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TECHNOLOGY SPECIFIC WORK PLAN FOR NEUTRALIZATION/ PRECIPITATION/ DEACTIVATION/STABILIZATION

09/26/96

DOE-1311-96
DOE-FN EPAS
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RESPONSES

7851

Department of Energy

Ohio Field Office
Fernald Area Office
P. O. Box 538705
Cincinnati, Ohio 45253-8705
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SEP 2 6 1996

DOE-1311-96

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

TECHNOLOGY SPECIFIC WORK PLAN FOR NEUTRALIZATION/PRECIPITATION/ DEACTIVATION/STABILIZATION

This letter transmits the Fernald Environmental Management Project (FEMP) responses to the comments contained in U.S. Environmental Protection Agency (U.S. EPA) and Ohio Environmental Protection Agency (OEPA) correspondence regarding the Technology Specific Work Plan for the Neutralization/Precipitation/Deactivation/Stabilization Project. Approval of the Technology Specific Work Plan is requested pending satisfactory resolution of the comments contained in your August 16, 1996 and August 12, 1996 letters. Comment, response and action items are provided within Enclosure 1 in order of U.S. EPA presentation and Enclosure 2 in order of OEPA presentation.

If you have any questions regarding this matter, please contact Robert Danner at (513) 648-3167.

Sincerely,

Jack R. Craig
Project Manager

FEMP: Danner

Enclosure

cc w/enc:

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F. Bell, ATSDR
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M. West, FDF/35-1
EDC, FDF/52-7

TECHNICAL REVIEW COMMENTS ON "MIXED WASTE CHEMICAL TREATMENT PROJECT TECHNOLOGY SPECIFIC WORK PLAN FOR NEUTRALIZATION/PRECIPITATION/DEACTIVATION/STABILIZATION OF MIXED WASTE MATERIAL" REVISION 0 FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

General Comment

Commenting Organization: Ohio EPA Commentor: Budich
Section #: NA Page #: NA Line #: NA
Original General Comment #: 1

Comment: There are varying descriptions throughout the work plan regarding floor covering and secondary containment. FEMP must provide adequate secondary containment for all areas where mixed waste will be stored or treated. Although there is some degree of existing contamination of the floor in Plant 6, FEMP must provide adequate floor covering in all areas where splashing is likely to occur to prevent buildup of transferrable contamination.

Response: Agree. All mixed waste treatment, storage and handling areas will be equipped with secondary containment devices. Floor coverings will consist of impervious polymer linears (Herculite ™ or equivalent) and temporary containment berms to prevent migration of spilled or splashed materials. Secondary containment for both the contaminated water container and the cone-bottom neutralization container is sized to hold 100 percent of the total volume of each tank.

Action: Section 3.5, Page 19 has been revised to discuss secondary containment and floor coverings. A copy of the change page is attached.

Commenting Organization: Ohio EPA Commentor: Budich
Section #: NA Page #: NA Line #: NA
Original General Comment #: 2

Comment: Section 3.1 of the work plan indicates that a treatability study was conducted on three of the four waste streams by Nuclear Fuel Services, Inc. and the results were documented in a final report entitled *Treatability Study for the FERMCO Chemical Treatment Project, NFS-SP-WST-006, Rev. 0, April 23, 1996.* OEPA DHWM request that FEMP provide a copy of this report.

Response: Agree. A copy of the requested report is included as Attachment A to this response to comments.

Action: No modifications to the existing Technology Specific Work Plan are required to

close-out this action item.

Commenting Organization: Ohio EPA
Section #: 3.3.1 and 3.5.1 Page #: NA
Original General Comment #: 3

Commentor: Budich
Line #: NA

Comment: Section 3.3.1, page 12 of the work plan states that corrosive wastes will be bulked in portable cone-bottom container, followed by elementary neutralization. Also, section 3.5.1 describes the use of a contaminated water storage tank. OEPA DHWM feels that these tanks meet the applicability requirements described in OAC 3745-66-90 for tank systems and that FEMP must include OAC 3745-66-90 through OAC 3745-66-991 as Applicable or Relevant and Appropriate Requirements (ARARs).

Response: Agree. RCRA Tank Standards promulgated in OAC 3745-66-90 through OAC 3745-66-991 (40 CFR 265.190 through 265.200) are applicable to these tanks. Wastes that are stored and/or treated in the contaminated water tank and cone-bottomed neutralization tank will be managed in accordance with the provisions of these rules. These tanks will be constructed of appropriate materials and will be designed to ensure that they are compatible with project wastes and do not collapse, rupture, or fail. The tanks will be equipped with secondary containment devices capable of holding over 100 percent of the volume of each tank. The tanks will be operated to prevent ruptures, spills, leaks, and/or overflows. Inspections of the tanks and secondary containment devices will be conducted daily when in use. Inspections will be filed in the site RCRA Operating Record. The tanks will be decontaminated and demobilized as described in Section 3.9.5. of the Technology Specific Work Plan.

Action: Table 4-1, page -60- has been revised to include reference to the RCRA tank standards promulgated in OAC 3745-66-90 through OAC 3745-66-991 (40 CFR 265.190 through 265.200). A copy of the appropriate change pages associated with this revision are attached. A revised copy of Page iii entitled "Ohio RCRA Part B Permit Substantive Compliance Demonstration" is also attached.

Commenting Organization: Ohio EPA
Section #: Figure 3-2 Page #: 13
Original General Comment #: 4

Commentor: Budich
Line #: NA

Comment: Section 3.3.4 describes the Deactivation\Stabilization Treatment Technology. On page 15 it is stated that in addition to the reduction of oxidizers, leachable RCRA metals will require precipitation to meet the LDR treatment standards under the Universal Treatment Standards. Figure 3-2 on Page 13 should be revised to indicate this additional treatment for the oxidizer waste category.

Response: Agree. Figure 3-2, Page 15 has been revised to reflect that additional treatment will be required to precipitate RCRA metals as described above.

Action: A copy of Figure 3-2, Page 15 showing the requested revision is attached.

Commenting Organization: Ohio EPA
Section #: 3.5.1 Page #: 18
Original General Comment #: 5

Commentor: Budich
Line #: NA

Comment: Section 3.5.1, page 18 describes Process Unit A. In the description it is stated that free liquids would be pumped from the waste drums to the contaminated water storage tank. This contaminated water will be used later in several of the treatment processes. OEPA DHWM request information on what steps will be taken to ensure that incompatible waste are not introduced into a treatment process by reusing the contaminated water.

Response: Agree. The following specific precautions will be taken to limit the potential for intermingling of incompatible wastes and wastewaters associated with the project.

1.) Wastes have been characterized into the broad categories of Corrosive Liquids, Barium Chloride Residues, Oxidizers and Reactives. Each of these waste categories will be treated in its own discrete campaign. There will be no intermingling of wastes or contaminated waters collected from each one of these discrete categorical campaigns with those of any other campaign.

2.) Within each categorical treatment campaign, waste containers having compatible wastes will be grouped together into Compatible Waste Groups (CWGs), and these groups will move through the treatment process intact. No intermingling between CWGs will be permitted.

3.) Contaminated water collected from wastes from one categorical campaign will only be reused in the treatment of wastes from that campaign.

4.) Waste treatment and holding equipment will be rinsed between campaigns to prevent cross-contamination by incompatible materials. Rinseate will be collected, packaged and treated in the same manner as the waste from which it came.

Action: Section 3.5.1, Pages 19 through 21 have been revised to reflect the change. Redline copies of the appropriate change pages are attached.

Commenting Organization: Ohio EPA
Section #: 3.5.4 Page #: 27
Original General Comment #: 6

Commentor: Budich
Line #: NA

Comment: Section 3.5.4, page 27 describes Process Unit D and states that stabilization/deactivation treatment may proceed immediately after chemical precipitation treatment has been completed, or it may take place at a later time. FEMP must provide additional information on how these containers will be managed in the event that the stabilization/deactivation treatment does not proceed immediately following the chemical precipitation process.

Response: Agree. Stabilization/deactivation may be postponed to allow the waste and previously added precipitation reagents to have longer reaction times, so that the waste/reagent reaction will continue to completion. When a soaking or reaction period is required, the drums from each CWG will be re-lidded and will be transported to the soaking area by lift truck. All of the containers from a CWG that have been treated with a precipitating reagent will be staged in a group in a soaking area, and containers from different CWGs will not be intermingled. Secondary containment and spill protection will be provided at the soaking area as described in comment response #1 above.

Action: Section 3.5.4, Page 29 has been revised to reflect the change. A redline copy of the appropriate change page is attached.

Commenting Organization: Ohio EPA Commentor: Budich
Section #: 3.5.4 Page #: 27 Line #: NA
Original General Comment #: 7

Comment: Section 3.5.4, page 27 states that Process Unit D will also be used for the deactivation treatment of reactive and ignitable metals in addition to the treatment of oxidizers. FEMP must provide information on what precautions will be taken to control the hazards associated with incompatible wastes.

Response: Agree. As stated in comment response #5, oxidizers and reactives will be treated as separate and distinct waste campaigns. Waste from each campaign will not be put into Process Unit D until all waste from the previous campaign has been treated and the equipment has been rinsed to remove residual contamination from the equipment.

Action: Section 3.5.4, Page 29 has been revised to reflect the change. A redline copy of the appropriate change page is attached.

Commenting Organization: Ohio EPA Commentor: Budich
Section #: 3.6.4, page 33 Page #: NA Line #: NA
Original General Comment #: 8

Comment: Section 3.6.4, page 35 describes facility and container inspection and indicates a weekly inspection schedule. However, OAC 3745-65-15(B)(4) requires that areas subject to spills, such as loading and unloading areas, shall be inspected daily when in use. FEMP must revise the work plan as appropriate.

Response: Agree. Section 3.6.4, page 35, 1st paragraph, 2nd sentence of the Technology Specific Work Plan has been revised as follows: "Container storage, staging, loading, and unloading areas will be inspected daily when in use."

Action: A copy of the appropriate change pages (Page 35 and 36) reflecting this modification to the Technology Specific Work Plan are attached.

Commenting Organization: Ohio EPA Commentor: Budich
Section #: Table 4-1 Page #: 57 Line #: NA
Original General Comment #: 9

Comment: Table 4-1 (ARARS), page 27 under the RCRA Closure Performance Standards references Section 4.8 of the Work Plan. It does not appear that a Section 4.8 was included in the work plan submittal to OEPA. FEMP must correct this discrepancy and provide the information described in the ARARS table regarding closure performance standards.

Response: Agree. Section 4.8 was incorrectly referenced in Table 4-1 (ARARS), page 57. Compliance with RCRA Closure Performance Standards is described in Sections 3.9.4 and 3.9.5 of the Technology Specific Work Plan.

Action: The citation for RCRA Closure Performance Standards contained in Table 4-1, page 57 has be revised to reflect this change. A copy of the appropriate change page (Page 60) is attached. A revised copy of Page iii, entitled OEPA RCRA Part B Substantive Compliance Demonstration" is also attached to reflect the correct citation to these standards in the Technology Specific Work Plan.

Commenting Organization: Ohio EPA Commentor: Budich
Section #: NA Page #: NA Line #: NA
Original General Comment #: 10

Comment: The revision to the work plan proposes that the treatment of thorium waste be conducted in Plant 5. OEPA DHWM concurs with the proposed revision. FEMP must provide detailed information addressing this treatment in its response to these comments.

Response: Agree. Thorium contaminated oxidizers will be treated in Plant 5 using the same methods employed to treat uranium contaminated oxidizers in Plant 6. Thorium wastes will be treated in Plant 5 within a special temporary enclosure referenced to as the Thorium Room. This room will be sealed and off-gassed through a HEPA filtration unit to satisfy BAT requirements established under OAC 3745-31 and OAC 3745-35. Secondary containment will be provided in all areas used to treat and/or store wastes as described in comment response #1, above. The specific waste handling and treatment activities for use in Plant 5 are presented in the attached procedure, POP-CT-2.24, *Deactivation/Stabilization of Thorium Wastes.*

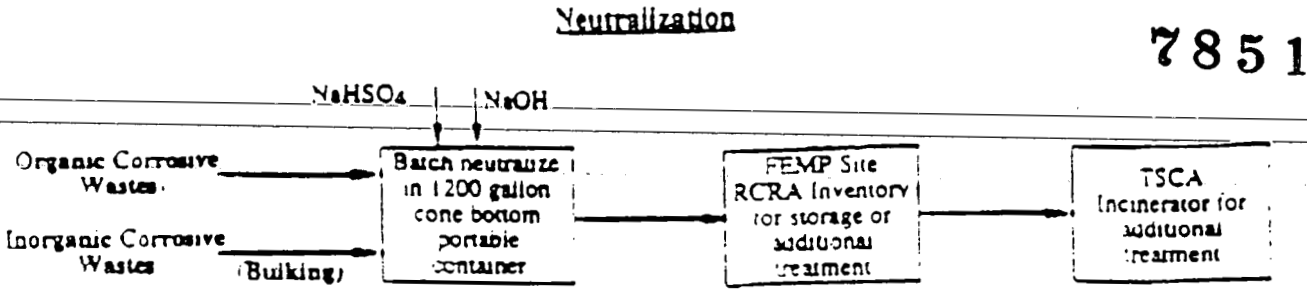
Action: Text on thorium processing has been added to Section 3.3.4, Page 18. A copy of POP-CT-2.24, *Deactivation/Stabilization of Thorium Wastes* is included in Appendix E of Revision 1 of the Technology Specific Work Plan.

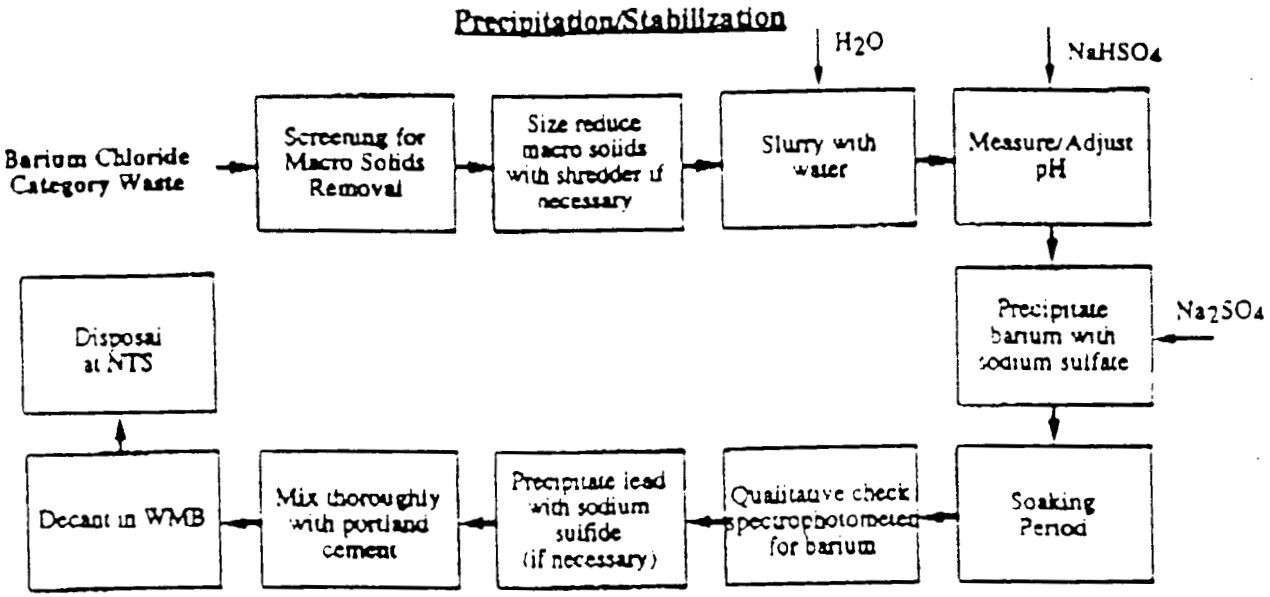
FEMP MIXED WASTE CHEMICAL TREATMENT PROJECT
Neutralization/Precipitation/Deactivation/Stabilization

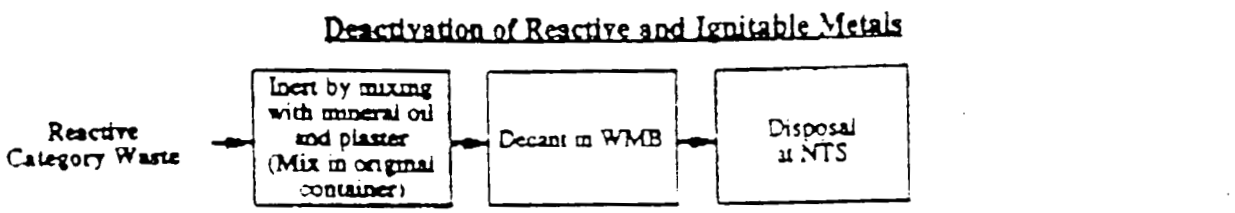
OEPA RCRA PART B PERMIT
SUBSTANTIVE COMPLIANCE DEMONSTRATION

APPLICABLE Y/N	ITEM	CROSS REFERENCE INDEX
Y	Hazardous Waste Determinations (OAC 3745-52-11), (40 CFR 262.11)	Section 2.0
Y	Interim Status: Treatment, Storage, and Disposal General Facility Standards - (OAC 3745-65-13 through 17) (40 CFR 265.13 through 265.17)	Sections 2.0, 3.2, 3.3, 3.6, 3.7.1, 3.7.2
Y	Interim Status: Treatment, Storage, and Disposal Facility Preparedness and Prevention (OAC 3745-65-31 through 35, 3745-65-37) (40 CFR 265.31 through 265.35, 265.37)	Sections 3.6.1 through 3.6.5, 4.0
Y	Interim Status: Treatment, Storage and Disposal Facility Contingency Plan and Emergency Procedures (OAC 3745-65-51 through 56) (40 CFR 265.51 through 265.56)	Sections 3.6.1 through 3.6.5, 4.0
Y	Container Storage (OAC 3745-52-34, 3745-66-70 through 77) (40 CFR 262.34, 265.170 through 265.177)	Section 3.6.3
Y	RCRA Tank Standards (OAC 3745-66-90 through OAC 3745-66-991) (40 CFR 265.190 through 40 CFR 265.200)	Section 3.3.1, 3.5.1, 3.6.4 and 4.0
Y	Residue of Hazardous Waste in Empty Containers (OAC 3745-66-11, 3745-66-14), (40 CFR 265.111, 265.114)	Sections 3.5 and 3.6.3
Y	Closure Performance Standards (OAC 3745-66-11, 3745-66-14) (40 CFR 265.111 and 40 CFR 265.114)	Section 3.9.4 and 3.9.5
Y	Reusable Equipment Decontamination (OEPA Closure Plan Review Guidance for RCRA Facilities)	Section 3.9
Y	Land Disposal Restrictions (OAC 3745-59), (40 CFR 268)	Section 4.1

NOTE: Compliance with the applicable, or relevant and appropriate requirements (ARARs) is discussed in Section 4.0 and in Table 4-1 of the attached Technology Specific Work Plan (TSWP).







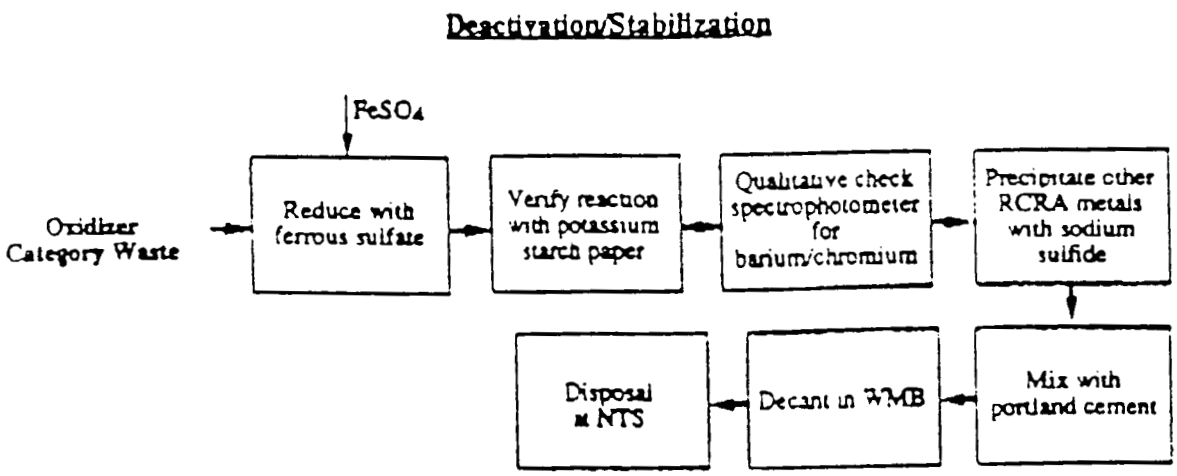


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Figure 3-2
Process Flow Diagrams
Fernald Mixed Waste Chemical Treatment Project

For dry or water-based wastes, the stabilization reagent will be portland cement. The amount of portland cement prescribed in the Design Recipe Notice will be added, thoroughly mixed with the waste, and evaluated for slump.

