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PLANT 1 ORE SILOS REMOVAL ACTION NUMBER 13 WORK PLAN JULY 1992

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DOE/EPA
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WORK PLAN

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3494

Plant 1 Ore Silos Removal Action Number 13 Work Plan

Fernald Environmental Management Project
Fernald, Ohio

July 1992
Revision No. 2

U. S. Department of Energy

3494

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PLANT 1 ORE SILOS
OF OPERABLE UNIT NUMBER 3
REMOVAL ACTION NUMBER 13
WORK PLAN

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B Plant 1 Silos Structural Evaluation

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SP-P-35-023 - Radiological Contamination Surveys
SSOP-0002 - Completing the Material Evaluation Form

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E SSOP-0003 Receiving, On-Site Movement and Off-Site Shipment of Nonradioactive Hazardous Material
PP-0314 Packaging, On-Site Movement and Off-Site Shipment of Material

F Control of Construction Waste

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LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirements
ASME	American Society of Mechanical Engineers
BGS	Below Ground Surface
CA	Consent Agreement
CAM	Continuous Air Monitor
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOE	United States Department of Energy
DOT	United States Department of Transportation
dpm	disintegrations per minute
FEMP	Fernald Environmental Management Project (formerly Feed Materials Production Center)
FMPC	Feed Materials Production Center
HEPA	High Efficiency Particulate Air (Filter)
HSL	Hazardous Substance List
IH	Industrial Hygiene
LSA	Low Specific Activity
mrem	millirem
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NE	Northeast
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NTS	Nevada Test Site
NW	Northwest
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PPE	Personal Protective Equipment
PTI	Permit to Install
PTO	Permit to Operate
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
QC/QA	Quality Control/Quality Assurance
RCRA	Resource Conservation and Recovery Act
RESRAD	A Manual for Implementing Residual Radioactive Material Guidelines
RI/FS	Remedial Investigation/Feasibility Study
RSE	Removal Site Evaluation

LIST OF ACRONYMS (Continued)

RTV	Room Temperature Vulcanizing
SE	Southeast
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SMS	Site Media Sampling
SW	Southwest
TBC	To Be Considered
TCLP	Toxicity Characteristic Leaching Procedure
US EPA	United States Environmental Protection Agency
WEMCO	Westinghouse Environmental Management Company of Ohio (formerly Westinghouse Materials Company of Ohio [WEMCO])

EXECUTIVE SUMMARY

The United States Department of Energy (DOE) has conducted a Removal Site Evaluation (RSE) by the authority delegated to the agency under Section 104 of the Comprehensive Environmental Responsibility, Compensation, and Liability Act (CERCLA), through Executive Order 12580. The RSE was performed to determine whether the conditions present at the Plant 1 Silos warrant a removal action under CERCLA, consistent with Section 300.410 of the National Contingency Plan (NCP). Based upon the information in the RSE, the DOE has determined that a Time Critical Removal Action is appropriate. The objective of the removal action is to eliminate the potential for release of contaminants from the Plant 1 Silos.

The activities associated with this removal action are described in this work plan which is being provided to the United States Environmental Protection Agency (US EPA) for approval in accordance with the requirements of the 1990 CERCLA Consent Agreement between the DOE and the US EPA, as amended in September 1991.

The proposed action will remove all above surface structures and equipment down to the existing concrete slab including:

1) Tile silos, steel support structure and equipment
2) Concrete silos, steel support structure and equipment
3) Above ground conveyors between building 1A and the silos
4) Concrete support piers above the top of the slab.

The material removed will either be packaged for shipment to an appropriate disposal facility, or wiped down and moved into an on-site storage area for future decontamination.

The proposed removal action will eliminate the potential for release of radioactive contaminants from the silos and will eliminate the hazard from a structural failure. In addition, the removal will contribute to the long-term remedial actions proposed for the Fernald site.

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SECTION 1

INTRODUCTION

This document provides a work plan describing the Plant 1 Ore Silo Removal Action. The objective of the removal action is to remove the source and any potential hazards (radiological and safety) presented by the Plant 1 Ore Silos until final remediation is performed under Operable Unit 3 (OU-3). The proposed action is authorized by the DOE under authority of Section 104 of CERCLA, through Executive Order 12580. As required by the Amended Consent Agreement between the US EPA and the DOE, this work plan, outlining the proposed removal action, is being submitted to the US EPA for approval. The DOE has conducted a Removal Site Evaluation[1] to determine whether the conditions present at the Plant 1 Ore Silos warrant a removal action under CERCLA, consistent with Section 300.410 of the National Contingency Plan. Based upon the information in the Removal Site Evaluation, the DOE has determined that a Time Critical Removal Action is appropriate. The proposed removal action is protective of human health and the environment and will be conducted in accordance with all CERCLA requirements.

This work plan outlines the approach to remove six concrete silos, eight tile silos, and their associated structural steel supports and support piers down to the top of the concrete slab. The work will include dismantling, size reducing, segregating, packaging, and placing material in interim storage for future decontamination. All project activities will be completed in strict accordance with the requirements defined in applicable Westinghouse Environmental Management Company of Ohio (WEMCO) procedures, in the NCP, CERCLA, pertinent DOE Orders, and the Fernald Environmental Management Project (FEMP) (formerly the Feed Materials Production Center (FMPC)) Quality Assurance Plan (PL 3014, November 27, 1991, Revision 0), and the FEMP OU-3 Remedial Investigation/Feasibility Study (RI/FS) Quality Assurance Program Plan (QAPP). While adhering to these standards, the work will be performed in an expeditious and prudent manner to remove the hazard created by these silos.

All activity will be controlled to prevent the spread of contamination. The work areas will be isolated with physical barriers and a ventilated containment system. Ventilation air will be filtered through pre-filters and High Efficiency Particulate Air (HEPA) filters before discharge to the atmosphere. FEMP standards for worker safety will be observed during the project. A task-specific health and safety plan will supplement the formal Health and Safety Program at the FEMP, addressing the specific requirements of this removal action.

The proposed removal action work plan details the removal activity including (1) installing protective structures for nearby facilities; (2) installing temporary containment systems; (3) erecting scaffolding and

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[1] Removal Site Evaluation Plant 1 Ore Silos, Fernald Site Office, U.S. Department of Energy, *September* 1991, attached in Appendix A.

preparing the silos for removal; (4) removal of the silos; (5) segregation, size reduction, and packaging of wastes for disposal; (6) removal, size reduction, placement of structural steel in temporary storage; and (7) cleaning the area.

Installation of protective structures for nearby facilities will prevent the potential damage to these facilities in the event of an accident involving falling silo structures or debris throughout the course of the removal action. Removal of the silos and remaining structures followed by silo area cleanup will minimize the release of contaminated materials from the Plant 1 Silos area. Subsurface conveyors originally used to transfer material between plants will not be removed under this action but will be removed under final remediation.

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9A

SECTION 2

FERNALD SITE BACKGROUND

The FEMP is owned by the DOE and was used for the processing of uranium. The facility is a 1,050-acre site located in southwest Ohio. The process area is situated on approximately 136 acres toward the center of the site. The facility was placed on the National Priorities List (NPL) in 1989. The DOE is conducting a Remedial Investigation and Feasibility Study (RI/FS) and other response actions under the Amended Consent Agreement between the US EPA and the DOE.

Since the early 1950s, various chemical and metallurgical processes at the facility have been used to manufacture uranium products for the defense complex. In addition to uranium, thorium was processed in small amounts. Substantial quantities and varieties of waste materials were generated during production operations. The current waste inventory contains radioactive, organic, and inorganic waste constituents.

In July 1989, production was halted. The Fernald site is currently undergoing a RI/FS which is required prior to site remediation. The Plant 1 Ore Silos are part of the Production Area which makes up most of Operable Unit 3. Preliminary structural analysis studies have already been completed on the silo support structures which indicated a substantial deterioration which could result in the structures collapsing. Based on this preliminary analysis, planning was initiated to examine the potential of implementing a removal action to address potential environmental concerns.

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SECTION 3

PLANT 1 ORE SILOS BACKGROUND

3.1 Plant 1 Ore Silos Description

Plant 1 was the "Sampling Plant" for the FEMP site and the receiving point for incoming ores and residues to be processed, and for FEMP's own "waste" for further processing. The Plant 1 Ore Silos were constructed in 1953 for the purpose of sampling and blending ore concentrates to feed the refinery (Plant 2/3) after sampling was completed. This system proved to be inefficient and was terminated. In approximately 1955, the silos were temporarily used as overflow storage for the cold metal oxides stream which was a by-product of ore processing. The silos have not been in use since late 1962. The contents were removed except for small amounts of residue.

The Plant 1 Ore Silos include the two groups of silos in an area directly south of Building 1A, consisting of the six reinforced concrete silos to the east and the eight glazed tile silos to the west. Figure 3-1 shows an overall view of the silos looking east with the tile silos in the foreground. The concrete silos are behind and to the right of the tile silos. Building 1A can be seen on the left side of the photo. Four of the glazed tile silos are 44 feet tall and the remaining four are 10 feet tall. The six reinforced concrete silos which are 10 feet tall and the eight glazed tile silos sit on separate superstructures which are approximately 38 feet tall and are connected by a mezzanine. The estimated height of residual material in each of the eight glazed tile silo cones ranges from 1-4 feet. The residual material in the concrete silos is minimal.

The silo area is bounded on the south by four uranyl nitrate hydrate (UNH) tanks which presently contain approximately 100,000 gallons of approximately 1 percent U-235 UNH in weak nitric acid solution. Figure 3-2 is a view of the silos looking north. The tile silos are in the center of the picture with the concrete silos on the right and the four uranyl nitrate hydrate storage tanks in the foreground. Building 72, which contains slightly enriched uranium material, and Plant 1 waste shipping dock are located on the east side. Building 67 Thorium Warehouse is northwest of the silo complex. The material housed in Building 72 will be removed prior to the start of Plant 1 Ore Silo work.

The material in the UNH tanks will be removed as part of a separate removal action.

3.2 Silos Condition and Releases

In the 1970s, spalling of the tile silos due to the effects of weathering, particularly the freeze-thaw cycles, was first observed on the two westerly tile silos. This deterioration has continued to the present time. Figure 3-3 is an aerial view showing the upper structure and equipment. The southwest tile silo can be

seen at the center of the photograph. Spalling of the top course of tile is evident. Figure 3-4 is a view showing the upper end of the two western tile silos. Spalling is evident on the upper course of the southwest silo (at the upper right of the photograph). The steel support structures are extensively corroded, with rust being evident throughout. Figure 3-5 is a view of the bottom of one of the silos. Spalling of the silos is again evident as is corrosion of the structural members. Figure 3-6 is an overhead view of one of the tall tile silos; deterioration of the tile and structural members can be seen. Because of the questionable structural integrity of the silos, a structural evaluation was performed in late 1990 and early 1991. The structural evaluation report is attached in Appendix B. Calculations supporting this evaluation are in the Administrative Record File. The recommendations presented in this report include (1) demolish the entire facility or (2) demolish the tall (44-foot) tile silos and inspect and repair, as required, the support structure for both the tile and concrete silos. The second alternative would be inconsistent with the final remediation of the site and would result in the creation of additional waste. Therefore, the first alternative was selected.

On February 6, 1991, a spill was observed on the ground level under the northwest tile silo during routine inspections by plant personnel. It is hypothesized that heavy rain on the previous day wetted the residues to the point of flow from this silo. Inspections indicated that residues had also accumulated on the lower platform under both western tile silos and the northwest small tile silo. It was estimated that approximately 2,600 pounds of residue and corrosion product debris were released from the three silos. Figure 3-7 is a view under one of the tile silos, showing the accumulation of residue and debris on the steel deck under the silo cone. Figure 3-8 is another view at the tile silo cone level. Residue and debris is apparent under two of the silos--the one at the center of the picture and the one directly to the south (almost hidden by the front silo). These spills were cleaned up and the debris stored in drums on Plant 1 Pad pending further evaluation. After the residues were cleaned up, further inspection and emergency maintenance activities to seal the silo vents were performed. This prevented the influx of rain, thus reducing the potential for further releases. Caps were fabricated, sealed with room temperature vulcanizing (RTV) material, and held in position with clamps or sandbags. After collection of representative samples from the silos, maintenance installed boxes to catch any remaining residues, and sealed the sampling/inspection ports.

