[1] The quantities of stockpiled coal vary seasonally. No significant quantities of coal are expected to remain after the Boiler Plant/Water Plant Complex is shut down.

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# TABLE C-3 Operable Unit 3 Bulked Material Volume Estimates (in cubic feet)

| Component | Component Designation | OU3 FS Material Category A Accessible Metals | B Inaccessible Metals | C Process-Related Metals | D Painted Light-Guage Metals | E Concrete | F Brick | G Non-Regulated ACM | H Regulated ACM | I Misc. Materials | Component/ Complex Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Building 4A** | | | | | | | | | | | |
| Green Salt Plant | 4 A | 97,590 | 281,893 | 30,741 | 390 | 0 | 0 | 6,054 | 2,922 | 16,626 | 436,215 |
| **Thorium/Plant 9 Complex** | | | | | | | | | | | |
| Special Products Plant | 9 A | 33,569 | 218,725 | 23,717 | 662 | 303 | 0 | 4,319 | 3,473 | 17,715 | 302,704 |
| Plant 9 Sump Treatment Facility | 9 B | 559 | 2,759 | 302 | 8 | 105 | 0 | 193 | 125 | 685 | 4,736 |
| Plant 9 Dust Collector | 9 C | 102 | 93 | 0 | 7 | 0 | 0 | 0 | 39 | 38 | 279 |
| Plant 9 Substation | 9 D | 293 | 223 | 0 | 0 | 0 | 0 | 265 | 12 | 845 | 1,638 |
| Plant 9 Cylinder Shed | 9 E | 14 | 0 | 0 | 0 | 0 | 0 | 7 | 4 | 19 | 44 |
| Electrostatic Precipitator | 9 F | 68 | 148 | 9 | 7 | 0 | 0 | 15 | 35 | 57 | 339 |
| Magnesium Storage Building | 32 A | 1,658 | 663 | 0 | 5 | 6,530 | 0 | 0 | 93 | 2,724 | 11,672 |
| Building 32 Covered Loading Dock | 32 B | 200 | 37 | 0 | 0 | 0 | 0 | 0 | 4 | 426 | 757 |
| Thorium Warehouse | 64 | 3,297 | 3,720 | 0 | 212 | 1,560 | 0 | 40 | 215 | 2,758 | 11,802 |
| (Old) Plant 5 Warehouse | 65 | 4,497 | 1,315 | 0 | 144 | 0 | 0 | 0 | 166 | 1,505 | 7,626 |
| Decontamination Building | 69 | 2,599 | 621 | 57 | 33 | 7,313 | 0 | 0 | 235 | 2,249 | 13,307 |
| D & D Building | 76 | 3,985 | 14,023 | 1,431 | 97 | 10,608 | 0 | 68 | 265 | 7,395 | 37,893 |
| Plant 9 Warehouse | 61 | 1,347 | 761 | 0 | 60 | 0 | 0 | 0 | 132 | 143 | 2,463 |
| **Thorium/Plant 9 Complex Total** | | 52,278 | 243,289 | 25,516 | 1,476 | 26,420 | 0 | 4,927 | 4,797 | 36,560 | 395,261 |
| **Boiler Plant/Water Plant Complex** | | | | | | | | | | | |
| Boiler Plant | 10 A | 30,059 | 191,366 | 20,859 | 233 | 7,124 | 0 | 5,660 | 1,255 | 5,519 | 262,325 |
| Boiler Plant Maintenance Building | 10 B | 687 | 376 | 10 | 42 | 754 | 0 | 62 | 45 | 219 | 2,215 |
| Wet Salt Storage Bin | 10 C | 120 | 61 | 7 | 0 | 2,077 | 0 | 0 | 32 | 148 | 2,445 |
| Utilities Heavy Equipment Building | 10 E | 204 | 222 | 2 | 26 | 0 | 0 | 0 | 17 | 464 | 935 |
| Pump Station & Power Center | 20 A | 930 | 1,245 | 116 | 6 | 0 | 0 | 243 | 287 | 1,044 | 3,870 |
| Water Plant | 20 B | 3,736 | 15,011 | 1,630 | 46 | 426 | 0 | 197 | 937 | 2,301 | 24,287 |
| Cooling Towers | 20 C | 360 | 620,109 | 0 | 537 | 0 | 0 | 521 | 271 | 9,838 | 631,656 |
| Process Water Storage Tank | 20 H | 0 | 94 | 0 | 0 | 10,530 | 0 | 0 | 232 | 1,114 | 11,970 |
| Railroad Scale House | 24 A | 0 | 7 | 0 | 0 | 468 | 0 | 0 | 4 | 121 | 599 |
| Coal Pile[1] | P-005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Boiler Plant/Water Plant Complex Total** | | 36,119 | 828,509 | 22,634 | 892 | 21,380 | 0 | 6,923 | 3,080 | 20,767 | 940,303 |
| **Tank Farm Complex** | | | | | | | | | | | |
| Main Tank Farm | 19 A | 3,694 | 72,752 | 0 | 0 | 3,159 | 0 | 0 | 384 | 392 | 80,380 |
| Tank Farm Control House | 19 C | 204 | 1,041 | 102 | 5 | 1,690 | 0 | 57 | 16 | 726 | 3,841 |
| Old North Tank Farm | 19 D | 0 | 42,000 | 0 | 0 | 832 | 0 | 0 | 71 | 373 | 43,076 |
| Tank Farm Lime Slitter Building | 19 E | 461 | 1,974 | 209 | 13 | 0 | 0 | 0 | 32 | 124 | 2,814 |
| **Tank Farm Complex Total** | | 4,359 | 117,766 | 312 | 18 | 5,481 | 0 | 57 | 503 | 1,615 | 130,111 |
| **Plant 1 Complex** | | | | | | | | | | | |
| Preparation Plant | 1 A | 27,497 | 135,910 | 14,795 | 679 | 6,524 | 0 | 3,375 | 4,583 | 12,500 | 205,863 |
| Plant 1 Storage Shelter | 1 B | 2,077 | 136 | 0 | 64 | 0 | 0 | 0 | 48 | 503 | 2,830 |
| Chemical Warehouse | 30 A | 10,361 | 2,347 | 0 | 3 | 416 | 0 | 2,345 | 400 | 4,698 | 20,570 |
| Drum Storage Warehouse | 30 B | 136 | 173 | 0 | 9 | 0 | 0 | 0 | 28 | 174 | 521 |
| CP Storage Warehouse | 56 A | 2,237 | 609 | 0 | 106 | 0 | 0 | 18 | 147 | 1,662 | 4,778 |
| Storage Shed (West) | 56 B | 0 | 33 | 0 | 8 | 0 | 0 | 0 | 37 | 476 | 555 |
| Storage Shed (East) | 56 C | 0 | 33 | 0 | 13 | 0 | 0 | 0 | 28 | 548 | 623 |
| Quonset Hut #1 | 60 | 773 | 304 | 0 | 34 | 0 | 0 | 0 | 11 | 71 | 1,193 |
| Quonset Hut #2 | 61 | 412 | 211 | 0 | 28 | 0 | 0 | 0 | 14 | 93 | 758 |
| Quonset Hut #3 | 62 | 412 | 212 | 0 | 28 | 0 | 0 | 433 | 7 | 60 | 1,152 |
| KC-2 Warehouse | 63 | 6,199 | 1,817 | 0 | 0 | 11,669 | 0 | 65 | 273 | 10,560 | 30,624 |
| Drum Reconditioning Building | 66 | 649 | 18,429 | 1,994 | 49 | 0 | 0 | 34 | 286 | 845 | 22,486 |
| Plant 1 Thorium Warehouse | 67 | 1,953 | 314 | 0 | 47 | 0 | 0 | 0 | 62 | 605 | 2,981 |
| General In-Process Warehouse | 71 | 3,658 | 1,177 | 0 | 0 | 6,989 | 0 | 0 | 204 | 9,576 | 21,604 |
| Drum Storage Building | 72 | 855 | 131 | 0 | 0 | 0 | 0 | 136 | 60 | 362 | 1,545 |
| Tension Support Structure #4 | TS-004 | 6,616 | 1,582 | 0 | 0 | 0 | 0 | 0 | 40 | 531 | 8,969 |
| Tension Support Structure #5 | TS-005 | 6,616 | 1,647 | 0 | 0 | 0 | 0 | 0 | 40 | 531 | 9,034 |
| Tension Support Structure #6 | TS-006 | 750 | 261 | 0 | 0 | 0 | 0 | 0 | 13 | 104 | 1,128 |
| **Plant 1 Complex Total** | | 72,002 | 165,328 | 16,789 | 1,069 | 25,818 | 0 | 6,406 | 6,281 | 43,920 | 337,613 |
| **Maintenance Complex** | | | | | | | | | | | |
| Main Maintenance Building | 12 A | 24,282 | 27,127 | 2,482 | 165 | 34,520 | 0 | 7,076 | 755 | 25,785 | 122,192 |
| Cylinder Storage Building | 12 B | 215 | 82 | 0 | 167 | 2,023 | 0 | 0 | 35 | 765 | 3,286 |
| Lumber Storage Building | 12 C | 409 | 56 | 0 | 23 | 0 | 0 | 0 | 19 | 324 | 832 |
| Maintenance Building Warehouse | 12 D | 893 | 529 | 0 | 67 | 0 | 0 | 0 | 117 | 2,001 | 3,607 |
| Railroad Engine House | 24 B | 206 | 363 | 23 | 0 | 2,253 | 0 | 0 | 45 | 665 | 3,555 |
| Propane Storage | 36 A | 180 | 856 | 78 | 0 | 1,847 | 0 | 0 | 261 | 407 | 3,630 |
| Cylinder Filling Station | 36 B | 27 | 7,046 | 0 | 2 | 0 | 0 | 0 | 80 | 335 | 7,490 |
| **Maintenance Complex Total** | | 26,212 | 36,058 | 2,583 | 423 | 40,644 | 0 | 7,076 | 1,312 | 30,283 | 144,591 |
| **East Warehouses Complex** | | | | | | | | | | | |
| Elevated Potable Storage Tank | 20 D | 8,698 | 528 | 0 | 0 | 0 | 0 | 0 | 90 | 416 | 9,732 |
| Finished Products Warehouse (4A Warehouse) | 77 | 3,430 | 1,536 | 0 | 169 | 0 | 0 | 0 | 280 | 181 | 5,595 |
| Plant 6 Warehouse | 79 | 2,855 | 1,401 | 0 | 147 | 0 | 0 | 0 | 207 | 115 | 4,725 |
| Receiving/Incoming Materials Inspection | 82 | 2,045 | 1,920 | 104 | 128 | 3,120 | 0 | 109 | 201 | 778 | 8,405 |
| **East Warehouses Complex Total** | | 17,028 | 5,385 | 104 | 444 | 3,120 | 0 | 109 | 778 | 1,489 | 28,458 |
| **Plant 3 Complex** | | | | | | | | | | | |
| Ozone Building | 3 B | 511 | 93 | 3 | 0 | 0 | 0 | 143 | 49 | 242 | 1,041 |
| NAR Control House | 3 C | 1,193 | 27,539 | 0 | 0 | 0 | 0 | 488 | 166 | 2,040 | 31,427 |
| NAR Towers | 3 D | 6,353 | 145,143 | 0 | 3 | 0 | 0 | 21 | 985 | 765 | 153,270 |
| Hot Raffinate Building | 3 E | 3,257 | 78,527 | 8,619 | 34 | 7,722 | 0 | 652 | 571 | 1,339 | 100,722 |
| Hanshaw Digestion Fume Recovery | 3 F | 2,045 | 3,793 | 0 | 1 | 0 | 0 | 0 | 117 | 234 | 6,190 |
| Refrigeration Building | 3 G | 348 | 3,134 | 341 | 11 | 0 | 0 | 156 | 42 | 637 | 4,669 |
| Combined Raffinate Tanks | 3 J | 1,677 | 56,975 | 0 | 0 | 0 | 0 | 0 | 309 | 545 | 59,505 |
| Old Cooling Water Tower | 3 K | 0 | 117 | 0 | 0 | 101 | 0 | 0 | 45 | 234 | 498 |
| Incinerator Building | 39 A | 3,106 | 753 | 39 | 0 | 0 | 0 | 691 | 203 | 1,352 | 6,144 |
| Incinerator Sprinkler Riser House | 39 C | 38 | 715 | 22 | 0 | 313 | 0 | 0 | 23 | 113 | 1,224 |
| **Plant 3 Complex Total** | | 18,528 | 316,789 | 9,025 | 50 | 8,136 | 0 | 2,152 | 2,509 | 7,501 | 364,689 |
| **Plant 2 Complex** | | | | | | | | | | | |
| Ore Refinery Plant | 2 A | 62,089 | 476,566 | 51,740 | 504 | 11,556 | 520 | 4,873 | 2,923 | 16,443 | 627,215 |
| Metal Dissolver Building | 2 D | 2,239 | 29,816 | 3,174 | 9 | 0 | 0 | 417 | 274 | 2,470 | 38,198 |
| NFS Storage and Pump House | 2 E | 49 | 24,786 | 0 | 0 | 674 | 0 | 0 | 358 | 326 | 26,192 |
| Cold Side Ore Conveyor | 2 F | 743 | 21,474 | 0 | 2 | 0 | 0 | 109 | 63 | 254 | 22,646 |
| Hot Side Ore Conveyor | 2 G | 654 | 27,986 | 0 | 0 | 0 | 0 | 74 | 74 | 222 | 29,010 |
| Waste Oil Decant Shelter | 39 B | 409 | 37 | 1 | 6 | 0 | 0 | 0 | 23 | 76 | 553 |
| **Plant 2 Complex Total** | | 66,183 | 580,465 | 54,916 | 521 | 12,229 | 520 | 5,474 | 3,715 | 19,791 | 743,814 |