Due to the health and radiological hazards associated with the various forms of Thorium to be treated with this technology, the major process equipment used to handle Thorium-containing wastes will be set up and operated in a temporary enclosure called the Thorium Room at the northeast corner of Plant 5. By relocating the Thorium treatment activities to this already contaminated area of Plant 5, contamination of Plant 6 with thorium can be prevented. In the Thorium Room, isolating materials, floor coverings, secondary containment, negative pressure ventilation, and HEPA filtration prevent release of Thorium into the Plant 5 work space outside of the Thorium Room. See Appendix E of this Technology Specific Work Plan for a layout diagram of the Thorium Room, and the process operating procedure which will govern Thorium treatment operations in the Thorium Room.

3.4 SECONDARY WASTE TREATMENT

During the project, two main types of waste will be managed: primary waste and secondary waste. Primary waste includes all waste containers of the approximately 360 containers comprising the four waste categories. Secondary wastes include byproduct streams derived from the primary wastes.

Table 3-1 provides rough estimates of the types and volumes of primary and secondary waste, along with the anticipated disposal or long-term storage sites. These volume calculations are based on prior operating experience gained from treatment of similar wastes during the Fernald Mixed Waste Stabilization Project. Volumetric swell resulting from generation and incorporation of secondary waste will also be minimized.

To the greatest extent possible and consistent with the disposal site WAC, secondary wastes will be disposed along with the primary wastes with which they are associated by incorporating them into the processed waste. If separate disposal is required, secondary wastes will be compacted to the extent possible to minimize their volume. Efforts will be made to prevent contamination of solid waste materials with mixed waste constituents. Uncontaminated solid wastes are managed separately and properly disposed of by FEMP site personnel.

Secondary waste production will be minimized to the greatest extent possible by use of recyclable personal protective equipment such as respirators, and outer boots. The Perma-Fix team uses disposable protective clothing over launderable protective clothing. Wastes which must be disposed will be packaged as directed, properly labeled and marked, and transferred to the custody of FEMP site personnel.

3.5 PROCESS DESCRIPTION

The process that will be employed in treating the specified wastes, is a production process, in which mixed waste (exhibiting hazardous and low level radioactive characteristics) will be treated to produce stable LLRW forms capable of meeting disposal site WAC. The barium chloride residue, reactive and oxidizer categories will be rendered non-hazardous after treatment and will therefore be eligible for disposal at NTS. Most of the wastes in the corrosive category bear F-listed waste codes or exhibit the toxicity characteristic for TC organic constituents which are prohibited by NTS. After these wastes are treated, they will be returned to the FEMP site RCRA inventory to await transfer to the Mixed Liquid Waste Project and subsequent off-site treatment at the TSCA Incinerator at the K-25 Site near Oak Ridge, Tennessee. Perma-Fix will perform all treatment activities and will manage all waste containers in the process area. This section describes each of the major process units and the manner in which one or more of these units is used in the performance of each treatment technology. Figure 3-3 is a schematic diagram illustrating how major materials handling activities will be accomplished. Figure 3-4 is a production flow diagram of the mixed waste chemical treatment process. Figure 3-5 is an equipment layout drawing of the process area in the Plant 6 Building.

The individual process units, which make up the waste treatment production process, are enclosed by dashed lines in Figure 3-4 and designated as follows: Process Unit A - **Waste Preparation;** Process Unit B - **Macro Solids Sorting and Size Reduction**; Process Unit C - **Chemical Precipitation**; Process Unit D - **Deactivation/Stabilization;** Process Unit E - **Decanting and Curing;** Process Unit F - **Reagent Makeup;** and Process Unit G - **Neutralization.**

All process operations will be performed by highly qualified and experienced technicians, who will be referred to in the following presentation as "operators." All mixed waste treatment, storeage, and handling areas identified in the following sections will be equipped with secondary containment devices. Floor coverings will consist of impervious polymer linears (Herculite ™ or equivalent) and temporary containment berms to prevent migration of spilled or splashed materials. Secondary containment for both the contaminated water container and the cone-bottom neutralization container is sized to hold 100 percent of the total volume of each tank.

3.5.1 Process Unit A - Waste Preparation

Process Unit A, Waste Preparation, is the process unit in which Compatible Waste Groupings (CWG) are created, and in which the waste and containers in each CWG are processed to prepare them for treatment. The waste preparation begins when waste containers are transported from an Incoming Waste Staging Area (See Figure 3-5) to the Deheading and Inspection Station where the containers are logged in, opened and inspected. To limit the potential intermingling of incompatible wastes, the four broad categories (Corrosive Liquids, Barium Chloride Residues, Oxidizers and Reactives) have been grouped by container into CWGs which are comprised of containers of compatible wastes. Each of these CWGs will be treated in its own discrete campaign. No waste or wastewater for a campaign will be allowed to intermingle with that of another. Contaminated waste collected from each CWG will only be

Table 3-1
Summary of Estimated Waste Volumes for Storage/Disposal

Waste Description	Volume Raw/Treated (Cubic Feet)	Disposal or Storage Site
Primary Mixed Wastes Treated to Eliminate Hazard Characteristic		
Barium Chloride Residues	1,500/2,700	NTS
Corrosives	794/794	Envirocare/TSCA Incin.
Reactives	241/362	NTS
Oxidizers	278/348	NTS
Total Waste Volume	2,813/4,204	----
Secondary Mixed Wastes Generated From Treatment Activities		
Compacted Anti-C Clothing	125	FEMP/NTS
Compacted Respirator Cartridges	260	FEMP/NTS
Used HEPA Filters/Prefilters	30.00	Shredded, Treated and Co-disposed with Primary Wastes
Damaged Respirator	2.00	FEMP/NTS
Wipes & Plastic	75	FEMP/NTS
Excess Water	100	Precipitation, Stabilization and NTS Disposal as LLRW
Totals Mixed Waste	592	----
Off-Site LLRW Disposal		
Used Drums (RCRA Empty)	400/450 Drums	FEMP/NTS
Totals Off-Site LLRW Disposal	400/450 Drums	----
Free Release Solid Waste		
Uncontaminated packaging	20	Off-site landfill

reused in the treatment of wastes from that campagin. Waste treatment and holding equipment will be rinsed between campaigns to prevent cross-contamination. Rinseate will be treated in the same manner as the waste from which it came. Free liquid layers encountered in the raw waste containers will be pumped out with an air-driven double diaphragm pump, which will discharge by way of hoses to a contaminated water holding tank. This tank is located within a manufactured secondary containment of sufficient capacity to contain over 100 percent of the capacity of the tank. The floor of the Deheading and Inspection Station is spill protected by a Herculite™ floor covering. The Deheading and Inspection station is also equipped with an engineered negative pressure dust/fume collection system which discharges outside the building through a prefilter and a high efficiency particulate air (HEPA) filter.

Some waste containers have been overpacked one or more times while in on-site RCRA storage. A fork lift and suitably rated T-bar and drum clamp will be used to lift the inner container out of the overpack. This operation will be performed over the Herculite™ so that any spills due to container leakage will be contained. Waste from the inner container may be decanted into the overpack and then managed in the same manner as other containers that contained no inner containers. The leaking container removed from the overpack may also be bagged to contain leakage until it can be emptied. Empty inner containers and lids will be inspected and cleaned, if necessary, to ensure compliance with the RCRA empty container rule promulgated in 40 CFR 261.7 (Ohio Administrative Guide [OAC] 3745-51-07), and placed in an Empty Container Storage Area to await disposition by FEMP site personnel. Rinse waters will be collected, and pumped to the contaminated water holding container in the same manner as the excess liquids were removed from the containers.

After the waste containers have been opened, the excess liquid removed, and the inner containers separated from the waste, the waste containers are grouped by the operators at the Deheading and Inspection Station into CWGs. A CWG is sized, based on the design recipe, to fill a WMB after all hydration water, reagents and shredded solids have been combined with the waste in the stabilization step.

In the next step of the waste preparation process, macro solids (over 2 inches in any dimension) will be separated from the waste by passing the waste through a bar screen in a screening hopper as shown in Figure 3-4. Each drum in a CWG is clamped in an engineered hydraulic drum lift, and lifted to the top of the screen hopper, and the contents dumped onto the bar screen. Macro solids retained by the bar screen are raked down a chute onto a sorting table where Process Unit B begins. Waste that passes through the bar screen is dispensed from the bottom of the screen hopper through a discharge valve into a heavy wall 55-gallon mixing drum. If necessary, the loading of solids and liquids in each mixing drum is adjusted to the proper ratios, and freeboard is provided to make room for the added reagents. Screening for macro solids removal can be used on any of the wastes identified for this project except those containing thorium. If thorium wastes must be repackaged or inspected for macro solids prior to treatment, the wastes will be manually transferred inside a ventilated enclosure. The exhaust air flow from the enclosure will pass through the HEPA filtration system prior to discharge to the atmosphere.

In performing the treatment technologies specified for this project, some aspects of Process Unit

prepared waste and shredded compatible solids in the proper proportions to comply with the design recipe.

The mix units will be equipped with a negative pressure dust/fume collection system to protect the operator from exposure to dusty waste constituents, chemical fumes or vapors, and radioactive contamination. This negative pressure dust collection system will discharge to the atmosphere outside the Plant 6 Building by way of the prefilter and HEPA filter system.

Because of the use of sodium sulfide, there is a potential that hydrogen sulfide gas could be generated if sodium sulfide became mixed with acid or was added to a waste mixture that has a low pH. To protect against this possibility, pH of the receiving material (water or waste) will be checked each time before sodium sulfide is added. Sodium sulfide will not be added unless pH of the receiving material is at least 9.0. If a receiving material is found to have a pH less than 9.0, its pH will be adjusted upward with an alkaline reagent such as caustic soda, lime or portland cement before the sodium sulfide is added.

Due to the nature of the chemical precipitation process, a potential for minor spillage and splash out of waste materials from the mixing drums under the mix unit exists. Operators will exercise care in mix unit operations to minimize spills and splashing. Daily housekeeping in these areas with HEPA wet-vacs will be performed to prevent a buildup of transferrable contamination on the floor in this area.

3.5.4 Process Unit D - Deactivation/Stabilization

Process Unit D, deactivation/stabilization, will be used after precipitation treatment of barium chloride residues and reduction of oxidizers. This process will also be used to provide deactivation treatment of reactive and ignitable metals. The same precautions described in Section 3.5.1 will be used during this treatment step to prevent intermingling of incompatible wastes.

Process Unit D, deactivation/stabilization, is the operation in which solidification or inerting reagents are added to the waste and thoroughly mixed. After waste has been subjected to the chemical precipitation in Process Unit C, it will be further stabilized or deactivated with appropriate chemical reagents to bring about solidification of the waste into a solid waste/grout monolith. Solidification treatment takes place under the same mix units which were used to perform chemical precipitation or deactivation. Stabilization/Deactivation treatment may proceed immediately after chemical precipitation treatment has been completed, or it may be postponed to allow the precipitation reagents to have additional time to react. When a soaking period is required, the drums from a CWG will be re-lidded and transported by lift truck to a soaking area equipped with secondary containment and/or floor coverings. Wastes will be managed within the soaking area to prevent intermingling of incompatible materials. Stabilization/Deactivation reagents may include Type I portland cement, gypsum, mineral oil/gypsum, or Petroset II, as appropriate. The stabilization/deactivation reagent's primary purpose is to bind free liquid (water or mineral oil) and solidify the waste into a solid matrix. Portland cement has the added benefit of raising the pH of the treated waste. 000015

can be reused. When excess contaminated water is generated, it will be packaged, labeled, marked, and returned to the FEMP site RCRA inventory pending characterization.

Air pollution from the treatment process will be minimized by presoaking waste as necessary, and by providing dust suppression using water sprays at all likely fugitive dust emission points. Water will not be used for the suppression of magnesium wastes. Also, a negative pressure ventilation system of hoods, hoses and ducts will draw air from the fugitive dust zones and discharge it to the atmosphere outside the Plant 6 building via HEPA filters equipped with dust pre-filters.

3.6.3 Management of Facility Waste Containers

Primary wastes for this project will include the four specific waste categories, macro solids, and free water layers separated from these wastes during waste preparation. Secondary wastes will include used personal protective equipment which has exceeded its useful life, contaminated area isolation materials, decontamination water, HEPA filters, and uncontaminated solid wastes. The Perma-Fix Team will manage all waste materials in cooperation with FERMCO, to minimize hazards to the project personnel, other personnel on the Fernald Site, the public, and the environment. The team will assist FEMP site personnel in complying with all substantive requirements under the Federal and state regulations identified in Section 4.0 that relate to identification, characterization, labeling, marking, inspection, tracking and storage of hazardous wastes in containers or tanks. Also, the team will comply with the 40 CFR 265 and OAC 3745-65 requirements for emergency preparedness and response. The following Fernald site procedures will be used to ensure compliance with these waste management requirements:

EW-0001	"Initializing Waste Characterization Activities using the Material Evaluation Form"
SOP-20-C-017	"Movement of RCRA and Hazardous Waste"
SOP-20-C-500	"Inspecting RCRA Waste Load/Unload and Staging Areas"
SOP-20-C-616	"Inspection of Hazardous Waste Management Units"
SOP-20-C-630	"Receipt Inspection and Placement of Hazardous, Mixed, PCB and Asbestos Wastes into Storage"
SOP-20-C-606	"Hazardous Materials Spill Clean-up"
SOP-0067	"Spill Incident Reporting and Clean-up"
EP-0005	"Controlling Aqueous Waste Water Discharges into the Waste Water System"

3.6.4 Facility and Container Inspections

Inspections of waste and holding containers, and equipment in the Plant 6 Exclusion Zone will be conducted weekly when maintenance and housekeeping activities are performed in the process area. Both the contaminated water tank and the cone-bottom neutralization tank and their associated secondary containment devices will be inspected on a daily basis when they are

in use. Also, container storage, staging, loading, and unloading areas will be inspected daily when in use. Inspections in container storage or staging areas will include, but not be limited to, inspection of containers for leaks, damage, indications of overpressure, loose or illegible labels, aisle spacing, and waste compatibility. The presence and accessibility of adequate quantities of emergency response equipment will be verified. The area in which waste materials are held in containers will undergo an inspection of the secondary containment for evidence of leakage from the container.

Process equipment will be inspected for any mechanical or electrical conditions which could cause an accident or emergency or render the equipment inoperable if not corrected. If such a condition is found, the equipment will be immediately tagged out of service, and maintenance or repairs will be initiated. Before maintenance or repair work can take place, the equipment must be de-energized and locked out by the person performing the work so that it cannot be re-energized until the lock is removed. The lock-out/tag-out procedures in place at the FEMP site will be used in these situations. If hot work (cutting, grinding, or welding) is required, the FEMP site hot work authorization procedure will be followed carefully to ensure that hot work is conducted safely.

3.6.5 Spill Response

In the event that the inspection tour reveals a leaking container or accumulations of dry or liquid mixed wastes in process equipment or on the floor, immediate action will be taken to contain, cleanup and package the materials in question. Perma-Fix team personnel will perform all spill response and related housekeeping within the Exclusion Zone. Spill kits containing dry absorbent granules, pads and booms will be located in the Exclusion Zone close to areas of potential spills or leaks. In the event of a large spill or a spill that causes a condition immediately dangerous to life or health (IDLH), Perma-Fix and FEMP site personnel will evacuate the Exclusion Zone, notify the Fernald Assistant Emergency Duty Officer (AEDO) and stay outside the Exclusion Zone until allowed to return by Fernald site personnel.

3.6.6 Management of Contaminated Water

Wash water will be collected in the contaminated water holding container. Contaminated water is reused to slurry wastes and dissolve reagents. The objective is to operate the process with a zero discharge water balance if possible. The production rate of contaminated water from decontamination and housekeeping operations is managed in order to avoid exceeding the capacity of the waste to consume water. If excess water is produced, it will be packaged as directed by FEMP site personnel. Excess contaminated water will be returned to on-site RCRA inventory pending characterization and disposition.

PERMIT THAT WOULD BE REQUIRED	PERMIT REQUIREMENTS (ARARS)	COMPLIANCE PLAN
Resource Conservation and Recovery Act (U.S.C. 6901 et. seq.)	Container Storage (OAC 3745-52-34, 3745-66-70 through 77) (40 CFR 262.34, 265.170 through 265.177)	Containers of hazardous waste will be managed and inspected in accordance with regulatory requirements. Secondary containment will be provided for the 5000-gallon contaminated water container, the 1200-gallon neutralization container, and at the drumming stations and staging areas. Containers will be handled in a manner to prevent rupture, leakage, or spillage. The containers will be compatible with all stabilized material and will remain closed during storage.
	Residue of Hazardous Waste in Empty Containers (OAC 3745-51-07) (40 CFR 261.7)	Containers used for the project will be considered empty in accordance with the requirements of this rule.
	Closure Performance Standards (OAC 3745-66-11, 3745-66-14) (40 CFR 265.111, 265.114)	Decontamination of the treatment system will be conducted to meet closure performance standards as specified in Sections 3.9.4 and 3.9.5. Equipment contacting waste will be decontaminated in accordance with OEPA Closure Plan Review Guidance.
	RCRA Tank Standards (OAC 3745-66-90 through OAC 3745-66-991) 40 CFR 265.190 through 40 CFR 265.200)	Wastes that are stored and/or treated in the contaminated water tank and cone-bottom neutralization tank will be managed in accordance with the provisions of these rules. These tanks will be constructed of appropriate materials and will be designed to ensure that they are compatible with the project wastes and do not collapse, rupture or fail. The tanks will be equipped with secondary containment devices capable of holding over 100 percent of the volume of each tank. The tanks will be operated to prevent ruptures, spills, leaks, and/or overflows. Inspections of the tanks and secondary containment devices will be conducted daily when in use. Inspections will be filed in the site RCRA Operating Record. The tanks will be decontaminated and demobilized as described in Section 3.9.5 of the Technology Specific Work Plan.

APPENDIX E

PESI PROCEDURE
POP-CT-2.24

DEACTIVATION/STABILIZATION OF THORIUM WASTES

Perma-Fix Environmental Services, Inc.

Process Operating Procedure

NPDS Project

Approval: _____

DEACTIVATION/STABILIZATION OF THORIUM WASTES

I. POLICY

PESI policy is to minimize the risk of personnel injury while efficiently performing deactivation/stabilization of Thorium wastes (oxidizers) for off-site disposal. The process goal of the deactivation/stabilization treatment is to produce a solid monolith inside a disposal container that no longer exhibits the hazard characteristic of ignitability and complies with land disposal restrictions regarding the hazard characteristic of toxicity. This procedure establishes the guidance that PESI operators and subcontractor personnel must use when performing deactivation/stabilization of Thorium wastes using the Perma-Fix Mixer.

II. DISCUSSION

A waste is considered to be an oxidizer if it has the ability to continuously generate oxygen when burned, thus increasing the severity of any fire that may occur. The Thorium wastes to be processed in this project include its oxide, fluoride and nitrate forms. In addition to its hazard characteristics, Thorium represents a significant radiological hazard. Thorium in all its forms gives off large quantities of alpha radiation. On the Fernald Site, Thorium waste handling and treatment activities are tightly controlled. Unless otherwise authorized by FERMCO, this procedure is to be used only for Thorium wastes, and only in the Thorium Room at the northeast corner of the ground floor of the Plant 5 Building. Figure 1 shows the location of the Thorium Room and its configuration.

III. DEFINITIONS

Design Recipe - Prescribed dosages of one or more chemical reagents that have been shown by bench-scale testing to be effective in solidifying wastes having a specific waste profile.

Design Recipe Notice - An easy to read notice which is posted at each operator location, to communicate the currently applicable design recipe, raw waste profile and performance specifications to the operators.

Performance Specifications - A set of chemical and physical criteria which comprise minimum performance expectations for successful treatment of wastes fitting the raw waste profile using the design recipe.

Raw Waste Profile - A physical description of a waste category that is used to evaluate incoming waste batches for applicability of the design recipe.

White Metal Box (WMB) - A DOT strong, tight container built to FERMCO/NTS specifications and painted white. Approximate dimensions are 7 ft. × 4 ft. × 2 ft., giving a useful storage capacity of 40 cubic feet.

IV. REFERENCES

1. POP-CT-2.2, *Drum Opening, Inspection, and Liquid Adjustments, Process Stage 1*
2. POP-CT-2.8, *Chemical Treatment, Process Stage 4*
3. POP-CT-2.9, *Solidification Treatment, Process Stage 5*
4. POP-CT-2.11, *Decanting, Sampling, Curing and Reclaim, Process Stage 6*

V. PROCEDURE

This procedure is considered to be an addendum to References 1, 2, and 3. The drum handling and mixing methods described in those three procedures are applicable to this procedure. This procedure describes the additional requirements and process steps which the operators must perform to minimize radiological and chemical hazards while performing deactivation/stabilization treatment of Thorium wastes.

A. Area Setup

Processing of Thorium wastes will take place in the Thorium Room at Plant 5. The Thorium Room is a temporary enclosure constructed of wooden supports and polyethylene sheeting, with plywood doors. Outside the enclosure there is a radiological buffer zone, a frisker station for detection of alpha contamination, and a doffing area where outer anti-C clothing and respirators are doffed prior to exiting back to the Plant 5 radiation control point. All treatment equipment, reagents, and the waste to be treated must be brought into the area, setup, assembled, staged and tested as necessary, before waste processing can begin. The exterior surfaces of the equipment to be used will be protected from Thorium contamination by wrapping the equipment with plastic or by using strippable coatings.