All work on silos was performed with Level 2 personal protective equipment (PPE) to ensure worker protection from radiological/chemical hazards, and the workers were tied off to prevent falls. The workers were required to work from scaffolding to ensure safety on the corroded steel deck. The area surrounding the base of the silo supports has been roped off and posted as a restricted area. Radiological surveys have been made of the silo area as discussed in Section 4.

8/10/53 FMPC, Fernald, Job 3002, Complete
Looking east showing completed Silo Area for Sampling Plant. Contract AT(30-1)-1165, George A. Fuller Company.

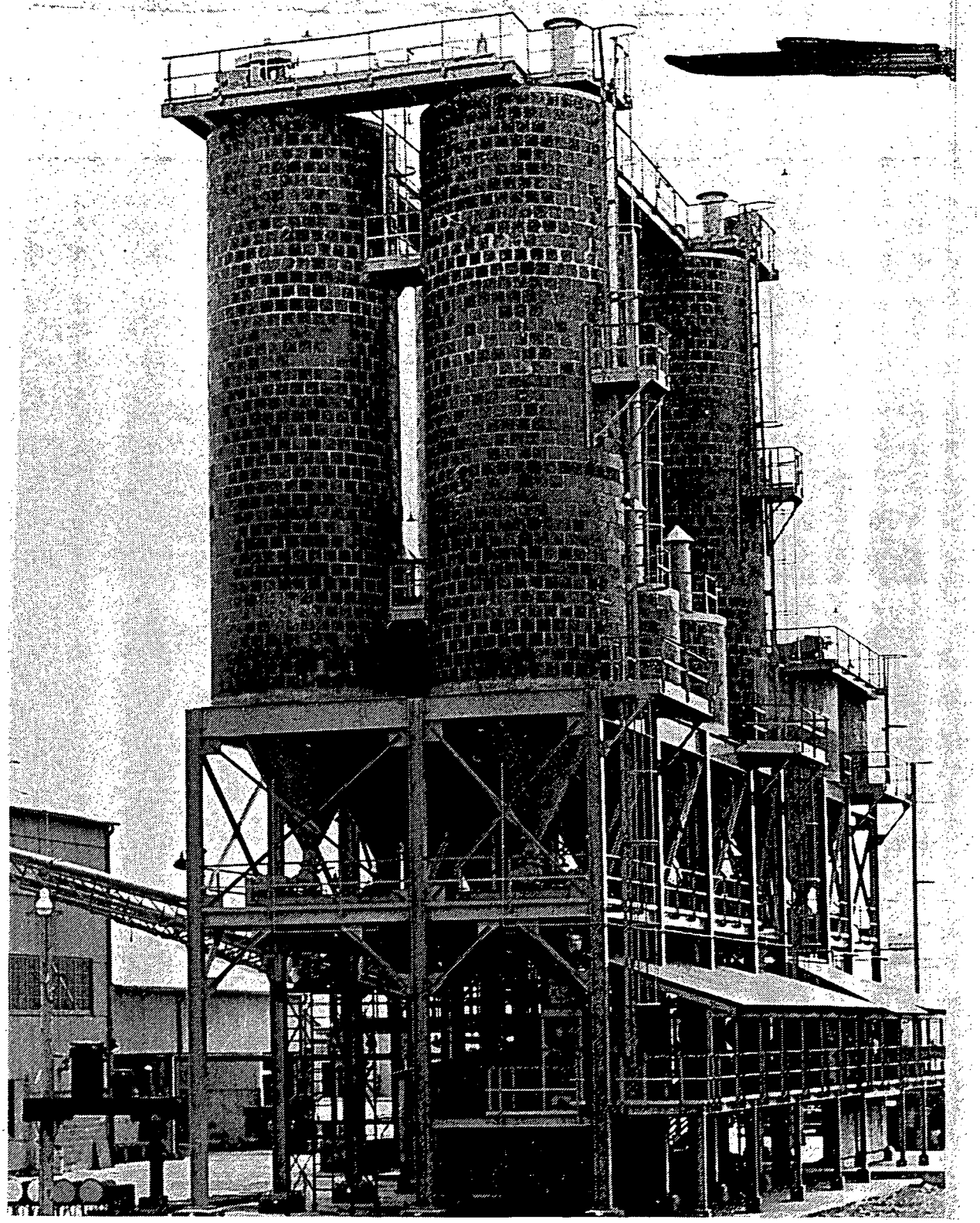