# TABLE C–3 Operable Unit 3 Bulked Material Volume Estimates (in cubic feet)

| Component | Component Designation | OU3 FS Material Category A Accessible Metals | B Inaccessible Metals | C Process-Related Metals | D Painted Light-Guage Metals | E Concrete | F Brick | G Non-Regulated ACM | H Regulated ACM | I Misc. Materials | Component/ Complex Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Plant 8 Complex** | | | | | | | | | | | |
| Recovery Plant | 8 A | 39,220 | 211,459 | 22,690 | 362 | 9,235 | 0 | 4,091 | 5,184 | 24,257 | 316,698 |
| Plant 8 Maintenance Building | 8 B | 563 | 245 | 5 | 0 | 3,165 | 0 | 234 | 92 | 1,347 | 5,671 |
| Rotary Kiln/Drum Reconditioning | 8 C | 26,009 | 119,650 | 13,154 | 379 | 4,940 | 0 | 0 | 348 | 9,683 | 174,162 |
| Plant 8 Railroad Filter Building | 8 D | 68 | 111 | 10 | 2 | 0 | 0 | 0 | 27 | 57 | 276 |
| Drum Conveyor Shelter | 8 E | 399 | 58 | 0 | 6 | 0 | 0 | 0 | 11 | 57 | 531 |
| Plant 8 Old Drum Washer | 8 F | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 23 | 38 | 57 |
| Plant 8 Warehouse | 80 | 1,705 | 614 | 0 | 106 | 0 | 0 | 0 | 161 | 464 | 3,048 |
| **Plant 8 Complex Total** | | 67,964 | 332,136 | 36,059 | 860 | 17,360 | 0 | 4,325 | 5,846 | 35,903 | 500,452 |
| **General Sump Complex** | | | | | | | | | | | |
| General/Refinery Sump Control Building | 2 B | 1,665 | 22,405 | 2,459 | 18 | 230 | 0 | 206 | 103 | 1,699 | 29,005 |
| Bulk Lime Handling Building | 2 C | 511 | 7,245 | 799 | 0 | 0 | 0 | 109 | 68 | 364 | 9,137 |
| Maintenance Building | 3 A | 1,595 | 30,510 | 3,347 | 20 | 0 | 0 | 528 | 143 | 2,145 | 38,288 |
| Refinery Sump | 3 H | 1,084 | 45,211 | 0 | 0 | 0 | 0 | 0 | 346 | 445 | 47,085 |
| Electrical Power Center Building | 3 L | 652 | 18,859 | 2,023 | 0 | 0 | 0 | 332 | 86 | 1,407 | 23,559 |
| General Sump | 16 B | 1,084 | 3,751 | 0 | 4 | 0 | 0 | 0 | 591 | 936 | 6,366 |
| Biodenitrification Towers | 16 D | 9,304 | 19,537 | 2,006 | 139 | 0 | 0 | 214 | 444 | 5,443 | 37,086 |
| BDN Effluent Treatment Facility | 16 H | 149 | 119,544 | 13,259 | 28 | 0 | 0 | 0 | 104 | 949 | 134,033 |
| **General Sump Complex Total** | | 16,484 | 267,042 | 23,893 | 209 | 230 | 0 | 1,390 | 1,905 | 13,408 | 324,540 |
| **Plant 5 Complex** | | | | | | | | | | | |
| Plant 4 Warehouse | 4 B | 2,767 | 923 | 0 | 131 | 0 | 0 | 0 | 197 | 609 | 4,627 |
| Metals Production Plant | 5 A | 64,962 | 601,069 | 65,765 | 955 | 25,016 | 0 | 8,167 | 6,100 | 23,517 | 815,571 |
| Plant 5 Ingot Pickling | 5 B | 981 | 8,850 | 980 | 24 | 0 | 0 | 0 | 131 | 287 | 11,253 |
| Plant 5 Electrical Substation | 5 C | 136 | 2,490 | 260 | 6 | 0 | 0 | 0 | 116 | 189 | 3,198 |
| West Derby Breakout/ Slag Milling | 5 D | 25,941 | 76,727 | 6,361 | 165 | 290 | 0 | 0 | 654 | 932 | 113,091 |
| Plant 5 Filter Building | 5 E | 635 | 167 | 0 | 40 | 0 | 0 | 0 | 32 | 417 | 1,311 |
| Plant 5 Covered Storage Pad | 5 F | 2,391 | 437 | 0 | 55 | 0 | 0 | 0 | 36 | 436 | 3,355 |
| Plant 5 Ingot Storage Shelter | 5 G | 426 | 67 | 0 | 13 | 0 | 0 | 0 | 10 | 103 | 619 |
| Slag Recycling Building | 55 A | 5,178 | 21,270 | 2,307 | 32 | 0 | 0 | 601 | 223 | 2,939 | 32,558 |
| Slag Recycling Pit/Elevator | 55 B | 934 | 1,607 | 171 | 11 | 0 | 0 | 120 | 85 | 172 | 3,100 |
| **Plant 5 Complex Total** | | 124,351 | 713,636 | 77,865 | 1,432 | 25,306 | 0 | 8,888 | 7,583 | 29,601 | 988,662 |
| **Plant 6 Complex** | | | | | | | | | | | |
| Metals Fabrication Plant | 6 A | 91,068 | 642,818 | 70,112 | 1,037 | 11,248 | 0 | 13,040 | 4,820 | 12,920 | 847,064 |
| Plant 6 Covered Storage Area | 6 B | 735 | 37 | 0 | 18 | 0 | 0 | 0 | 73 | 124 | 989 |
| Plant 6 Electrostatic Precipitator (South) | 6 C | 204 | 168 | 13 | 25 | 0 | 0 | 0 | 113 | 186 | 710 |
| Plant 6 Electrostatic Precipitator (Central) | 6 D | 102 | 93 | 0 | 16 | 0 | 0 | 0 | 94 | 148 | 453 |
| Plant 6 Electrostatic Precipitator (North) | 6 E | 204 | 1,929 | 209 | 24 | 0 | 0 | 0 | 109 | 186 | 2,662 |
| Plant 6 Salt Oil Heat Treat Building | 6 F | 341 | 6,438 | 708 | 23 | 0 | 0 | 0 | 858 | 331 | 8,699 |
| Plant 6 Sump Building | 6 G | 6,161 | 31,031 | 3,369 | 84 | 281 | 0 | 95 | 743 | 2,290 | 44,074 |
| **Plant 6 Complex Total** | | 98,817 | 682,515 | 74,431 | 1,227 | 11,529 | 0 | 13,136 | 6,810 | 16,187 | 904,651 |
| **Liquid Storage Complex** | | | | | | | | | | | |
| Methanol Tank | 18 J | 307 | 103 | 0 | 0 | 421 | 0 | 0 | 25 | 24 | 879 |
| Low Nitrate Tank | 18 K | 136 | 925 | 0 | 0 | 0 | 0 | 0 | 9 | 24 | 1,094 |
| High Nitrate Tank | 18 L | 136 | 925 | 0 | 0 | 0 | 0 | 0 | 9 | 29 | 1,099 |
| Well House #1 | 20 E | 0 | 184 | 19 | 0 | 389 | 0 | 0 | 29 | 217 | 839 |
| Well House #2 | 20 F | 0 | 222 | 23 | 0 | 391 | 0 | 0 | 29 | 217 | 882 |
| Well House #3 | 20 G | 26 | 1,176 | 128 | 4 | 514 | 0 | 0 | 22 | 263 | 2,154 |
| Gas Meter Building | 22 A | 27 | 105 | 8 | 0 | 753 | 0 | 0 | 27 | 191 | 1,111 |
| Storm Sewer Lift Station | 22 B | 38 | 829 | 90 | 4 | 331 | 0 | 0 | 50 | 120 | 1,462 |
| Scale House & Weigh Scale | 22 D | 53 | 34 | 1 | 0 | 0 | 0 | 19 | 22 | 115 | 243 |
| Pump House–HP Fire Protection | 26 A | 2,608 | 1,608 | 164 | 9 | 7,557 | 0 | 0 | 103 | 723 | 12,972 |
| Elevated Water Storage Tank | 26 B | 29,447 | 1,138 | 0 | 0 | 702 | 0 | 0 | 193 | 163 | 31,642 |
| Rust Engineering Building | 45 A | 2,624 | 6,994 | 0 | 221 | 3,934 | 0 | 1,025 | 572 | 706 | 16,276 |
| Utility Shed East of Rust Trailers | 45 B | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 22 | 263 | 296 |
| **Liquid Storage Complex Total** | | 35,803 | 14,254 | 435 | 238 | 14,992 | 0 | 1,044 | 1,110 | 3,073 | 70,949 |
| **Pilot Plant Complex** | | | | | | | | | | | |
| Pilot Plant Wet Side | 13 A | 2,834 | 55,669 | 6,080 | 26 | 13,557 | 0 | 514 | 1,502 | 6,213 | 86,395 |
| Pilot Plant Maintenance Building | 13 B | 197 | 592 | 37 | 0 | 4,376 | 0 | 31 | 67 | 1,054 | 6,354 |
| Sump Pump House | 13 C | 68 | 986 | 107 | 1 | 433 | 0 | 0 | 93 | 197 | 1,886 |
| Pilot Plant Thorium Tank Farm | 13 D | 0 | 33,759 | 0 | 0 | 0 | 0 | 0 | 146 | 258 | 34,143 |
| Pilot Plant Annex | 37 | 2,410 | 36,169 | 3,936 | 0 | 6,060 | 0 | 0 | 295 | 2,669 | 53,538 |
| Six to Four Reduction Facility #1 | 54 A | 9,458 | 68,689 | 9,790 | 220 | 13,622 | 0 | 604 | 1,172 | 7,863 | 131,419 |
| Pilot Plant Shelter | 54 B | 409 | 233 | 0 | 28 | 0 | 0 | 0 | 169 | 889 | 1,728 |
| Pilot Plant Dissolator Shelter | 54 C | 409 | 5,150 | 561 | 94 | 0 | 0 | 0 | 73 | 24 | 6,311 |
| Pilot Plant Warehouse | 66 | 2,577 | 760 | 0 | 11 | 1,053 | 0 | 444 | 62 | 662 | 5,568 |
| **Pilot Plant Complex Total** | | 18,363 | 221,987 | 20,511 | 380 | 41,101 | 0 | 1,593 | 3,578 | 19,830 | 327,342 |
| **Laboratory Complex** | | | | | | | | | | | |
| Laboratory | 15 A | 14,910 | 101,660 | 10,197 | 1,123 | 110,260 | 0 | 8,693 | 8,493 | 42,866 | 298,201 |
| Laboratory Chemical Storage Building | 15 B | 221 | 1,824 | 0 | 20 | 1,129 | 0 | 0 | 39 | 5 | 3,238 |
| **Laboratory Complex Total** | | 15,131 | 103,484 | 10,197 | 1,143 | 111,389 | 0 | 8,693 | 8,532 | 42,870 | 301,439 |
| **Electrical Station Complex** | | | | | | | | | | | |
| Main Electrical Station | 16 A | 1,637 | 14,320 | 0 | 0 | 2,387 | 0 | 0 | 27 | 732 | 19,104 |
| Electrical Substation | 16 B | 49 | 4,675 | 338 | 43 | 1,149 | 0 | 0 | 0 | 308 | 6,761 |
| Electrical Panels & Transformer | 16 C | 0 | 231 | 0 | 0 | 0 | 0 | 0 | 27 | 180 | 439 |
| Main Electrical Switch House | 16 D | 44 | 1,668 | 177 | 0 | 966 | 0 | 20 | 27 | 143 | 3,065 |
| Main Electrical Transformers | 16 E | 0 | 19,695 | 0 | 0 | 0 | 0 | 0 | 27 | 143 | 19,865 |
| Trailer Substation #1 | 16 F | 45 | 619 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 666 |
| Trailer Substation #2 | 16 G | 42 | 625 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 669 |
| Main Electrical Strainer House | 26 C | 19 | 176 | 17 | 0 | 347 | 0 | 6 | 40 | 143 | 748 |
| Engine House/Garage | 31 A | 2,113 | 2,040 | 137 | 0 | 5,865 | 0 | 0 | 96 | 3,509 | 13,760 |
| Heavy Equipment Building | 46 | 3,674 | 1,029 | 32 | 124 | 1,352 | 0 | 97 | 148 | 1,427 | 7,883 |
| **Electrical Station Complex Total** | | 7,623 | 45,277 | 702 | 171 | 12,105 | 0 | 123 | 393 | 6,586 | 72,960 |
| **Sewage Treatment Plant Complex** | | | | | | | | | | | |
| Chlorination Building | 25 A | 0 | 300 | 26 | 0 | 600 | 0 | 0 | 10 | 152 | 1,088 |
| M.H. #175/Effluent Line/Sampling Building | 25 B | 0 | 517 | 52 | 2 | 0 | 0 | 0 | 13 | 48 | 632 |
| Sewage Lift Station Building | 25 C | 68 | 328 | 34 | 4 | 666 | 0 | 0 | 13 | 174 | 1,308 |
| U.V. Disinfection Building | 25 D | 8 | 424 | 42 | 0 | 435 | 0 | 0 | 20 | 48 | 977 |
| Digester & Control Building | 25 E | 504 | 1,171 | 118 | 5 | 4,976 | 0 | 0 | 96 | 365 | 7,234 |
| Skeet Range Building | 28 F | 0 | 50 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 54 |
| Sewage Treatment Plant Incinerator | 39 D | 162 | 2,218 | 0 | 0 | 263 | 0 | 241 | 34 | 134 | 3,052 |
| **Sewage Treatment Plant Complex Total** | | 740 | 5,008 | 272 | 16 | 6,963 | 0 | 241 | 186 | 920 | 14,345 |