B. Drum Handling and Movement

Incoming waste drums will be brought to the Thorium Room, placed on 4-wheel ring dollies, and rolled into the Thorium Room for treatment. The drums will be tightly sealed when entering or leaving the Thorium Room. They will be opened only after they have been moved into the Thorium Room. After treatment at the mixer, each drum will be allowed to cure overnight in the Thorium Room, and will be resealed the following day for removal from the room after confirmation of cure (no free liquid). The processing crew will consist of:

1 mix unit operator
1 inside helper
1 radiological technician
2 outside helpers
1 outside lift truck operator

The following specific procedures will be required for Thorium drum handling and movement.

Performer	Action
Project Manager	1. Ensures that Operations Log Sheets are prepared and matched with the incoming Thorium waste drums.
Outside Helpers	2. Receive Thorium waste drums and their Operations Log Sheets from the outside lift truck operator.
	3. With the help of the outside lift truck operator, places each Thorium waste drum on a 4-wheel ring dolly, and stages the drums along with their Operations Log Sheets just outside the Buffer Zone in the order in which processing will take place.
Inside Helper	4. Fastens the lids tightly on all treated Thorium waste drums that have cured overnight, and rolls them into the Buffer Zone.
Outside Helper	5. Receives sealed treated waste drums from the inside personnel and stages them in the Buffer Zone for later radiological survey.
	6. Rolls the incoming waste drums along with their Operations Log Sheets into the Thorium Room where they are received by the Inside Helpers.
Inside Helper	7. Groups the incoming waste drums into Compatible Waste Groups (CWGs) containing a maximum of 6 drums. **Note**: Since 6 treated drums will be overpacked together in one White Metal Box, as a "Six Pack," the CWG size will be six drums.
	8. One at a time, removes the lid from each incoming Thorium waste drum and inspects the condition of the drum to determine whether the waste can be mixed in the drum.

Performer	Action
Inside Helpers (Cont'd)	9. If the drum is in acceptable condition, rolls the drum up an incline ramp to a position under the mixing unit.
	10. If the original drum is too deteriorated for mixing, manually transfer the drum's contents to a replacement drum, and rolls the replacement drum up the ramp to the mixing position. **Caution: All Thorium material transfers must be done carefully to minimize dust generation in the work space. The flexible hose intake of the HEPA ventilators must also be used at the point of dust generation.**
	11. When mixing is complete, replaces the lid on each drum and fastens it in place with a bolt and ring.
	12. Rolls the treated Thorium waste drum down the ramp into a staging area inside the Thorium Room, and removes the lid for overnight curing.
	13. Repeats Steps 8 through 12 for each Thorium waste drum treated.
Outside Operators	14. Assist the FERMCO Lift Truck Operator and the Rad Tech, as necessary, in surveying and removing the previously treated drums from the Buffer Zone.

C. Treatment of Thorium Wastes

Treatment of Thorium wastes will be performed by the Mix Unit Operator in accordance with a Design Recipe Notice and using the methods described in Reference 2 and Reference 3. The major difference between normal waste processing under these two procedures and Thorium Room operations is that Thorium wastes will be slurried, mixed and cured in the original drums when possible, or in replacement drums if necessary. When cured, the drums of treated waste will be packed into White Metal Boxes to form "Six Packs" for disposal. Special requirements or Thorium Room operations include the following:

1. There is no water service available in the Thorium Room, so slurry water will be brought in from Plant 6 in sealed drums, marked to identify their contents.

2. Portland cement for hydrolyzing free liquid will be brought to the area in 94-pound paper sacks stacked on pallets. Approximately 20 bags will be needed.

3. Ferrous Sulfate will be the reagent used to reduce the thorium wastes: approximately 2 five-gallon buckets will be required.

4. The mixer and associated equipment must be decontaminated and surveyed prior to removal from the Thorium Room. To aid in the decontamination effort, the mixer shaft will be removed from the mixer and abandoned in the last drum of waste after mixing is complete.

D. Sampling of Treated Thorium Waste

The FERMCO Waste Characterization Group will prepare waste-specific sampling and analysis plans (SAPs) for each MEF of Thorium waste to be treated in this project. When the wastes are treated, the Perma-Fix Team will collect the samples inside the Thorium Room, in compliance with the applicable SAP, immediately after mixing is complete, and before the waste sets. The samples will be held in a locked box until they have cured, and then will be transferred to FERMCO custody following all applicable FERMCO procedures. The sampling will proceed as follows:

Performer	Action
Mix Unit Operator or Inside Helper	1. Collects samples from the drum, as required by the SAP produced by the FERMCO Waste Characterization Group.
	2. Transfers the samples to the storage box and locks the box, keeping sole custody of the key until the samples are transferred to FERMCO for analysis.
	3. Follows the specific procedural steps of Reference 4, in transferring custody of the samples to FERMCO.

VI. ATTACHMENTS

A. Figure 1 - Plant 5 Thorium Room Layout Diagram

B. Figure 2 - Design Recipe Notice

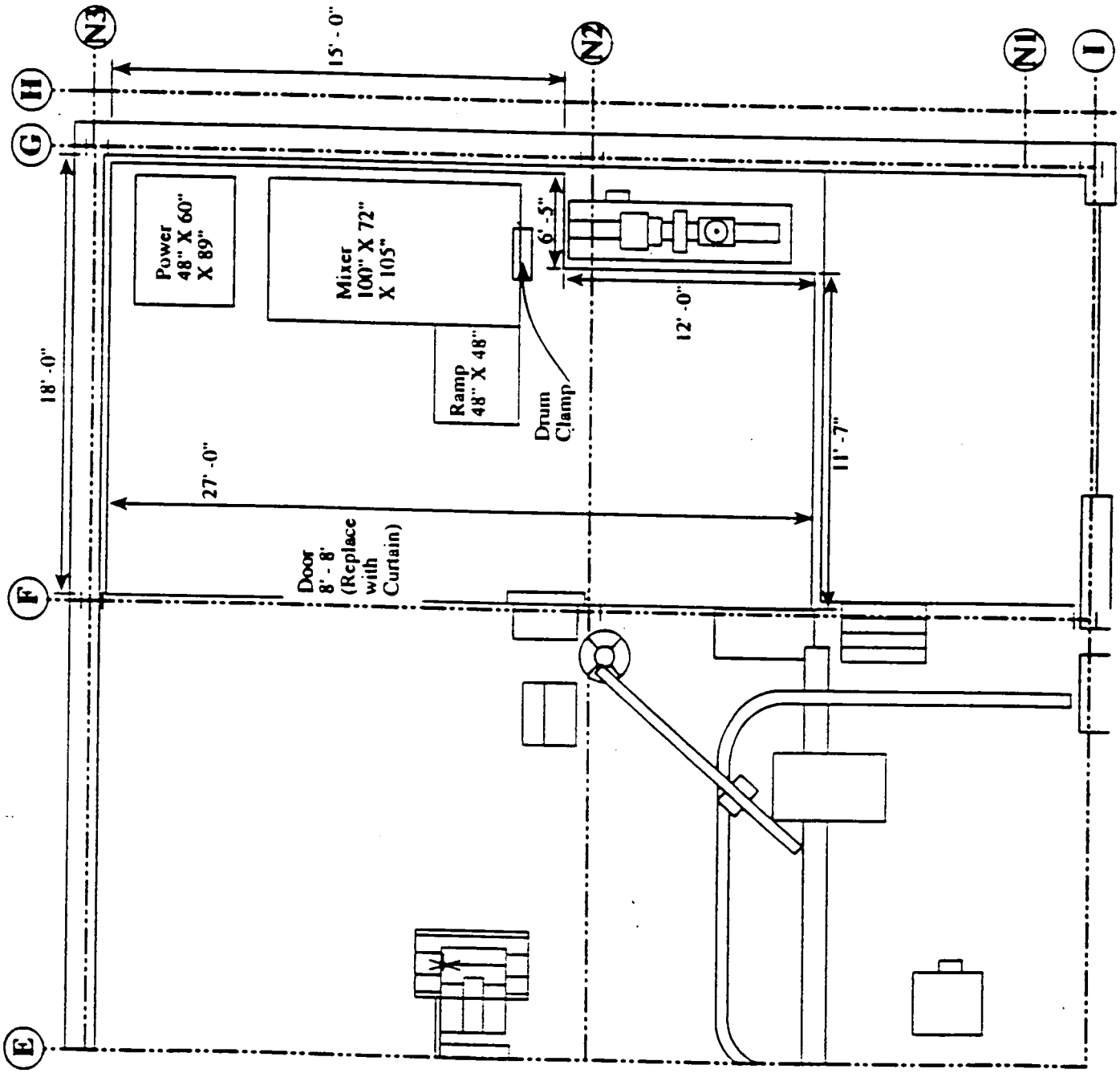

Figure 1

Not to Scale

9535-3-BSB HD-8/13/96

Figure 2

Design Recipe Notice

Waste Category Designation _____

Posting Date_____ Posting Time_____

Raw Waste Profile

Color_____
Texture_____

Prescribed Dosages

1. Slurry with water until mixture is smooth and saturated.

2. Reduce oxidizers in the waste by adding a minimum of 1000 milliliters of dry Ferrous Sulfate, and mixing for 2 minutes.

3. Test for completeness of reaction with Potassium Starch Paper, and add more Ferrous Sulfate, if necessary to achieve the required end point.

4. When the end point has been achieved, add 40 pounds, or ½ bags of Portland Cement, and mix for 2 minutes.

PERFORMANCE SPECIFICATIONS

Final Color of Treated Waste _____.

Final Texture of Treated Waste _____.

Potassium Starch Test Color, No Black Stain .

Blade Slump Value, _____ maximum (inches).
_____ minimum (inches).

RESPONSE TO TECHNICAL REVIEW COMMENT ON THE "FERNALD ENVIRONMENTAL MANAGEMENT PROJECT MIXED WASTE CHEMICAL TREATMENT PROJECT NEUTRALIZATION, PRECIPITATION, DEACTIVATION, AND STABILIZATION TECHNOLOGY SPECIFIC WORK PLAN, DOCUMENT NUMBER 8ADD9-2200-005, REVISION 0, JUNE 1996" FERNALD ENVIRONMENTAL MANAGEMENT PROJECT, FERNALD, OHIO

GENERAL COMMENT

Commenting Organization: U.S. EPA | Commentor: Saric
Section #: 4.0 | Page #: NA | Line #: NA
Original General Comment #: 1

Comment: Table 4-2 in this section presents a list of underlying hazardous constituents (UHC) for each material evaluation form number under the four main waste categories. Many of the UHCs are not discussed in earlier portions of the technology-specific work plan. For example, under the oxidizer category in Table 4-2, beryllium, nickel, cadmium, selenium, and acetone are listed as UHCs. However, these oxidizer category waste constituents are not discussed in Section 2.0, Waste Description, or Section 3.0, Treatment Description. Sections 2.0 and 3.0 should be revised to discuss all UHCs listed in Table 4-2 in Section 4.0. Section 3.0 should also discuss how wastes containing UHCs will be treated to meet all regulatory requirements for disposal.

Response: Agree. Of the four waste categories that will be treated under the NPDS Project, three (reactives, oxidizers, and corrosives) contain waste streams subject to compliance with Universal Treatment Standards (UTS) for underlying hazardous constituents (UHCs) promulgated in 40 CFR 268.48. The corrosives waste category is the only one of these three which contains organic UHCs at concentrations above the UTS limits. The fourth waste category (barium chloride residues) is only hazardous for TC metals (D005 and D008) and therefore, is not subject to UTS compliance in accordance with the treatment standards promulgated in 40 CFR 268.40 (OAC 3745-59).

The rationale used to select applicable UHCs for each of these waste streams is described in Section 4.1 and Table 4-2 of the Technology Specific Work Plan and is largely based on the process knowledge and characterization data that has been collected for each waste stream contained in the project. In its original form, Section 2.0 of the Technology Specific Work Plan described the general process used at the Fernald Site to collect this characterization and process knowledge data. However, Section 2.0 did not discuss compliance with Universal Treatment Standards for the UHCs contained in project waste streams. Therefore, Section 2.0 has been revised to briefly described the UHCs and reference the appropriate portions of Section 4.0 (Section 4.1 and Table 4-2) of the Technology Specific Work Plan where the selection of UHCs for each MEF under the four broad waste categories is described in detail. Additional text on the manner in which UHCs will be treated to attain

compliance with the Universal Treatment Standards has also been added to Section 2.0 and 3.0. Treatment of inorganic UHCs (metals) will consist of the same precipitation and stabilization technologies used to treat wastes exhibiting the toxicity characteristic for TC metals. Since the treatment of corrosives under the NPDS Project is limited solely to neutralization and bulking, treatment of organic UHCs is not a treatment objective of the project. Rather, these waste will be returned to on-site RCRA storage after their initial neutralization under the NPDS project, and will be further treated to meet all applicable LDR and UTS treatment standards at the TSCA Incinerator in Oak Ridge, Tennessee. All EPA waste codes and UHCs currently identified in the Technology Specific Work Plan, with the exception of the D002 code which will be removed after neutralization under the NPDS Project, will be applied to these wastes until their final disposition at the TSCA incinerator.

Action: Redlined copies of Pages -4- through -6- showing the requested revisions are attached.

SPECIFIC COMMENTS

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.0 Page #: 2-1 Line #: NA
Original Specific Comment #: 1
Comment: Table 2-1 contains several inconsistencies and deficiencies, which are discussed below.

- Table 2-1 lists the anticipated volumes of each waste category using the drum as the unit of volume. The total number of drums listed in this table for the four waste categories is equal to the number of "anticipated containers" for these waste categories as listed in Section 1.1, Table 1-1. Section 1.1, however, states that the containers referred to in Table 1-1 "range from 5-gallon buckets to 112-cubic-foot white metal boxes (WMBs)." The tables and text should be revised to present accurate and consistent numbers and volumes of containers for each waste category.

- Several discrepancies exist between the information summarized in Table 2-1 and the information provided in Appendix C. For example, Table 2-1 lists 19 drums of magnesium powder and turnings under "reactive category wastes." However, in Appendix C, only six containers are labeled as "magnesium powder and turnings" under the "reactives" category. As another example, Table 2-1 lists "magnesium metal contaminated with oil rags" as having U.S. EPA waste code D003. Appendix C, however, lists U.S. EPA waste code D001 for this waste. In addition, Appendix C list under the "reactives" category a waste describes as "cobalt trifluoride, cobaltic fluoride, cof." This waste is not listed in Table 2-1 under the reactive waste category. Table 2-1 should be revised to be consistent with the waste inventory provided in Appendix C. Because these discrepancies represent examples only, all of

Table 2-1 should be checked against Appendix C for consistency and accuracy.

Response: Agree. The text and table should be revised to consistently refer to the quantity of waste contained in each waste category. All wastes scheduled for treatment under the NPDS Project are currently contained in drums, with some drums being overpacked into white metal boxes (WMBs). Since waste tracking is done by drums and the contract between FERMCO and the subcontractor treating the waste is based on the number of drums treated, FERMCO prefers to refer to the quantity of waste in each waste category using the number of drums as a standard unit of measure. Therefore, the above referenced tables and text have been revised to consistently represent waste quantities in terms of the number of drums contained in each waste category. In addition, Table 2-1, Table 4-2 and Appendix C have been revised to accurately and consistently depict waste quantities and/or waste codes for all waste categories contained in the project. The waste referred to above as "cobalt trifluoride, cobalt fluoride, cof." has been removed from the NPDS project and is no longer referred to in Appendix C.

Action: Revised copies of Table 1-1 (Page -3-), Table 2-1 (Page -7- through -9-), Table 4-2, and Appendix C are attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.0 Page #: 4 Line #: NA
Original Specific Comment #: 2

Comment: The "Fernald Environmental Management Project Mixed waste Chemical Treatment Project General CERCLA Work Plan" dated November 1995 states that the barium chloride salts waste category includes "TC [toxicity characteristic] metals, barium, and lead" as primary contaminants. However, neither Section 2.0 or Table 2-1 of the work plan mention any TC metals other than barium and lead (for example, arsenic and cadmium). The text should be revised to clarify whether or not additional TC metals are present in the barium chloride salts waste category.

The text also states that the oxidizer waste category contains U.S. EPA waste codes D001, D002, D005, D007, and D008. Table 2-1 indicates that some wastes under the oxidizer category also contains wastes with U.S. EPA waste codes D004, D009, and D011. The text should be revised to mention these waste codes as well.

Response: Agree. The barium chloride waste category exhibits the toxicity characteristic for barium and lead only (DO05 and D008). No additional TC metal are present within these wastes at concentrations above the regulatory limit. In addition, the oxidizer waste category contains wastes with the following waste codes: DO01, D002, D004, D005, D007, D008, D009, and D011.

Action: Section 2.0, Page -4- has been revised to reflect that the barium chloride waste category exhibits the toxicity characteristic for barium and lead only (D005 and D008). Section 2.0, Page -5- and Table 2-1, Pages -8- and -9- have been revised to reflect that the oxidizer waste category contains wastes with EPA wastes D001, D002, D004, D005, D007, D008, D009, and D011. Redlined copies of the appropriate change pages are attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.1 Page #: 8 Line #: NA
Original Specific Comment #: 3

Comment: The text states that neutralization of the corrosive waste stream removed the corrosive characteristic during bench-scale testing. The text also states that the "treatment for the remaining hazardous constituents in the corrosive waste stream is outside the scope of this project. NFS also added sodium sulfide to precipitate the metals from the neutralized solution." These two statements appear contradictory because precipitation of metals in the neutralized solution represents treatment for at least some of the "remaining hazardous constituents" in the corrosive waste stream. The text should be revised to resolve this apparent discrepancy. The text should also briefly discuss when and how the "remaining hazardous constituents" will be treated.

Response: Agree. Neutralization and precipitation of corrosive wastes was conducted as part of the NFS Treatability Study. However, this information was included in the Technology Specific Work Plan for informational purposes only. Wastes contained within the corrosives wastes category will only be neutralized under the NPDS Project. Although it is true some metals may precipitate during the neutralization process, precipitation of metals from these waste streams is not a treatment objective for the NPDS Project. Rather, these wastes will be bulked and returned to RCRA storage to await ultimate disposition at the TSCA incinerator after neutralization has been conducted under the NPDS Project. Ash generated during the incineration of these wastes will be stabilized at the TSCA Incinerator to meet all applicable LDR treatment standards. All EPA waste codes and UHCs currently identified in the Technology Specific Work Plan, with the exception of the D002 code which will be removed after neutralization under the NPDS Project, will be applied to these wastes until their final disposition at the TSCA Incinerator.

Action: The text in Section 3.1 has been revised to reflect that only neutralization will be conducted under the NPDS Project. A redlined copy of Page -10- is attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.2.2 Page #: 10 Line #: NA
Original Specific Comment #: 4

Comment: The text states that during waste treatment, the mix unit operator may add

more than the minimum amount of reagent specified in the design recipe notice if extra addition is needed to meet performance specifications. The text should be revised to state that the design recipe notice will provide information regarding maximum allowable dosages for all reagents.

Response: Disagree. The quantity of reagent that is added is variable dependent upon the reagent demand of the particular waste in question. The design recipe is intended to provide the mixture operator with basic information concerning the anticipated quantity of reagent that will be required to drive the precipitation reaction to completion, however, this information is not intended to predict the exact quantity or limit the actual quantity of reagent that may be added. Rather, this determination is made by the mixture operator during the actual treatment of the wastes and is largely dependent upon qualitative tests conducted during the actual treatment process. The mixer operator may add more reagent than the Design Recipe Notice requires if increased reagent is required to meet the reagent demand of the waste and/or performance specifications. Addition of excess reagent will not have a significant bearing on the treatment process or the finalized waste form.

Action: Section 3.2.2, Page -12- has been revised to clarify the mixer operator's responsibilities with regard to the addition of reagents. A redline copy of the change page is attached.

Commenting Organization: U.S. EPA Commentor: Saric
Figure #: 3-2 Page #: 13 Line #: NA
Original Specific Comment #: 5

Comment: This figure show that "$Na_4(SO_4)_2$" will be used to adjust the pH of the barium chloride waste slurry under the "Precipitation/Stabilization" treatment process flow diagram. $Na_4(SO_4)_2$ is a weak base and would be effective only in making the slurry slightly more basic. However, it would not be effective in adjusting the slurry to a lower more acidic pH. The sulfate ions in this compound will also form a precipitate with the barium ions in the slurry. $Na_4(SO_4)_2$ may therefore be more effective as a precipitating agent than as a pH adjuster. The work plan should provide more justification that shows that this compound can accomplish pH adjustment. The text should also explain why ferrous sulfate will also be used to precipitate barium when $Na_4(SO_4)_2$ is already accomplishing this task. In addition, $Na_4(SO_4)_2$ has the same stoichiometry as Na_2SO_4 (anhydrous sodium sulfate). If "$Na_4(SO_4)_2$" is meant to represent Na_2SO_4, the more common formula (Na_2SO_4) should be used in the figure and work plan.

Sections 3.3.2 and 3.3.4 state that the barium chloride and oxidizer category wastes will be sampled and analyzed after the wastes are treated with ferrous sulfate. The process flow diagram in Figure 3-2 for treating barium chloride category wastes designates this analysis as a "qualitative check spectrophotometer for barium." However, the process flow diagram for treating oxidizer category wastes does not include this analysis. This analysis

should be added to the process flow diagram for treating oxidizer category wastes. The process flow diagrams in Figure 3-2 and the text of the technology-specific work plan should be revised to present the treatment process consistently.