Figure 3-1 - Overview of Plant 1 Silos Looking East

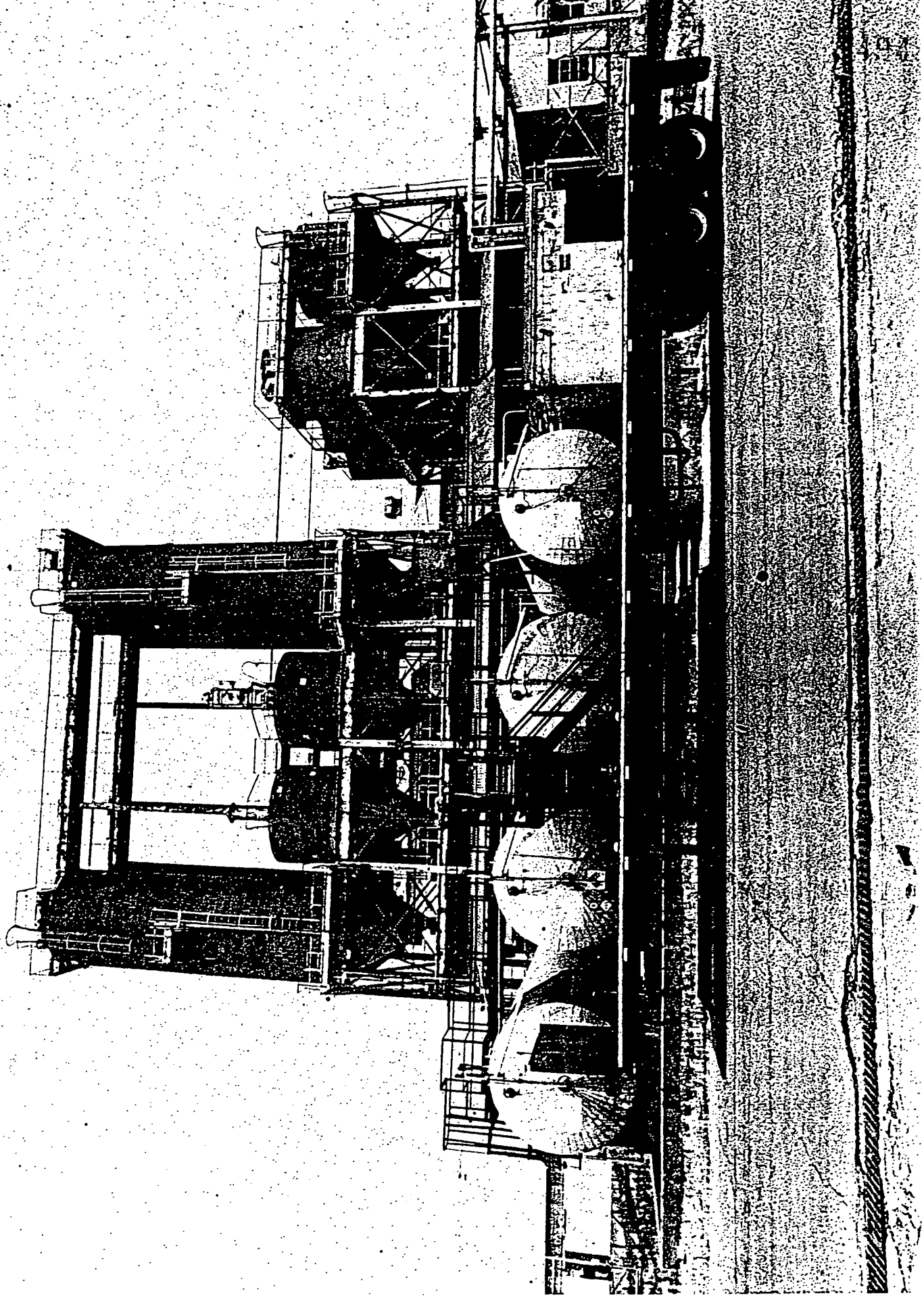

Figure 3-2 - Overview of Plant 1 Silos Looking North

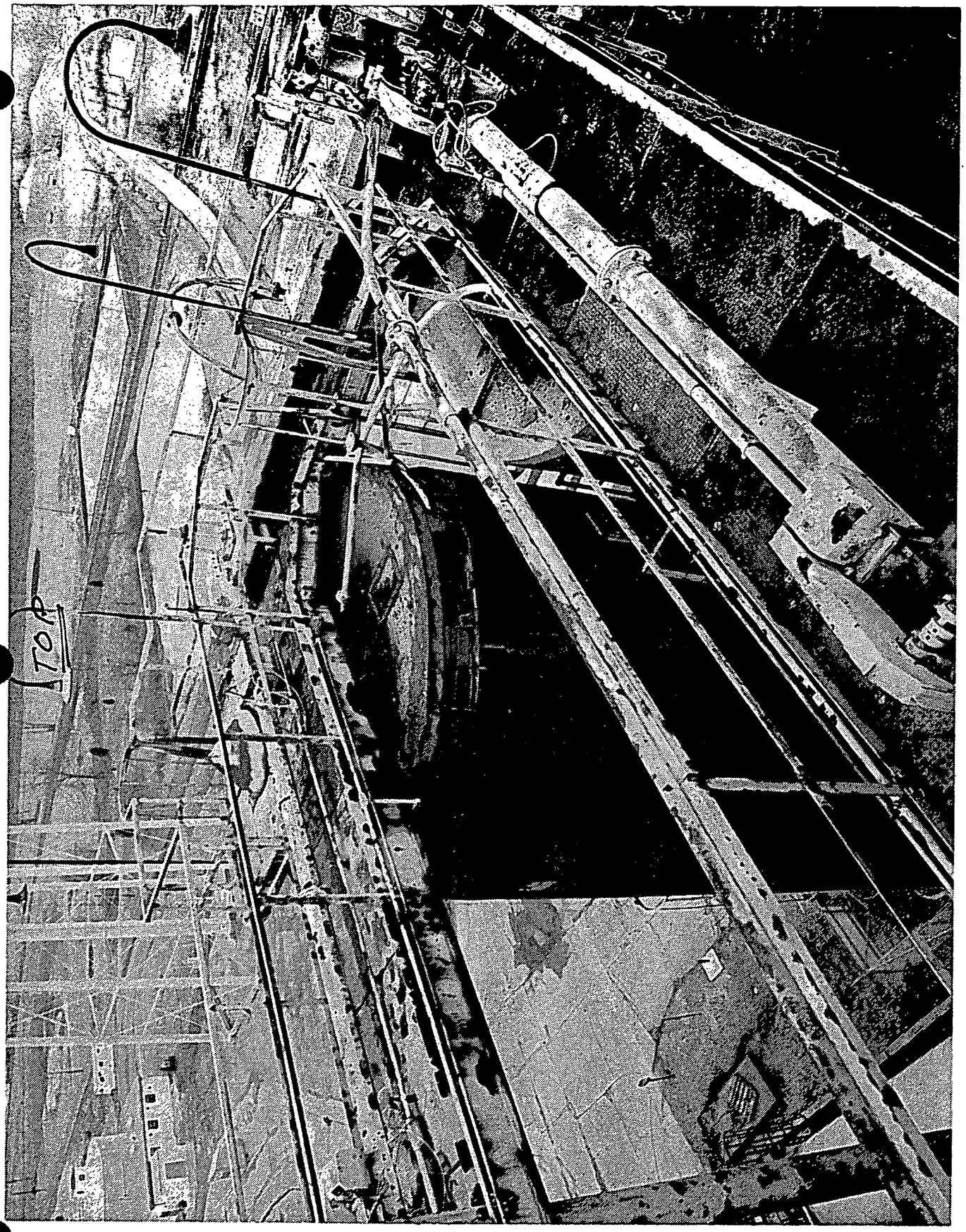

Figure 3-3 - Aerial View at Top of Tile Silos

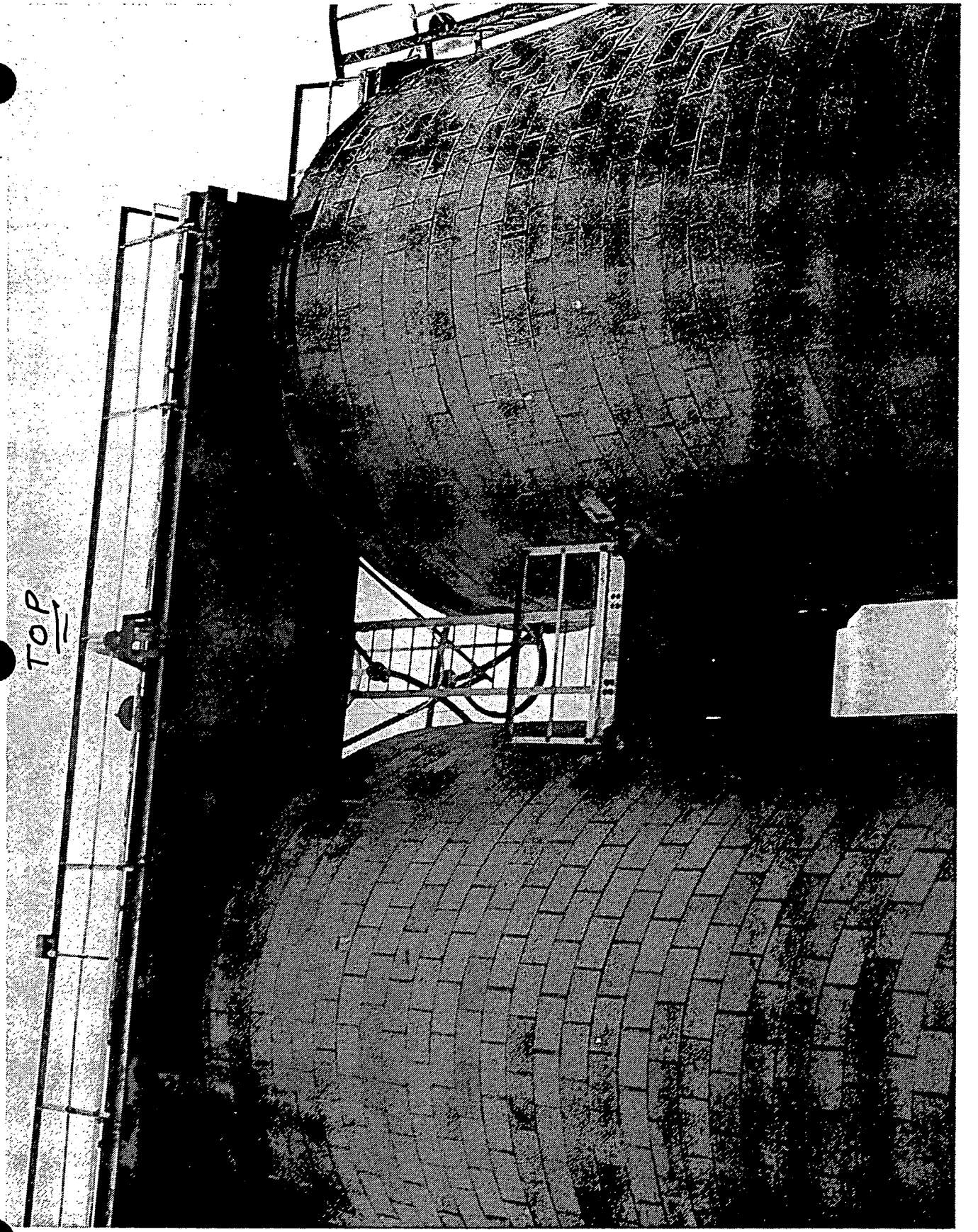

Figure 3-4 - View Showing the Two Westerly Tile Silos

Figure 3-5 - Close-up View of the Bottom of One of the Westerly (Tile) Silos

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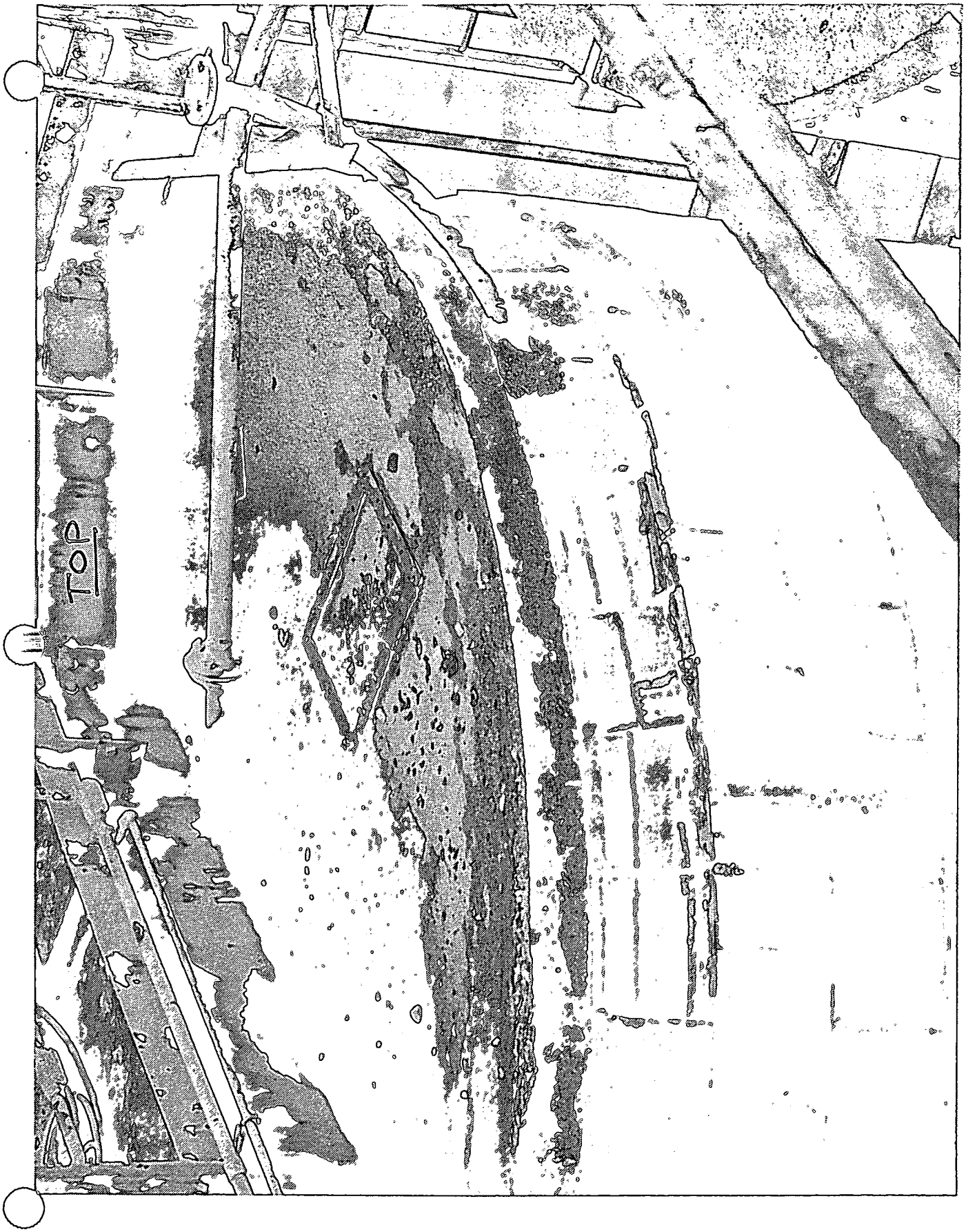

Figure 3-6 - View of the Top of One of the Tile Silos

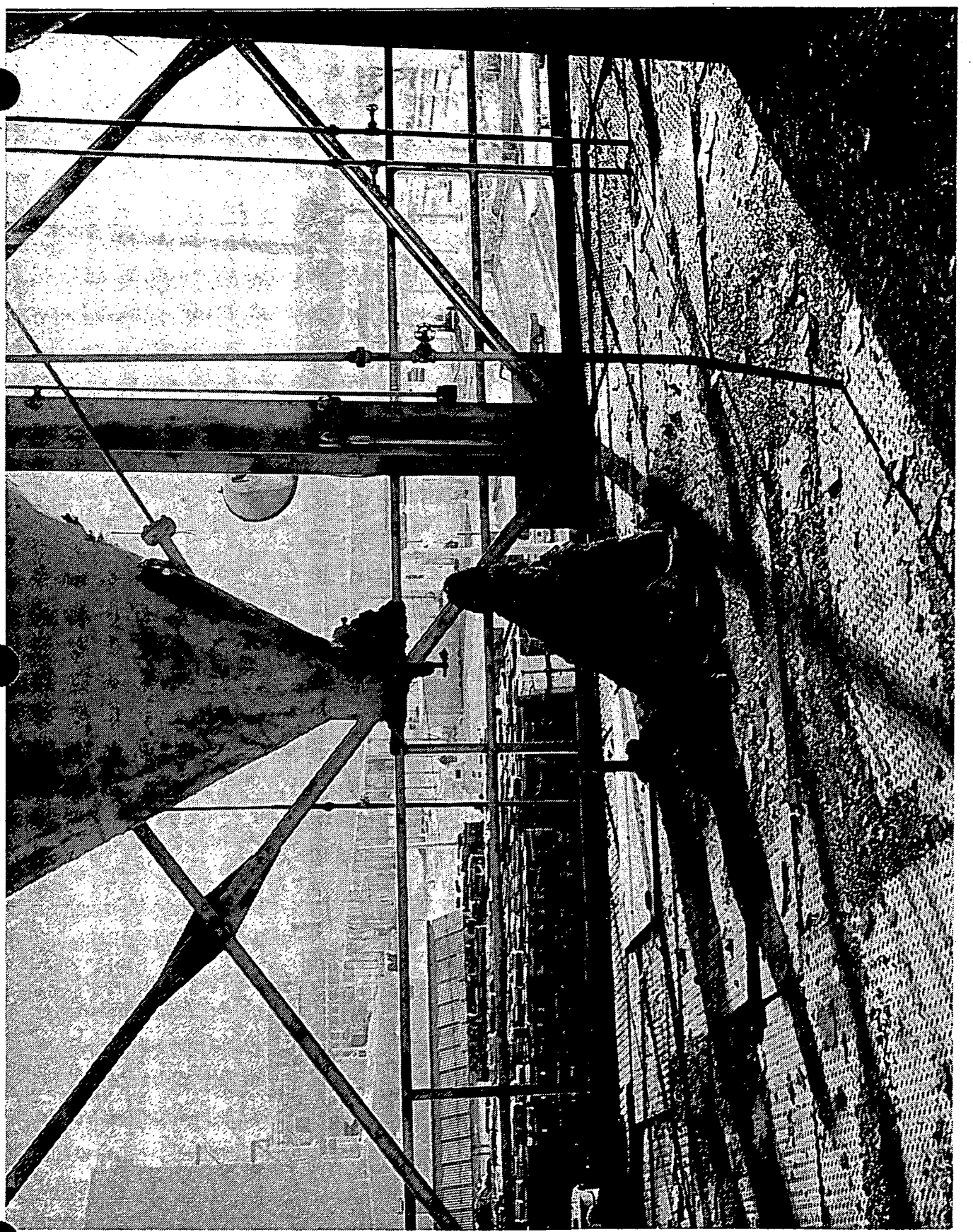

Figure 3-7 - View Under One of the Tile Silos Showing Accumulated Debris on the Steel Deck