# TABLE C–3 Operable Unit 3 Bulked Material Volume Estimates (in cubic feet)

| Component | Component Designation | OU3 FS Material Category A Accessible Metals | B Inaccessible Metals | C Process-Related Metals | D Painted Light-Guage Metals | E Concrete | F Brick | G Non-Regulated ACM | H Regulated ACM | I Misc. Materials | Component/ Complex Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Administration Complex** | | | | | | | | | | | |
| Service Building | 11 | 2,736 | 91,695 | 0 | 572 | 192,336 | 0 | 1,422 | 3,975 | 27,281 | 320,019 |
| Administration Building | 14 A | 908 | 33,653 | 0 | 75 | 55,712 | 0 | 3,945 | 749 | 17,529 | 112,571 |
| Building 14 EOC Generator Set | 14 B | 0 | 949 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 949 |
| Security Building | 26 A | 170 | 2,417 | 0 | 33 | 10,631 | 0 | 0 | 118 | 5,911 | 19,281 |
| Human Resources Building | 26 B | 3,924 | 3,238 | 0 | 61 | 4,157 | 0 | 1,107 | 228 | 6,272 | 18,987 |
| Health & Safety Building | 53 A | 5,560 | 19,714 | 0 | 314 | 61,536 | 0 | 6,156 | 1,791 | 36,522 | 131,625 |
| In-Vivo Building | 53 B | 408 | 4,464 | 0 | 51 | 0 | 0 | 281 | 99 | 2,503 | 7,806 |
| **Administration Complex Total** | | 13,726 | 156,130 | 0 | 1,106 | 324,377 | 0 | 12,921 | 6,960 | 96,019 | 611,238 |
| **Miscellaneous Complex** | | | | | | | | | | | |
| 10-Plex North Substation | 16 H | 2 | 2,940 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,942 |
| 10-Plex South Substation | 16 J | 2 | 2,940 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,942 |
| Clearwell Pump House | 18 G | 42 | 329 | 27 | 0 | 0 | 0 | 28 | 5 | 389 | 819 |
| Meteorological Tower | 23 | 129 | 126 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 255 |
| 10-Plex Sewage Lift Station | 25 J | 1 | 275 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 276 |
| Guard Post on West End of 2nd Street | 26 D | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 27 | 332 | 382 |
| Guard Post East of T-61 | 26 E | 25 | 14 | 0 | 3 | 0 | 0 | 0 | 0 | 68 | 110 |
| Guard Post South of Building 51 | 26 G | 14 | 18 | 0 | 2 | 0 | 0 | 0 | 0 | 65 | 99 |
| Utility Lines | G-004 | 0 | 34,534 | 625 | 0 | 0 | 0 | 0 | 41,136 | 0 | 76,294 |
| Process Trailers | G-006 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 142,272 | 142,272 |
| Non-Process Trailers | G-007 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 610,272 | 610,272 |
| Pipe Bridges | G-008 | 37,776 | 0 | 0 | 0 | 456 | 0 | 0 | 0 | 0 | 38,232 |
| **Miscellaneous Complex Total** | | 37,990 | 41,200 | 652 | 5 | 456 | 0 | 28 | 41,168 | 753,398 | 874,897 |
| **Below Grade Components** | | 162,857 | 87,646 | 27,899 | 0 | 5,137,951 | 26,360 | 4,942 | 76 | 54,842 | 5,502,591 |
| **Operable Unit 3 Total** | | 990,128 | 5,245,795 | 435,536 | 12,067 | 5,846,987 | 26,900 | 96,500 | 110,041 | 1,251,169 | 14,015,143 |

[1] The quantities of stockpiled coal vary seasonally. No significant quantities of coal are expected to remain after the Boiler Plant/Water Plant Complex is shut down.

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# TABLE C–4 Operable Unit 3 Material Weight Estimates (in tons)

| Component | Component Designation | OU3 FS Material Category A Accessible Metals | B Inaccessible Metals | C Process-Related Metals | D Painted Light-Guage Metals | E Concrete | F Brick | G Non-Regulated ACM | H Regulated ACM | I Misc. Materials | Component/ Complex Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Building 4A** | | | | | | | | | | | |
| Green Salt Plant | 4 A | 1,432 | 2,296 | 246 | 44 | 0 | 0 | 285 | 2 | 72 | 4,376 |
| **Thorium/Plant 9 Complex** | | | | | | | | | | | |
| Special Products Plant | 9 A | 492 | 1,167 | 116 | 104 | 6 | 0 | 201 | 2 | 80 | 2,168 |
| Plant 9 Sump Treatment Facility | 9 B | 6 | 20 | 2 | 0 | 6 | 0 | 9 | 0 | 2 | 48 |
| Plant 9 Dust Collector | 9 C | 2 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 6 |
| Plant 9 Substation | 9 D | 4 | 6 | 0 | 0 | 0 | 0 | 12 | 0 | 2 | 24 |
| Plant 9 Cylinder Shed | 9 E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Electrostatic Precipitator | 9 F | 1 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 6 |
| Magnesium Storage Building | 32 A | 24 | 14 | 0 | 1 | 138 | 0 | 0 | 0 | 24 | 202 |
| Building 32 Covered Loading Dock | 32 B | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 8 |
| Thorium Warehouse | 64 | 48 | 49 | 0 | 20 | 33 | 0 | 1 | 0 | 23 | 174 |
| (Old) Plant 5 Warehouse | 65 | 66 | 23 | 0 | 13 | 0 | 0 | 0 | 0 | 13 | 115 |
| Decontamination Building | 69 | 36 | 17 | 1 | 0 | 216 | 0 | 0 | 0 | 16 | 290 |
| D & D Building | 76 | 56 | 65 | 6 | 6 | 281 | 0 | 1 | 0 | 49 | 464 |
| Plant 9 Warehouse | 81 | 20 | 15 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 43 |
| **Thorium/Plant 9 Complex Total** | | 767 | 1,381 | 126 | 155 | 661 | 0 | 225 | 3 | 212 | 3,550 |
| **Boiler Plant/Water Plant Complex** | | | | | | | | | | | |
| Boiler Plant | 10 A | 441 | 693 | 93 | 10 | 300 | 0 | 302 | 1 | 45 | 2,086 |
| Boiler Plant Maintenance Building | 10 B | 10 | 7 | 0 | 3 | 16 | 0 | 1 | 0 | 1 | 39 |
| Wet Salt Storage Bin | 10 C | 2 | 1 | 0 | 0 | 120 | 0 | 0 | 0 | 0 | 123 |
| Utilities Heavy Equipment Building | 10 E | 3 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 10 |
| Pump Station & Power Center | 20 A | 14 | 27 | 3 | 0 | 0 | 0 | 11 | 0 | 4 | 59 |
| Water Plant | 20 B | 55 | 202 | 22 | 4 | 25 | 0 | 9 | 1 | 16 | 334 |
| Cooling Towers | 20 C | 6 | 214 | 0 | 5 | 0 | 0 | 24 | 0 | 73 | 322 |
| Process Water Storage Tank | 20 H | 0 | 2 | 0 | 0 | 608 | 0 | 0 | 0 | 1 | 611 |
| Railroad Scale House | 24 A | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 1 | 11 |
| Coal Pile[1] | P–005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Boiler Plant/Water Plant Complex Total** | | 530 | 1,349 | 119 | 26 | 1,078 | 0 | 348 | 2 | 143 | 3,594 |
| **Tank Farm Complex** | | | | | | | | | | | |
| Main Tank Farm | 19 A | 54 | 132 | 0 | 0 | 182 | 0 | 0 | 0 | 0 | 370 |
| Tank Farm Control House | 19 C | 3 | 4 | 0 | 1 | 36 | 0 | 0 | 0 | 3 | 47 |
| Old North Tank Farm | 19 D | 0 | 28 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | 65 |
| Tank Farm Lime Slitter Building | 19 E | 7 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 13 |
| **Tank Farm Complex Total** | | 64 | 168 | 1 | 2 | 254 | 0 | 0 | 0 | 4 | 494 |
| **Plant 1 Complex** | | | | | | | | | | | |
| Preparation Plant | 1 A | 403 | 433 | 45 | 68 | 388 | 0 | 150 | 3 | 32 | 1,521 |
| Plant 1 Storage Shelter | 1 B | 30 | 3 | 0 | 8 | 0 | 0 | 0 | 0 | 2 | 44 |
| Chemical Warehouse | 30 A | 152 | 47 | 0 | 1 | 9 | 0 | 99 | 0 | 25 | 333 |
| Drum Storage Warehouse | 30 B | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 6 |
| CP Storage Warehouse | 56 A | 33 | 13 | 0 | 9 | 0 | 0 | 0 | 0 | 13 | 68 |
| Storage Shed (West) | 56 B | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 4 |
| Storage Shed (East) | 56 C | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 5 |
| Quonset Hut #1 | 60 | 11 | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 19 |
| Quonset Hut #2 | 61 | 6 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 12 |
| Quonset Hut #3 | 62 | 6 | 2 | 0 | 3 | 0 | 0 | 23 | 0 | 0 | 36 |
| KC–2 Warehouse | 63 | 91 | 34 | 0 | 0 | 252 | 0 | 3 | 0 | 94 | 474 |
| Drum Reconditioning Building | 66 | 12 | 54 | 4 | 6 | 0 | 0 | 1 | 0 | 3 | 81 |
| Plant 1 Thorium Warehouse | 67 | 29 | 4 | 0 | 5 | 0 | 0 | 0 | 0 | 3 | 40 |
| General In–Process Warehouse | 71 | 57 | 25 | 0 | 0 | 148 | 0 | 0 | 0 | 84 | 313 |
| Drum Storage Building | 72 | 13 | 2 | 0 | 0 | 0 | 0 | 6 | 0 | 1 | 22 |
| Tension Support Structure #4 | TS–004 | 100 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 123 |
| Tension Support Structure #5 | TS–005 | 100 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 124 |
| Tension Support Structure #6 | TS–006 | 11 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 15 |
| **Plant 1 Complex Total** | | 1,056 | 664 | 47 | 131 | 777 | 0 | 264 | 4 | 276 | 3,240 |
| **Maintenance Complex** | | | | | | | | | | | |
| Main Maintenance Building | 12 A | 356 | 129 | 7 | 14 | 620 | 0 | 271 | 1 | 107 | 1,706 |
| Cylinder Storage Building | 12 B | 3 | 1 | 0 | 2 | 79 | 0 | 0 | 0 | 6 | 90 |
| Lumber Storage Building | 12 C | 6 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 11 |
| Maintenance Building Warehouse | 12 D | 13 | 11 | 0 | 8 | 0 | 0 | 0 | 0 | 4 | 36 |
| Railroad Engine House | 24 B | 3 | 4 | 0 | 0 | 48 | 0 | 0 | 0 | 5 | 60 |
| Propane Storage | 38 A | 3 | 21 | 2 | 0 | 69 | 0 | 0 | 0 | 3 | 98 |
| Cylinder Filling Station | 38 B | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 |
| **Maintenance Complex Total** | | 365 | 220 | 10 | 26 | 1,015 | 0 | 271 | 1 | 127 | 2,054 |
| **East Warehouses Complex** | | | | | | | | | | | |
| Elevated Potable Storage Tank | 20 D | 128 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 138 |
| Finished Products Warehouse (4A Warehouse) | 77 | 50 | 33 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 102 |
| Plant 8 Warehouse | 79 | 42 | 28 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 85 |
| Receiving/Incoming Materials Inspection | 82 | 30 | 25 | 1 | 15 | 66 | 0 | 1 | 0 | 5 | 143 |
| **East Warehouses Complex Total** | | 250 | 94 | 1 | 48 | 66 | 0 | 1 | 1 | 6 | 467 |
| **Plant 3 Complex** | | | | | | | | | | | |
| Ozone Building | 3 B | 8 | 2 | 0 | 0 | 0 | 0 | 7 | 0 | 1 | 17 |
| NAR Control House | 3 C | 18 | 71 | 0 | 0 | 0 | 0 | 23 | 0 | 5 | 116 |
| NAR Towers | 3 D | 93 | 378 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 474 |
| Hot Raffinate Building | 3 E | 48 | 195 | 19 | 3 | 446 | 0 | 31 | 0 | 6 | 747 |
| Hershaw Digestion Fume Recovery | 3 F | 30 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| Refrigeration Building | 3 G | 5 | 18 | 2 | 0 | 0 | 0 | 7 | 0 | 1 | 34 |
| Combined Raffinate Tanks | 3 J | 25 | 143 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 168 |
| Old Cooling Water Tower | 3 K | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 6 |
| Incinerator Building | 30 A | 46 | 15 | 1 | 0 | 0 | 0 | 33 | 0 | 5 | 100 |
| Incinerator Sprinkler Riser House | 30 C | 1 | 6 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 15 |
| **Plant 3 Complex Total** | | 272 | 843 | 23 | 4 | 460 | 0 | 101 | 2 | 20 | 1,725 |
| **Plant 2 Complex** | | | | | | | | | | | |
| Ore Refinery Plant | 2 A | 911 | 1,313 | 110 | 62 | 667 | 26 | 227 | 2 | 76 | 3,396 |
| Metal Dissolver Building | 2 D | 33 | 92 | 7 | 0 | 0 | 0 | 19 | 0 | 8 | 161 |
| NFS Storage and Pump House | 2 E | 1 | 74 | 0 | 0 | 21 | 0 | 0 | 0 | 1 | 96 |
| Cold Side Ore Conveyor | 2 F | 11 | 45 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 61 |
| Hot Side Ore Conveyor | 2 G | 10 | 59 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 72 |
| Waste Oil Decant Shelter | 30 B | 6 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 8 |
| **Plant 2 Complex Total** | | 971 | 1,583 | 118 | 64 | 687 | 26 | 255 | 2 | 87 | 3,795 |