Response: Agree. Sodium bisulfate will be used to neutralize alkaline corrosive liquids. The formula for sodium bisulfate was incorrectly identified in Figure 3-2 as $Na_4(SO_4)_2$. The correct formula is $NaHSO_4$. The sodium bisulfate will hydrolysis when added to the waste to form a weak form of sulfuric acid (H_2SO_4). The sulfuric acid will provide the required pH adjustment. In addition, the portion of Figure 3-2 describing deactivation/stabilization of wastes in the oxidizer category did not describe qualitative testing for purposes of evaluating the completion of critical reactions. The figure has been revised to show this step in the treatment process.

Action: Figure 3-2, Page -15- has been revised as requested above. A copy of the appropriate change page is attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.3.1 Page #: 10 and 12 Line #: NA
Original Specific Comment #: 6

Comment: Section 3.3.1 contains several inconsistencies. For example, Section 3.3.1 states that if inorganic wastes cannot be neutralized before organic wastes, the treatment equipment will be "triple rinsed, per Section 3.9" before treatment of inorganics begins. However, Section 3.9 contains no decontamination procedure that involves only triple rinse (although the triple rinse is mentioned as on step in a decontamination process). Section 3.3.1 also states that basic wastes will be neutralized by combining them with acidic wastes. However, later in Section 3.3.1, the text states that bases will be neutralized by sodium bisulfate. The text in this section should be revised to be internally consistent and provide information that is consistent with other information throughout the work plan.

Response: Agree. The text in question was originally contained in an internal draft of the Technology Specific Work Plan for the project in which organic and inorganic wastes were planned to be neutralized separately from one another.. The references to triple rinsing were provided to address decontamination of the neutralization container between the organic and inorganic treatment campaigns. Prior to the issuance of Revision 0 of the Technology Specific Work Plan, it was decided to blend all corrosive liquids in a bulking operation and then neutralize them. The text from the internal draft of the Technology Specific Work Plan was inadvertently left in Revision 0 during final editing of the document and will now be revised to consistently describe the current neutralization operation.

Action: Section 3.3.1, Pages -12 through -14- and the appropriate portions of Figure

3-2, Page -15- have been extensively revised to reflect the current bulking/neutralization operation. References to triple rinsing have been removed from the text. The decontamination procedures described in Section 3.9.5 and Table 3-3 will be used to decontaminate the tank and piping at the conclusion of the neutralization campaign. Redline copies of the appropriate change pages are attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.3.2 Page #: 12 Line #: NA
Original Specific Comment #: 7

Comment: This section states that for barium chloride waste having barium only, the stabilization agent "will be a sulfate in a commercially available dry form (sodium, aluminum, or ferrous sulfate)...." The text should specifically indicate which sulfate compound will be used to precipitate the barium. The technology-specific work plan should also consistently refer to the specific sulfate compound that will be used.

Response: Agree. Sodium sulfate will be used as the precipitating reagent during treatment of the barium chloride waste category.

Action: Section 3.3.2, Pages -14- through -16- of the Technology Specific Work Plan has been revised to reflect this change. All additional references to the use of sulfate compounds have been changed to sodium sulfate as appropriate. Redline copies of the appropriate change pages are attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.3.3 Page #: 14 Line #: NA
Original Specific Comment #: 8

Comment: The text states that the reactive category waste inventory includes a drum that is "reactive for calcium metal." Calcium metal is not included under the reactive category wastes listed in Table 2-1 or under the "reactives" wastes listed in Appendix C. The text of this section, Table 2-1, and Appendix C should be revised to present consistent and accurate listings of reactive category wastes.

Response: Agree. Reference to this waste stream is inconsistently presented in Section 3.3.3, Table 2-1 and Appendix C. The waste in question is part of MEF 40137 and is comprised of an unfired reduction charge that contains calcium fluoride. The waste has been characterized as a reactive for this reason and not on the basis of its calcium metal content. The text in Section 3.3.3, Page -16- has been revised to reflect the true nature of the waste stream and to be consistent with the data presented within Table 2-1 and Appendix C.

Action: Section 3.3.3 (Page -16-), Table 2-1 (Pages -7- through -9-), and Appendix C have been revised to consistently present data on all waste categories contained within the project. Copies of the appropriate change pages are attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.3.4 Page #: 15 Line #: NA
Original Specific Comment #: 9

Comment: This section states that "Reduction of hexavalent chromium and precipitation of barium are very important factors in treatment success, providing adequate reaction time and testing for completion in this metal's precipitation step." The sentence should either be revised to explain what will provide adequate reaction time and testing for completion or to more clearly discuss treatment success.

Response: Agree. The text requires revision for additional clarity. Reaction time can be a critical factor in reducing hexavalent chromium and in precipitating barium. To achieve complete reactions, waste will be mixed with the appropriate reagent and placed in a soaking area to provide adequate residence time for reactions to go to completion. At the end of the soaking period, samples of the waste will be extracted and analyzed for the parameter of concern. If additional reagent and reaction time is required, another dose will be added, mixed and the waste will be allowed to soak again. This cycle of treat, soak, test, and retreat will continue until an acceptable test result is obtained. Only then can the stabilization reagent be added to hydrolyze free liquids.

Action: The text in Section 3.3.4, Pages -17- and -18- have been revised. Redline copies of the appropriate change pages are attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.5 Page #: 18 Line #: NA
Original Specific Comment #: 10

Comment: This section states that the individual process units that make up the waste treatment production process are "enclosed by dashed lines in Figure 3-5." This statement is incorrect. The text should be revised to replace "Figure 3-5" with Figure 3-4."

Response: Agree. Figure 3-5 was incorrectly referenced in the sentence described above. The correct reference to this figure is Figure 3-4.

Action: The text in Section 3.5, Page -19- of the Technology Specific Work Plan has been revised by replacing the reference to Figure 3-5 with that of Figure 3-4. A copy of the appropriate change page is attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.5.1 Page #: 18 Line #: NA
Original Specific Comment #: 11

Comment: This section, as well as other portions of the work plan, mention the use of prefilters and high-efficiency particulate air (HEPA) filters to collect airborne contaminant fumes and dust during treatment. These prefilters and HEPA filters are secondary wastes and should be discussed in Section 3.4 and

included in Table 3-1.

Response: Agree. Prefilters and HEPA filter cartridges are secondary waste streams that will be generated during the course of the project. These wastes will be shredded and solidified in the same manner as the primary waste streams being treated under the project.

Action: Section 3.6.7, Page -37- and Table 3-1, Page -20- have been revised to include reference to these secondary waste streams and their subsequent treatment. Copies of the appropriate change pages are attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.5.4 Page #: 27 Line #: NA
Original Specific Comment #: 12

Comment: This section states that stabilization and deactivation reagent may include portland cement, gypsum, and mineral oil and gypsum. However, the stabilization and deactivation reagent, Petroset II, which is discussed in Sections 3.3.3 and 3.3.4, in not mentioned here. Petroset II should be discussed in Section 3.5.4 and as a deactivation and stabilization reagent.

The text also states that the stabilization and deactivation reagent's primary purpose is to "bind free water and solidify the waste into a solid matrix." However, as discussed in Section 3.3.4, the oxidizer waste characterized as tributyl phosphate in kerosene, which is an organic, solvent-based mixture, will be stabilized using gypsum or Petroset II to bind the organic solvent and not to bind "free water." Section 3.5.4 should be revised to state that the stabilization and deactivation reagents may be used to bind aqueous solutions or organic solutions, as appropriate.

Response: Agree. Petroset II may also be used as a stabilization and deactivation reagent. Discussion on the use of Petroset II has been added to Section 3.5.4 of the Technology Specific Work Plan. Section 3.5.4 has been revised to state that stabilization and deactivation reagents may be used to bind aqueous solutions or organic solutions, dependant upon the particular waste being treated. In addition, the oxidizer waste referred to as tributyl phosphate in kerosene was mis-identified within the text of this Section. This waste stream actually consists of UNH with trace quantities of tributyl phosphate/kerosene (organic UHCs below the UTS limit).

Action: Section 3.5.4, Page -29- has been revised by adding the following language: "Stabilization/Deactivation reagents may include Type I portland cement, gypsum, mineral oil/gypsum, or Petroset II, as appropriate. The stabilization/deactivation reagent's primary purpose is to bind free liquid (water or mineral oil) and solidify the waste into a solid matrix." A copy of the appropriate change page reflecting this revision is attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.5.6 Page #: 29 and 30 Line #: NA
Original Specific Comment #: 13

Comment: The text, under the subheading "Ferrous Sulfate," states that ferrous sulfate "will be used for wastes having high concentrations of barium and chromium." However, the text does not discuss how ferrous sulfate will also be used as a reducing agent to deactivate oxidizer category wastes. The text should be revised to discuss all of the ways that ferrous sulfate will be used during this project.

In addition, under the subheading "pH Adjustment Chemicals," the text mentions sodium bisulfate and caustic soda (sodium hydroxide) as chemicals to be used for pH adjustment. However, other pH-adjustment chemicals are discussed elsewhere in the work plan. For example, in Section 3.5.3, lime and portland cement are listed as chemicals that may be used to increase the pH of waste mixtures. Section 3.5.6 should be revised to list all pH-adjustment chemicals that may be used during the project.

Response: Agree. Section 3.5.6 under the subheading "Ferrous Sulfate" has been revised to discuss all uses of ferrous sulfate under the project. Specifically ferrous sulfate will only be used as a precipitation reagent for wastes containing chromium and high concentrations of barium. Ferrous sulfate will be used as a reducing reagent during the treatment of these wastes to reduce hexavalent chromium to the trivalent state. Ferrous sulfate will also be used in reducing wastes in the oxidizer waste category. Section 3.5.6 under the subheading "pH Adjustment Chemicals" has also been revised to discuss the use of all pH-adjustment chemical that may be used during the project. These include sodium bisulfate, sodium hydroxide, portland cement, and/or lime.

Action: Section 3.5.6, Page -32- has been revised as described above. A redline copy of the appropriate change page is attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.6.7 Page #: 34 Line #: NA
Original Specific Comment #: 14

Comment: This section states that "the most significant secondary waste stream will be used personal protective equipment and protective clothing." Table 3-1, however, shows that "Excess Water" will constitute the secondary waste stream with the largest volume. The text in Section 3.6.7 should be revised to address the volume of "Excess Water" compared to the volume of the personal protective equipment and protective clothing secondary waste stream.

Response: Agree. Used personal protective equipment and protective clothing will be the most significant secondary waste stream generated during the project. The volume of excess water--800 cubic feet, presented in Table 3-1 is incorrect. Only 100 cubic feet of excess water is actual anticipated to be

generated during the project. Excess water will be stored within the contaminated water container and will be precipitated and solidified with the waste streams from which it is derived. Excess water generated during the treatment of a particular waste category, will be managed and consumed during the treatment of that waste stream to avoid intermingling with wastes or waters generated during the treatment of the remaining waste streams.

Action: Table 3-1, Page -20- has been revised to reflect that 100 cubic feet of excess water will be produced as a result of the project. Additional text on the anticipated quantity of excess water that will be produced during the project has been added to Section 3.6.7, Page -37-. Redline copies of the appropriate change pages are attached.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.8 Page #: 41 and 43 Line #: NA
Original Specific Comment #: 15

Comment: This section should be updated to indicate actual dates for past deliverables and activities and revised estimated dates for future events related to the project.

Response: Agree. Section 3.8 of the NPDS Technology Specific Work Plan has been revised to reflect the actual dates of past project deliverables and activities as well as the anticipated future project schedule.

Action: A copy of the appropriate changes page (Page -45-, Figure 3-6) is attached.

Table 1-1
Summary of Waste Treatment Campaigns

Technology	Waste Category Description	# of Anticipated Containers
Neutralization	Corrosives	103
Precipitation/Stabilization	Barium Chloride Residues	176
Deactivation	Reactives	25
Deactivation/Stabilization	Oxidizers	58
TOTAL		**362**

1.2 ORGANIZATION OF THE WORK PLAN

This Technology Specific Work Plan is organized in the manner that is consistent with previously submitted and approved work plans. This work plan and its attached appendices provide a complete description of how and where the NPDS project will be performed. The plan identifies the parties responsible for storage, handling, treatment, and disposal of mixed wastes, and those parties having oversight responsibilities for quality assurance, environmental compliance, health and safety. Section 2.0 of the Work Plan provides a description of the mixed wastes to be treated and stabilized in terms of the Material Evaluation Form (MEF) characterization process. Section 3.0 provides a detailed description of the treatment process and all of its ancillary and support activities to be scheduled. This process description is presented in terms of the major work tasks and a Process Flow Diagram, Figure 3-2. Section 4.0 describes the applicable or relevant and appropriate requirements for this project. Section 5.0 and Appendix A, "Health and Safety Plan," describe the health and safety program to be implemented during this project. Section 6.0 describes the organization of the project team, and how the work and the project schedule will be managed. Appendix B is the Quality Assurance Program Plan, Appendix C is the MEF Listing, and Appendix D is the Sampling Plan for this project. Appendix E is PESI procedure POP-CT-2.24, "Deactivation/Stabilization of Thorium Wastes."

2.0 WASTE DESCRIPTION

Since October 1991, RCRA closure actions and CERCLA response actions have redirected the central mission of the FEMP towards the implementation of waste management and environmental restoration initiatives. One of these initiatives is to identify, characterize, treat, and dispose of all legacy waste stored at the FEMP in accordance with applicable federal, state and local requirements. Approximately 360 containers of legacy mixed waste have been identified to be treated under this project. The mixed waste is currently stored and managed in RCRA-permitted facilities at the FEMP.

The mixed wastes in this project are divided into four waste categories as summarized in Table 1-1 and further described in Table 2-1. These categories were established based on the chemical and physical characteristics and the treatment needs and requirements of the waste streams. The containers of mixed waste have been grouped and categorized using the MEF procedures discussed later in this section. The mixed waste is material contaminated with constituents with EPA waste codes D001 through D043. Multiple treatment technologies such as neutralization, precipitation, deactivation, and stabilization may be required to treat waste in each waste category.

The barium chloride residues category consists of solidified furnace salt, bricks, floor sweepings, and miscellaneous trash containing EPA waste codes D005 and D008. These streams contain high concentrations of barium and lead. None of the other toxicity characteristic (TC) metals are present in the barium chloride wastes at concentrations above the TC limit. Because these wastes are only hazardous for TC metals, they are not subject to compliance with the Universal Treatment Standard (UTS) promulgated in 40 CFR 268.48 as discussed in Section 4.1 and Table 4-2 of the Technology Specific Work Plan.

The corrosive waste category consists of acidic and caustic solutions carrying EPA waste code D002. Most of these liquids are comprised of radioactive lab wastes, metal extracts and digests that also exhibit the toxicity characteristic for both TC metals and/or TC organics. As discussed in Table 4-2 a variety of both inorganic and organic underlying hazardous constituents (UHCs) are believed to be present within these waste streams. However, since treatment of these wastes under the NPDS Project will merely involve neutralization, strict compliance with the UTS standards is not an objective of the project. Rather, these wastes will be further treated at the TSCA Incinerator to meet all applicable LDR and UTS treatment standards.

The reactive waste category contains magnesium metal, powder and turnings with EPA waste codes D001 and D003. There is also one drum of unfired reduction charges containing thorium fluoride, calcium fluoride, and zinc fluoride. Since this drum contains thorium, it will be processed in a similar manner to wastes in the oxidizer category. As discussed in Table 4-2, no UHCs are believed to be present in these wastes at concentrations above the UTS.

The oxidizer waste category is mainly uranyl and thorium nitrate solids and liquids. This category includes a drum of unused Draw Temp 275, an oxidizer which contains sodium nitrite, sodium nitrate, and potassium nitrate. The oxidizer category also contains wastes which do not contain nitrates, but do contain thorium. These are included in this category based on similar treatment requirements and radioactive handling requirements. The oxidizer wastes contain EPA waste codes D001 and D002, and are toxic due to one or more of the TC metals (D004 through D011). Some of the MEFs in the oxidizer category also contain beryllium and nickel as UHCs. The same precipitation and stabilization technologies used in treating wastes having the toxicity characteristic for metals in the D004 through D011 range will also be effective in meeting the Universal Treatment Standard for nickel and beryllium. Table 4-2 in Section 4.0 references the UHCs present in each MEF.

Mixed waste to be treated as part of this project has been characterized using process knowledge and sampling and analysis results in accordance with site procedure EW-0001, "Initializing Waste Characterization Activities Using the Material Evaluation Form." A listing of the MEF categories to be treated is listed in Appendix C. The waste characterization methodologies specified by EW-0001 are consistent with U.S. EPA and OEPA hazardous waste regulations. Although the drums of mixed waste have been characterized under EW-0001, it is possible that some waste containers may contain waste materials that are prohibited from disposal under NTS WAC or other candidate disposal sites. During waste treatment operations, prohibited materials will be physically removed from the waste, repackaged, and placed back in the FEMP RCRA inventory for evaluation and projectization into other waste treatment projects. Prohibited materials will not be stabilized or encapsulated in the final stabilized product that will be disposed of. Additional information on NTS prohibited items is included in Table 3-2 of Section 3.5.2.

The primary guidance for completing waste characterization is the three page MEF which is part of EW-0001. The first page of the MEF is the Generator's Section which summarizes information provided by the FEMP (internal) waste generator. It is similar to the waste profile sheets used by commercial TSD facilities allowing for documentation of information regarding: generator and waste stream identification; generation information; gross material characteristics; material composition; and health and safety precautions.

The second and third pages of the MEF are the Evaluation Section, which summarizes the results of the waste characterization with respect to the evaluation criteria. It summarizes pertinent information from the evaluation process including: material regulatory status; material management requirements; and health and safety precautions.

The MEF evaluation process relies on a combination of process knowledge and sampling and analysis to complete the waste characterization process. Process knowledge includes the sum of all information that can be collected on a material, including information from operating procedures, manufacturing specifications, material safety data sheets (MSDS), spill reporting logs, visual inspections, and personnel affidavits. All process knowledge that is brought to bear on waste characterization is documented in the waste characterization files.

Sampling and analysis conducted in support of the MEF process is conducted in accordance with site procedures based on USEPA SW-846, *Test Methods for Evaluating Solid Waste*, for RCRA waste characterization. Protocols required by other regulatory programs are used when applicable. All data required to support waste characterization by sampling and analysis are included in the MEF waste characterization files. This includes the request for analysis, sampling plan, field sample log book, analytical data report, QA/QC report, chain-of-custody forms, and statistical treatment of analytical data once the sampling and analysis is completed.

Table 2-1 identifies the waste categories, EPA waste codes, and the anticipated volume for each category and subcategory of waste to be treated under the project.

Newly identified waste streams that exhibit similar characteristics of the MEFs listed in Table 2.1 are continuously being added to the project. Any waste streams added to the project will be included in the annual update to the STP and will be treated in the same manner as the waste identified in the work plan.

TABLE 2-1

SUMMARY OF CORROSIVES Waste Subcategory(EPA Waste Codes)	Anticipated Volume
MEF 1707 - Lab Generated Waste, Acid Digestates (D002, D007, D008, D018, D019, D028, D029, D039, D043)	12 Drums
MEF 1711 - Metals Extracts and Digestates (D001, D002, D008, D009, D010, D018, D019, D028, D040, D043)	12 Drums
MEF 2362 - Radioactive Acidic Lab Waste (D002, D007, D008, D018, D019, D021, D022, D028, D029, D035, D039, D040, D043)	48 Drums
MEF 1709 - Lab Generated Waste Flammable Organic Extracts D001, D002, D018, D019, D021, D022, D027, D028, D029, D035, D039, D040, D043	4 Drums
MEF 61006 - Magnuspray/surplus chemicals (D002)	1 Drum
MEF 2825 - Nitric Acid (D002, D007)	1 Drum
MEF 1604 - Wastewater Lab Sample Reagents (D001, D002, D006, D007, D009, D011)	1 Drum
MEF 816 - Water Contaminated with oil from Baker Sump (D002, D018, D019, D039, D040)	16 Drum
MEF 2425 - CTC Corrosive Waste (D002)	1 Drum
MEF 2690 - Acidic Extract Waste (D002)	4 Drums
MEF 20145 - Decanted Water from Sump/Filter Cakes (D002, D007)	2 Drums
MEF 2692 - Corrosive, Flammable Lab Waste (D001, D002, D007, D018)	1 Drum
Total	**103 Drums**
SUMMARY OF BARIUM CHLORIDE RESIDUES **Waste Subcategory (EPA Waste Codes)**	**Anticipated Volume**
MEF 10002 - Scrap Salts (D005, D008)	25 Drums
MEF 10025 - Contaminated Soil & Rocks (D005)	22 Drums
MEF 60306 - Sludges, Salt, Chloride (D005)	50 Drums
MEF 60307 - Furnace Salt, Solidified, Chloride (D005, D008)	4 Drum

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MEF 60306 - Hardened Salt Bath Sludge (D005)	7 Drums
MEF 1425 - Contaminated Rags/Paper from RMI (D005)	1 Drum
MEF 60307 - Salt & Furnace Brick (D005, D008)	67 Drums
Total	**176 Drums**

SUMMARY OF REACTIVE CATEGORY WASTE

Waste Subcategory (EPA Waste Codes)	Anticipated Volume
MEF 50089 - Magnesium Powder and Turnings (D001)	19 Drums
MEF 50089 - Contaminated Magnesium (D001)	4 Drums
MEF 700 - Magnesium Metal Contaminated With Oily Rags (D001)	1 Drum
MEF 40137 - Unfired Reduction Charge Plus Calcium Fluoride - Thorium (D001, D003)	1 Drum
Total	**25 Drums**

SUMMARY OF OXIDIZER CATEGORY WASTE

Waste Subcategory (EPA Waste Codes)	Anticipated Volume
MEF 1949 - Draw Temp 275 (Clay Wire/Pink/White/Orange) (D001)	1 Drum
MEF 40181 - Thorium Nitrate Solutions (D002, D005, D007, D008)	9 Drums
MEF 60193 - Pure Uranyl or Thorium Nitrate Solution (D002)	1 Drum
MEF 40186 - Impure Thorium Nitrate Solid (D001, D007, D008)	19 Drums
MEF 30080 - Nitric Acid Mixed with Uranyl Nitrate (D002, D004, D007, D008, D011)	1 Drum
MEF 30081 - Discarded Process Residues, Slurries, Etc. (D002)	1 Drum
MEF 40122 - Thorium Trailer Cakes (D002, D005, D009)*	1 Drum
MEF 40152 - Thorium Oxide/Fluorides (D005)*	2 Drums
MEF 40185 - Thorium Nitrate Solid (D001, D005, D007, D008)	6 Drums

MEF 40192 - ThO_2 Powder, Refinery Feed (D008)*	1 Drum
MEF 60095 - UNH Solution Contaminated With Traces of TBP/ Kerosene (D002, D005)	10 Drums
MEF 60095 - Clean-up Material - UNH (D002, D005)	1 Drum
MEF 1575 - UNH, Excess Analysis Byproduct (D001)	2 Drums
MEF 60160 - Impure Uranyl Nitrate - Solid (D001)	3 Drums
Total	**58 Drums**

* Solely due to the presence of thorium.