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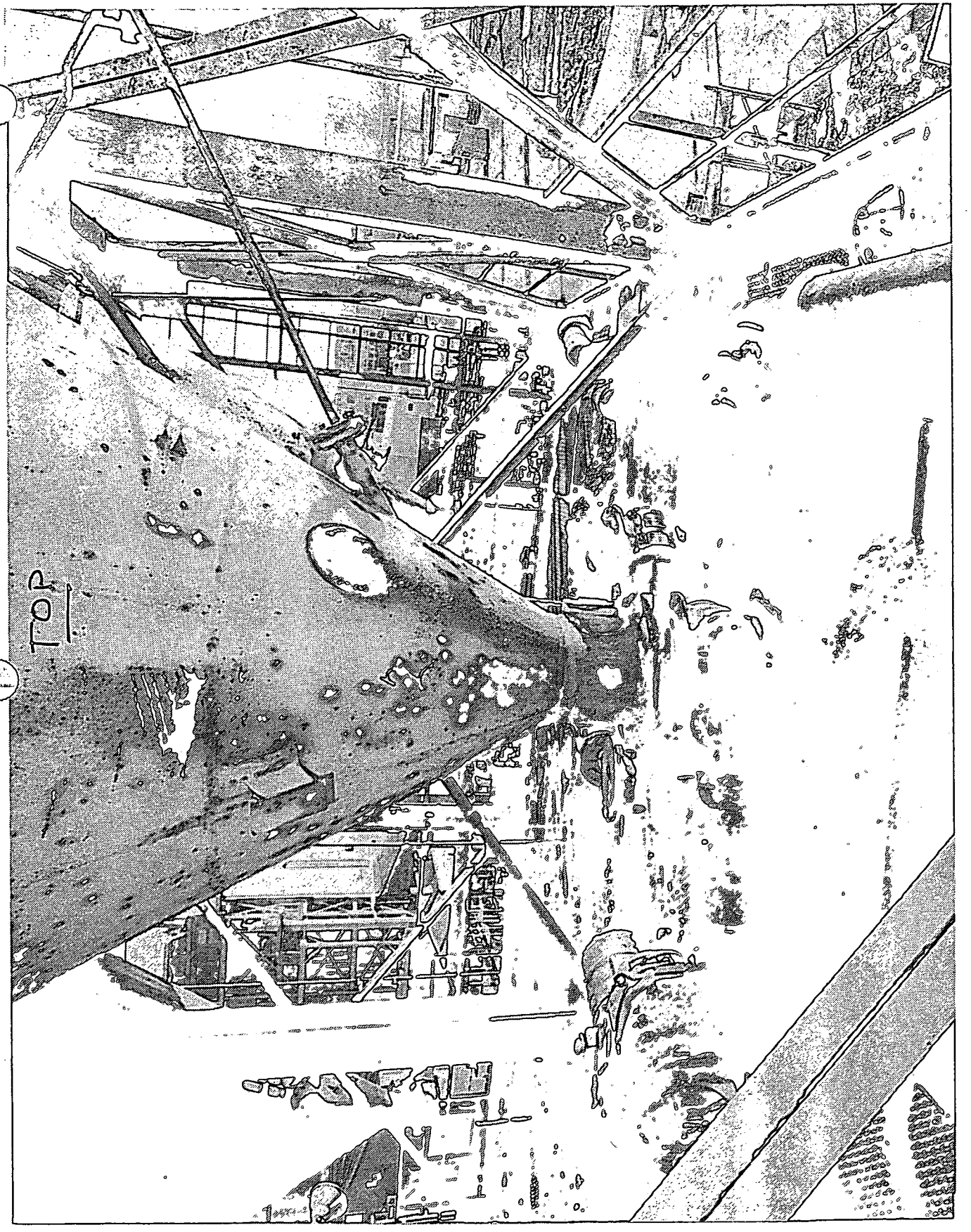

Figure 3-8 - Another View Under One of the Tile Silos at the Tile Silo Cone Level

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SECTION 4

SUMMARY OF EXISTING SURVEY SAMPLING DATA

In March and April 1991, the DOE contractor, Westinghouse Environmental Management Company of Ohio (WEMCO), surveyed radiation levels, took smear samples from the silo surfaces, and collected grab samples of the waste residues. The samples were collected for the preparation of the RSE. Table 4-1 summarizes the analytical results, which are also presented in the RSE (see Appendix A).

The contact radiation rates ranged from <0.5 to 7.5 mrem/hr, with the highest reading occurring at the base of the northwest tile silo. At 3 feet from the silos, the highest radiation rate was 2 mrem/hr at one of the tile silos. The smear samples ranged from non-detectable to 12,000 dpm alpha/100 cm^2 and 4,800 dpm beta-gamma/100 cm^2 on the floor underneath the southwest tile silo. The highest levels measured on the external surfaces of the silos were 3,300 dpm alpha/100 cm^2 and 1,000 dpm beta-gamma/100 cm^2 also found on the northwest tile silo.

The results of grab samples taken are listed in Appendix A of the Removal Site Evaluation (the Removal Site Evaluation is attached in Appendix A of this document). Radiochemical analytical results are given in Appendix A.1 of the Removal Site Evaluation. These results indicate the presence of uranium and radionuclides of the uranium decay chain. Chemical analytical results are given in Appendix A.2 of the Removal Site Evaluation. Few organic compounds were observed above detection limits. Results for Toxicity Characteristic Leaching Procedure (TCLP) tests are presently available for only the concrete silos. None of these results are above regulatory limits.

The presence of asbestos and lead was identified during industrial hygiene investigation surveys. Asbestos is present in transite panels of the small electrical building beneath the silo structure and the covered walkway on the south side of the silo structure. Lead has been confirmed to exist in the paint on the steel structures and in the residue in the silos. Lead in the residue is present as a part of the natural uranium decay chain. Investigation indicates that polychlorinated biphenyls do not exist in transformers, capacitors, and switchgear located in the building.

Table 4-1 – Waste Residue Characterization Summary

SILO NUMBER:	1	2	3	4	5	6	7	10	11	12	13	14
SAMPLE NUMBER:	EM-2001	EM-2504	EM-2505	EM-2506	EM-2507	EM-2508	EM-2509	EM-2570	EM-2571	EM-2572	EM-2573	EM-2574
DUPLICATE SAMPLE NUMBER:			EM-2510				EM-2510		EM-2575			
RADIONUCLIDES (ALL RESULTS ARE GIVEN IN pCi/g UNLESS OTHERWISE NOTED)												
Cs - 137									<3.1 / <3.1			
Np - 237		11	-- / 0.77	0.74	13	<0.76	3.3	10	9.8 / 4.9	<0.40	5.7	<0.40
Pu - 238	<0.17	<0.17	<0.17 / <0.19	<0.18	<0.17	<0.40	<0.17	<0.15	<0.15 / <0.15	<0.15	<0.14	<0.15
Pu - 239/240	<0.12	<0.12	<0.12 / <0.20	0.56	<0.12	<0.20	<0.12	<0.38	1.2 / < 0.38	<0.38	<0.37	<0.39
Pu - Total (ppm)								<0.53	<1.4 / <0.53	<0.53	<0.51	<0.54
Ra - 226	1,600	560	30 / 39	25	210	59	1,200	1,200	1,400 / 436	81	310	79
Ra - 228	130	6.1	<7.4 / 7.8	3.6	29	5.7	14	79	83 / 31	7.4	32	6.4
Tc - 99		<5.2	-- / 8.5	<5.2	<5.4	<5.4	11	<19	<43 / <19	<55	<18	<27
Th - 228	64	1,600	24 / 43	17	660	97	85	14	8.4 / 10	13	9.7	5
Th - 230	160,000	100,000	960 / 630	1,400	140,000	3,900	14,000	4,700	4,800 / 4,200	1,700	3,600	1,900
Th - 232	64	2,300	21 / 18	49	2,500	96	170	12	18 / 7.4	9.1	15	9.2
Th - Total (ppm)	590	450	<45 / <45	48	2,400	<45	110	420	491 / 580	150	230	100
U - 234	310	140	1.6 / 18	13	1,000	20	80	61	170	28		
U - 235	13	6.5	0.24 / 1.1	0.66	49	1.2	4.1	3.5	12	0.64		
U - 236	<0.53	0.16	0.048 / 0.34	0.18	<2.1	0.18	0.42	<0.001	<0.48	0.32		
U - 238	280	140	5.3 / 24	10	1,100	25	90	76	250	14		
U - Total (ppm)	830	430	16 / 73	31	3,300	74	270	230	750 / 580	42	36	24
METALS - TOTAL (ALL RESULTS ARE GIVEN IN ug/g)												
Arsenic		960			64.4			43.8	95.2 / 79.9	30.2	32.2	27.9
Barium	216	64.4	21.4	16.8	119	30.7	47 / 15.9	34.4	21.1 / 15.4	115	7.92	40.4
Cadium		3.2			6.1		3.8	17.3	20.8 / 20.0	24.6	24.2	24.3
Chromium		733	95.3	46.5	305	70.6	152 / 43.9	126	184 / 171	172	182	165
Lead	441	7,780	739	354	8,730	386	3,370 / 464	1,040	1,220 / 896	556	561	547
Mercury		0.883		0.295	1.8		0.1 / 0.2	0.3	0.76 / 1.1	0.57	0.56	0.67
Selenium		891			4,090		81	35	161 / 114	8.4	18	3.5
Silver								16	21 / 22	13	12	13
RCRA - TCLP (ALL RESULTS ARE GIVEN IN ug/L)												
Barium								0.22	-- / 0.25	0.25		0.21
Lead								0.44	-- / 0.46	0.46	0.2	
Mercury									0.002			
Selenium									0.74			
Methyl Ethyl Ketone									0.083			
ORGANICS - TOTAL (ALL RESULTS ARE GIVEN IN ug/g)												
Tetrachloethene				13		64	181					
Acetone					10.3							
Toluene					13		19					
Cyclohexane						263						
2-Nitropropane						34						
Total Xylenes							14					

Reference: Removal Site Evaluation Plant 1 Ore Silos (DOE, 9/91)

Notes: 1) Blank spaces indicates either analysis not performed, analytical parameter not detected.
2) Samples not collected for Silo 8 (Sealed) and Silo 9 (Empty).
3) Duplicate sample results are presented for Silos 3, 7 and 11 as primary result / duplicate sample result.

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P:\...\OU-3\PO-22\SUMMARY.WK3

SECTION 5

NEED FOR REMOVAL

Pursuant to Section 300.410 of the NCP, the DOE has determined that a removal action is required for the Plant 1 Ore Silos. A Removal Site Evaluation has been completed (attached in Appendix A) as has a Management Implementation Plan (attached in Appendix D). The determination meets the following criteria:

1) 40 CFR 300.415(b)(2)(i) - Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

2) 40 CFR 300.415(b)(2)(ii) - Actual or potential contamination of drinking water supplies or sensitive ecosystems.

3) 40 CFR 300.415(b)(2)(iii) - Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release.

4) 40 CFR 300.415(b)(2)(v) - Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

5) 40 CFR 300.415(b)(2)(viii) - Other situations or factors that might pose threats to public health or welfare or the environment.

Relative to 40 CFR 300.415(b)(2)(i), (ii), (iii), and (v), the following considerations apply:

1) The silos contain radioactive metal oxide process residue. When the silos were emptied and abandoned in place, they were neither flushed nor decontaminated.

2) The silos are in an advanced state of deterioration. The silos were not kept adequately sealed, and leakage has occurred.

3) While the silos have been sealed since the release of contaminated material, the threat of future release still exists because of the advanced state of deterioration.

4) The potential for release of radionuclides to plant population and the surrounding population from airborne or air conveyed releases from the ore silo facility exists due to weather conditions.