# TABLE C–4 Operable Unit 3 Material Weight Estimates (in tons)

| Component | Component Designation | OU3 FS Material Category A Accessible Metals | B Inaccessible Metals | C Process-Related Metals | D Painted Light-Guage Metals | E Concrete | F Brick | G Non-Regulated ACM | H Regulated ACM | I Misc. Materials | Component/ Complex Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Plant 8 Complex** | | | | | | | | | | | |
| Recovery Plant | 8 A | 575 | 929 | 88 | 34 | 533 | 0 | 190 | 3 | 119 | 2,471 |
| Plant 8 Maintenance Building | 8 B | 6 | 4 | 0 | 0 | 125 | 0 | 1 | 0 | 11 | 150 |
| Rotary Kiln/Drum Reconditioning | 8 C | 382 | 306 | 32 | 36 | 285 | 0 | 0 | 0 | 39 | 1,079 |
| Plant 8 Railroad Filter Building | 8 D | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Drum Conveyor Shelter | 8 E | 6 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 8 |
| Plant 8 Old Drum Washer | 8 F | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Plant 8 Warehouse | 80 | 25 | 12 | 0 | 11 | 0 | 0 | 0 | 0 | 1 | 49 |
| **Plant 8 Complex Total** | | 997 | 1,254 | 120 | 82 | 943 | 0 | 192 | 4 | 170 | 3,762 |
| **General Sump Complex** | | | | | | | | | | | |
| General/Refinery Sump Control Building | 2 B | 26 | 51 | 5 | 2 | 13 | 0 | 10 | 0 | 5 | 113 |
| Bulk Lime Handling Building | 2 C | 8 | 15 | 2 | 0 | 0 | 0 | 5 | 0 | 2 | 32 |
| Maintenance Building | 3 A | 23 | 68 | 7 | 0 | 0 | 0 | 25 | 0 | 5 | 128 |
| Refinery Sump | 3 H | 16 | 116 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 133 |
| Electrical Power Center Building | 3 L | 13 | 56 | 4 | 0 | 0 | 0 | 15 | 0 | 3 | 91 |
| General Sump | 16 B | 16 | 135 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 154 |
| Biodenitrification Towers | 16 D | 136 | 85 | 6 | 15 | 0 | 0 | 1 | 0 | 21 | 262 |
| BDN Effluent Treatment Facility | 16 H | 2 | 109 | 12 | 3 | 0 | 0 | 0 | 0 | 2 | 129 |
| **General Sump Complex Total** | | 242 | 635 | 36 | 19 | 13 | 0 | 56 | 2 | 41 | 1,041 |
| **Plant 5 Complex** | | | | | | | | | | | |
| Plant 4 Warehouse | 4 B | 41 | 18 | 0 | 11 | 0 | 0 | 0 | 0 | 2 | 72 |
| Metals Production Plant | 5 A | 1,246 | 2,319 | 239 | 127 | 1,443 | 0 | 394 | 4 | 113 | 5,885 |
| Plant 5 Ingot Pickling | 5 B | 14 | 35 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 56 |
| Plant 5 Electrical Substation | 5 C | 2 | 16 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 20 |
| West Derby Breakout/ Slag Milling | 5 D | 361 | 297 | 31 | 16 | 17 | 0 | 0 | 0 | 1 | 743 |
| Plant 5 Filter Building | 5 E | 9 | 3 | 0 | 5 | 0 | 0 | 0 | 0 | 2 | 20 |
| Plant 5 Covered Storage Pad | 5 F | 35 | 5 | 0 | 7 | 0 | 0 | 0 | 0 | 2 | 49 |
| Plant 5 Ingot Storage Shelter | 5 G | 6 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 9 |
| Slag Recycling Building | 55 A | 76 | 75 | 8 | 4 | 0 | 0 | 28 | 0 | 10 | 202 |
| Slag Recycling Pit/Elevator | 55 B | 14 | 7 | 1 | 1 | 0 | 0 | 6 | 0 | 0 | 29 |
| **Plant 5 Complex Total** | | 1,824 | 2,777 | 283 | 176 | 1,460 | 0 | 427 | 5 | 133 | 7,085 |
| **Plant 6 Complex** | | | | | | | | | | | |
| Metals Fabrication Plant | 6 A | 1,336 | 2,573 | 256 | 88 | 244 | 0 | 602 | 3 | 104 | 5,206 |
| Plant 6 Covered Storage Area | 6 B | 11 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 15 |
| Plant 6 Electrostatic Precipitator (South) | 6 C | 3 | 4 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 11 |
| Plant 6 Electrostatic Precipitator (Central) | 6 D | 2 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 6 |
| Plant 6 Electrostatic Precipitator (North) | 6 E | 3 | 8 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 16 |
| Plant 6 Soft Oil Heat Treat Building | 6 F | 5 | 77 | 8 | 3 | 0 | 0 | 0 | 1 | 1 | 94 |
| Plant 6 Sump Building | 6 G | 90 | 161 | 17 | 6 | 16 | 0 | 2 | 0 | 4 | 296 |
| **Plant 6 Complex Total** | | 1,450 | 2,826 | 282 | 107 | 260 | 0 | 604 | 4 | 110 | 5,643 |
| **Liquid Storage Complex** | | | | | | | | | | | |
| Methanol Tank | 18 J | 5 | 2 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 31 |
| Low Nitrate Tank | 18 K | 2 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| High Nitrate Tank | 18 L | 2 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| Well House #1 | 20 E | 0 | 3 | 0 | 0 | 8 | 0 | 0 | 0 | 1 | 13 |
| Well House #2 | 20 F | 0 | 3 | 0 | 0 | 8 | 0 | 0 | 0 | 1 | 13 |
| Well House #3 | 20 G | 0 | 2 | 0 | 0 | 11 | 0 | 0 | 0 | 2 | 16 |
| Gas Meter Building | 22 A | 0 | 1 | 0 | 0 | 24 | 0 | 0 | 0 | 1 | 27 |
| Storm Sewer Lift Station | 22 B | 1 | 3 | 0 | 1 | 7 | 0 | 0 | 0 | 0 | 12 |
| Scale House & Weigh Scale | 22 D | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Pump House–HP Fire Protection | 26 A | 41 | 23 | 2 | 0 | 263 | 0 | 0 | 0 | 6 | 335 |
| Elevated Water Storage Tank | 26 B | 432 | 168 | 0 | 0 | 41 | 0 | 0 | 0 | 0 | 640 |
| Rust Engineering Building | 45 A | 41 | 50 | 0 | 29 | 132 | 0 | 6 | 0 | 3 | 261 |
| Utility Shed East of Rust Trailers | 45 B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| **Liquid Storage Complex Total** | | 525 | 278 | 3 | 29 | 519 | 0 | 7 | 1 | 16 | 1,380 |
| **Pilot Plant Complex** | | | | | | | | | | | |
| Pilot Plant Wet Side | 13 A | 42 | 193 | 20 | 4 | 674 | 0 | 22 | 1 | 52 | 1,007 |
| Pilot Plant Maintenance Building | 13 B | 3 | 6 | 0 | 0 | 170 | 0 | 0 | 0 | 9 | 190 |
| Sump Pump House | 13 C | 1 | 6 | 1 | 0 | 9 | 0 | 0 | 0 | 1 | 18 |
| Pilot Plant Thorium Tank Farm | 13 D | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 |
| Pilot Plant Annex | 37 | 35 | 63 | 8 | 0 | 170 | 0 | 0 | 0 | 23 | 320 |
| Six to Four Reduction Facility #1 | 54 A | 139 | 169 | 18 | 24 | 577 | 0 | 15 | 1 | 49 | 991 |
| Pilot Plant Shelter | 54 B | 6 | 4 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 14 |
| Pilot Plant Dissociator Shelter | 54 C | 6 | 15 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 25 |
| Pilot Plant Warehouse | 68 | 36 | 5 | 0 | 0 | 61 | 0 | 20 | 0 | 3 | 127 |
| **Pilot Plant Complex Total** | | 269 | 520 | 48 | 34 | 1,661 | 0 | 57 | 3 | 138 | 2,730 |
| **Laboratory Complex** | | | | | | | | | | | |
| Laboratory | 15 A | 219 | 604 | 51 | 154 | 4,508 | 0 | 54 | 5 | 425 | 6,020 |
| Laboratory Chemical Storage Building | 15 B | 3 | 6 | 0 | 2 | 24 | 0 | 0 | 0 | 0 | 35 |
| **Laboratory Complex Total** | | 222 | 610 | 51 | 156 | 4,532 | 0 | 54 | 5 | 425 | 6,055 |
| **Electrical Station Complex** | | | | | | | | | | | |
| Main Electrical Station | 16 A | 24 | 41 | 0 | 0 | 136 | 0 | 0 | 0 | 5 | 207 |
| Electrical Substation | 16 B | 1 | 15 | 1 | 1 | 24 | 0 | 0 | 0 | 3 | 45 |
| Electrical Panels & Transformer | 16 C | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Main Electrical Switch House | 16 D | 1 | 5 | 0 | 0 | 21 | 0 | 1 | 0 | 0 | 28 |
| Main Electrical Transformers | 16 E | 0 | 222 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 222 |
| Trailer Substation #1 | 16 F | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Trailer Substation #2 | 16 G | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Main Electrical Strainer House | 26 C | 0 | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 10 |
| Engine House/Garage | 31 A | 31 | 37 | 2 | 0 | 150 | 0 | 0 | 0 | 31 | 251 |
| Heavy Equipment Building | 46 | 54 | 20 | 1 | 15 | 29 | 0 | 1 | 0 | 11 | 130 |
| **Electrical Station Complex Total** | | 112 | 350 | 4 | 17 | 369 | 0 | 2 | 0 | 50 | 904 |
| **Sewage Treatment Plant Complex** | | | | | | | | | | | |
| Chlorination Building | 25 A | 0 | 2 | 0 | 0 | 20 | 0 | 0 | 0 | 1 | 23 |
| M.H. #175/Effluent Line/Sampling Building | 25 B | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Sewage Lift Station Building | 25 C | 1 | 1 | 0 | 0 | 22 | 0 | 0 | 0 | 1 | 25 |
| U.V. Disinfection Building | 25 D | 0 | 2 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 28 |
| Digester & Control Building | 25 E | 7 | 10 | 1 | 0 | 193 | 0 | 0 | 0 | 2 | 214 |
| Skeet Range Building | 28 F | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Sewage Treatment Plant Incinerator | 30 D | 2 | 2 | 0 | 0 | 15 | 0 | 13 | 0 | 0 | 32 |
| **Sewage Treatment Plant Complex Total** | | 11 | 19 | 1 | 1 | 275 | 0 | 13 | 0 | 5 | 325 |