3.0 TREATMENT DESCRIPTION

The key to chemical treatment success will be to effectively match treatment recipes to the waste categories for which they have been designed and to respond to waste variability within each category. Treatment recipes will be designed for each waste category or major subcategory, as appropriate, based upon bench-scale testing. Once developed, design recipes will be communicated to the treatment operators using postings called Design Recipe Notices. It will be the responsibility of the Perma-Fix Project Manager to enforce compliance with the Design Recipe Notices.

3.1 TREATABILITY STUDY

A treatability study was performed by Nuclear Fuel Services, Inc. (NFS), on samples from three of the four waste categories, and documented in a final report entitled. *Treatability Study Report for the FERMCO Chemical Treatment Project, NFS-SP-WST-006, Rev. 0, April 23, 1996*. A treatability study was not performed on the oxidizer waste category because treatability and actual process information is available for similar waste streams which have been successfully treated on-site. The goal of the treatability study was to perform bench-scale tests to determine treatment methods which would render the waste non-hazardous, and to recommend treatment methods that are likely to be successful for full-scale treatment of the waste.

Bench-scale testing on the barium chloride salts indicated that the waste can be rendered non-hazardous by precipitating the barium as an insoluble salt. NFS used a soluble sulfate compound in the form of aluminum sulfate to precipitate the barium and then added Portland type 1 cement to solidify the waste, bind up any free liquids, and immobilize any remaining toxicity characteristic metals. Bench-scale testing conducted on the corrosive waste stream indicated that neutralization of the waste will remove the corrosive characteristic. Treatment for the remaining hazardous constituents in the corrosive waste stream is outside the scope of this project. Even though NFS also added sodium sulfide to precipitate the metals from the neutralized solution, only neutralization treatment will be performed on the corrosive waste as part of the NPDS Project. Bench-scale testing on the reactives waste stream indicated that deactivation by stabilization with Petroset II and mineral oil can be used to render the waste non-hazardous. NFS also added methanol to the mixture to catalyze the hardening process during mixing. At this time, it is anticipated that adding a catalyst during mixing will not be required to successfully treat mixed wastes under the NPDS project.

3.2 DESIGN RECIPES

The key to successfully meeting the RCRA LDR treatment standards and disposal site WAC is application of well-designed and demonstrated treatment recipes to specific wastes. Initial treatment recipe development for each waste category in the project was performed in the NFS treatability study. After mobilization on the Fernald site, the treatment subcontractor may

- A Raw Waste Profile
- Prescribed Reagent Dosages
- Performance Specifications

The raw waste profile provides the mix unit operator with a physical description of the waste to which the design recipe can be successfully applied. If the mix unit operator encounters a waste that does not fit the raw waste profile, processing of that waste will be postponed until the Project Manager or the Waste Treatment Operations Supervisor decides how best to proceed. New optimization tests may be required. The prescribed dosages specify to the mix unit operator the minimum reagent dosages believed necessary to successfully treat waste that meets the raw waste profile. However, the exact amount of reagent needed to meet the reagent demand of the precipitation reaction for each waste container is not known before treatment begins. The mix unit operator continues to add reagent doses until qualitative testing shows the reaction end point to have been achieved. The performance specifications describe to the mix unit operator the physical and chemical attributes that should be exhibited by waste after the treatment has been completed. These attributes include the required test result for any qualitative tests to be performed for evaluation of treatment success. The mix unit operator may add more reagents than the Design Recipe Notice requires if increased dosages are needed to meet the reagent demand of the waste and/or the performance specifications.

3.2.3 Stage 3 - Design Recipe Adjustment

If performance standards are not met by the design recipe, or if additional reagents must be routinely added to meet the performance standards, the design recipe may require adjustment. In these situations, additional optimization tests may be performed to provide a basis for adjustment of the design recipe. The mix unit operator will provide the Waste Treatment Operations Supervisor with timely process feedback so that decisions whether or not to adjust the design recipe can be made in a timely and deliberate manner.

3.3 PRIMARY WASTE TREATMENT

The following subsections describe the treatment technologies and their application to each of the identified primary wastes. Please refer to the process flow diagrams of Figure 3-2 during review of each treatment technology.

3.3.1 Neutralization Treatment Technology Application

Neutralization treatment will be performed in a mobile cone-bottom neutralization container to transform corrosive liquids into a non-corrosive form by reaction with acid or base, as appropriate. The waste descriptions show that the corrosives may be broken down further into the subcategories shown in Table 2-1. There are two main types of corrosives, inorganic (aqueous) and organic. The process flow diagram for neutralization in Figure 3-2 shows that

Figure 3-1

FEMP MIXED WASTE CHEMICAL TREATMENT PROJECT

Design Recipe Notice

Waste Category Designation _____

Posting Date_____ Posting Time_____

Raw Waste Profile

Color_____
Texture_____

Free Water
Content _____

Macro Solids_____
_____
_____

pH_____

Freeboard _____ inches.

Prescribed Reagent Dosages

1. Adjust pH to _____,
with _____.

2. Stabilize Barium & Chromium
with _____ Gallons of _____%
Ferrous Sulfate, Mix _____ min.

3. Adjust pH to _____,
with_____.

4. Allow to Soak _____ hrs.

5. Stabilize all metals with
_____ Gallons of_____%
Sodium Sulfide, Mix _____ min.

6. Add solidification reagent
_____ lbs/gallons of Type ___
Portland Cement, Mix ____ min.

Performance Specifications

Final Color of Treated Waste _____.

Final Texture of Treated Waste _____.

Lead Acetate Test Color Intensity Value, _____ minimum (CIV).

Blade Slump Range _____to_____ (inches).

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inorganic and organic corrosive liquids will be bulked in the neutralization container and treated by elementary neutralization to eliminate the hazard characteristic of corrosivity.

Neutralization Treatment for this project will involve bulking of corrosive liquids followed by additions of acid or base, as appropriate, and mixing to adjust the pH of the waste into the range of 5.0 to 9.0 standard units. For waste having a pH less than 5.0, sodium hydroxide will be added. Based on waste characterization data, it appears that most of the corrosive wastes are acidic. Caustic wastes and acidic wastes will be blended in the neutralization container to partially neutralize the acids. Then additional sodium hydroxide will be added as necessary to neutralize the remaining acid and adjust the pH to between 5.0 and 9.0. If any wastes having a pH over 9.0 remain after blending with the acidic wastes, these wastes will be neutralized by additions of sodium bisulfate, either in dry form or diluted to make a standard sulfuric acid solution.

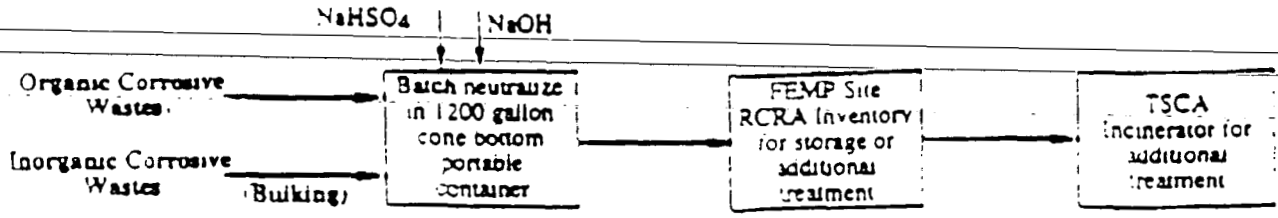
When the corrosive liquids have been neutralized, they will be repackaged and returned to on-site RCRA inventory for storage. Later they will be transferred into the Liquid Mixed Waste Project and eventually sent to the TSCA Incinerator at the K-25 Site near Oak Ridge, Tennessee for treatment.

3.3.2 Precipitation/Stabilization Treatment Technology Application

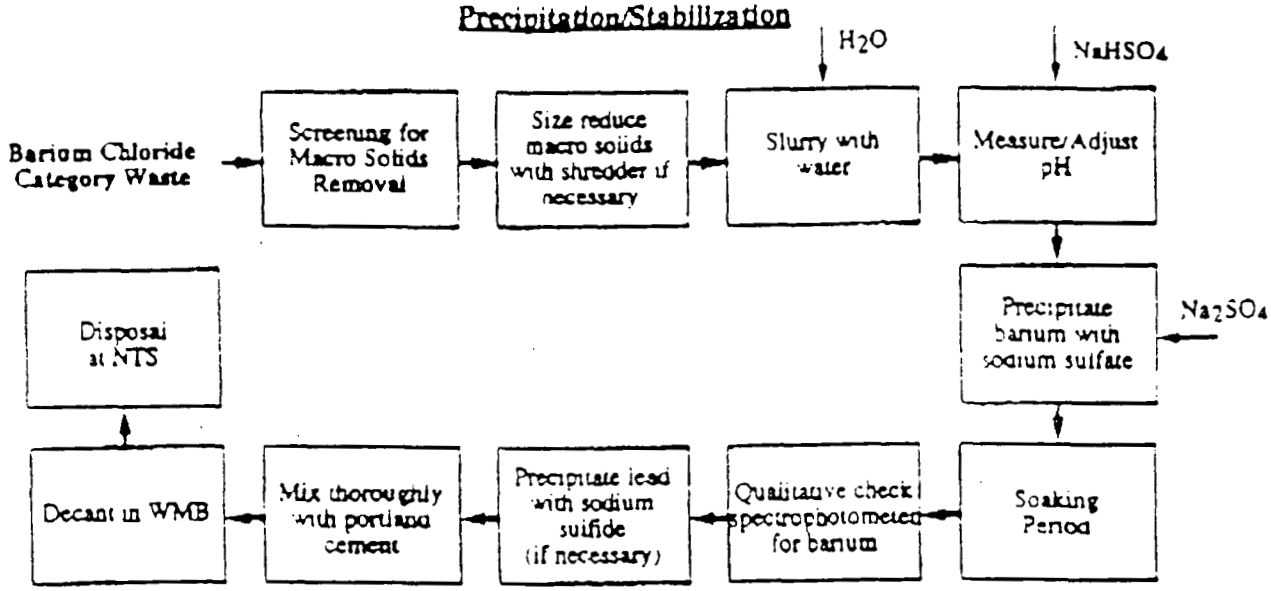
Precipitation/stabilization treatment, as it will be applied in this project, involves reaction of the soluble metallic cations in the waste matrix with a precipitation reagent followed by stabilization to produce a solid monolith. The products of these reactions will be metal precipitates having very low solubility in water, and therefore very low potential for leaching. The largest primary waste stream suitable for precipitation treatment is described as barium chloride residues. The waste descriptions indicate that the barium chloride residues may be broken down further into the subcategories identified in Table 2-1. The waste codes indicate that barium and lead are the only TC contaminants of concern. For the waste having barium only, the stabilizing agent will be sodium sulfate with the dosage increased or decreased as appropriate to match the reagent demand of the waste. For the waste having barium and lead, a synergistic recipe using both sodium sulfate and sodium sulfide will be used.

The physical characteristics of the barium chloride residues are expected to vary from contaminated soils and relatively soft salt cake to hard salt and contaminated furnace brick. As shown in Figure 3-2, the treatment scheme for these wastes will include screening and sorting of the waste to remove any prohibited items, size reduction in the shredder, slurrying with water, measurement and adjustment of pH (as specified in the Design Recipe), precipitation of barium with sodium sulfate, upward pH adjustment, precipitation of lead with sodium sulfide (if necessary), solidification treatment with portland cement, and decanting of the treated waste into WMBs. Because the barium content of these wastes is high, a commensurately high dosage of sodium sulfate will be used. Also, an appropriate soaking period may be utilized to ensure adequate time for the reaction of the sulfate. Before stabilization, reagents are added to the sulfate-treated waste, representative samples of the pretreated waste will be subjected to

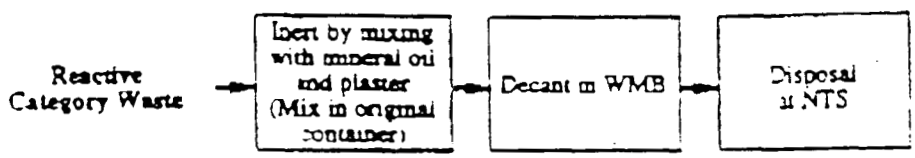
Neutralization



Precipitation/Stabilization



Deactivation of Reactive and Ignitable Metals



Deactivation/Stabilization

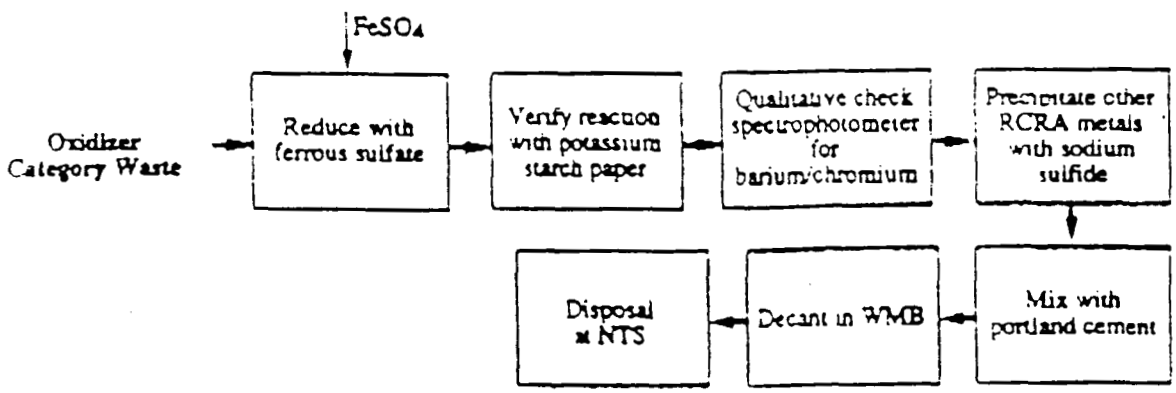


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Figure 3-2
Process Flow Diagrams
Fernald Mixed Waste Chemical Treatment Project

extraction and analyzed for barium in the field. If leachable barium is still in excess of treatment targets, the mixing drums of waste will be returned to the mixer, treated with more sodium sulfate and allowed to soak again. When an acceptable test result is obtained, the next step of treatment can proceed. Precipitation treatment technology will also be used to treat RCRA metal constituents in the oxidizer waste category. If significant concentrations of other RCRA metals such as lead are present, sodium sulfide will be added to the waste drum under the mixer to precipitate the other RCRA metals of concern. A test of the precipitated waste with lead acetate paper will be performed to ensure that a slight residual of unreacted sodium sulfide is present after the reaction is complete. When a satisfactory result for the lead acetate paper test has been obtained, stabilization treatment will be performed.

After toxic metals have been precipitated, the waste will be stabilized with portland cement to produce a solid monolith for disposal. Stabilization technology is discussed in more detail in Section 3.3.4 below.

3.3.3 Deactivation Treatment Technology for Reactive and Ignitable Metals

Deactivation treatment for this project will consist of mixing the waste with an appropriate inerting reagent to produce a non-reactive treated waste form. Wastes classified as reactives for this project are primarily magnesium metal (D001) in several different physical forms, as shown in Table 2-1. One additional drum is an unfired reduction charge left over from the production process which contains thorium and calcium fluoride. Ignition is the main safety concern that will be addressed in processing these reactives.

As shown in Figure 3-2, the treatment scheme for the reactive metal wastes will include in-drum slurrying in mineral oil to minimize ignition potential, followed by inerting and solidification treatment with plaster (gypsum), or Petroset II as an inerting material. The mixing necessary to slurry the waste in mineral oil and disperse the solidification reagent will be provided with Perma-Fix's in-drum propeller mixer. This treatment scheme is a technical match with the methodology used by NFS in their treatability study.

As shown in Figure 3-2, the deactivation technology also has an application in the treatment of waste in the oxidizer category. The oxidation/reduction reaction between ferrous sulfate and the waste is a deactivation step. The application of deactivation and stabilization technology to the oxidizer category is discussed in more detail in Section 3.3.4 below.

3.3.4 Deactivation/Stabilization Treatment Technology Application

Wastes in the oxidizer category are hazardous because of their tendency to react with other chemicals in a sometimes violent oxidation/reduction reaction. Deactivation treatment takes advantage of this tendency by adding reducing agents in a safe and controlled manner, to bring the oxidation/reduction reaction to completion before the waste is offered for disposal. The waste descriptions show that the oxidizers may be further broken down into the subcategories

shown in Table 2-1. Most of the wastes to be treated by deactivation are nitrate salts of various metals (sodium, potassium, uranium and thorium). In addition, thorium is present in its oxide and fluoride forms. Many of these wastes exhibit the toxicity characteristic due to the presence of RCRA metals (D004 through D011) above the TCLP limit. Other metals are also present as UHCs (beryllium and nickel). Ten drums of uranyl nitrate (UNH) solution are also contaminated with traces of tributyl phosphate and kerosene. The treatment for this waste stream will be similar to the other oxidizers, except that plaster (gypsum) or Petroset II may be used alone or in combination with portland cement in the stabilization recipe.

As shown in Figure 3-2, the treatment scheme for the nitrate, oxide and fluoride based wastes will include an in-drum reduction step using ferrous sulfate. Slurrying of the waste with pH-adjusted water will precede reduction of the oxidizers with the sulfate. Through-out the slurrying and reduction steps, the waste will be mixed using Perma-Fix's in-drum mixer. At the conclusion of the reduction step, a test with potassium starch paper will be used to verify that sufficient reducing reagent has been added. A positive test result (black stain) indicates that all of the reagent has been consumed in the reaction and no residual exists, showing the need for more reducing agent. No color change in the potassium starch paper indicates that an unreacted residual of reducing reagent exists. No color change is the desired result.

In addition to the reduction of oxidizers, leachable RCRA metals will require precipitation in order to meet the LDR treatment standards under the Universal Treatment Standard (UTS). Reduction of hexavalent chromium and precipitation of barium are very important factors in treatment success. Barium will be precipitated, and chromium will be reduced with ferrous sulfate. If necessary, each mixing drum of reduced waste will be removed from the mixer and placed in a soaking area for 8 - 16 hours to allow reactions to reach completion. If soaking is required for deactivation of oxidizers, or if gas/vapor generation is anticipated, the soaking area will be provided with a tent enclosure which is ventilated through a HEPA filtration system. Before the drums are returned from the soaking area, representative samples will be extracted in the field and the extracts analyzed for barium and chromium concentration as described in Section 3.3.2. If leachable barium and chromium are still in excess of treatment targets, the drums will be returned to the mixer, treated with more ferrous sulfate, and allowed to soak again. When an acceptable test result is obtained, the drums will be returned to the mixer for the second step of the precipitation process.

For wastes that contain other TC metals such as arsenic, lead and silver, a second precipitation step will be performed with sodium sulfide to precipitate the metals in their sulfide forms. Lead-acetate paper will be used to test for the sulfide reaction end point.

This treatment scheme, which combines reduction with ferrous sulfate, sulfate precipitation of barium, and sulfide precipitation of other toxic metals, will effectively eliminate the toxicity characteristic, and meet the universal treatment standard for UHC metals.

Stabilization technology will be applied to the waste after precipitation has been achieved. The goal of the stabilization treatment will be to produce a solid monolith which has no free liquid.