5) The potential for leaching or flushing of radionuclides from the ore silos facility to the ground, then to the storm sewer system and, potentially, to the nearby river exists because of weather conditions.

Relative to 40 CFR 300.415(b)(2)(viii) the following considerations apply:

1) The silo structural integrity has not been maintained and there is a potential for complete collapse of the silos accompanied by the release of contents. This collapse could also damage and release radioactive materials from nearby facilities.

2) The silos are supported on a 38-foot structure so that the tall silos with additional structure and equipment on top extend over 80 feet high. A collapse due to a high wind could extend damage to Building 72 which is presently used to store containers with up to 20 percent enriched uranium, to Building 1A which is also used to store containers with up to 20 percent enriched uranium, or to the four uranyl nitrate hydrate storage tanks. Damage to any of these buildings could result in the release of airborne contamination and exposure. Damage to the storage tanks could result in release of liquid uranyl nitrate hydrate. These tanks are surrounded by a concrete basin with capacity to contain contents of one tank. Damage to more than one of these tanks could result in overflow and release to the environment. (Note: The uranyl nitrate hydrate contains only a small quantity (less than 1 percent) of free acid; therefore, nitric acid fume hazard would not be expected in the event of a spill.)

3) A complete collapse of a silo or silos could result in serious injury or death to site workers. While access is restricted to the silo area, some traffic is necessary along the west roadway in case of an emergency and for inspection of the silo area.

Based on these considerations, there is a need to remove the silos. The removal action will eliminate a potential for release of radioactive contaminants from the silo area and eliminate the hazard of a catastrophic structural failure.

In addition, the removal will contribute to the long-term remedial actions proposed for the Fernald site, which incudes corrections to eliminate adverse environmental impacts associated with past and present operations.

SECTION 6

PROPOSED PLANT 1 ORE SILOS REMOVAL ACTION

6.1 Removal Action Approach

The objective of this removal action is to implement interim actions to eliminate the potential for release of contaminants from the Plant 1 Ore Silo facility prior to final remediation. Prior to the initiation of this removal action, the development and approval of removal action documentation required by the CERCLA Section 120 and 106(a) Consent Agreement (CA) and development and approval of National Environmental Policy Act (NEPA) of 1969 documentation will be implemented.

This removal action consists of the removal of six concrete silos, eight tile silos, their supporting steel structure, and ancillary equipment. The removal action will also address the segregation, size reduction, decontamination (surface cleaning to remove loose contamination), packaging, certification, shipping, and disposal of only low-level radioactive waste scrap metal and masonry rubble. The pads and surrounding soils are not included in this removal action and will be addressed as part of the final remedial action for OU-3 and/or OU-5.

Incidental to performing the work, there are several potential release pathways to the environment such as:

1) Air - Fugitive dust emissions
2) Surface water - Particles of contamination being carried to the storm sewer
3) Groundwater - Particles of contamination being driven into the soils beneath the pad

The removal action will be consistent with all applicable or relevant and appropriate requirements (ARARs) for OU-3 to the extent practicable considering the urgency of the situation and the scope of the removal action (see 40 CFR 300.415(i)). This removal action will also be consistent with the final remedy to the extent required by CERCLA Section 104(a)(2).

A schematic plot plan of the silos and nearby facilities (also showing material flow) is given in Figure 6-1. Nearby facilities include Building 1A located about 50 feet north of the tile silos and 25 feet north of the concrete silos, four uranyl nitrate hydrate storage tanks located about 25 feet south of the tile silos, Building 67 located about 70 feet northwest of the tile silos, and Building 72 located 4 feet east of the concrete silo structure.

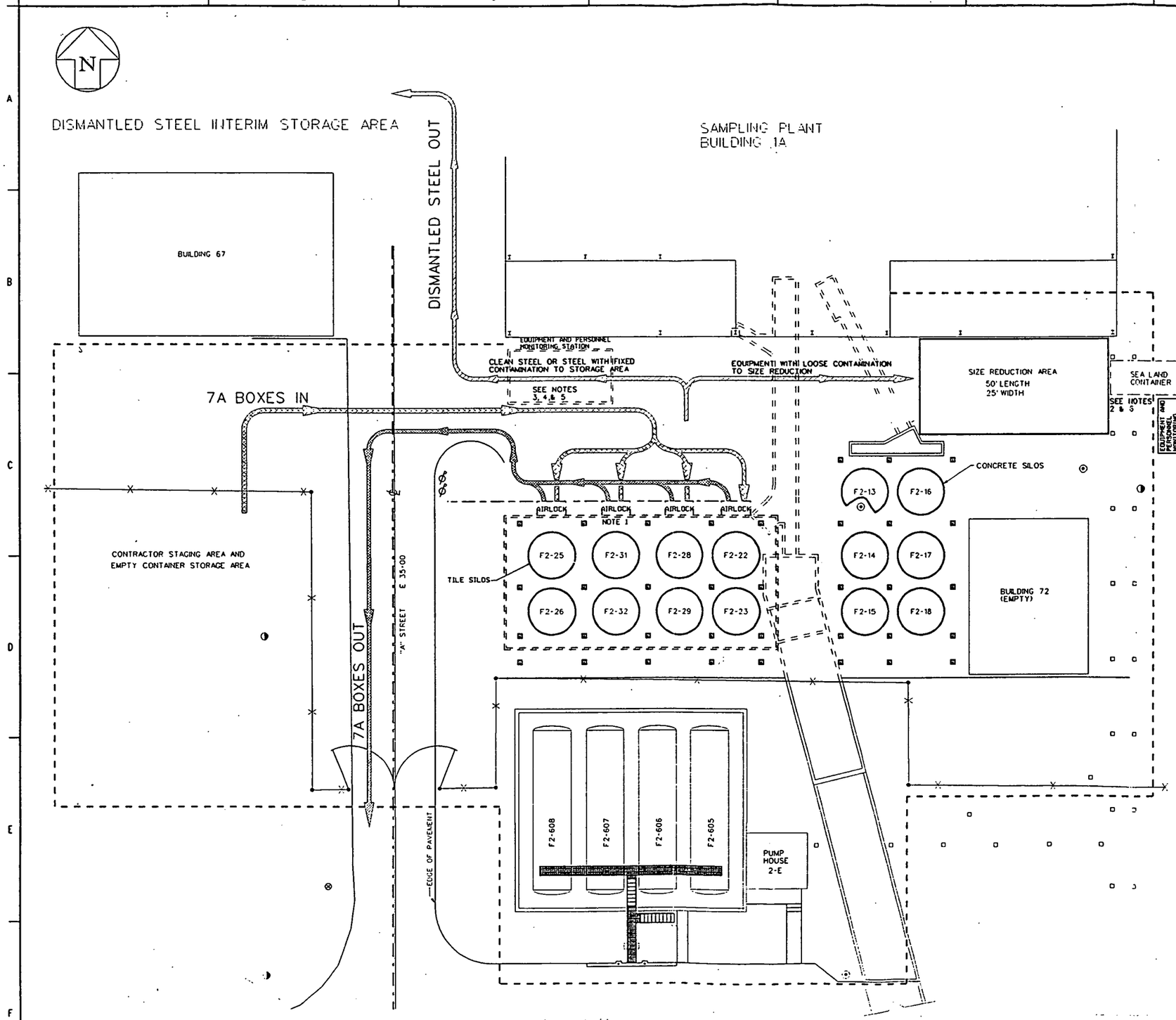

Figure 6-1 - Schematic Plot Plan of Plant 1 Silo Area

NOTES

1. CONTRACTOR RESPONSIBLE FOR FILLING '7-A' BOXES AND MOVEMENT INSIDE AIR LOCK. OWNER'S REPRESENTATIVE RESPONSIBLE FOR VERIFYING CONTENTS, AND REMOVING FILLED BOXES FROM AIR LOCK.
2. OWNER'S REPRESENTATIVE RESPONSIBLE FOR MOVEMENT OF ALL CONTAINERS OUTSIDE THE CONTAINMENT AREAS.
3. CONTRACTOR IS RESPONSIBLE FOR STRUCTURAL STEEL MOVEMENT TO THE INTERIM STORAGE AREA AND THE SIZE REDUCTION FACILITY.
4. ALL STEEL PIECES WILL BE SIZE REDUCED TO A MAXIMUM OF 19' LENGTH ON PAD BETWEEN PLANT 1 AND TILE SILOS.
5. ALL PROCESS EQUIPMENT WILL BE MOVED TO THE SIZE REDUCTION FACILITY. ALL OPENINGS ON EQUIPMENT WILL BE SEALED BEFORE REMOVAL FROM STRUCTURE.
6. OWNER'S REPRESENTATIVE IS RESPONSIBLE FOR VERIFYING CONTENTS OF, AND REMOVAL OF FULL SEA/LAND CONTAINER. OWNER'S REPRESENTATIVE ALSO TO PROVIDE AND MOVE PREPARED AND EMPTY SEA/LAND CONTAINERS INTO PLACE.

REFERENCE DWG.#	REFERENCE DWG. TITLE

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	SPONSOR	DOE
		INITIALS AND DATE		

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
FEMP ERA
PLANT 1 ORE SILOS REMOVAL ACTION OU3/PO22

DRAWING TITLE
PROCESS
MATERIAL AND TRAFFIC FLOW

M. CARTER	2-3-92	M. HEIDKAMP	2-14-92
PLANT 1 ORE SILOS		NONE	

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BY D.O.E. LATER	WBS 1.1.1.1.3.2.6 00-90701	93X-5900-F-00075	F0003

6.2 Control Measures

Contamination control will be provided by local containment at work stations, and area containments of the silo structures and the size reduction building. Local containment at working levels will be provided to contain removal debris, such as mortar and dust. Radiological monitoring stations at the work levels will be provided along with periodic radiation surveys. Area containment for the silo structures will consist of scaffolding erected to the full silo height and fiber reinforced plastic sheeting fixed to the exterior of the scaffolding (see Figure 6-2). This containment will be ventilated by drawing outside air through the structures to progressively more contaminated areas (see Figure 6-2). Air will enter at the bottom of the secondary containment, flow upward between the secondary containment and the outside wall of the silo, and then be drawn downward through the silo and primary containment to HEPA filters on the ground. The system will be designed to achieve a minimum of seven air changes per hour. Area containment will have area radiation monitors and be subject to periodic radiation surveys. Egress routes from the containment will be controlled through airlocks containing local radiation monitors and subject to periodic radiation surveys. The size reduction building will have area radiation monitors and be subject to periodic radiation surveys. The ventilation system will be designed for a minimum of ten air changes per hour.

Access to the construction area will be controlled by two step off pads. One will be located at the southwest corner of Sampling Plant Building 1A and will control all personnel, equipment, and materials entering and leaving the silo area. This point will have radiation monitors and a station for collecting smear samples as necessary to determine disposition of equipment and materials. The second pad will be located to the north of Building 72 and will serve as a personnel monitoring station. See Figure 6-1 for additional details. Additional step-off pads and monitors will be provided at the airlocks to control access to the silo containment.

Temporary diking will be provided at the base of containment areas to assure that radionuclide contamination cannot escape during stormy weather. Water, and any contaminants carried with it, will be collected for transfer and disposition through the existing site stormwater retention system.

Removal of transite structures will be done in accordance with the site Industrial and Hygiene Safety Manual, IH&S-IH-03, Control of Work Involving Asbestos, 3-20-89, Revision 0, attached in Appendix C. This includes the building at grade level and the roof over the elevated walkway on the south side of the silo area, and may include any removal or repairs to Building 72.

The FEMP Procedures for cutting, working in enclosed areas, and employment of HEPA filters will be observed. Exposed process surfaces and cut ends will be wrapped with plastic and sealed with tape before they are removed to the ground level.