# TABLE C–4 Operable Unit 3 Material Weight Estimates (in tons)

| Component | Component Designation | OU3 FS Material Category A Accessible Metals | B Inaccessible Metals | C Process-Related Metals | D Painted Light-Guage Metals | E Concrete | F Brick | G Non-Regulated ACM | H Regulated ACM | I Misc. Materials | Component/ Complex Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Administration Complex** | | | | | | | | | | | |
| Service Building | 11 | 40 | 447 | 0 | 63 | 7,066 | 0 | 39 | 2 | 240 | 7,916 |
| Administration Building | 14 A | 13 | 147 | 0 | 10 | 2,645 | 0 | 31 | 0 | 200 | 3,048 |
| Building 14 EOC Generator Set | 14 B | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Security Building | 28 A | 3 | 20 | 0 | 4 | 481 | 0 | 0 | 0 | 52 | 560 |
| Human Resources Building | 28 B | 58 | 12 | 0 | 6 | 134 | 0 | 7 | 0 | 68 | 286 |
| Health & Safety Building | 53 A | 82 | 163 | 0 | 42 | 3,133 | 0 | 54 | 1 | 356 | 3,831 |
| In-Vivo Building | 53 B | 6 | 110 | 0 | 6 | 0 | 0 | 2 | 0 | 17 | 141 |
| **Administration Complex Total** | | 201 | 901 | 0 | 134 | 13,478 | 0 | 133 | 4 | 935 | 15,786 |
| **Miscellaneous Complex** | | | | | | | | | | | |
| 10-Plex North Substation | 16 H | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 10-Plex South Substation | 16 J | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Clearwell Pump House | 18 G | 1 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 9 |
| Meteorological Tower | 23 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 10-Plex Sewage Lift Station | 25 J | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Guard Post on West End of 2nd Street | 28 D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Guard Post East of T-81 | 28 E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Guard Post South of Building 51 | 28 G | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Utility Lines | G-004 | 0 | 986 | 23 | 0 | 0 | 0 | 0 | 23 | 0 | 1,033 |
| Process Trailers | G-006 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 209 | 209 |
| Non-Process Trailers | G-007 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 897 | 897 |
| Pipe Bridges | G-008 | 554 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 0 | 581 |
| **Miscellaneous Complex Total** | | 557.3 | 1,001.7 | 23.6 | 0.6 | 26.3 | 0.0 | 1.3 | 23.2 | 1,111.1 | 2,745 |
| **Below Grade Components** | | 2,369 | 2,086 | 650 | 0 | 276,744 | 1,420 | 429 | 0 | 452 | 284,160 |
| **Operable Unit 3 Total** | | 14,526 | 21,656 | 2,201 | 1,255 | 305,299 | 1,448 | 3,744 | 68 | 4,533 | 354,929 |

[1] The quantities of stockpiled coal vary seasonally. No significant quantities of coal are expected to remain after the Boiler Plant/Water Plant Complex is shut down.

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# APPENDIX D

# SUPPORT DOCUMENTATION

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FERMCO OU2 7411

**Department of Energy**
**Fernald Environmental Management Project**
P.O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 738-6357

JUN 30 1 51 PM '94

JUN 29 1994

DOE-1993-94

Mr. Thomas P. Schneider
Fernald Group Leader
Ohio Federal Facilities Office
Ohio Environmental Protection Agency
401 East Fifth Street
Dayton, Ohio 45402-2086

Dear Mr. Schneider:

**REQUEST FOR APPROVAL OF MANAGEMENT PLAN FOR OPERABLE UNIT 2 INVESTIGATION DERIVED WASTE**

In a meeting with you in Dayton on May 19, 1994, we discussed your agency's approval of the Management Plan for Investigation Derived waste (IDW). This is waste generated during the Operable Unit 2 (OU 2) Remedial Investigation Phase II sampling program. You indicated a willingness to approve the procedures for handling OU 2 IDW in the site's Management Plan. The procedures for OU 2 are enclosed and have been excerpted from the proposed site-wide IDW Management Plan which was previously submitted to your agency. We request your approval with the understanding that it is for the IDW from the OU 2 sampling program only, and that the proposed site-wide IDW Management Plan remains under review.

If you have any questions regarding this matter, please contact Rod Warner at (513) 648-3156.

Sincerely,

Jack R. Craig
Remedial Project Manager

Enclosure: As Stated

000078

Recycled and Recyclable

## EXCERPT FROM FEMP INVESTIGATION DERIVED WASTE MANAGEMENT PLAN

OU2 1993 Remedial Investigation: (220 drums)

Drill cuttings from investigations associated with Operable Unit 2 subunits will be disposed as described below:

South Field: cuttings will be placed in a near surface pit located in an identified low level contaminated area in the South Field.

Solid Waste Landfill: cuttings will be placed in a near surface pit located in the controlled area of the Solid Waste Landfill.

Active Flyash Pile: ash cuttings will be segregated to the extent possible and incorporated into the continued maintenance operation associated with Removal Action #10 (regrading and reapplication of the surface sealant). Soil cuttings or mixed soil/ash material will be placed in a near surface pit immediately exterior of the toe of the Active Flyash Pile.

Inactive Flyash Pile: ash cuttings will be segregated to the extent possible and placed in a near surface pit at the top of the pile, but below the soil cover. Soil or mixed soil/ash material will be placed in a separate near surface pit such that the soil cover is not fully penetrated.

Lime Sludge Ponds: lime sludge cuttings will be placed in the North Lime Sludge Pond. Soil or mixed soil/lime material will be placed in a near surface pit immediately exterior to the encircling dike.

Drummed decon water will be discharged to the General Sump of the FEMP Wastewater Treatment Facility.

Department of Energy
Fernald Environmental Management Project
P. O. Box 538705
Cincinnati, Ohio 45253-8705
(513) 648-3155

7411

FEB 2 4 1995

DOE-0582-95

Mr. James A. Saric, Remedial Project Manager
U. S. Environmental Protection Agency
Region V-5HRE-8J
77 W. Jackson Blvd.
Chicago, Illinois 60604-3590

Mr. Thomas P. Schneider, Project Manager
Ohio Federal Facilities Office
Ohio Environmental Protection Agency
401 East Fifth Street
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Schneider:

**REQUEST FOR APPROVAL OF INTERIM MANAGEMENT PLAN FOR OPERABLE UNIT 5 INVESTIGATION DERIVED WASTE**

Reference: Letter, Thomas A. Schneider (OEPA) to Jack Craig (DOE-FN), dated July 5, 1994.

The Department of Energy, Fernald Area Office (DOE-FN) is requesting approval from the Ohio Environmental Protection Agency (OEPA) and the U. S. Environmental Protection Agency (USEAP) for this proposed Interim Investigation-Derived Waste (IDW) Management Plan for Operable Unit 5 (OU5) soil/drill cuttings, which is intended to be in effect until the Sitewide Soil IDW Policy is approved. The objectives of this plan are consistent with the Interim IDW Management Plan that OEPA approved for Operable Unit 2 (OU2) on July 5, 1994 (Reference).

Currently there are numerous drums of IDW stored that were generated from earlier OU5 field investigations. These drums have been in the field since 1993, due to insufficient storage space and because there is no approved policy in place that adequately addresses management of OU5 IDW soil drill cuttings. Continued drum storage of existing or future OU5 IDW soil/drill cuttings is not considered appropriate in light of the National Contingency Plan's policy for Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) sites to minimize IDW generated by CERCLA activities.

Recycled and Recyclable

Therefore, it is proposed that OU5 IDW soil/drill cuttings be managed as follows:

> *If the concentration of potential contaminants in IDW from a given depth of a sampling location exceeds the general concentration of existing ground surface contamination, or differs from the contaminants present at the ground surface, then the IDW will be managed on an Operable Unit 5 soil pile, as specified in Removal Action 17. If the concentration of potential contaminants in IDW collected from a given depth is generally equivalent to, or less than the concentrations of the same contaminants at the ground surface of a sampling location, then the IDW will be deposited in a shallow surface depression near the sampling location.*

Information contained in the Operable Unit 5 RI Report provides an adequate basis for compliance with this interim policy to determine the disposition of IDW located within the Operable Unit 5 area of concern. The interim IDW management strategy and RI information that is pertinent for future investigations will be referenced, as appropriate, in each corresponding work plan for agency review. The same approach and documentation will also be applied to the existing IDW that has been stored in approximately 200 drums since 1993. These drums are located on the Fernald property outside of the Production Area near the locations where the investigations took place.

DOE understands that this proposed interim Management Plan applies to soil/drill cuttings generated from Operable Unit 5 investigations, and that the proposed sitewide IDW Management Plan remains under review.

If you have any questions regarding this matter, please contact Rob Janke at (513) 648-3124 or Kathi Nickel at (513) 648-3166.

Sincerely,

Kenda Allen

for Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Nickel

cc:

K. H. Chaney, EM-423 QO
D. R. Koslowski, EM-42 QO
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J. Kwasniewski, OEPA-Columbus
P. Harris, OEPA-Dayton
M. Profitt, OEPA-Dayton
B. Cohan, GeoTrans
F. Bell, ATSDR
J. Michaels, PRC

bcc:

R. J. Janke, DOE-FN
D. J. Carr, FERMCO
E. M. Dupuis-Nouille, FERMCO
T. D. Hagen, FERMCO
M. A. Jewett, FERMCO
M. J. Strimbu, FERMCO
V. Zimmerman, FERMCO
AR Coordinator, FERMCO
OU5 Letter Log, FERMCO
R. L. Glenn, Parsons
J. W. Thiesing, FERMCO

Department of Energy
Fernald Environmental Management Project
P. O. Box 538705
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7411

MAR 2 3 1995

DOE-0711-95

Mr. James A. Saric, Remedial Project Manager
U. S. Environmental Protection Agency
Region V-5HRE-8J
77 W. Jackson Blvd
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Southwest District Office
Ohio Environmental Protection Agency
401 East Fifth Street
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Schneider:

**REQUEST FOR APPROVAL OF POLICY FOR MANAGEMENT OF AQUEOUS INVESTIGATION DERIVED WASTE**

This letter requests your formal approval of the Fernald Environmental Management Project (FEMP) policy for management of aqueous Investigation Derived Waste (IDW). IDW to be managed under this policy includes purge water and development water from FEMP groundwater monitoring wells, as well as, wastewater generated by decontaminating sampling equipment. The inventory of backlog aqueous IDW currently in storage at the FEMP is also included. Unused sample fractions, extracts and other residues from laboratory analyses will be managed under a separate policy currently being developed; these materials are not addressed in this proposed policy.

The aqueous IDW policy previously presented for your review has been modified to take into account the treatment provided by the Advanced Wastewater Treatment (AWWT) facility, which began operation January 27, 1995. This modified proposal is based upon the fact that all IDW, regardless of its source, will be treated through the AWWT facility. The AWWT facility currently treats all FEMP stormwater and process wastewater, along with a portion of the South Plume groundwater. As illustrated in the attached schematic, the AWWT includes carbon filters upstream of the ion exchange beds. The carbon filters were included in the design to protect the ion exchange resin from possible damage caused by incidental Volatile Organic Compound (VOC) contamination. These carbon filters accomplish the same level of VOC removal provided by the Granular Activated Carbon (GAC) filters in the Plant 8 VOC system.

Recycled and Recyclable

Since all process wastewater and stormwater is now subjected to adequate VOC treatment, pretreatment based upon a threshold level of VOC contamination is no longer necessary, except for instances where VOC contamination is known to originate from listed waste. The Fire Training Facility and the Sewage Treatment Plant Sludge Drying Beds are potential sources of known listed hazardous constituents. Since these units are isolated from other potential sources of VOC contamination, VOCs encountered in perched water beneath these two units will be considered to potentially originate from listed waste. IDW from the vicinity of these two units which exhibits detectable levels of a "listed" VOC will be treated through the Plant 8 GAC system to remove the listed RCRA constituent to below the analytical detection limit before being sent to the AWWT via the General Sump.

All other aqueous IDW will be discharged to the wastewater treatment system at the location that most efficiently provides direct access to AWWT treatment. Purge water and well development water from wells in Operable Unit 2 (OU2) and Operable Unit 5 (OU5) will be collected in a truck-mounted tank, transported to the Stormwater Retention Basin (SWRB), and discharged directly to whichever of the two basins is being pumped to the AWWT at that time. Discharging purge water from these two areas to the SWRB avoids the need to transport the material through the production area and, as illustrated in the attached flow diagram, provides direct access to the AWWT. All other IDW streams will be discharged to the General Sump for subsequent treatment at the AWWT.

If you have any questions or comments, please contact Pete Yerace at (513)648-3161 or John Sattler at (513)648-3145.