For dry or water-based wastes, the stabilization reagent will be portland cement. The amount of portland cement prescribed in the Design Recipe Notice will be added, thoroughly mixed with the waste, and evaluated for slump.

Due to the health and radiological hazards associated with the various forms of Thorium to be treated with this technology, the major process equipment used to handle Thorium-containing wastes will be set up and operated in a temporary enclosure called the Thorium Room at the northeast corner of Plant 5. By relocating the Thorium treatment activities to this already contaminated area of Plant 5, contamination of Plant 6 with thorium can be prevented. In the Thorium Room, isolating materials, floor coverings, secondary containment, negative pressure ventilation, and HEPA filtration prevent release of Thorium into the Plant 5 work space outside of the Thorium Room. See Appendix E of this Technology Specific Work Plan for a layout diagram of the Thorium Room, and the process operating procedure which will govern Thorium treatment operations in the Thorium Room.

3.4 SECONDARY WASTE TREATMENT

During the project, two main types of waste will be managed: primary waste and secondary waste. Primary waste includes all waste containers of the approximately 360 containers comprising the four waste categories. Secondary wastes include byproduct streams derived from the primary wastes.

Table 3-1 provides rough estimates of the types and volumes of primary and secondary waste, along with the anticipated disposal or long-term storage sites. These volume calculations are based on prior operating experience gained from treatment of similar wastes during the Fernald Mixed Waste Stabilization Project. Volumetric swell resulting from generation and incorporation of secondary waste will also be minimized.

To the greatest extent possible and consistent with the disposal site WAC, secondary wastes will be disposed along with the primary wastes with which they are associated by incorporating them into the processed waste. If separate disposal is required, secondary wastes will be compacted to the extent possible to minimize their volume. Efforts will be made to prevent contamination of solid waste materials with mixed waste constituents. Uncontaminated solid wastes are managed separately and properly disposed of by FEMP site personnel.

Secondary waste production will be minimized to the greatest extent possible by use of recyclable personal protective equipment such as respirators, and outer boots. The Perma-Fix team uses disposable protective clothing over launderable protective clothing. Wastes which must be disposed will be packaged as directed, properly labeled and marked, and transferred to the custody of FEMP site personnel.

3.5 PROCESS DESCRIPTION

The process that will be employed in treating the specified wastes is a production process, in which mixed waste (exhibiting hazardous and low level radioactive characteristics) will be treated to produce stable LLRW forms capable of meeting disposal site WAC. The barium chloride residue, reactive and oxidizer categories will be rendered non-hazardous after treatment and will therefore be eligible for disposal at NTS. Most of the wastes in the corrosive category bear F-listed waste codes or exhibit the toxicity characteristic for TC organic constituents which are prohibited by NTS. After these wastes are treated, they will be returned to the FEMP site RCRA inventory to await transfer to the Mixed Liquid Waste Project and subsequent off-site treatment at the TSCA Incinerator at the K-25 Site near Oak Ridge, Tennessee. Perma-Fix will perform all treatment activities and will manage all waste containers in the process area. This section describes each of the major process units and the manner in which one or more of these units is used in the performance of each treatment technology. Figure 3-3 is a schematic diagram illustrating how major materials handling activities will be accomplished. Figure 3-4 is a production flow diagram of the mixed waste chemical treatment process. Figure 3-5 is an equipment layout drawing of the process area in the Plant 6 Building.

The individual process units, which make up the waste treatment production process, are enclosed by dashed lines in Figure 3-4 and designated as follows: Process Unit A - **Waste Preparation;** Process Unit B - **Macro Solids Sorting and Size Reduction**; Process Unit C - **Chemical Precipitation**; Process Unit D - **Deactivation/Stabilization;** Process Unit E - **Decanting and Curing;** Process Unit F - **Reagent Makeup;** and Process Unit G - **Neutralization.**

All process operations will be performed by highly qualified and experienced technicians, who will be referred to in the following presentation as "operators." All mixed waste treatment, storeage, and handling areas identified in the following sections will be equipped with secondary containment devices. Floor coverings will consist of impervious polymer linears (Herculite ™ or equivalent) and temporary containment berms to prevent migration of spilled or splashed materials. Secondary containment for both the contaminated water container and the cone-bottom neutralization container is sized to hold 100 percent of the total volume of each tank.

3.5.1 Process Unit A - Waste Preparation

Process Unit A, Waste Preparation, is the process unit in which Compatible Waste Groupings (CWG) are created, and in which the waste and containers in each CWG are processed to prepare them for treatment. The waste preparation begins when waste containers are transported from an Incoming Waste Staging Area (See Figure 3-5) to the Deheading and Inspection Station where the containers are logged in, opened and inspected. To limit the potential intermingling of incompatible wastes, the four broad categories (Corrosive Liquids, Barium Chloride Residues, Oxidizers and Reactives) have been grouped by container into CWGs which are comprised of containers of compatible wastes. Each of these CWGs will be treated in its own discrete campaign. No waste or wastewater for a campaign will be allowed to intermingle with that of another. Contaminated waste collected from each CWG will only be

Table 3-1
Summary of Estimated Waste Volumes for Storage/Disposal

Waste Description	Volume Raw/Treated (Cubic Feet)	Disposal or Storage Site
Primary Mixed Wastes Treated to Eliminate Hazard Characteristic		
Barium Chloride Residues	1,500/2,700	NTS
Corrosives	794/794	Envirocare/TSCA Incin.
Reactives	241/362	NTS
Oxidizers	278/348	NTS
Total Waste Volume	2,813/4,204	----
Secondary Mixed Wastes Generated From Treatment Activities		
Compacted Anti-C Clothing	125	FEMP/NTS
Compacted Respirator Cartridges	260	FEMP/NTS
Used HEPA Filters/Prefilters	30.00	Shredded, Treated and Co-disposed with Primary Wastes
Damaged Respirator	2.00	FEMP/NTS
Wipes & Plastic	75	FEMP/NTS
Excess Water	100	Precipitation, Stabilization and NTS Disposal as LLRW
Totals Mixed Waste	592	----
Off-Site LLRW Disposal		
Used Drums (RCRA Empty)	400/450 Drums	FEMP/NTS
Totals Off-Site LLRW Disposal	400/450 Drums	----
Free Release Solid Waste		
Uncontaminated packaging	20	Off-site landfill

reused in the treatment of wastes from that campagin. Waste treatment and holding equipment will be rinsed between campaigns to prevent cross-contamination. Rinseate will be treated in the same manner as the waste from which it came. Free liquid layers encountered in the raw waste containers will be pumped out with an air-driven double diaphragm pump, which will discharge by way of hoses to a contaminated water holding tank. This tank is located within a manufactured secondary containment of sufficient capacity to contain over 100 percent of the capacity of the tank. The floor of the Deheading and Inspection Station is spill protected by a Herculite™ floor covering. The Deheading and Inspection station is also equipped with an engineered negative pressure dust/fume collection system which discharges outside the building through a prefilter and a high efficiency particulate air (HEPA) filter.

Some waste containers have been overpacked one or more times while in on-site RCRA storage. A fork lift and suitably rated T-bar and drum clamp will be used to lift the inner container out of the overpack. This operation will be performed over the Herculite™ so that any spills due to container leakage will be contained. Waste from the inner container may be decanted into the overpack and then managed in the same manner as other containers that contained no inner containers. The leaking container removed from the overpack may also be bagged to contain leakage until it can be emptied. Empty inner containers and lids will be inspected and cleaned, if necessary, to ensure compliance with the RCRA empty container rule promulgated in 40 CFR 261.7 (Ohio Administrative Guide [OAC] 3745-51-07), and placed in an Empty Container Storage Area to await disposition by FEMP site personnel. Rinse waters will be collected, and pumped to the contaminated water holding container in the same manner as the excess liquids were removed from the containers.

After the waste containers have been opened, the excess liquid removed, and the inner containers separated from the waste, the waste containers are grouped by the operators at the Deheading and Inspection Station into CWGs. A CWG is sized, based on the design recipe, to fill a WMB after all hydration water, reagents and shredded solids have been combined with the waste in the stabilization step.

In the next step of the waste preparation process, macro solids (over 2 inches in any dimension) will be separated from the waste by passing the waste through a bar screen in a screening hopper as shown in Figure 3-4. Each drum in a CWG is clamped in an engineered hydraulic drum lift, and lifted to the top of the screen hopper, and the contents dumped onto the bar screen. Macro solids retained by the bar screen are raked down a chute onto a sorting table where Process Unit B begins. Waste that passes through the bar screen is dispensed from the bottom of the screen hopper through a discharge valve into a heavy wall 55-gallon mixing drum. If necessary, the loading of solids and liquids in each mixing drum is adjusted to the proper ratios. and freeboard is provided to make room for the added reagents. Screening for macro solids removal can be used on any of the wastes identified for this project except those containing thorium. If thorium wastes must be repackaged or inspected for macro solids prior to treatment, the wastes will be manually transferred inside a ventilated enclosure. The exhaust air flow from the enclosure will pass through the HEPA filtration system prior to discharge to the atmosphere.

In performing the treatment technologies specified for this project, some aspects of Process Unit

prepared waste and shredded compatible solids in the proper proportions to comply with the design recipe.

The mix units will be equipped with a negative pressure dust/fume collection system to protect the operator from exposure to dusty waste constituents, chemical fumes or vapors, and radioactive contamination. This negative pressure dust collection system will discharge to the atmosphere outside the Plant 6 Building by way of the prefilter and HEPA filter system.

Because of the use of sodium sulfide, there is a potential that hydrogen sulfide gas could be generated if sodium sulfide became mixed with acid or was added to a waste mixture that has a low pH. To protect against this possibility, pH of the receiving material (water or waste) will be checked each time before sodium sulfide is added. Sodium sulfide will not be added unless pH of the receiving material is at least 9.0. If a receiving material is found to have a pH less than 9.0, its pH will be adjusted upward with an alkaline reagent such as caustic soda, lime or portland cement before the sodium sulfide is added.

Due to the nature of the chemical precipitation process, a potential for minor spillage and splash out of waste materials from the mixing drums under the mix unit exists. Operators will exercise care in mix unit operations to minimize spills and splashing. Daily housekeeping in these areas with HEPA wet-vacs will be performed to prevent a buildup of transferrable contamination on the floor in this area.

3.5.4 Process Unit D - Deactivation/Stabilization

Process Unit D, deactivation/stabilization, will be used after precipitation treatment of barium chloride residues and reduction of oxidizers. This process will also be used to provide deactivation treatment of reactive and ignitable metals. The same precautions described in Section 3.5.1 will be used during this treatment step to prevent intermingling of incompatible wastes.

Process Unit D, deactivation/stabilization, is the operation in which solidification or inerting reagents are added to the waste and thoroughly mixed. After waste has been subjected to the chemical precipitation in Process Unit C, it will be further stabilized or deactivated with appropriate chemical reagents to bring about solidification of the waste into a solid waste/grout monolith. Solidification treatment takes place under the same mix units which were used to perform chemical precipitation or deactivation. Stabilization/Deactivation treatment may proceed immediately after chemical precipitation treatment has been completed, or it may be postponed to allow the precipitation reagents to have additional time to react. When a soaking period is required, the drums from a CWG will be re-lidded and transported by lift truck to a soaking area equipped with secondary containment and/or floor coverings. Wastes will be managed within the soaking area to prevent intermingling of incompatible materials. Stabilization/Deactivation reagents may include Type I portland cement, gypsum, mineral oil/gypsum, or Petroset II, as appropriate. The stabilization/deactivation reagent's primary purpose is to bind free liquid (water or mineral oil) and solidify the waste into a solid matrix. Portland cement has the added benefit of raising the pH of the treated waste.

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When preparing sodium sulfide solution, high pH water is used to minimize the potential for production of hydrogen sulfide gas in the work area. In the full-scale operation, pH of the reuse water will be checked and adjusted if necessary to ensure that its pH is above 9.0 before sodium sulfide is added. If traces of hydrogen sulfide gas are produced during the dissolving process, they can be easily collected and exhausted from the building by the negative pressure dust/fume collection system, which has an intake in the reagent makeup area.

- **Ferrous Sulfate**

Ferrous sulfate will be used as a precipitation reagent for wastes having high concentrations of barium. It will also be used as a reducing agent in the reduction of hexavalent chromium to the trivalent state and in reducing wastes in the oxidizers waste category. Ferrous sulfate will be received as dry crystal in bags on pallets and will be stored, handled and dosed in the same manner as sodium sulfide. Ferrous sulfate will be added dry to waste drums after sufficient slurry water has been added.

- **pH Adjustment Chemicals**

Some treatment recipes may require pH adjustment steps using acids or caustics. If acid is required to lower pH, it will be added in the form of dry sodium bisulfate, which hydrolyzes with water to form sulfuric acid. If it is necessary to pump the acid, a standard solution of sulfuric acid will be prepared by dissolving sodium bisulfate in water. If additions of base are required to raise pH, sodium hydroxide (caustic soda), portland cement, or lime will be used. All of these materials will be received and stored in dry form in separate locations out of traffic patterns. Dry acids or bases will be dispensed into compatible transfer containers suitable for that purpose, and added to the waste from those transfer containers. If it is necessary to feed liquid acids or bases, standard solutions will be prepared in suitable drums by dissolving the dry material in water. Dry acids will be segregated from dry caustics and sodium sulfide in the storage area by distance, so that reactions between these incompatible dry chemicals can not take place. Acid or base solutions will be stored in drums positioned over spill containment pallets, to ensure that these incompatible liquids do not come into contact.

- **Contaminated Water Storage, and Reuse**

A 5,000 gallon polyethylene storage container will temporarily hold contaminated water from waste preparation and decontamination activities. This water is reused for waste slurrying and reagent hydration. The container will be located inside a plastic spill containment basin capable of holding 100 percent of the largest container, in an area of the building away from fork lift traffic but near points of contaminated water generation and reuse. Water is transferred to and from the tank using small diameter hoses and air-driven pumps. All pumping activities are attended by process operators at the suction and discharge ends of the hose.

3.6.7 Management of Secondary Waste

Secondary wastes listed in Table 3-1 will be segregated into separate containers by category so that they may be managed as efficiently as possible. The most significant secondary waste stream will be used personal protective equipment and protective clothing. At each break, personnel in the Exclusion Zone will pass through a dress-out area where personal protective equipment and clothing will be doffed. Respirators and cartridges will be replaced each time a seal is broken. Separate plastic-lined collection drums for protective clothing, used respirators, outer boots and disposable items (e.g., gloves, tape, cartridge wrappers) will be provided at the egress station. Fernald site personnel will manage these accumulated secondary wastes. Fernald site personnel will also manage the segregation and handling of all personnel protective equipment.

Spent prefilters and HEPA filters removed from the negative pressure ventilation system will be hand fed into the shredder for size reduction. The shredded filters will be treated by the same technologies used to treat the waste which contaminated the filters.

Another important secondary waste stream is the contaminated water generated by equipment decontamination activities. This water will be stored in the Contaminated Water Holding Container and reused in the slurrying of waste and in the hydration of portland cement. We will manage contaminated waters in an attempt to achieve a zero-discharge water balance for the project. Past experience has shown this goal to be achievable, however it is possible that up to 100 cubic feet of excess water could remain after all waste has been processed. This water will be precipitated in the same manner as the waste that generated it, and then will be solidified with portland cement, and shipped for disposal as LLRW.

3.6.8 Management of Miscellaneous Waste Materials

Miscellaneous secondary waste materials include contaminated polymeric sheeting and wipes used for decontamination. Contaminated plastic will be washed and/or vacuumed in place to remove potentially leachable waste constituents before the plastic is removed from the process area. Decontaminated polymeric sheeting will be bundled for disposal by Fernald site personnel. All reagent containers will be completely emptied before being staged for pick-up and disposal by Fernald site personnel.

3.6.9 Materials Management

Non-waste materials such as reagents, equipment spare parts, and consumable supplies will be managed to prevent emergency situations from spills or releases, and to prevent project delays due to shortages of critical supplies. The consumable supplies are vendor-supplied materials necessary to make the production process function. These include fuels, equipment maintenance supplies (e.g.: lubricants, hydraulic fluids, filters, etc.), hand tools, spare parts,

TABLE 4-2
UNDERLYING HAZARDOUS CONSTITUENTS

MEF #	WASTE DESCRIPTION	EPA WASTE CODE	UTS RATIONALE	UNDERLYING HAZARDOUS CONSTITUENT
OXIDIZER CATEGORY				
1575	UNH from analytical laboratories	D002	Data compiled by laboratory personnel indicates that no UHCs are present at levels which exceed the regulatory thresholds.	None
1949	Draw Temp 275	D001	Unused chemical from laboratory. Based on MSDS, Draw Temp 275 is an oxidizer and does not contain any underlying hazardous constituents (UHCs).	None
30080	Black sludge and green liquid	D002, D004, D007, D008, D011	Process knowledge indicates that the sludge material is comprised of digester solids which settled in the bottom of Plant 2/3 digester tanks. The solids were periodically removed and drummed. Analytical results indicated TC metals all below TCLP values and UTS limits except those for which the waste exhibits the toxicity characteristic. Analysis of Total VOAs indicates trace amounts of acetone, benzene, ethyl benzene, tetrachloroethane, toluene, xylene, and methyl ethyl ketone, however, the concentrations of these parameters are below their UTS limits based on analytical results conducted during waste characterization. No other inorganic or organic constituents are expected to be present in concentrations above UTS limits in this waste stream.	Arsenic Chromium Lead Silver

TABLE 4-2
UNDERLYING HAZARDOUS CONSTITUENTS

MEF #	WASTE DESCRIPTION	EPA WASTE CODE	UTS RATIONALE	UNDERLYING HAZARDOUS CONSTITUENT
1709	Lab Generated, Flammable Organic Extracts	D001, D002, D018, D019, D021, D022, D027, D028, D029, D035, D039, D040, D043	Waste consists of flammable organic extracts mixed with metals waste from extraction of FERMCO samples for herbicide analysis. No inorganic or organic constituents are expected to be present in concentrations above UTS limits.	None
1711	Metals, Extracts and Digests	D001, D002, D008, D009, D010, D018, D019, D028, D040, D043	This waste stream consists of spent acid from the laboratory analysis of FERMCO samples. The samples were from various projects and consisted of soil, water, and waste material. Only those constituents for which the waste exhibits the toxicity characteristic are expected to be present in concentrations above the UTS limit.	Lead Mercury Selenium Benzene Vinyl Chloride
2362	Radioactive Acid Lab Wastes	D002, D007, D008, D018, D019, D021, D022, D028, D029, D035, D039, D040, D043	This waste stream was generated through analysis of samples taken from various locations at the Fernald Site. Only those constituents for which the waste exhibits the toxicity characteristic are expected to be present in concentrations above the UTS limit.	Chromium Lead Benzene Carbon Tetrachloride Chlorobenzene Chloroform 1,2-Dichloroethane 1,1-Dichloroethylene Methyl Ethyl Ketone Tetrachloroethylene Trichloroethylene Vinyl Chloride

TABLE 4-2
UNDERLYING HAZARDOUS CONSTITUENTS

MEF #	WASTE DESCRIPTION	EPA WASTE CODE	UTS RATIONALE	UNDERLYING HAZARDOUS CONSTITUENT
2692	Corrosive/Flammable Lab Waste	D001, D002, D007, D018	This waste was generated from the analysis of FERMCO samples. Analytical results for TC metals indicate only chromium (D007) was detected in concentrations greater than the TCLP regulatory limit. Benzene (D018) was also detected at a concentration greater than the TCLP regulatory limit. The following constituents exceed their respective UTS limits: vinyl chloride, 1,1-dichloroethylene, methyl ethyl ketone, carbon tetrachloride, benzene, 1,1-dichloroethane, chlorobenzene, trichloroethylene, tetrachloroethylene, methanol, n-butyl alcohol, isobutanol, acetone, carbon disulfide, cyclohexanone, ethyl acetate, ethyl ether, ethylbenzene, methylene chloride, methyl isobutyl ketone, total xylene, 1,1,2-trichloroethane, toluene, 1,1,1-trichloroethane, trichlorofluoromethane, and 1,1,2-trichloro-1,2,2-trifluoroethane.	vinyl chloride, 1,1-dichloroethylene, methyl ethyl ketone, carbon tetrachloride, benzene, 1,1-dichloroethane, chlorobenzene, trichloroethylene, tetrachloroethylene, methanol, n-butyl alcohol, isobutanol, acetone, carbon disulfide, cyclohexanone, ethyl acetate, ethyl ether, ethylbenzene, methylene chloride, methyl isobutyl ketone, total xylene, 1,1,2-trichloroethane, toluene, 1,1,1-trichloroethane, trichlorofluoromethane, and 1,1,2-trichloro-1,2,2-trifluoroethane.
2825	Nitric Acid from Zimlo Processing Area in Plant 9	D002, D007	This waste stream contains nitric acid from safe-shutdown activities in Plant 9. Analytical results indicated arsenic, cadmium, copper, nickel, barium, chromium, lead, and silver are present in the waste stream. Of these, chromium is the only TC metal present above the TCLP regulatory limit. Based on analytical data nickel and lead are also present in concentrations above UTS limits.	Chromium Lead Nickel
61006	Magnuspray 205, surplus chemical	D002	See MEF 1949	None