6.3 UNH Tank Protection

Removal of uranyl nitrate hydrate from the storage tanks, which are located 25 feet south of the tile silos, will be accomplished under a separate removal action. This removal may or may not be accomplished prior to the Plant 1 Ore Silo removal action. Protection will be provided against damage to the tanks and process piping. The risk of tank damage will be minimal based on the proposed design of scaffolding and engineered tank protection. The north end of the tanks will be protected by a 21-foot by 56-foot steel frame structure with a 1/4-inch plate covering the roof and north face. If the tanks are empty and cleaned, the structure may be deleted.

6.4 Disassembly and Removal Sequence

6.4.1 Definition of Dismantlement Phases

1) Phase I involves the two northernmost concrete silos.
2) Phase II involves the four southernmost concrete silos. These four silos shall be removed in the following order: Northwest (NW), Northeast (NE), Southwest (SW), Southeast (SE).
3) Phase III involves the removal of the two easternmost tall tile silos. The northern silo of these two silos shall be removed first.
4) Phase IV involves the removal of the two westernmost tall tile silos. The northern silo of these two silos shall be removed first.
5) Phase V involves the removal of the four short tile silos. The two northernmost silos of these four silos shall be removed first.

6.4.2 Preconstruction Sampling

Preconstruction sampling will be conducted on both tile and concrete silos to verify waste handling procedures (Subsection 8.3 details the sampling). Air monitoring will be conducted throughout the removal action to monitor the operation of the HEPA filtration system and to ensure proper PPE is used. Soil and groundwater will be monitored as defined in Subsection 8.3 to provide a pre-removal baseline.

6.4.3 Removal Sequence

The following removal sequence shall be used as a plan of action for the removal of the Plant 1 Ore Silos, associated structures, and equipment. See Figure 6-3 in conjunction with the following sequence.

1) Personnel and equipment arrive on site.
2) Access control barriers shall be set up for the entire project work area (Ref. Figure 6-1).

3A) Verify that all drums and material have been removed from Building 72.

3B) Verify that the area for the interim steel storage north of Building 67 shall be available.

4A) Place concrete barriers on the south face of Building 1A (Ref. Figure 6-4).

4B) Place concrete barriers on the east side of Building 67.

4C) Begin installation of the protective cover over the UNH tanks located south of the tile silos.

5) Set up two access/monitoring locations at the SW corner of Building 1A and east of the Size-Reduction building, and provide a change facility for workers.

6A) Remove the two elevated conveyors and support structures located between Building 1A and the silos. All open ends of the conveyor shall be sealed with plastic and tape wrap. The conveyors and truss support shall be stored on the concrete pad in the silo area until the Size-Reduction Containment Building is erected.

6B) Seal openings in the exterior wall of Building 1A through which the conveyors passed.

7) Erect the Size-Reduction Containment Building. Concrete barriers shall be required inside the building to protect it from damage during various size-reduction activities (i.e., concrete size reduction).

8A) Fabricate/install the size-reduction area ventilation system. This includes the system ductwork, fan/filter units, and electrical power. Provide and install the discharge duct monitors.

8B) Install the Size-Reduction area electrical power. This includes power for interior lighting, power tools, and the ventilation system fan/filter unit.

9) Start up and test the size-reduction area ventilation system.

10) Verify established access routes for the placement and removal of the sea/land containers.

11A) Remove all transite material from the silo area and package per the Material Disposition Plan (see Section 6.6). This includes materials in the electrical building at grade level and the roof over the elevated walkway on the south side of the silo area.

11B) Install bracing in structures.

12A) Remove the elevated personnel platform and support beams which extend from the southwest corner of the tile silo structure east to the southeast corner of the concrete silo structure.

12B) Remove all miscellaneous equipment and structural assemblies from the perimeter of the concrete silo structures (excluding the platform on top of the silo structure). This includes elevated platforms, personnel ladders, and utility piping, which will interfere with the installation of the containment scaffolding.

12C) Remove decking from the concrete silo structure that interferes with the scaffolding installation.

13A) Remove the conveyors, drives, miscellaneous equipment, and platforms from the top of the concrete silos.

13B) Install scaffolding around the concrete silo structure (Phases I and II). Installation shall be coordinated to allow scaffolding to be used during the removal of upper level platforms and equipment.

14) Install vertical containment sheeting around the concrete silo scaffolding (Phase I and II).

15A) Install Phase I and II electrical power (for lighting, tools, etc.) and electrical power to the silo structure containment filter/fan units. One set of filter/fan units shall be used for ventilation of both the concrete and tile silo removal actions.

15B) Install Phase I ventilation system ductwork and supports.

15C) Install ventilating fan/filter units and discharge duct for the silo containment.

16) Start up and test Phase I ventilation system.

17) Remove top of concrete silos Phase I to the Size-Reduction area.

18) Remove the concrete silos Phase I. Each concrete silo section shall be lowered to grade and moved into the Size-Reduction area for further work and packaging.

19) Disassemble and move Phase I ventilation system ductwork and supports. Reuse intake/prefilter assembly and ductwork if possible. Dispose of prefilter and any unusable ductwork.

20) Install Phase II ventilation system ductwork and supports including the installation of the intake/prefilter assemblies. The same fan/HEPA filter units shall be used for all phases of disassembly.

21) Start up and test ventilation system for Phase II concrete silo removal.

22) Remove top of concrete silo for Phase II and move to the Size-Reduction area.

23) Remove the concrete silos Phase II and move to the Size-Reduction area. See Step 18.

24) Disassemble and move the Phase II ventilation system ductwork and supports.

25A) Remove the concrete silo area containment sheeting.

25B) Disassemble and move the concrete silo scaffolding.

25C) Remove Phase I and II electrical supply equipment from the concrete silo structure.

25D) Install bracing as shown on contract drawings.

26A) Remove any exterior platforms or structures that may interfere with the scaffold installation around the tile silo.

26B) Remove interior steel decking from the tile silo structure prior to installation of the scaffolding.

26C) Begin scaffolding installation around tile silo structure.

27A) Remove concrete silo structural steel and move to grade level. All structural steel (including remaining process equipment) shall be radiologically monitored prior to disposition.

27B) Remove column piers to below grade level and grout to grade level.

28A) Continue installation of scaffolding around tile silo structure (Phase III, IV, and V). Erect scaffold up to bottom of top platform to aid in removal of platform.

28B) Install containment sheeting material around tile silo structure.

28C) Install electrical power to tile silo structure for lighting, hand tools, etc.

29A) Remove the process equipment from the platform on top of the tall tile silos and move to the Size-Reduction area. This includes chain conveyors, drives, valves, ducts, etc.

29B) Remove steel decking and support steel from the top of the "tall" tile silos.

30A) Complete the installation of the scaffolding for the Phase III (two east tall silos) removal.

30B) Complete installation of containment sheeting for Phase III.

30C) Install the Phase III ventilation system ductwork and supports.

31) Start up and test Phase III ventilation system.

30

32) Remove concrete cap from tile silo and move to Size-Reduction area.

33) Install hoisting system and associated electrical and structural items on the tile silo to be removed.

34) Remove cone bottom of appropriate tile silo and lower to grade level. Size reduce and package inside tile silo containment.

35) Disassemble the tile silo into 7A boxes. Boxes shall be filled, radiologically monitored, and sealed inside the silo containment. Full boxes shall be removed through an air lock. Move the boxes inside the silo containment.

36) Repeat Steps 32-35 for the second tile silo in Phase III.

37A) Remove the ventilation system ductwork and supports for Phase III.

37B) Install the ventilation system ductwork and supports for Phase IV removal. Reuse all possible ductwork and supports from previous phases.

38) Start up and test the ventilation system - Phase IV.

39) Repeat Steps 32-35 for both silos in Phase IV.

40) Remove the ventilation system ductwork and supports from Phase IV.

41) Install ventilation system ductwork and supports for the Phase V tile silo removal (four short silos).

42) Start up and test the Phase V ventilation system.

43) Repeat steps 32-35 for all four "short" tile silos in Phase V.

44) Remove the hoist system from the silo area. All associated equipment shall be plastic wrapped prior to movement and radiologically monitored before movement.

45) Remove the tile silo ventilating system ductwork and supports. Ductwork larger than 10 inches in diameter shall be radiologically monitored for disposition.

46) Remove the containment sheeting from the tile silo area.

47) Remove tile silo containment electrical power equipment.

48A) Remove the silo ventilation electrical power supply equipment.

48B) Remove silo portable fan/filter vents. This includes associated ductwork, discharge stack, and monitoring system.

49) Disassemble and remove the tile silo scaffolding. Monitor the scaffolding to determine if decontamination shall be necessary.

50) Remove the tile silo structural support steel. This action includes all remaining decking and process equipment.

51) Remove column piers below grade level and grout to grade level.

52) Complete size reduction and packaging of all remaining material.

53A) Remove all equipment, hand tools, etc., from the interior of the Size-Reduction area. Decontaminate as necessary.

53B) Remove size-reduction ventilation ductwork and supports.

53C) Remove size-reduction ventilation fan/filter units.

54) Remove the Size-Reduction area electrical power.

55) Remove the Size-Reduction area containment fabric. Monitor the fabric prior to disposition.

56) Remove the Size-Reduction area structure.

57A) Remove all remaining equipment from work area including concrete barriers and monitoring equipment, and remove all loose contamination from the concrete pads.

57B) Remove work area access controls.

58) Project completion.

6.4.4 Post-Construction Sampling

Once all residues have been drummed, lot sampling will be conducted for ensuring compliance to NTS acceptance criteria. (Subsection 8.3 details sampling.) Post construction field radiation surveys will be conducted to determine waste disposition requirements. Figure 6-5 identifies the post-construction sampling activities.

A review of baseline measurements of groundwater and soil will be compared to data gathered during the removal action to assess any environmental impact as a result of the removal action.

6.5 Size Reduction

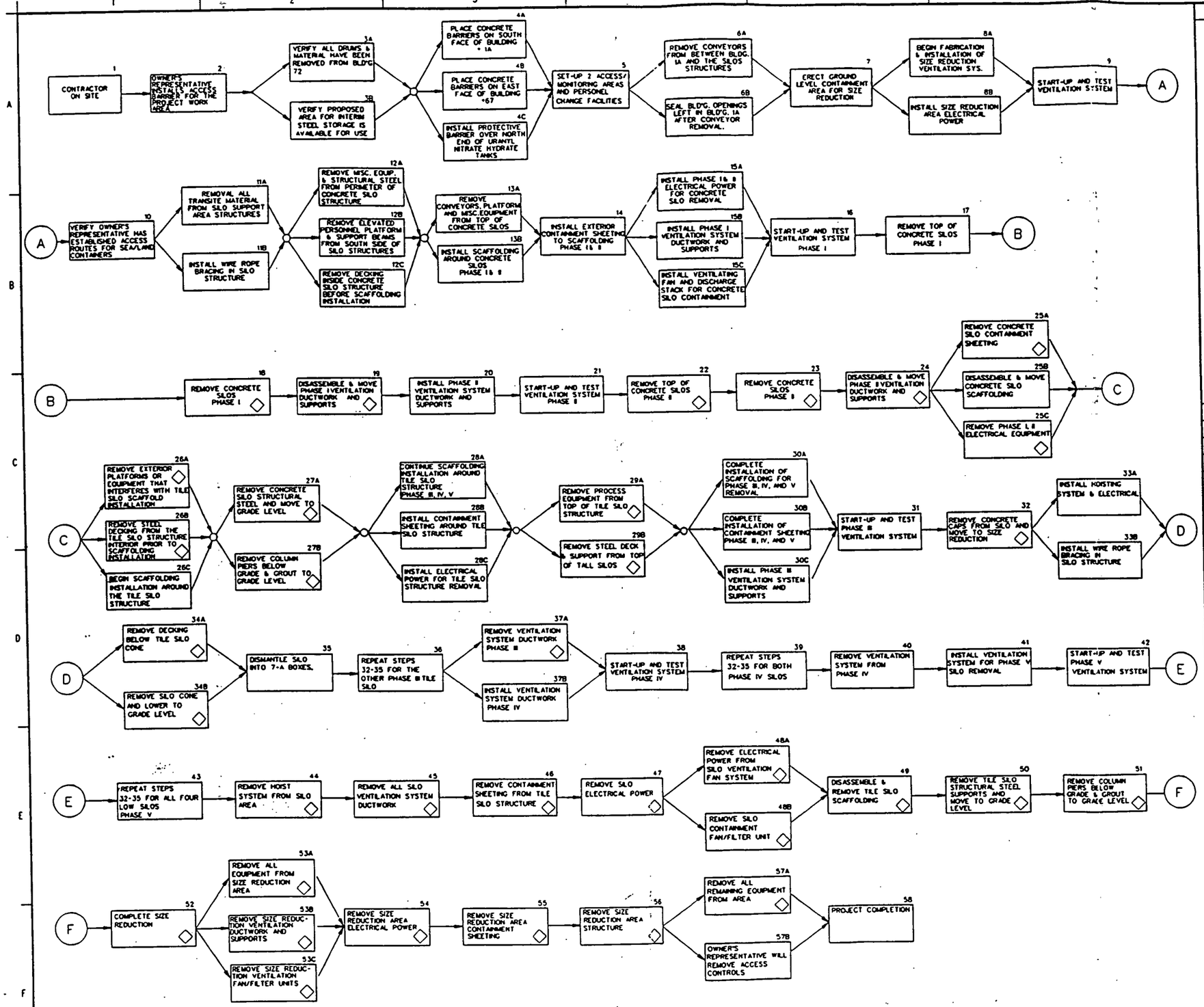
Size reduction of material from the silos and structures will be done both in place on the structures using local containment and in the Size Reduction Building which has its own ventilation system.