Sincerely,

Johnny Reising

for Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Yerace

REGULATORY PROGRAMS
REGULATORY TECHNICAL
SUPPORT DEPARTMENT



23 10 37 AM '95

cc:

K. H. Chaney, EM-423/QO
D. R. Kozlowski, EM-423/QO
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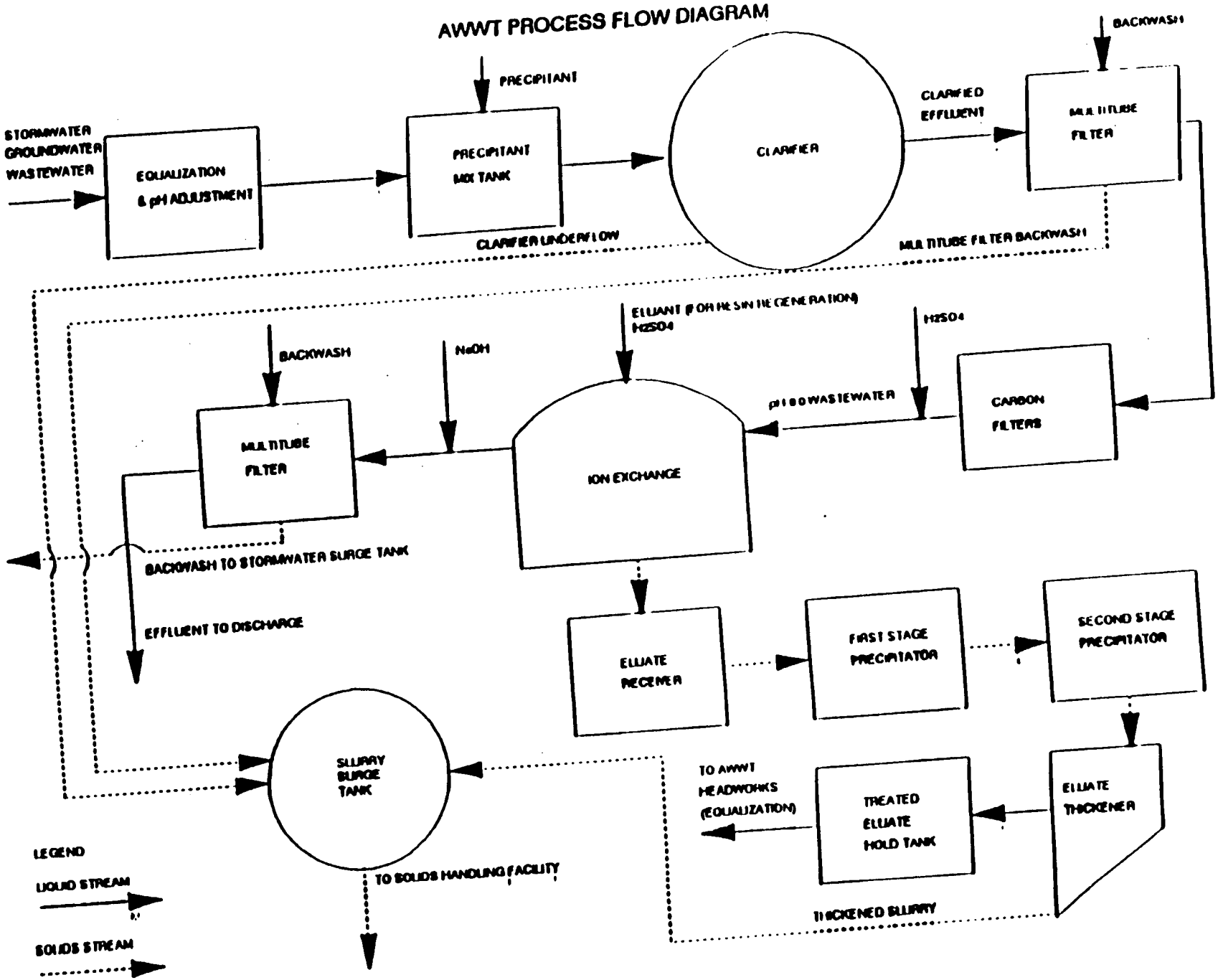
R. Owen, ODOH
K. A. Nickel, DOE-FN
S. M. Beckman, FERMCO/MS65-2
T. Hagen, FERMCO/65-2
E. M. Dupuis-Nouille, FERMCO/MS52-5
R. D. George, FERMCO/52-2
J. Thiesing, FERMCO
M. Yates, FERMCO/9
AR Coordinator, FERMCO

# AWWT PROCESS FLOW DIAGRAM

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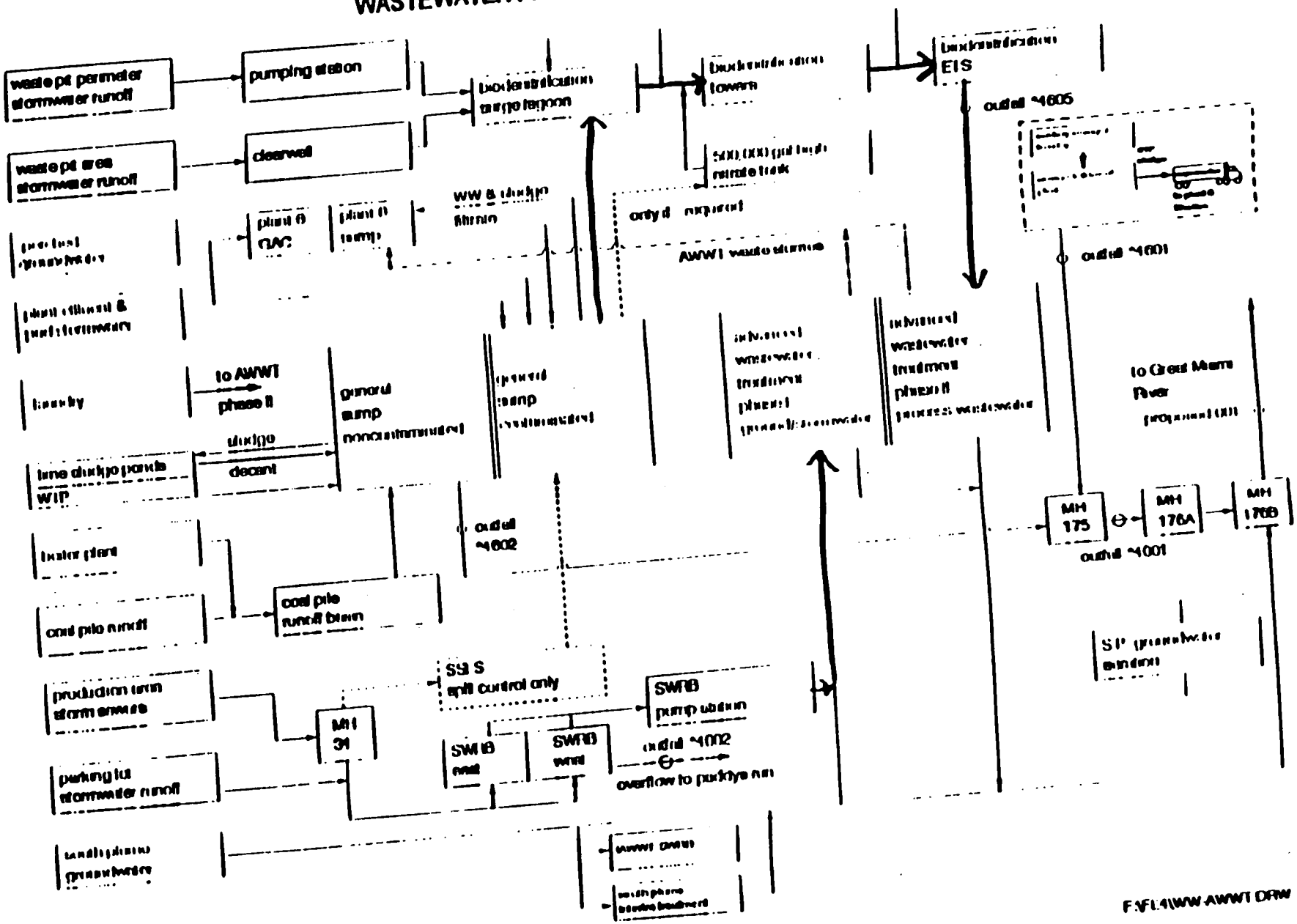
# WASTEWATER FLOW DIAGRAM - AWWT OPERATIONAL

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

7411

JAN 14 1994

REPLY TO THE ATTENTION OF

HRE-8J

Mr. Jack R. Craig
United States Department of Energy
Feed Materials Production Center
P.O. Box 398705
Cincinnati, Ohio 45239-8705

RE: Approval of Soil and Rubble Pile Cover

Dear Mr. Craig:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the United States Department of Energy's (U.S. DOE) Soil and Rubble Pile Cover Document. This document describes U.S. DOE's approach for sample collection, analysis, data evaluation, and recommendation for interim management of the soil and rubble pile north of 3rd Street. Although this pile is not a hazardous waste as defined by the Resource Conservation and Recovery Act, it is a solid waste. Also, the pile contains levels of radioactivity below the threshold established in Removal Action 17.

U.S. EPA concurs with U.S. DOE's proposal to remove visible rubble, and grade and seed the pile as an interim action, until final action is determined in the Operable Unit 5 Record of Decision. However, as discussed in previous meetings between the agencies, the pile material is <u>not</u> to be used as backfill.

Please contact me at (312) 886-0992 if you have any questions.

Sincerely,

James A. Saric
Remedial Project Manager

cc: Graham Mitchell, OEPA-SWDO
Pat Whitfield, U.S. DOE-HDQ
Jim Thiesing, FERMCO
Paul Clay, FERMCO

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**OhioEPA**
State of Ohio Environmental Protection Agency

Southwest District Office
40 South Main Street
Dayton, Ohio 45402-2086
(513) 285-6357
FAX (513) 285-6404

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

| | |
|---|---|
| To Johnny Reising | From Tom Schneider |
| Co. DOE FEMP | Co. OEPA/DFO |
| Dept. | Phone # 285-6038 |
| Fax # 648-3076 | Fax # |

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George V. Voinovich
Governor

July 28, 1994

RE: DOE FEMP
MSL #531-0297
RA 17 PROPOSED CHANGES-
COMMENT

J. Iault
Copy: T Clark
D Daley
K Kolthoff

Mr. Jack Craig
Project Manager
U.S. DOE FEMP
P.O. Box 398705
Cincinnati, OH 45329-8705

Dear Mr. Craig:

This letter provides Ohio EPA's concerns regarding "Proposed Changes to the Removal Action 17 Improved Storage of Soil and Debris" submitted to the agency on May 31, 1994. Ohio EPA is concerned that the proposed relocation of the CSF and subsequent delay may already be outdated. DOE needs to provide a justification for the relocation in light of recent finding of OU5 which suggest that the usefulness of soil washing is very limited. Additionally, it would seem appropriate if the CSF will actually be a staging facility for disposal that it should be located based upon accessibility to the disposal cell.

It was Ohio EPA's understanding that the CSF would provide interim storage for debris and soils generated by other removal actions and the OU3 Interim Remedial Action. The delay in construction of this facility questions its usefulness for this purpose. At this point it may be more appropriate for the agencies and DOE to discuss design of facilities which will act as staging areas for OU3 and OU5 remedial actions. Regardless of what the facility is called interim storage or staging, a discussion of the objectives of this facility should occur prior to any additional design activities.

Ohio EPA concurs with DOE's position regarding the TSS covers for the decon pad and scrap metal pad. Ohio EPA is available to discuss this issue with DOE and USEPA. If you should have any questions, please contact me.

Sincerely,

Thomas A. Schneider

Thomas A. Schneider
Fernald Project Manager
Office of Federal Facilities Oversight

Jim, I am scheduling a meeting with Hauser to discuss this. Will let you know about meeting time & date. J. Iff

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

AUG 5 11 17 AM '94

REPLY TO THE ATTENTION OF:

AUG 0 4 1994

Mr. Jack R. Craig
United States Department of Energy
Feed Materials Production Center
P.O. Box 398705
Cincinnati, Ohio 45239-8705

HRE-8J

RE: Proposed Changes to Removal Action 17

Dear Mr. Craig:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the Proposed Changes to Removal Action 17 Improved Storage and Debris. U.S. EPA has concerns with some of the proposed changes.

The relocation of the Central Storage Facility (CSF) and subsequent delay in the construction completion schedule may not be necessary. Recent findings have questioned the applicability of soil washing at the Fernald Environmental Management Project. It may be more appropriate to discuss which facilities will serve as staging areas for the Operable Unit 3 and 5 remedial actions.

U.S. EPA does concur with U.S. DOE's proposal to not erect the Tension Support Structure (TSS) for the scrap metal pad, and using separate procurement procedures to construct the TSS cover for the decontamination facility pad.

Please contact me at (312) 886-0992 if you have any questions.

Sincerely,

James A. Saric
Remedial Project Manager
Technical Enforcement Section #1
RCRA Enforcement Branch

cc: Tom Schneider, OEPA-SWDO
Pat Whitfield, U.S. DOE-HDQ
Don Ofte, FERMCO
Jim Thiesing, FERMCO
Paul Clay, FERMCO

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

Hoover
TRC
KRK

REPLY TO THE ATTENTION OF

Gene Lang
Rodney Whitaker

JAN 0 4 1995.

HRE-8J

Mr. Jack R. Craig
United States Department of Energy
Feed Materials Production Center
P.O. Box 398705
Cincinnati, Ohio 45239-8705

RE: Proposed Actions to Removal Action 17

Dear Mr. Craig:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the Proposed Actions to Removal Action (RA) 17 Improved Storage and Debris. U.S. EPA concurs with the proposed scope revisions and milestone changes to RA 17.