TABLE 4-2
UNDERLYING HAZARDOUS CONSTITUENTS

MEF #	WASTE DESCRIPTION	EPA WASTE CODE	UTS RATIONALE	UNDERLYING HAZARDOUS CONSTITUENT
REACTIVE CATEGORY				
700	Magnesium metal contaminated with oily rags	D001	This waste consists of magnesium metal with oily rags from the blenders in the Plant 5 Metal Reduction Area. No inorganic or organic constituents are expected to be present in concentrations greater than the UTS limit based on process knowledge.	None
40137	Unfired reduction charge plus CaF2	D001, D003	Unfired reduction charge containing thorium fluoride, calcium fluoride, calcium metal, and zinc fluoride. Fluoride is the only underlying hazardous constituent that is reasonably expected to be present; however, per 40 CFR 268.2(I) fluoride not considered for purposes of UTS compliance.	None
50089	Contaminated magnesium	D001	MEF indicated waste primarily contains magnesium powder, flasks and turnings. May also contain small quantities of magnesium fluoride, uranium, and uranium tetrafluoride. Historical analysis of similar waste indicates TCLP metals present in concentrations well below regulatory and UTS limits. Process knowledge indicates no organic UTS constituents present.	None
BARIUM CHLORIDE RESIDUE CATEGORY				
1425	Contaminated Rags/Paper from RMI	D005	Waste exhibits toxicity characteristic for TC metal (D005 and D008) and therefore, UTS compliance not applicable pursuant to 40 CFR 268.7 and 268.40.	Not Applicable
10002	Scrap Salts	D005, D008	Waste exhibits toxicity characteristic for TC metal (D005 and D008) and therefore, UTS compliance not applicable pursuant to 40 CFR 268.7 and 268.40.	Not Applicable

APPENDIX C

MATERIAL EVALUATION FORMS

8/22/96

SUBPROJECT	MEF #	INV #	LOT C OD	NET WT	SIZE	INVENTORY DESCRIPTION	RTR COMMENTS	U	U235	EPA CODES
REACTIVES	700	W506635	R050 511 P 019 0349	165	085	MG METAL CONTAMINATED WITH OILY RAGS		0.01	0.5	D001
REACTIVES	40137	W506566	R000 320 T 079 0106	2	055	UNFIRED REDUCTION CHARGE PLUS CAF2	STAT = A			D001 D003
REACTIVES	50089	W065214	D690 730 019 0331	231	055	CONTAMINATED MAGNESIUM		10	0 2	D001
REACTIVES	50089	W079543	S070 107 019 XXX	21	055	CONTAMINATED MAGNESIUM		0.01	0 7	D001
REACTIVES	50089	W088409	W050 107 P 019 XXX	355	085	CONTAMINATED MAGNESIUM		0 01	0 5	D001
REACTIVES	50089	W088410	W050 107 P 019 XXX	342	085	CONTAMINATED MAGNESIUM		0.01	0.5	D001
REACTIVES	50089	W150563	H093 510 019 0408	25	005	MAGNESIUM POWDER AND TURNINGS		10	0.2	D001
REACTIVES	50089	W150954	R060 500 P 019 0370	319	085	MAGNESIUM POWDER AND TURNINGS		0.01	0.6	D001
REACTIVES	50089	W150955	R060 500 P 019 0370	304	085	MAGNESIUM POWDER AND TURNINGS		0.01	0.6	D001
REACTIVES	50089	W150956	R060 500 P 019 0370	307	085	MAGNESIUM POWDER AND TURNINGS		0.01	0.6	D001
REACTIVES	50089	W150957	R060 500 P 019 0370	242	085	MAGNESIUM POWDER AND TURNINGS		0.01	0.6	D001
REACTIVES	50089	W150958	R060 500 P 019 0370	312	085	MAGNESIUM POWDER AND TURNINGS		0.01	0.6	D001
REACTIVES	50089	W150959	R060 500 P 019 0370	336	085	MAGNESIUM POWDER AND TURNINGS		0.01	0.6	D001
REACTIVES	50089	W150960	R060 500 P 019 0370	248	085	MAGNESIUM POWDER AND TURNINGS		0.01	0 6	D001
REACTIVES	50089	W150961	R060 500 P 019 0370	317	085	MAGNESIUM POWDER AND TURNINGS		0.01	0.6	D001
REACTIVES	50089	W150962	R060 500 P 019 0370	337	085	MAGNESIUM POWDER AND TURNINGS		0.01	0 6	D001
REACTIVES	50089	W150963	R060 500 P 019 0370	294	085	MAGNESIUM POWDER AND TURNINGS		0.01	0 6	D001
REACTIVES	50089	W150964	R060 500 P 019 0370	323	085	MAGNESIUM POWDER AND TURNINGS		0 01	0 6	D001
REACTIVES	50089	W150965	R060 500 P 019 0370	317	085	MAGNESIUM POWDER AND TURNINGS		0.01	0 6	D001
REACTIVES	50089	W154354	R050 732 P 019 0378	11	005	MAGNESIUM POWDER AND TURNINGS		.01	0.5	D001
REACTIVES	50089	W509035	H093 510 019 0273	111	085	MAGNESIUM POWDER & TURNINGS	METAL,STAT = A	10	0.2	D001
REACTIVES	50089	W509627	H093 510 019 0267	166	055	MAGNESIUM POWDER & TURNINGS	METAL,STAT = A	7.71	0.2	D001
REACTIVES	50089	W511534	H093 510 019 0267	160	055	MAGNESIUM POWDER & TURNINGS	METAL,STAT = A	7.71	0.2	D001
REACTIVES	50089	W511535	H093 510 019 0267	139	055	MAGNESIUM POWDER & TURNINGS	METAL,STAT = A	7.71	0.2	D001
REACTIVES	50089	W514402	H093 510 019 0379	276	055	MAGNESIUM POWDER & TURNINGS	METAL,STAT = A	0.01	0.5	D001
CORROSIVES	816	W047682	W050 137 P 012 0352	301	055	CONTAMINATED WATER OR SUMP LIQUOR, NON		0.01	0 5	D002 D018 D019 D039 D040
CORROSIVES	816	W048145	W050 137 P 012 0352	273	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D018 D019 D039 D040
CORROSIVES	816	W048146	W050 137 P 012 0352	612	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0 01	0 5	D002 D018 D019 D039 D040
CORROSIVES	816	W048147	W050 137 P 012 0352	631	055	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0 01	0 5	D002 D018 D019 D039 D040
CORROSIVES	816	W048151	W050 137 P 012 0352	632	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D018 D019 D039 D040
CORROSIVES	816	W048152	W050 137 P 012 0352	629	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D018 D019 D039 D040
CORROSIVES	816	W048153	W050 137 P 012 0352	603	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D018 D019 D039 D040
CORROSIVES	816	W091978	W050 137 P 012 0374	280	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D018 D019 D039 D040
CORROSIVES	816	W091980	W050 137 P 012 0374	412	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D018 D019 D039 D040
CORROSIVES	816	W091981	W050 137 P 012 0374	411	055	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0 5	D002 D018 D019 D039 D040
CORROSIVES	816	W091982	W050 137 P 012 0374	300	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0 01	0 5	D002 D018 D019 D039 D040
CORROSIVES	816	W091983	W050 137 P 012 0374	398	055	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0 5	D002 D018 D019 D039 D040
CORROSIVES	816	W091984	W050 137 P 012 0374	378	055	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D018 D019 D039 D040
CORROSIVES	816	W091985	W050 137 P 012 0374	352	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D018 D019 D039 D040
CORROSIVES	816	W091986	W050 137 P 012 0374	599	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D018 D019 D039 D040
CORROSIVES	816	W300702	W050 137 P 012 0374	155	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D018 D019 D039 D040
CORROSIVES	1604	W091533	W050 732 P 013 0365	45	055	WASTEWATER LAB SAMPLE REAGENTS		0.01	0.5	D001 D002 D006 D007 D009 D011
CORROSIVES	1707	W514045	R070 CNL P 012 0371	425	085	LAB GENERATED WASTE, ACID DIGESTATES	FULL BLADDER INSIDE (55 & 85 GAL)	0 01	0 7	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043
CORROSIVES	1707	W514046	R070 CNL P 012 0371	440	085	LAB GENERATED WASTE, ACID DIGESTATES	3/4 FULL LIQUID BETWEEN DRUMS (55 & 85 GAI	0 01	0 7	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043
CORROSIVES	1707	W514047	R070 CNL P 012 0371	437	055	LAB GENERATED WASTE, ACID DIGESTATES	FULL OF FREE LIQUID	0 01	0 7	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043
CORROSIVES	1707	W514048	R070 CNL P 012 0371	436	055	LAB GENERATED WASTE, ACID DIGESTATES	FULL OF FREE LIQUID	0 01	0 7	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043
CORROSIVES	1707	W514049	R070 CNL P 012 0371	446	055	LAB GENERATED WASTE, ACID DIGESTATES	FULL OF FREE LIQUID	0.01	0.7	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043
CORROSIVES	1707	W514050	R070 CNL P 012 0371	242	085	LAB GENERATED WASTE, ACID DIGESTATES	1/2 FULL BLADDER INSIDE (55 & 85 GAL)	0.01	0.7	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043
CORROSIVES	1707	W514051	R070 CNL P 012 0371	452	085	LAB GENERATED WASTE, ACID DIGESTATES	FULL BLADDER (55 & 85 GAL)	0.01	0.7	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043
CORROSIVES	1707	W514842	R067 CTC P 012 0385	462	055	LAB GENERATED WASTE, ACID DIGESTATES	FULL OF FREE LIQUID	0.01	0 67	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043
CORROSIVES	1707	W514843	R067 CTC P 012 0385	462	055	LAB GENERATED WASTE, ACID DIGESTATES	FULL OF FREE LIQUID	0.01	0.67	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043
CORROSIVES	1707	W514844	R067 CTC P 012 0385	429	055	LAB GENERATED WASTE, ACID DIGESTATES	3/4 FULL OF FREE LIQUID	0.01	0.67	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043
CORROSIVES	1707	W514846	R067 CTC P 012 0385	479	055	LAB GENERATED WASTE, ACID DIGESTATES	FULL OF FREE LIQUID	0.01	0.67	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	LAB GENERATED WASTE, ACID DIGESTATES	FULL BLADDER INSIDE (30 & 55 GAL)	0.01	0.67	D002 D007 D008 D018 D019 D028 D029 D039 D040 D043

SUBPROJECT	MEF #	INV #	LOT C OD	NET WT	SIZE	INVENTORY DESCRIPTION	RTR COMMENTS	U	U235	EPA CODES
CORROSIVES	1709	W150546	R067 TCT P 012 0407	458	055	LAB GENERATED WASTE FLAMMABLE ORGANIC E		0.01	0.67	D001 D002 D018 D019 D021 D022 D027 D028 D029 D035 D039 D040 D043
CORROSIVES	1709	W150550	R067 TCT P 012 0407	454	055	LAB GENERATED WASTE FLAMMABLE ORGANIC E		0.01	0.67	D001 D002 D018 D019 D021 D022 D027 D028 D029 D035 D039 D040 D043
CORROSIVES	1709	W150551	R067 TCT P 012 0407	452	055	LAB GENERATED WASTE FLAMMABLE ORGANIC E		0.01	0.67	D001 D002 D018 D019 D021 D022 D027 D028 D029 D035 D039 D040 D043
CORROSIVES	1709	W514036	R050 CNL P 047 0371	70	055	LAB GENERAGED, FLAMMABLE ORGANIC EXTRAC		0.01	0.5	D001 D002 D018 D019 D021 D022 D027 D028 D029 D035 D039 D040 D043
CORROSIVES	1711	W149778	R050 TCT P 012 0375	240	085	METALS,EXTRACTS AND DIGESTS		0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	1711	W149779	R050 TCT P 012 0375	399	085	METALS,EXTRACTS AND DIGESTS		0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	1711	W306263	R050 TCT P 012 0375	401	085	METALS,EXTRACTS AND DIGESTS		0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	1711	W514208	R050 TCT P 012 0375	180	055	METALS,EXTRACTS AND DIGESTS	RUBBER TUBE IN LIQUID, 1/4 FULL OF FREE LIQUI	0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	1711	W514210	R050 TCT P 012 0375	410	055	METALS,EXTRACTS AND DIGESTS	FULL OF FREE LIQUID	0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	1711	W514211	R050 TCT P 012 0375	363	055	METALS,EXTRACTS AND DIGESTS	3 QUARTER FULL OF FREE LIQUID (55 GAL. DRU	0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	1711	W514212	R050 TCT P 012 0375	410	055	METALS,EXTRACTS AND DIGESTS	FULL OF FREE LIQUID	0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	1711	W514213	R050 TCT P 012 0375	406	055	METALS,EXTRACTS AND DIGESTS	3/4 FULL OF FREE LIQUID	0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	1711	W514214	R050 TCT P 012 0375	396	055	METALS,EXTRACTS AND DIGESTS	3/4 FULL OF FREE LIQUID	0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	1711	W514216	R050 TCT P 012 0375	406	055	METALS,EXTRACTS AND DIGESTS	3/4 FULL OF FREE LIQUID	0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	1711	W514218	R050 TCT P 012 0375	355	055	METALS,EXTRACTS AND DIGESTS	3/4 FULL OF FREE LIQUID	0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	1711	W514219	R050 TCT P 012 0375	477	055	METALS,EXTRACTS AND DIGESTS	FULL OF FREE LIQUID S/S DRUM	0.01	0.5	D001 D002 D008 D009 D010 D018 D019 D028 D040 D043
CORROSIVES	2362	W306331	R072 710 012 0413	39	055	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.72	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514927	R067 ITA P 012 0387	504	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514928	R067 ITA P 012 0387	500	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514929	R067 ITA P 012 0387	501	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514930	R067 ITA P 012 0387	499	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514931	R067 ITA P 012 0387	470	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514932	R067 ITA P 012 0387	487	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514933	R067 ITA P 012 0387	540	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514934	R067 ITA P 012 0387	493	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514935	R067 ITA P 012 0387	509	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514936	R067 ITA P 012 0387	482	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514937	R067 ITA P 012 0387	457	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514938	R067 ITA P 012 0387	487	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514939	R067 ITA P 012 0387	482	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514940	R067 ITA P 012 0387	458	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514941	R067 ITA P 012 0387	496	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514942	R067 ITA P 012 0387	502	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514943	R067 ITA P 012 0387	476	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514944	R067 ITA P 012 0387	428	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514945	R067 ITA P 012 0387	527	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514946	R067 ITA P 012 0387	515	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514947	R067 ITA P 012 0387	512	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514948	R067 ITA P 012 0387	488	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514949	R067 ITA P 012 0387	507	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514950	R067 ITA P 012 0387	501	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514951	R067 ITA P 012 0387	489	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514952	R067 ITA P 012 0387	468	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514953	R067 ITA P 012 0387	497	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514954	R067 ITA P 012 0387	518	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514955	R067 ITA P 012 0387	534	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514956	R067 ITA P 012 0387	500	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514957	R067 ITA P 012 0387	488	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514958	R067 ITA P 012 0387	505	085	CONTAMINATED WATER OR SUMP LIQUOR, NON-		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514959	R067 ITA P 012 0387	483	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514960	R067 ITA P 012 0387	480	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514961	R067 ITA P 012 0387	486	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514962	R067 ITA P 012 0387	493	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
[illegible]	[illegible]	[illegible]	[illegible]	525	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043

SUBPROJECT	MEF #	INV #	LOT C OD	NET WT	SIZE	INVENTORY DESCRIPTION	RTR COMMENTS	U	U235	EPA CODES
CORROSIVES	2362	W514964	R067 ITA P 012 0387	503	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514965	R067 ITA P 012 0387	540	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514966	R067 ITA P 012 0387	481	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514967	R067 ITA P 012 0387	512	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514968	R067 ITA P 012 0387	517	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514969	R067 ITA P 012 0387	514	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514970	R067 ITA P 012 0387	497	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514971	R067 ITA P 012 0387	508	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514972	R067 ITA P 012 0387	459	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2362	W514973	R067 ITA P 012 0387	486	085	RADIOACTIVE ACIDIC LAB WASTE		0.01	0.5	D002 D007 D008 D018 D019 D021 D022 D028 D029 D035 D039 D040 D043
CORROSIVES	2425	W514346	R050 CTC P 013 0378	437	055	CTC CORROSIVE WASTE	FULL OF FREE LIQUID	0.01	0.5	D002
CORROSIVES	2690	W148787	R067 QT P 013 0400	444	085	ACIDIC EXTRACT WASTE		0.01	0.67	D002
CORROSIVES	2690	W148788	R067 QT P 013 0400	429	085	ACIDIC EXTRACT WASTE		0.01	0.67	D002
CORROSIVES	2690	W150182	R067 QT P 013 0407	59	055	ACIDIC EXTRACT WASTE		0.01	0.67	D002
CORROSIVES	2690	W306235	R067 QT P 013 0407	454	085	ACIDIC EXTRACT WASTE		0.01	0.67	D002
CORROSIVES	2692	W147631	R067 CTC P 012 0400	60	055	CORROSIVE/FLAMMABLE LAB WASTE		0.01	0.67	D001 D002 D007 D018
CORROSIVES	2825	W152352	R095 987 027 0408	343	055	NITRIC ACID		0.01	0.95	D002 D007
CORROSIVES	20145	W506158	R125 HX 0 068 0338	436	085	DECANTED WATER FROM SUMP/FILTER CAKES		1	1.25	D002 D007
CORROSIVES	20145	W506159	R125 HX 0 068 0338	160	055	DECANTED WATER FROM SUMP/FILTER CAKES		1	1.25	D002 D007
CORROSIVES	61006	W500470	R050 730 P 013 0307	550	085	MAGNUSPRAY/SURPLUS CHEMICALS		0.01	0.5	D002
BARIUM CHLORIDE	1425	W152393	R050 FTA P 027 6346	4	005	CONTAMINATED RAGS/PAPER FROM RMI		0.01	0.5	D005
BARIUM CHLORIDE	10002	W150565	R050 FTA 066 0408	33	005	SCRAP SALTS		1.14	0.5	D005 D008
BARIUM CHLORIDE	10002	W500905	R050 FTA P 066 7414	631	055	SCRAP SALTS	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W500907	R050 FTA P 066 6378	638	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501171	R050 FTA 066 5155	510	055	SCRAP SALTS	VERY DENSE MATERIAL, FLOOR SWEEPINGS	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501197	R050 FTA 066 6333	652	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501200	R050 FTA 066 6321	686	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501206	R050 FTA 066 5066	462	085	SCRAP SALTS	FLOOR SWEEPINGS, TRASH SPRAY CAN IN DRU	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501207	R050 FTA 066 5060	511	085	SCRAP SALTS	VERY DENSE MATERIAL METAL AND FLOOR SWE	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501211	R050 FTA 066 6337	656	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501223	R050 FTA 066 5167	474	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501226	R050 FTA 066 5179	515	085	SCRAP SALTS	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501228	R050 FTA 066 6307	666	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501242	R050 FTA 066 5076	460	055	SCRAP SALTS	VERY DENSE MATERIAL, FLOOR SWEEPINGS	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501244	R050 FTA 066 BRCH	427	055	SCRAP SALTS	TRASH, FLOOR SWEEPINGS	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501271	R050 FTA 066 6294	655	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501282	R050 FTA 066 5061	441	055	SCRAP SALTS	VERY DENSE MATERIAL, FLOOR SWEEPINGS	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501283	R050 FTA 066 5078	458	085	SCRAP SALTS	FLOOR SWEEPINGS, TRASH	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501284	R050 FTA 066 5068	636	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501287	R050 FTA 066 5151	564	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT, DRUM	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501288	R050 FTA 066 5100	611	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT, DRUM	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501314	R050 FTA 066 5181	542	085	SCRAP SALTS	FLOOR SWEEPINGS	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501315	R050 FTA 066 5169	683	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501316	R050 FTA 066 5182	564	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT	0.01	0.5	D005 D008
BARIUM CHLORIDE	10002	W501826	S063 FTA 066 7113	641	055	SCRAP SALTS	VERY DENSE MATERIAL, FURNACE SALT	0.01	0.63	D005 D008
BARIUM CHLORIDE	10002	W501853	S063 FTA 066 7114	610	055	SCRAP SALTS	VERY DENSE MATERIAL	1	0.63	D005 D008
BARIUM CHLORIDE	10025	W500125	R050 FTA P 011 8400	706	055	CONTAMINATED SOIL & ROCKS	CONTAMINATED BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W500126	R050 FTA P 011 8400	624	055	CONTAMINATED SOIL & ROCKS	CONTAMINATED BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W500127	R050 FTA P 011 8400	745	055	CONTAMINATED SOIL & ROCKS	CONTAMINATED BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W500128	R050 FTA P 011 8400	660	055	CONTAMINATED SOIL & ROCKS	CONTAMINATED BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W500171	R050 FTA P 011 0271	609	085	CONTAMINATED SOIL & ROCKS	FURNACE SALT AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W500172	R050 FTA P 011 0271	519	055	CONTAMINATED SOIL & ROCKS	FURNACE SALT AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501052	R050 FTA P 011 8629	570	055	CONTAMINATED SOIL & ROCKS	FURNACE SALT AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501073	R095 FTA 011 8664	330	055	CONTAMINATED SOIL & ROCKS	FURNACE SALT AND BRICKS	0.01	0.95	D005