The Size Reduction Building is a 25-foot by 50-foot metal frame supported fabric structure with two personnel doors and two material doors. The building will be ventilated with five 1,000 cfm HEPA systems in order to maintain a negative pressure. Doors to the building will be closed during size reduction operations and only opened to allow personnel or materials to move in or out.

6.5.1 Methods

1) Concrete cutting will be required both in situ and in the Size Reduction Building as part of the concrete silo removal. Control of particulate and water emissions beyond the work area will be provided.
2) Mechanical disassembly of process equipment at flanged or bolted connections will be preferred over cutting. Process equipment will be size reduced in place only to allow easy movement to the Size Reduction Building. All openings on equipment will be sealed with plastic wrap and taped per Site Procedures. Large pieces of equipment will be further size reduced inside the Size Reduction Building for ultimate disposition in sea/land containers or 7A boxes.
3) Flame Cutting: All lead-based paint will be removed from the area to be flame cut in order to avoid creating airborne contaminants. If airborne contaminants are created, airline respirators will be required. This requirement applies both in situ and in the Size Reduction Building.

27



NOTES

3494

1. THIS SYMBOL ◇ INDICATES THAT THERE MUST BE A "MATERIAL DISPOSITION" DETERMINATION. THIS DETERMINATION AND MONITORING IS TO BE PERFORMED BY THE OWNER'S REPRESENTATIVE

REFERENCE DWG	REFERENCE DWG. TITLE

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

PARSONS
THE RALPH M. PARSONS CO. · CHAS. T. MAIN, INC. · ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

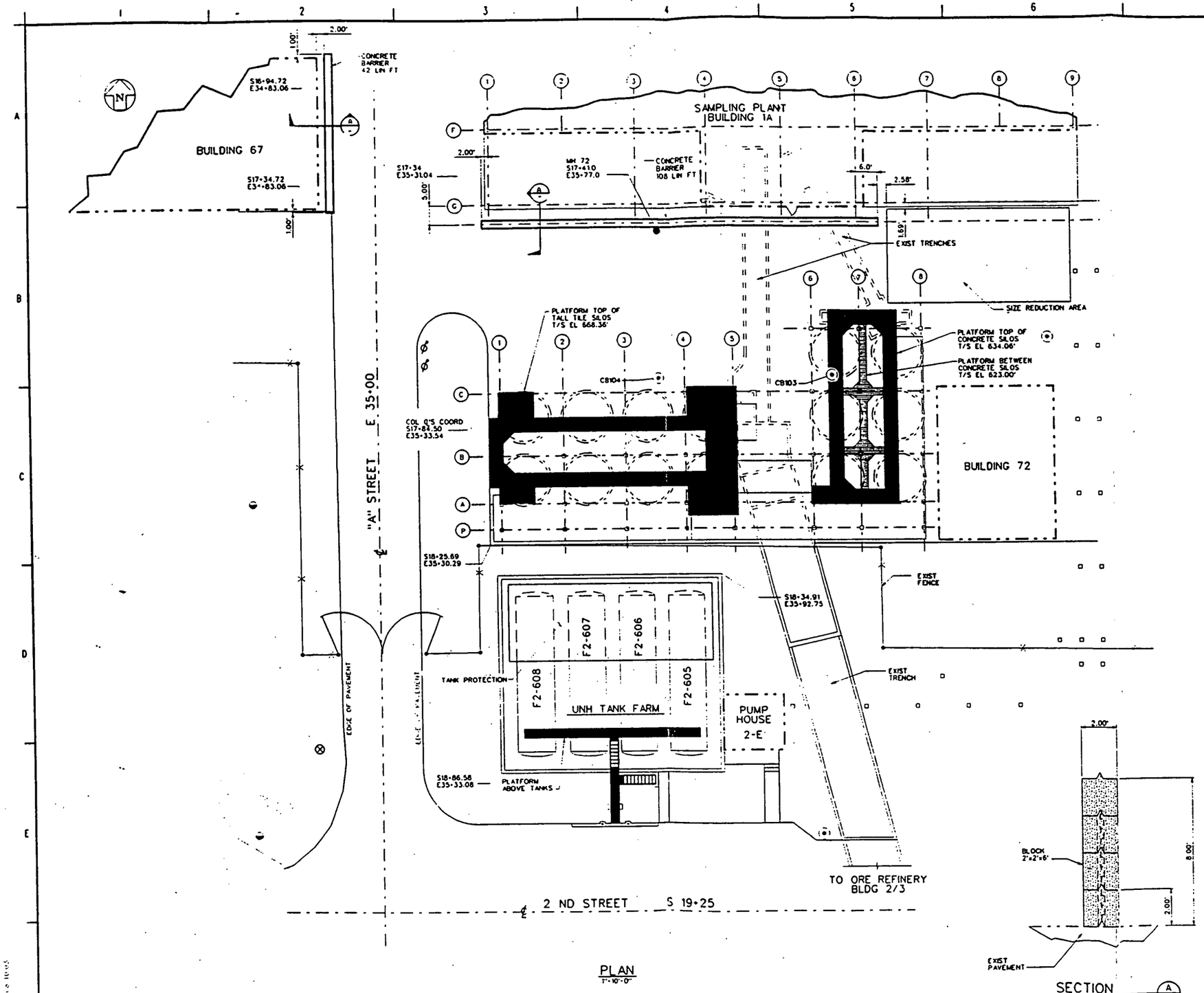
FEMP ERA
PLANT 1 ORE SILOS REMOVAL ACTION OU3/PO22

PROCESS
FLOW DIAGRAM
SEQUENCE OF REMOVAL

M. CARTER 2/3/92 | M. HEIDKAMP 2-6-92 | PLANT 1 ORE SILOS | NONE

BY D.O.E. LATER | WBS L.1.1.3.2.6 00-90701 | 93X-5900-F-00073 | F0001

Figure 6-3 - Sequence of Removal



NOTES

NOTES:
1. ERECT BARRIER FROM BLOCKS PROVIDED BY MIAMI VALLEY READY MIX.
2. REMOVE ALL DEBRIS FROM PAVEMENT BENEATH BARRIER.

LEGEND

EXISTING
- POST INDICATOR VALVE (P.I.V.)
- FIRE HYDRANT (F.H.)
- MANHOLE (MH)
- CATCH BASIN (CB)
- LIGHT POLE
- PIPE SUPPORT
- ELECTRICAL MANHOLE
- TELEPHONE MANHOLE
- STREET WASHERS
- VALVE BOX
- COLUMN
- FENCE

REFERENCE DWG.	REFERENCE DWG. TITLE

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	ENGINEER	DOE
		INITIALS AND DATE		

UNITED STATES
DEPARTMENT OF ENERGY
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CINCINNATI, OHIO

PROJECT NAME
FEMP ERA
PLANT 1 ORE SILOS REMOVAL ACTION, OU3/PO22

DRAWING TITLE
STRUCTURAL
PLANS, SECTIONS, DETAILS
BARRIER PROTECTION FOR BUILDING 1A AND 67

J LONEY	7-25-91	D. HIGBY	2-3-92
PLANT 1 ORE SILOS		SCALE AS NOTED	

BY D.O.E. LATER	WBS 1.1.1.1.3.2.6 00-90701	93X-5900-S-00062	S0002

Figure 6-4 - Protective Barriers

WASTE MATERIALS DISPOSITION DIAGRAM

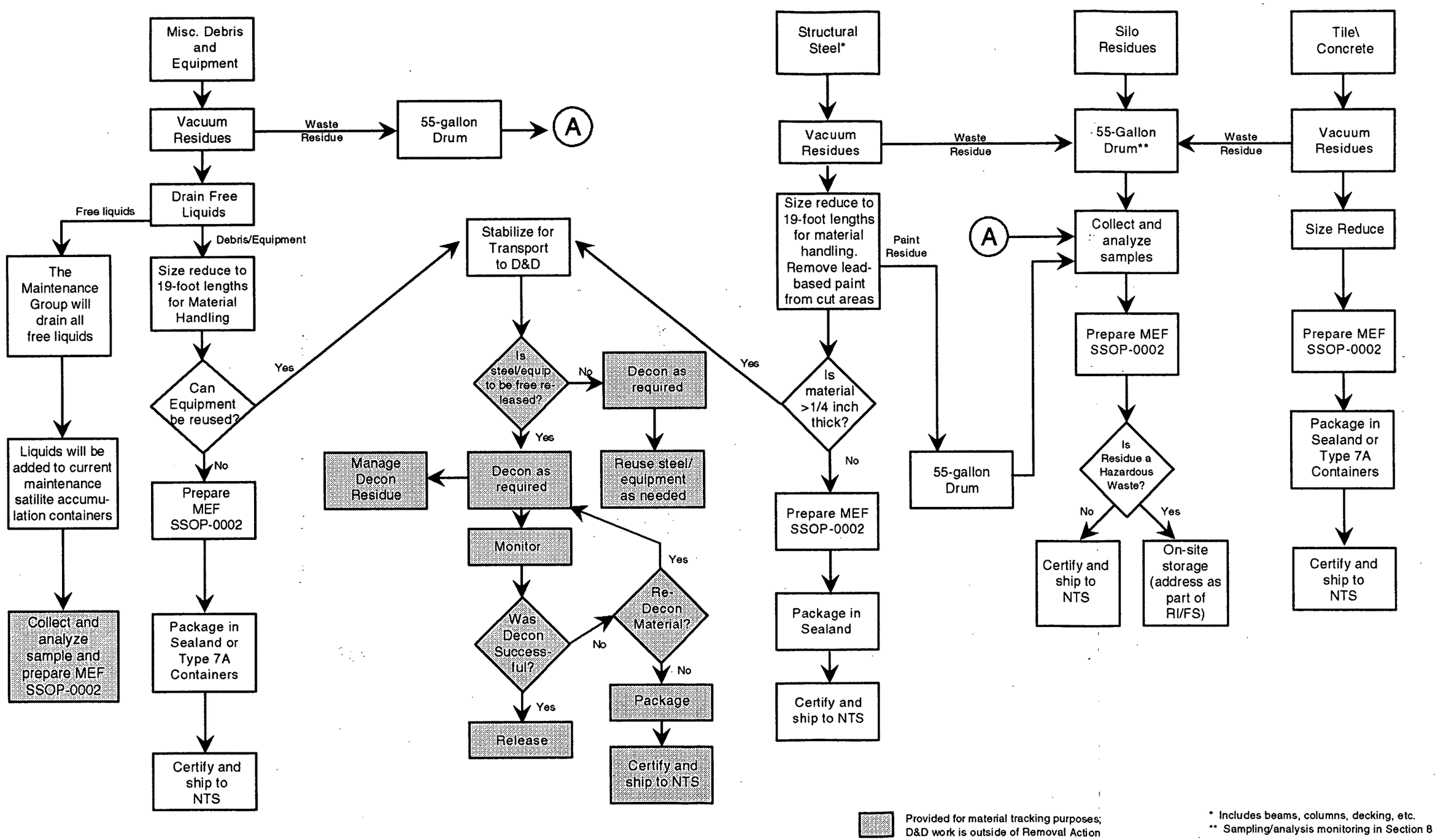

Figure 6-5 - Material Disposition (Page 1 of 2)