The United States Department of Energy must manage soil and debris consistently with RA 17 to assure no mixing of stockpile material with different designations occurs. Likewise, all controlled soil and debris stockpiles with engineered run-on and runoff controls or tarpaulin covers must be properly maintained.

Please contact me at (312) 886-0992 if you have any questions.

Sincerely,

James A. Saric
Remedial Project Manager
Technical Enforcement Section #1
RCRA Enforcement Branch

cc: Tom Schneider, OEPA-SWDO
Jack Baublitz, U.S. DOE-HDQ
Don Ofte, FERMCO
Jim Thiesing, FERMCO
Paul Clay, FERMCO

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# APPENDIX E

# REMEDIATION LEVELS

# AND

# WASTE ACCEPTANCE CRITERIA

**TABLE E-1 OPERABLE UNIT 1 REMEDIATION LEVELS IN SURFACE SOILS**

| CONSTITUENT OF CONCERN | REMEDIATION LEVELS |
|---|---|
| **RADIONUCLIDES:** | |
| Cs-137 + 1 progeny | 1.8 pCi/g |
| Th-230 | 902 pCi/g |
| U-235 | 9.3 pCi/g |
| U-238 + 2 progeny | 56 pCi/g |
| **CHEMICAL:** | |
| Beryllium | 2.1 mg/kg |
| Uranium | 190[a] mg/kg |

[a] 0.5 times the PRG to protect for multiple chemicals.

*Source - Operable Unit 1 Record of Decision (DOE 1995)*

**TABLE E-2 OPERABLE UNIT 1 PIT SUBSURFACE SOIL REMEDIAL LEVELS[a] BASED ON GROUNDWATER MODELING**

| CONSTITUENT OF CONCERN | WASTE PIT 1 | WASTE PIT 2 | WASTE PIT 3 | WASTE PIT 4 | WASTE PIT 5 | WASTE PIT 6 | BURN PIT | CLEARWELL |
|---|---|---|---|---|---|---|---|---|
| **RADIONUCLIDES:** | | | | | | | | |
| Tc-99 | NR | 5.5 pCi/g | 0.75 pCi/g | 0.26 pCi/g | 1.4 pCi/g | 7.3 pCi/g | 14 pCi/g | 9.9 pCi/g |
| U-238 +2d | 13,000 pCi/g. | NR | NR | 11,000 pCi/g | NR | NR | NR | NR |
| **CHEMICAL:** | | | | | | | | |
| PCBs[b] | 0.78 pCi/g | NR | NR | NR | NR | NR | NR | NR |

[a] Where calculated remedial levels are lower than background, the COC will be cleaned to establish background levels.
[b] PCBs (polychlorinated biphenyls) include all Aroclor congeners.
NR No Remediation Required

*SOURCE - Operable Unit 1 Record of Decision (DOE 1995).*





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## TABLE E-3 OPERABLE UNIT 2 PRIMARY SOIL CLEANUP LEVELS[a] FOR THE SELECTED ALTERNATIVE

| CONTAMINANT OF CONCERN | ALL SUBUNITS | SOLID WASTE LANDFILL | LIME SLUDGE POND | INACTIVE FLYASH PILE (WASTE/SOIL OVER THE GREAT MIAMI AQUIFER) | INACTIVE FLYASH PILE (WASTE/SOIL LOCATED OVER >16 FEET NATURAL SOIL) | SOUTH FIELD (WASTE/SOIL LOCATED OVER THE GREAT MIAMI AQUIFER) | SOUTH FIELD (WASTE/SOIL LOCATED OVER >16 FEET NATURAL SOIL) | ACTIVE FLYASH PILE |
|---|---|---|---|---|---|---|---|---|
| **RADIONUCLIDES:** | | | | | | | | |
| Radium-226 | 1.8 pCi/g | NR | NR | NR | NR | NR | NR | NR |
| Radium-228 | 2.0 pCi/g | NR | NR | NR | NR | NR | NR | NR |
| Thorium-228 | 1.8 pCi/g | NR | NR | NR | NR | NR | NR | NR |
| Thorium-230 | NR | NR | NR | NR | NR | 6.97[c] pCi/g | 6.97[c] pCi/g | NR |
| Thorium-232 | 1.5 pCi/g | NR | NR | NR | NR | NR | NR | NR |
| Uranium-234 | NR | 62.9[c] pCi/g | 196[c] pCi/g | 8.68[c] pCi/g | 4.24[c] pCi/g | 8.68[c] pCi/g | 4.24[c] pCi/g | 8.64[c] pCi/g |
| Uranium-235/236 | NR | 63.1[c] pCi/g | 195[c] pCi/g | 7.79[c] pCi/g | 3.35[c] pCi/g | 7.79[c] pCi/g | 3.35[c] pCi/g | 7.75[c] pCi/g |
| Uranium-238 | NR | 12.9[b] pCi/g | 45.3[b] pCi/g | 6.12[c] pCi/g | 3.22[c] pCi/g | 6.12[c] pCi/g | 3.22[c] pCi/g | 6.12[c] pCi/g |
| Uranium-Total | NR | 38.6 mg/kg | 136 mg/kg | 24.8[c] mg/kg | 24.8[c] mg/kg | 24.8[c] mg/kg | 24.8[c] mg/kg | 28[c] mg/kg |
| **CHEMICAL:** | | | | | | | | |
| Arsenic | NR | NR | NR | 16.9 mg/kg | 16.9 mg/kg | NR | NR | 16.9 mg/kg |
| Lead | NR | NR | NR | NR | NR | 400[d] mg/kg | NR | NR |

[a] The cleanup level is the lowest value of the $10^{-6}$ ILCR, 0.2 Hazard Index, or ARAR standard.
[b] This value determined by calculating the uranium-238 concentration in uranium-total.
[c] Cleanup level due to off-property resident farmer receptor.
[d] The lead cleanup level applies to the Firing Range only, not the entire South Field area.
NR No Remediation Required

*SOURCE - Table 2-23, Operable Unit 2 FS Report.*

**TABLE E-4 OPERABLE UNIT 2 SECONDARY SOIL CLEANUP LEVELS[a] FOR THE SELECTED ALTERNATIVE**

| CONSTITUENT OF CONCERN | SOUTH FIELD (WASTE/SOIL LOCATED OVER THE GREAT MIAMI AQUIFER) | SOUTH FIELD (WASTE/SOIL LOCATED OVER >16 FEET NATURAL SOIL) | ACTIVE FLYASH PILE |
|---|---|---|---|
| Aroclor-1260 | 25[b] mg/kg | 25[b] mg/kg | NR |
| Benzo(a)anthracene | 0.455 mg/kg | 0.455 mg/kg | NR |
| Benzo(a)pyrene | 0.777 mg/kg | 0.777 mg/kg | NR |
| Benzo(b)fluoranthene | 0.513[b] mg/kg | 0.513[b] mg/kg | NR |
| Benzo(k)fluoranthene | 0.603 mg/kg | 0.603 mg/kg | NR |
| Dibenzo(a,h)anthracene | 0.157[b] mg/kg | 0.157[b] mg/kg | NR |
| Dieldrin | 0.00957 mg/kg | 0.00957 mg/kg | NR |
| Indeno(1,2,3-cd)pyrene | 0.496[b] mg/kg | 0.496[b] mg/kg | NR |
| Neptunium-237 | NR | NR | 4.99 pCi/g |
| Phenanthrene | 0.19 mg/kg | 0.19 mg/kg | NR |
| Technetium-99 | 71 pCi/g | 71 pCi/g | NR |
| Thorium-230 | 6.97[b] pCi/g | 6.97[b] pCi/g | NR |

[a] The cleanup level is the lowest value of the $10^{-6}$ ILCR, 0.2 Hazard Index, or ARAR standard.
[b] Cleanup level due to off-property resident farmer receptor.
NR No Remediation Required

*SOURCE - Table 2-23, Operable Unit 2 FS Report.*

## TABLE E-5 OPERABLE UNIT 3 CONSTITUENTS OF CONCERN[a]

| | |
|---|---|
| **Radionuclides** | **Metals (Cont'd)** |
| Americium-241 | [Selenium] |
| Cesium-137 + 1Daughter | [Silver] |
| Lead-210 + 2Daughters | Thallium |
| Neptunium-237 + 1Daughter | Uranium |
| Polonium-210 | Vanadium |
| Plutonium-238 | Zinc |
| Plutonium-239/240 | **Volatile Organics, ug/kg** |
| Plutonium-241 | [Benzene] |
| Radium-226 + 5Daughters | [Styrene] |
| Radium-228 | Tetrachloroethene |
| Strontium-90 | **Semi-Volatile Organics** |
| Technetium-99 | 1,4-Dichlorobenzene |
| Thorium-227 | [2,4-Dinitrotoluene] |
| Thorium-228 + 7Daughters | Benzo(a)anthracene |
| Thorium-230 | Benzo(a)pyrene |
| Thorium-232 | Benzo(b)fluoranthene |
| Uranium-234 | [Benzo(k)fluoranthene] |
| Uranium-235/236 | [bis(2-Ethylhexyl)phthalate] |
| Uranium-238 + 2Daughters | [Carbazole] |
| **Metals** | [Chrysene] |
| Antimony | [Dibenzo(a,h)anthracene] |
| Arsenic | Hexachlorobutadiene |
| Barium | [Indeno(1,2,3-cd)pyrene] |
| Beryllium | [N-Nitroso-di-n-propylamine]Nitro |
| Cadmium | [Pentachlorophenol] |
| Chromium | **Pesticides/PCBs** |
| Copper | alpha-Chlordane |
| Lead | Aroclor-1248 |
| Manganese | Aroclor-1254 |
| Mercury | Dieldrin |
| Nickel | gamma-Chlordane |

[a] Brackets represent COCs found only in extraneous media (soil and loose media).
*SOURCE - Table 3-6, Operable Unit 3 Remedial Investigation/Feasibility Study Report*

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**TABLE E-6 OPERABLE UNIT 4 PRELIMINARY REMEDIATION LEVELS[a] IN SOILS**

| CONSTITUENT OF CONCERN | PROPOSED REMEDIATION LEVEL |
|---|---|
| Pb-210 +2 progeny | 78 pCi/g |
| Ra-226 +5 progeny | 2 pCi/g |
| Ra-228 +1 progeny | 2 pCi/g |
| Sr-90 +1 progeny | NR |
| Tc-99 | NR |
| Th-228 | 2 pCi/g |
| U-238 +2 progeny | 60 pCi/g |

[a] Sum of background and PRG.
NR No Remediation Required

*SOURCE - Operable Unit 4 Record of Decision*

## TABLE E-7 OPERABLE UNIT 5 FINAL REMEDIATION LEVELS FOR SOIL

| Constituent | On-Property Final Remediation Levels | Off-Property Final Remediation Levels |
|---|---|---|
| **Radionuclides (pCi/g)** | | |
| Cesium-137+1d | $1.4 \times 10^{0}$ | $8.2 \times 10^{-1}$ |
| Neptunium-237+1d | $3.2 \times 10^{0}$ | $4.9 \times 10^{-1}$ |
| Lead-210+2d | $3.8 \times 10^{1}$ | $2.2 \times 10^{0}$ |
| Plutonium-238 | $7.8 \times 10^{1}$ | $9.3 \times 10^{0}$ |
| Plutonium-239/240 | $7.7 \times 10^{1}$ | $9.0 \times 10^{0}$ |
| Radium-226+8d | $1.7 \times 10^{0}$ | $1.5 \times 10^{0}$ |
| Radium-228+1d | $1.8 \times 10^{0}$ | $1.4 \times 10^{0}$ |
| Strontium-90+1d | $1.4 \times 10^{1}$ | $6.1 \times 10^{-1}$ |
| Technetium-99 | $3.0 \times 10^{1}$ | $1.0 \times 10^{0}$ |
| Thorium-228+7d | $1.7 \times 10^{0}$ | $1.5 \times 10^{0}$ |
| Thorium-230 | $2.8 \times 10^{2}$ | $8.0 \times 10^{1}$ |
| Thorium-232+10d | $1.5 \times 10^{0}$ | $1.4 \times 10^{0}$ |
| Uranium, total ($K_l$=325 L/kg[a]) (ppm) | $8.2 \times 10^{1}$ | $5.0 \times 10^{1}$ |
| Uranium, total ($K_l$=15 L/kg[a]) (ppm) | $2.0 \times 10^{1}$ | NA |
| **Chemicals (mg/kg)** | | |
| Acetone | $4.3 \times 10^{4}$ | $4.3 \times 10^{-1}$ |
| Antimony | $9.6 \times 10^{1}$ | $6.1 \times 10^{-1}$ |
| Aroclor-1254 | $1.3 \times 10^{-1}$ | $4.0 \times 10^{-2}$ |
| Aroclor-1260 | $1.3 \times 10^{-1}$ | $4.0 \times 10^{-2}$ |
| Arsenic | $1.2 \times 10^{1}$ | $9.6 \times 10^{0}$ |
| Barium | $6.8 \times 10^{4}$ | $1.2 \times 10^{2}$ |
| Benzene | $8.5 \times 10^{2}$ | $4.3 \times 10^{-1}$ |
| Benzo(a)anthracene | $2.0 \times 10^{1}$ | $1.6 \times 10^{-1}$ |
| Benzo(a)pyrene | $2.0 \times 10^{0}$ | $9.0 \times 10^{-2}$ |
| Benzo(b)fluoranthene | $2.0 \times 10^{1}$ | $1.6 \times 10^{-1}$ |
| Benzo(k)fluoranthene | $2.0 \times 10^{2}$ | $9.0 \times 10^{-2}$ |
| Beryllium | $1.5 \times 10^{0}$ | $6.2 \times 10^{-1}$ |
| Bis(2-chloroisopropyl)ether | $4.2 \times 10^{2}$ | $2.0 \times 10^{-1}$ |
| Bis(2-ethylhexyl)phthalate | $8.2 \times 10^{2}$ | $2.6 \times 10^{1}$ |
| Boron | $7.4 \times 10^{3}$ | $4.0 \times 10^{0}$ |
| Bromodichloromethane | $4.0 \times 10^{0}$ | $1.8 \times 10^{-1}$ |
| Bromoform | $3.1 \times 10^{1}$ | $1.6 \times 10^{0}$ |
| Bromomethane | $8.2 \times 10^{3}$ | $2.4 \times 10^{-2}$ |
| Cadmium | $8.2 \times 10^{1}$ | $9.1 \times 10^{-1}$ |
| Carbazole | $1.2 \times 10^{1}$ | $3.1 \times 10^{0}$ |
| Carbon disulfide | $5.0 \times 10^{3}$ | $6.2 \times 10^{0}$ |
| Carbon tetrachloride | $2.1 \times 10^{0}$ | $9.1 \times 10^{-2}$ |
| Chlordane | $1.9 \times 10^{-1}$ | $3.8 \times 10^{-2}$ |
| Chlorobenzene | $3.4 \times 10^{2}$ | $1.9 \times 10^{0}$ |
| Chloroform | $4.5 \times 10^{1}$ | $5.0 \times 10^{-1}$ |
| Chromium VI | $3.0 \times 10^{2}$ | $1.1 \times 10^{1}$ |
| Chrysene | $2.0 \times 10^{3}$ | $1.6 \times 10^{1}$ |
| Cobalt | $7.4 \times 10^{2}$ | $2.6 \times 10^{1}$ |