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8/22/96

SUBPROJECT	MEF #	INV #	LOT C OD	NET WT	SIZE	INVENTORY DESCRIPTION	RTR COMMENTS	U	U235	EPA CODES
BARIUM CHLORIDE	10025	W501074	R095 FTA 011 8655	449	055	CONTAMINATED SOIL & ROCKS	FURNACE BRICKS	0.01	0.95	D005
BARIUM CHLORIDE	10025	W501173	R050 FTA 011 BRCH	421	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501175	R050 FTA 011 5239	573	085	CONTAMINATED SOIL & ROCKS	CONTAMINATED FURNACE SALT	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501178	R050 FTA 011 BRCH	692	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501190	R050 FTA 011 BRCH	396	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501224	R050 FTA 011 5228	391	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501250	R050 FTA 011 BRCH	528	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501251	R050 FTA 011 BRCH	546	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501252	R050 FTA 011 BRCH	586	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501298	R050 FTA 011 5242	499	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501309	R050 FTA 011 BRCH	486	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501318	R050 FTA 011 BRCH	523	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501319	R050 FTA 011 BRCH	598	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	10025	W501732	R050 FTA 011 BRCH	600	085	CONTAMINATED SOIL & ROCKS	FURNACE SALTS AND BRICKS	0.01	0.5	D005
BARIUM CHLORIDE	60306	W039000	S044 FTA 044 5588	458	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		16.7	0.44	D005
BARIUM CHLORIDE	60306	W039001	S044 FTA 044 5588	94	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		16.7	0.44	D005
BARIUM CHLORIDE	60306	W039002	S044 FTA 044 5588	462	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		16.7	0.44	D005
BARIUM CHLORIDE	60306	W039037	S051 FTA 044 5585	490	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		16.6	0.51	D005
BARIUM CHLORIDE	60306	W039038	S044 FTA 044 5588	462	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		16.7	0.44	D005
BARIUM CHLORIDE	60306	W039039	S044 FTA 044 5588	443	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		16.7	0.44	D005
BARIUM CHLORIDE	60306	W039040	S051 FTA 044 5585	547	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		16.6	0.51	D005
BARIUM CHLORIDE	60306	W039049	S051 FTA 044 5585	490	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		16.6	0.51	D005
BARIUM CHLORIDE	60306	W039050	S051 FTA 044 5585	489	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		16.6	0.51	D005
BARIUM CHLORIDE	60306	W039051	S051 FTA 044 5585	462	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		16.6	0.51	D005
BARIUM CHLORIDE	60306	W039068	S054 FTA 044 0035	481	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.54	D005
BARIUM CHLORIDE	60306	W039073	S044 FTA 044 0035	532	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.44	D005
BARIUM CHLORIDE	60306	W039074	S054 FTA 044 0035	515	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.54	D005
BARIUM CHLORIDE	60306	W039075	S054 FTA 044 0035	473	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.54	D005
BARIUM CHLORIDE	60306	W039076	S053 FTA 044 0035	476	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.53	D005
BARIUM CHLORIDE	60306	W039112	S062 FTA 044 6653	460	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.62	D005
BARIUM CHLORIDE	60306	W039113	S062 FTA 044 6653	458	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.62	D005
BARIUM CHLORIDE	60306	W039114	S062 FTA 044 6653	485	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.62	D005
BARIUM CHLORIDE	60306	W039115	S062 FTA 044 6653	463	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.62	D005
BARIUM CHLORIDE	60306	W039161	S044 FTA 044 0035	474	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.44	D005
BARIUM CHLORIDE	60306	W039162	S044 FTA 044 0035	505	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.44	D005
BARIUM CHLORIDE	60306	W039163	S053 FTA 044 0035	465	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.53	D005
BARIUM CHLORIDE	60306	W039181	S053 FTA 044 0035	496	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.53	D005
BARIUM CHLORIDE	60306	W039182	S054 FTA 044 0035	506	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.54	D005
BARIUM CHLORIDE	60306	W039184	S053 FTA 044 0035	476	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.53	D005
BARIUM CHLORIDE	60306	W039189	S062 FTA 044 6653	476	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.62	D005
BARIUM CHLORIDE	60306	W039205	S062 FTA 044 6653	512	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.62	D005
BARIUM CHLORIDE	60306	W039208	S062 FTA 044 6653	498	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.62	D005
BARIUM CHLORIDE	60306	W039331	S054 FTA 044 0035	520	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.54	D005
BARIUM CHLORIDE	60306	W039334	S053 FTA 044 0035	483	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.53	D005
BARIUM CHLORIDE	60306	W039343	S044 FTA 044 0035	500	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.44	D005
BARIUM CHLORIDE	60306	W052209	S074 FTA 0 044 6295	0	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		8.41	0.74	D005
BARIUM CHLORIDE	60306	W052210	S074 FTA 0 044 6295	372	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		8.41	0.74	D005
BARIUM CHLORIDE	60306	W052211	S074 FTA 0 044 6295	452	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		8.41	0.74	D005
BARIUM CHLORIDE	60306	W065968	S044 FTA 044 5588	456	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		16.7	0.44	D005
BARIUM CHLORIDE	60306	W065969	S023 FTA 044 0046	323	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.23	D005
BARIUM CHLORIDE	60306	W065970	S023 FTA 044 0046	414	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.23	D005
BARIUM CHLORIDE	60306	W065971	S023 FTA 044 0046	365	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.23	D005
BARIUM CHLORIDE	60306	W065972	S068 FTA 044 6294	517	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		14.2	0.68	D005
								13.4	0.23	D005

SUBPROJECT	MEF #	INV #	LOT C OD	NET WT	SIZE	INVENTORY DESCRIPTION	RTR COMMENTS	U	U235	EPA CODES
BARIUM CHLORIDE	60306	W065974	S023 FTA 044 0046	467	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13 4	0.23	D005
BARIUM CHLORIDE	60306	W065975	S023 FTA 044 0046	430	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13 4	0.23	D005
BARIUM CHLORIDE	60306	W065976	S023 FTA 044 0046	390	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.23	D005
BARIUM CHLORIDE	60306	W065977	S045 FTA 044 6403	463	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		17	0.27	D005
BARIUM CHLORIDE	60306	W065978	S045 FTA 044 6403	221	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		17	0 27	D005
BARIUM CHLORIDE	60306	W065979	S045 FTA 044 6403	439	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		17	0.27	D005
BARIUM CHLORIDE	60306	W065980	S045 FTA 044 6403	467	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		17	0.27	D005
BARIUM CHLORIDE	60306	W065981	S023 FTA 044 0046	482	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.23	D005
BARIUM CHLORIDE	60306	W065982	S023 FTA 044 0046	450	055	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.23	D005
BARIUM CHLORIDE	60306	W065983	S023 FTA 044 0046	371	085	SLUDGES, SALT, SOFT, CHLORIDE (FOR PLANT 8		13.4	0.23	D005
BARIUM CHLORIDE	60306	W501819	S063 FTA 044 7110	792	055	HARDENED SALT BATH SLUDGE FROM RMI	VERY DENSE MATERIAL	9.61	0.63	D005
BARIUM CHLORIDE	60306	W501820	S063 FTA 044 7110	886	055	HARDENED SALT BATH SLUDGE FROM RMI	VERY DENSE MATERIAL	9.61	0.63	D005
BARIUM CHLORIDE	60306	W501821	S063 FTA 044 7110	732	055	HARDENED SALT BATH SLUDGE FROM RMI	VERY DENSE MATERIAL	9.61	0.63	D005
BARIUM CHLORIDE	60306	W501822	S063 FTA 044 7110	642	055	HARDENED SALT BATH SLUDGE FROM RMI	VERY DENSE MATERIAL, FURNACE SALT	9.61	0.63	D005
BARIUM CHLORIDE	60306	W501823	S063 FTA 044 7111	646	055	HARDENED SALT BATH SLUDGE FROM RMI	VERY DENSE MATERIAL	8.59	0.53	D005
BARIUM CHLORIDE	60306	W501824	S063 FTA 044 7111	694	055	HARDENED SALT BATH SLUDGE FROM RMI	VERY DENSE MATERIAL, FURNACE SALT	8.59	0.53	D005
BARIUM CHLORIDE	60306	W501825	S063 FTA 044 7111	734	055	HARDENED SALT BATH SLUDGE FROM RMI	VERY DENSE MATERIAL	8.59	0.53	D005
BARIUM CHLORIDE	60307	W026521	X500 FTA 0 060 0318	215	085	FURNACE SALT, SOLIDIFIED, CHLORIDE (FOR PLA		10	0 95	D005 D008
BARIUM CHLORIDE	60307	W500169	R050 FTA P 060 8564	556	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500170	R050 FTA P 060 6323	679	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500520	R095 FTA 060 8527	369	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.95	D005 D008
BARIUM CHLORIDE	60307	W500529	R095 FTA 060 8525	453	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.95	D005 D008
BARIUM CHLORIDE	60307	W500533	R095 FTA 060 7487	562	085	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.95	D005 D008
BARIUM CHLORIDE	60307	W500534	R095 FTA 060 7471	597	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0 95	D005 D008
BARIUM CHLORIDE	60307	W500573	R095 FTA 060 8519	441	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0 95	D005 D008
BARIUM CHLORIDE	60307	W500576	R095 FTA 060 7445	589	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0 95	D005 D008
BARIUM CHLORIDE	60307	W500585	R095 FTA 060 8509	625	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.95	D005 D008
BARIUM CHLORIDE	60307	W500625	R095 FTA 060 7317	642	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.95	D005 D008
BARIUM CHLORIDE	60307	W500626	R095 FTA 060 8528	510	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.95	D005 D008
BARIUM CHLORIDE	60307	W500627	R095 FTA 060 8514	647	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.95	D005 D008
BARIUM CHLORIDE	60307	W500634	R095 FTA 060 8579	731	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.95	D005 D008
BARIUM CHLORIDE	60307	W500635	R095 FTA 060 8573	939	055	SALT & FURNACE BRICK	DENSE	0.01	0.95	D005 D008
BARIUM CHLORIDE	60307	W500664	R095 FTA 060 8543	475	055	SALT & FURNACE BRICK	DENSE	0.01	0.95	D005 D008
BARIUM CHLORIDE	60307	W500672	R095 FTA 060 8533	378	085	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.95	D005 D008
BARIUM CHLORIDE	60307	W500902	R050 FTA P 060 6367	600	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500906	R050 FTA P 060 7431	662	055	SALT & FURNACE BRICK	DENSE MATERIAL	0 01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500909	R050 FTA P 060 7432	688	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0 01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500911	R050 FTA P 060 7396	314	085	SALT & FURNACE BRICK	TRASH, FLOOR SWEEPINGS, PLASTIC ON TOP	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500912	R050 FTA P 060 6357	627	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500913	R050 FTA P 060 7430	554	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500918	R050 FTA P 060 6370	694	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0 5	D005 D008
BARIUM CHLORIDE	60307	W500921	R050 FTA P 060 7437	677	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500966	R050 FTA P 060 7433	706	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0 5	D005 D008
BARIUM CHLORIDE	60307	W500967	R050 FTA P 060 7395	488	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0 5	D005 D008
BARIUM CHLORIDE	60307	W500968	R050 FTA P 060 7393	471	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0 5	D005 D008
BARIUM CHLORIDE	60307	W500973	R050 FTA P 060 7434	687	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500974	R050 FTA P 060 6345	684	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500977	R050 FTA P 060 6348	670	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W500979	R050 FTA P 060 7442	566	085	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501172	R050 FTA 060 BRCH	620	085	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501180	R050 FTA 060 6293	638	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501181	R050 FTA 060 6291	647	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501182	R050 FTA 060 5187	394	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.5	D005 D008

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SUBPROJECT	MEF #	INV #	LOT C OD	NET WT	SIZE	INVENTORY DESCRIPTION	RTR COMMENTS	U	U235	EPA CODES
BARIUM CHLORIDE	60307	W501198	R050 FTA 060 BRCH	548	085	SALT & FURNACE BRICK	METAL AND TRASH	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501199	R050 FTA 060 6330	627	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501203	R050 FTA 060 6268	662	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501205	R050 FTA 060 5083	343	085	SALT & FURNACE BRICK	METAL AND TRASH	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501245	R050 FTA 060 5103	579	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501276	R050 FTA 060 5124	443	085	SALT & FURNACE BRICK	VERY DENSE FLOOR SWEEPINGS	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501281	R050 FTA 060 5067	559	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501317	R050 FTA 060 6334	297	085	SALT & FURNACE BRICK	DENSE CHUNKS	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501321	R050 FTA 060 5146	598	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501325	R050 FTA 060 BRCH	513	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501327	R050 FTA 060 5108	465	055	SALT & FURNACE BRICK	DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501328	R050 FTA 060 5111	526	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W501677	S053 FTA 060 6903	495	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	22.4	0.53	D005 D008
BARIUM CHLORIDE	60307	W501700	S053 FTA 060 6903	616	055	SALT & FURNACE BRICK	DENSE MATERIAL	22.4	0.53	D005 D008
BARIUM CHLORIDE	60307	W501729	S052 FTA 060 6905	30	055	SALT & FURNACE BRICK		9.74	0.55	D005 D008
BARIUM CHLORIDE	60307	W501730	S053 FTA 060 6903	15	085	SALT & FURNACE BRICK	5 GAL PAIL INSIDE W/ FREE LIQUID	22.4	0.53	D005 D008
BARIUM CHLORIDE	60307	W501739	S058 FTA 060 6904	251	055	SALT & FURNACE BRICK	DENSE MATERIAL	13.8	0.56	D005 D008
BARIUM CHLORIDE	60307	W501741	S058 FTA 060 6904	339	055	SALT & FURNACE BRICK	DENSE MATERIAL	13.8	0.56	D005 D008
BARIUM CHLORIDE	60307	W501745	S058 FTA 060 6904	582	055	SALT & FURNACE BRICK	DENSE MATERIAL	13.8	0.56	D005 D008
BARIUM CHLORIDE	60307	W501746	S053 FTA 060 6903	574	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL FURNACE SALT	22.4	0.53	D005 D008
BARIUM CHLORIDE	60307	W501747	S053 FTA 060 6903	420	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	22.4	0.53	D005 D008
BARIUM CHLORIDE	60307	W501748	S053 FTA 060 6903	582	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	22.4	0.53	D005 D008
BARIUM CHLORIDE	60307	W501827	S063 FTA 060 7113	580	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	1	0.63	D005 D008
BARIUM CHLORIDE	60307	W501828	S063 FTA 060 7113	624	055	SALT & FURNACE BRICK	DENSE MATERIAL	1	0.63	D005 D008
BARIUM CHLORIDE	60307	W501833	S063 FTA 060 7113	637	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	1	0.63	D005 D008
BARIUM CHLORIDE	60307	W501834	S063 FTA 060 7113	328	055	SALT & FURNACE BRICK	DENSE MATERIAL	1	0.63	D005 D008
BARIUM CHLORIDE	60307	W501835	S063 FTA 060 7113	554	055	SALT & FURNACE BRICK	DENSE MATERIAL	1	0.63	D005 D008
BARIUM CHLORIDE	60307	W501836	S063 FTA 060 7113	555	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	1	0.63	D005 D008
BARIUM CHLORIDE	60307	W501837	S063 FTA 060 7113	625	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	1	0.63	D005 D008
BARIUM CHLORIDE	60307	W501838	S063 FTA 060 7113	630	055	SALT & FURNACE BRICK	VERY DENSE MATERIAL	1	0.63	D005 D008
BARIUM CHLORIDE	60307	W506424	R050 733 P 060 0347	249	055	SOLID FURNACE SALT		0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W506425	R050 733 P 060 0347	435	055	SOLID FURNACE SALT		0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W506426	R050 733 P 060 0347	148	055	SOLID FURNACE SALT		0.01	0.5	D005 D008
BARIUM CHLORIDE	60307	W515146	S052 FTA 060 6905	30	085	SALT & FURNACE BRICK		9.74	0.55	D005 D008
OXIDIZERS	1575	W152224	R107 733 072 0412	476	010	UNH, EXCESS ANALYSIS BYPRODUCT		0.01	1.07	D002
OXIDIZERS	1575	W154933	R107 733 072 0412	410	085	UNH, EXCESS ANALYSIS BYPRODUCT				D002
OXIDIZERS	1949	W514840	R050 730 P 061 0346	203	085	DRAW TEMP 275		10	0.5	D001
OXIDIZERS	30080	W507580	R125 211 0 011 0260	503	110	NITRIC ACID MIXED WITH URANYL NITRATE	JARS	1	1.25	D002 D004 D007 D008 D011
OXIDIZERS	30081	W507545	R095 235 0 001 0254	851	110	DISCARD PROCESS RESIDUES, SLURRIES, ETC.	JARS	0.01	0.95	D002
OXIDIZERS	40122	W513840	R000 732 T 007 0225	402	085	THORIUM TRAILER CAKES	STAT = R			D002 D005 D009
OXIDIZERS	40152	W513838	R000 362 T 101 0279	86	055	THORIUM OXIDE/FLUORIDES				D005
OXIDIZERS	40152	W513839	R000 362 T 101 0279	42	055	THORIUM OXIDE/FLUORIDES				D005
OXIDIZERS	40181	W506539	R000 FAK T 150 0011	554	085	THORIUM NITRATE SOLUTION	STAT = A			D002 D005 D007 D008
OXIDIZERS	40181	W506540	R000 FAK T 150 0011	584	085	THORIUM NITRATE SOLUTION	STAT = A			D002 D005 D007 D008
OXIDIZERS	40181	W507736	R000 718 T 090 D362	3884	301	THORIUM NITRATE SOLUTION	GLASS JARS W/ FREE LIQUID/7 DRUMS IN WMB			D002 D005 D007 D008
OXIDIZERS	40185	W507735	R000 718 T 090 C362	1845	301	THORIUM NITRATE SOLID	6 DRUMS IN WMB			D001 D005 D007 D008
OXIDIZERS	40186	W507732	R000 718 T 090 0362	1658	301	IMPURE THORIUM NITRATE (SOLID)	6 DRUMS IN WMB			D001 D007 D008
OXIDIZERS	40186	W507733	R000 718 T 090 A362	1662	301	IMPURE THORIUM NITRATE (SOLID)	6 DRUMS IN WMB			D001 D007 D008
OXIDIZERS	40186	W507734	R000 718 T 090 B362	1085	301	IMPURE THORIUM NITRATE (SOLID)	7 DRUMS IN WMB			D001 D007 D008
OXIDIZERS	40192	W514206	0000 CB T 167 0045	68	010	THO2 POWDER, REFINERY FEED				D008
OXIDIZERS	60095	W042931	S045 221 022 0275	313	110	UNH SOLUTION WITH TBP/KEROSENE		0.07	0.45	D002 D005
OXIDIZERS	60095	W042934	S045 221 022 0275	346	110	UNH SOLUTION WITH TBP/KEROSENE		0.07	0.45	D002 D005
OXIDIZERS	60095	W501639	S045 221 022 0275	383	110	UNH SOLUTION WITH TBP/KEROSENE		0.07	0.45	D002 D005
OXIDIZERS	60095	W501640	S125 221 4 022 0310	479	085	UNH SOLUTION WITH TBP/KEROSENE		0.23	1.25	D002 D005

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SUBPROJECT	MEF #	INV #	LOT C OD	NET WT	SIZE	INVENTORY DESCRIPTION	RTR COMMENTS	U	U235	EPA CODES
OXIDIZERS	60095	W501641	S125 221 4 022 0310	336	085	UNH SOLUTION WITH TBP/KEROSENE		0.23	1.25	D002 D005
OXIDIZERS	60095	W501642	S125 221 4 022 0310	302	085	UNH SOLUTION WITH TBP/KEROSENE		0.23	1.25	D002 D005
OXIDIZERS	60095	W501643	S125 221 4 022 0310	358	085	UNH SOLUTION WITH TBP/KEROSENE		0.23	1.25	D002 D005
OXIDIZERS	60095	W501644	S125 221 4 022 0310	609	085	UNH SOLUTION WITH TBP/KEROSENE		0.23	1.25	D002 D005
OXIDIZERS	60095	W501645	S125 221 4 022 0310	435	085	UNH SOLUTION WITH TBP/KEROSENE		0.23	1.25	D002 D005
OXIDIZERS	60095	W501646	S125 221 4 022 0310	486	085	UNH SOLUTION WITH TBP/KEROSENE		0.23	1.25	D002 D005
OXIDIZERS	60095	W506599	S045 221 022 0275	50	055	CLEAN-UP MATERIAL		0.07	0.45	D002 D005
OXIDIZERS	60160	W049908	N000 FAL 1 160 0001	38	085	IMPURE URANYL NITRATE - SOLID		55.3	0.71	D001
OXIDIZERS	60160	W060173	S073 CBJ 0 160 0061	13	005	IMPURE URANYL NITRATE - SOLID		61.9	0.73	D001
OXIDIZERS	60160	W060174	S072 CBJ 0 160 0061	9	005	IMPURE URANYL NITRATE - SOLID		73.7	0.72	D001
OXIDIZERS	60193	W049852	S071 732 1 150 0343	25	085	PURE URANYL NITRATE SOLUTION	LIQUID IN VILES & JARS, DRUM MARKES AS DR	30.4	0.71	D002

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