**TABLE E-7 OPERABLE UNIT 5 FINAL REMEDIATION LEVELS FOR SOIL (Cont'd)**

| Constituent | On-Property Final Remediation Levels | Off-Property Final Remediation Levels |
|---|---|---|
| **Chemicals (Cont.) (mg/kg)** | | |
| Copper | $2.2 \times 10^{5}$ | $2.0 \times 10^{1}$ |
| Cyanide | $1.2 \times 10^{5}$ | $8.0 \times 10^{-1}$ |
| Dibenzo(a,h)anthracene | $2.0 \times 10^{0}$ | $1.6 \times 10^{-3}$ |
| 3,3'-Dichlorobenzidine | $5.5 \times 10^{-1}$ | $2.0 \times 10^{-1}$ |
| 1,2-Dichloroethane | $1.6 \times 10^{-1}$ | $1.3 \times 10^{-1}$ |
| 1,1-Dichloroethene | $4.1 \times 10^{-1}$ | $5.9 \times 10^{-2}$ |
| Dieldrin | $1.5 \times 10^{-2}$ | $8.8 \times 10^{-3}$ |
| Di-n-octylphthalate | $1.1 \times 10^{3}$ | $2.0 \times 10^{-1}$ |
| Ethylbenzene | $5.1 \times 10^{3}$ | $1.0 \times 10^{-3}$ |
| Fluoride | $7.8 \times 10^{4}$ | $8.5 \times 10^{2}$ |
| Heptachlorodibenzofuran | $8.8 \times 10^{-4}$ | $5.0 \times 10^{-5}$ |
| Heptachlorodibenzo-p-dioxin | $8.8 \times 10^{-4}$ | $5.0 \times 10^{-5}$ |
| Indeno(1,2,3-cd)pyrene | $2.0 \times 10^{1}$ | $1.6 \times 10^{-2}$ |
| Lead | $4.0 \times 10^{2}$ | $4.0 \times 10^{2}$ |
| Manganese | $4.6 \times 10^{3}$ | $1.4 \times 10^{3}$ |
| Mercury | $7.5 \times 10^{0}$ | $3.0 \times 10^{-1}$ |
| Methyl-2-pentanone | $2.5 \times 10^{3}$ | $9.4 \times 10^{-1}$ |
| Methylene chloride | $3.7 \times 10^{1}$ | $6.3 \times 10^{-1}$ |
| 4-Methylphenol | $2.5 \times 10^{2}$ | $2.7 \times 10^{-1}$ |
| Molybdenum | $2.9 \times 10^{3}$ | $1.3 \times 10^{1}$ [a] |
| Nickel | $1.5 \times 10^{4}$ | $3.4 \times 10^{1}$ |
| 4-Nitroanaline | $1.5 \times 10^{2}$ | $8.0 \times 10^{-1}$ |
| N-nitrosodiphenylamine | $5.1 \times 10^{1}$ | $1.3 \times 10^{1}$ |
| N-nitrosodipropylamine | $2.0 \times 10^{-1}$ | $2.0 \times 10^{-1}$ |
| Octachlorodibenzofuran | $8.8 \times 10^{-3}$ | $1.0 \times 10^{-5}$ |
| Octachlorodibenzo-p-dioxin | $8.8 \times 10^{-3}$ | $1.0 \times 10^{-5}$ |
| Pentachlorophenol | $2.3 \times 10^{0}$ | $9.7 \times 10^{-1}$ |
| Selenium | $5.4 \times 10^{3}$ | $2.5 \times 10^{0}$ |
| Silver | $2.9 \times 10^{4}$ | $1.0 \times 10^{0}$ |
| Tetrachloroethene | $3.6 \times 10^{0}$ | $1.0 \times 10^{0}$ |
| Thallium | $9.1 \times 10^{1}$ | $1.0 \times 10^{0}$ |
| Toluene | $1.0 \times 10^{5}$ | $2.7 \times 10^{1}$ |
| Tributyl phosphate | $2.5 \times 10^{2}$ | $2.9 \times 10^{0}$ |
| 1,1,2-Trichloroethane | $4.3 \times 10^{0}$ | $1.9 \times 10^{-1}$ |
| Trichloroethene | $2.5 \times 10^{1}$ | $1.5 \times 10^{0}$ |
| Vanadium | $5.1 \times 10^{3}$ | $5.8 \times 10^{1}$ |
| Vinyl chloride | $1.3 \times 10^{-1}$ | $2.3 \times 10^{-3}$ |
| Xylenes, total | $9.2 \times 10^{5}$ | $4.0 \times 10^{2}$ |
| Zinc | $1.2 \times 10^{5}$ | $8.2 \times 10^{1}$ |

[a] $K_l$ = leaching coefficient

**TABLE E-8 FINAL REMEDIATION LEVELS FOR SEDIMENT**

| Constituent | Final Remediation Levels |
|---|---|
| **Radionuclides (pCi/g)** | |
| Cesium-137(+1d) | $7.0 \times 10^{0}$ |
| Neptunium-237(+1d) | $3.2 \times 10^{1}$ |
| Lead-210(+2d) | $3.9 \times 10^{2}$ |
| Plutonium-238 | $1.2 \times 10^{3}$ |
| Plutonium-239/240 | $1.1 \times 10^{3}$ |
| Radium-226(+8d) | $2.9 \times 10^{0}$ |
| Radium-228(+1d) | $4.8 \times 10^{0}$ |
| Strontium-90(+1d) | $7.1 \times 10^{3}$ |
| Technetium-99 | $2.0 \times 10^{5}$ |
| Thorium-228(+7d) | $3.2 \times 10^{0}$ |
| Thorium-230 | $1.8 \times 10^{4}$ |
| Thorium-232(+10d) | $1.6 \times 10^{0}$ |
| Uranium, total (mg/kg) | $2.1 \times 10^{2}$ |
| Aroclor-1254 | $6.7 \times 10^{-1}$ |
| Aroclor-1260 | $6.7 \times 10^{-1}$ |
| Arsenic | $9.4 \times 10^{1}$ |
| Benzo(a)anthracene | $1.9 \times 10^{2}$ |
| Benzo(a)pyrene | $1.9 \times 10^{1}$ |
| Benzo(b)fluoranthene | $1.9 \times 10^{2}$ |
| Benzo(k)fluoranthene | $1.9 \times 10^{3}$ |
| Beryllium | $3.3 \times 10^{1}$ |
| Bis(2-ethylhexyl)phthalate | $5.0 \times 10^{3}$ |
| Bromoform | $1.6 \times 10^{2}$ |
| Cadmium | $7.1 \times 10^{1}$ |
| Carbazole | $6.3 \times 10^{1}$ |
| Chromium VI | $3.0 \times 10^{3}$ |
| Chrysene | $1.9 \times 10^{4}$ |
| Cobalt | $3.6 \times 10^{4}$ |
| Indeno(1,1,2-cd)-pyrene | $1.9 \times 10^{2}$ |
| **Chemicals (Cont.) (mg/kg)** | |
| Manganese | $4.1 \times 10^{2}$ |
| 4-Methyl-2-pentanone | $2.1 \times 10^{3}$ |
| N-Nitrosodiphenylamine | $2.6 \times 10^{2}$ |
| Phenathrene | $3.0 \times 10^{-3}$ |
| Thallium | $8.8 \times 10^{1}$ |

**TABLE E-9 ON-PROPERTY DISPOSAL FACILITY WASTE ACCEPTANCE CRITERIA**

| | SOIL | | DEBRIS |
|---|---|---|---|
| **CONSTITUENT OF CONCERN** | **OU2** | **OU5** | **OU3** |
| **RADIONUCLIDES:** | | | |
| Neptunium-237 | | $3.12 \times 10^{9}$ pCi/g | |
| Strontium-90 | | $56.7 \times 10^{9}$ pCi/g | |
| Technetium-99 | | 29.1 pCi/g | 105 g |
| U-238 | 346 pCi/g | | |
| Total Uranium | 1030 mg/kg | 1030 mg/kg | |
| **ORGANICS:** | | | |
| 1,2-Dichloroethane | | * | |
| Carbazole | | $72.7 \times 10^{3}$ mg/kg | |
| Bis(2-chlorisopropyl)ether | | $2.44 \times 10^{-2}$ mg/kg | |
| Alpha-chlordane | | $2.89 \times 10^{0}$ mg/kg | |
| Bromodichloromethane | | $9.03 \times 10^{-1}$ mg/kg | |
| 4-Nitroaniline | | $4.42 \times 10^{-2}$ mg/kg | |
| Chloroethane | | $3.92 \times 10^{3}$ mg/kg | |
| 1,1,1-Trichloroethane[a] | | * | |
| 1,1-Dichloroethane[a] | | * | |
| Carbon tetrachloride[a] | | * | |
| Chloroform[a] | | * | |
| Methylene chloride[a] | | * | |
| Chloromethane[a] | | * | |
| Vinyl chloride[a] | | $1.51 \times 10^{0}$ mg/kg | |
| Tetrachloroethene[a] | | 128 mg/kg | |
| Trichloroethene[a] | | 128 mg/kg | |
| 1,1-Dichloroehtene[a] | | 114 mg/kg | |
| 1,2-Dichloroethene[a] | | 114 mg/kg | |
| Acetone[a] | | * | |
| Benzene[a] | | * | |
| Endrin[a] | | * | |
| Ethylbenzene[a] | | * | |

**TABLE E-9 ON-PROPERTY DISPOSAL FACILITY WASTE ACCEPTANCE CRITERIA (Cont'd)**

| | SOIL | | DEBRIS |
|---|---|---|---|
| **CONSTITUENT OF CONCERN** | **OU2** | **OU5** | **OU3** |
| Heptachlor[a] | | * | |
| Heptachlor epoxide[a] | | * | |
| Hexachlorobutadiene[a] | | * | |
| Methoxychlor[a] | | * | |
| Methyl ethyl ketone[a] | | * | |
| Methyl isobutyl ketone[a] | | * | |
| Toluene[a] | | * | |
| Toxaphene[a] | | $106 \times 10^3$ mg/kg | |
| Xylenes[a] | | * | |
| **INORGANICS:** | | | |
| Boron | | $1.04 \times 10^3$ mg/kg | |
| Mercury[a] | | $56.6 \times 10^3$ mg/kg | |
| Chromium VI[a] | | * | |
| Barium[a] | | * | |
| Lead[a] | | * | |
| Silver[a] | | * | |

[a] RCRA-based constituent of concern.
* Denotes compounds that will not exceed designated Great Miami Aquifer action level within 1000-year performance period, regardless of starting concentration in the disposal facility.

*SOURCE - Operable Unit 2 Record of Decision*
*Operable Unit 5 Feasibility Study*
*Operable Unit 3 Remedial Investigation/Feasibility Study Report*