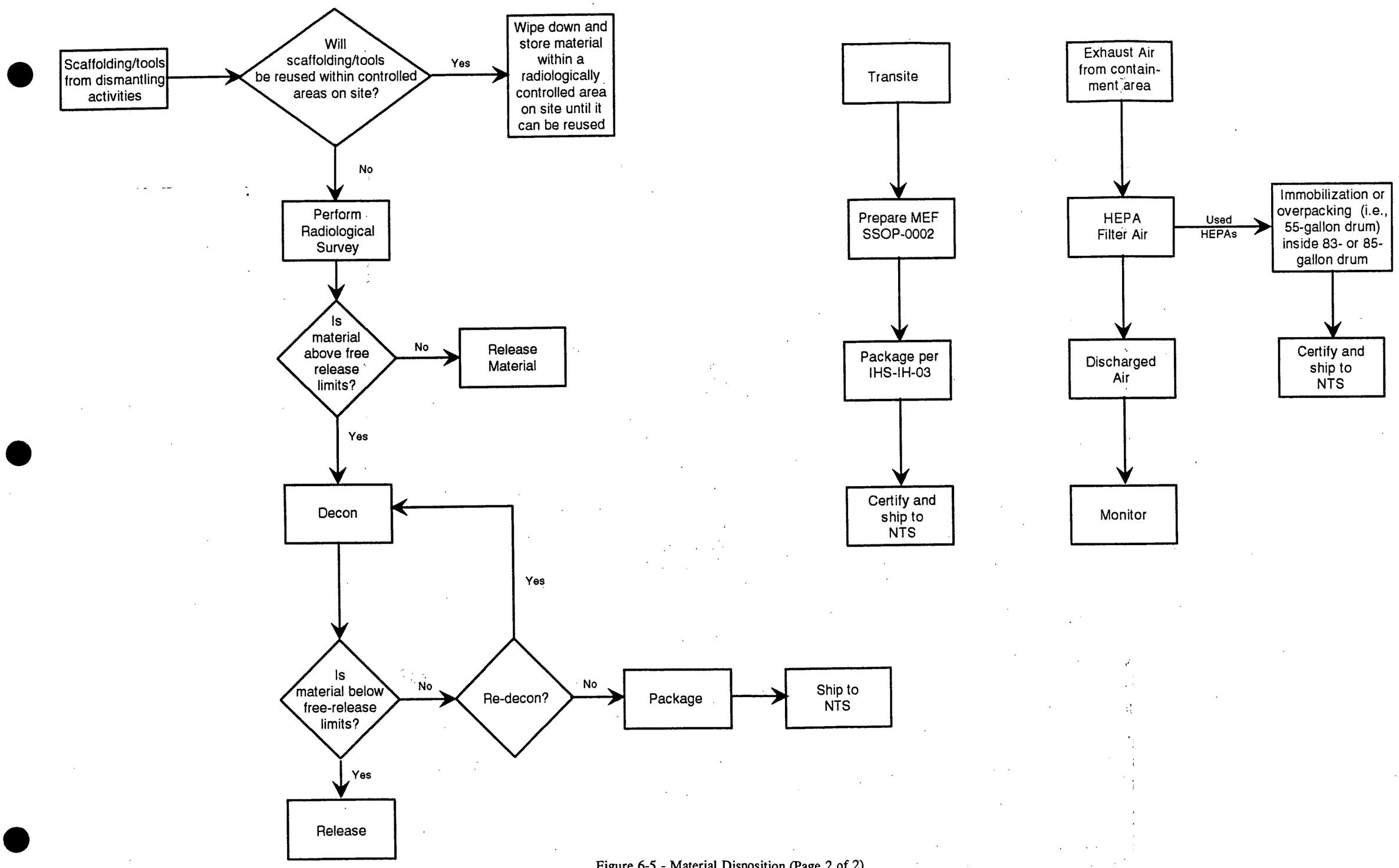

Figure 6-5 - Material Disposition (Page 2 of 2)

4) Mechanical Cutting: Mechanical cutting will be used in situ and in the Size Reduction building. Airline respirators will not be required for mechanical cutting even when lead paint is present. Local contamination control (i.e., ventilation) will be required in situ when no area ventilation is present.

5) Size Reduction Building: All material removed from the silo structures will be lowered to the grade level west of the building. From that point, the material will be taken into the building through a 16-foot-wide by 16-foot-high door on the west end. Saws, grinders, torches, jackhammers, etc. will all be possible choices for size reduction inside the building. All items will be size reduced to fit in the sea/land containers or 7A boxes and moved into the containers or boxes.

6) Containers: Both 7A boxes and sea/land containers will be used to hold the size-reduced material. The 7A boxes will be used for the tile silos, pieces of the metal cones under them, and concrete. The sea/land containers will be used for all remaining material after passing through the Size-Reduction building.

6.6 Waste Material Disposition

Several waste streams are expected to be generated as a result of this removal action. In general, the on-site waste handling and transportation will be in accordance with established procedures. The scope of this removal action is limited to the dismantling of the Plant 1 Ore Silos, on-site handling of waste materials resulting from these dismantling activities, and the potential on-site interim storage of waste material. Waste materials for which adequate treatment/disposal capacity is currently not available will be temporarily stored on site until adequate treatment/disposal capabilities are developed in accordance with the approved Records of Decision. Waste sampling and analysis, or radiation surveys will be conducted, as required, to ensure that the waste materials are properly characterized for subsequent management. Waste materials for which analytical characterization results are pending will also be placed into interim storage.

Since this removal action only addresses interim on-site storage and off-site disposal of waste materials, specific requirements related to the disposal of this waste material, such as waste disposal operating and design requirements, are not addressed in the Removal Action Work Plant. As required in Section IX.E of the Amended Consent Agreement, all material from the FEMP will be disposed of at a facility in compliance with applicable provisions of Federal and State requirements, including the US EPA's Off-Site Policy (Revised Procedures for Planning and Implementing Off-Site Response Actions - Interim Policy, from J. Winston, dated November 13, 1987). The waste streams which may be generated by this removal action are as follows:

1) Low specific activity waste
2) Free release waste/materials

3) Scaffolding and equipment
4) Cleaning and decontamination waste
5) Asbestos waste (in the form of transite panels)
6) Hazardous and/or mixed waste
7) Residues
8) HEPA filters

In addition to the above waste streams, organic materials, such as gear box oil or transformer mineral oil will be separated and transferred to existing site facilities for eventual treatment or disposal. The maintenance group will also be utilized for the draining of any "free liquids" contained within gear boxes or other equipment. Lead in paint on steel structures is not leachable and paint will not be removed except in areas where burning procedures are used for structural steel size reduction. Removable contamination will be removed with brushing and vacuuming techniques to the limits specified in DOE Order 5480.11, Attachment 2, or the materials will be packaged prior to their exit from the control zone. A waste handling and disposition description for each of the expected types of waste to be generated is provided below.

Low Specific Activity Waste

The bulk of the waste qualifies as low specific activity (LAS) for shipment under United States Department of Transportation (DOT) regulations as physical or chemical concentrates of uranium or thorium ore, reference 49 CFR 173.403(n)(1). Low specific activity wastes will be packaged in DOT Specification 7A, Type A package or sea land containers for transport in exclusive use closed transport vehicles to a DOE-approved disposal facility. The current plan is for disposal at the Nevada Test Site. The waste complies for transport under 49 CFR 173.425(c)(1)(i) as uranium or thorium ores and physical or chemical concentrates of those ores. The metal oxides previously stored in the Plant 1 Ore Silo facility included both uranium oxides and waste metal oxides, and all of the radionuclides were in the natural uranium or thorium decay chains. There are no fission products. Also, the radiation surveys indicate that dose rates are well within transport requirements. The highest dose rate readings around the ore silos were 7.5 mrem/hr at contact and 2 mrem/hr at 3 feet. This complies with the radiation rate requirement that transportation levels be less than 200 mrem/hr (49 CFR 173.441). The waste containers will be labelled and marked, as required, in accordance with 49 CFR Subparts D and E for off-site shipment. The proper shipping information specified in 49 CFR 172.101 will be used to identify the waste shipment.

Free Release Waste/Materials

The silos, equipment, and residue will be monitored and the wastes will be characterized and segregated to minimize waste volume. In particular, the wastes will be sampled and/or tested to determine if removed materials can be decontaminated for free release with a resultant reduction of low specific

activity waste. Structural materials that were not in contract with process metal oxides will be evaluated to determine if the removed components are eligible for free release.

The management and free release of wastes, residues, structures, equipment, and other property will adhere to the radiological protection requirements and guidelines described in DOE Order 5400.5.

A reasonable effort will be made to eliminate residual contamination and to achieve the acceptable surface contamination levels as stated in the US NRC Regulatory Guide 1.86.

The four choices available are:

1) Re-decontaminate
2) Package in sealed container and ship to NTS
3) Re-use within a contaminated area
4) Free release

Items which will not be released for unrestricted use include structural steel less than 1/4-inch thick, silo rubble and debris, asbestos materials, and waste residues. These items will be packaged and shipped to NTS.

Scaffolding and Equipment

Once all dismantling work has been completed, scaffolding and equipment will be compiled for free release certification. Radiological contamination surveys will be conducted for items to be released as part of this removal action for unrestricted release. It is expected that items like scaffolding and other contractor materials and equipment can be decontaminated and released from the area. The primary means of determining compliance with the free release criteria of NRC Guide 1.86 will be the results from smear testing and direct reading field instruments. The smear samples will be analyzed using a Tennelec Automatic Low Background Counting System to meet the 20 dpm (alpha)/100 cm^2 limit for removable contamination specified in Guide 1-86. As outlined in the NRC Acceptable Surface Contamination levels table for transuranics, the average of all readings taken within 1 square meter will not exceed 100 dpm/100 cm^2 as outlined in the table note "C". Likewise, no single measurement shall exceed 300 dpm/100 cm^2 for an area not more than 100 cm^2. Based upon the results of smear tests and field measurements, a determination will need to be made as to the disposition of the item.

Cleaning and Decontamination Waste

Currently accepted decontamination techniques will be used for removal activities. Simple wipe-down techniques will be used at the removal site. The wipes and waste residues will be managed as a LSA waste. Decontamination will be done to contain radioactive material and to clean equipment items for

release, including equipment used in the removal process. The base pad will also be decontaminated, to the extent practicable, as a part of this action. If structural members need to be decontaminated to allow for free release, they will be staged for future decontamination.

Decontamination methods may include vacuum grit blasting, because this method minimizes waste generation. A steam cleaner or high-pressure water spray may be used to clean the base slab. The wastewater that may be generated as a result of cleaning and decontamination operations will be collected and transferred to the Plant 8 sump. This wastewater will be combined with other plant wastewaters for treatment prior to discharge to the Great Miami River via the existing NPDES permitted outfall. As such, the treatment and discharge of this decontamination wastewater and the monitoring of the effluent discharge will be in accordance with the existing Permit to Install/Permit to Operate (PTI/PTO) and NPDES permits issued to the FEMP by the Ohio Environmental Protection Agency (Ohio EPA). In consideration of the anticipated contaminants and the expected volume of wastewater to be generated, the existing wastewater treatment facilities are deemed to be adequate.

Asbestos Waste

Asbestos material such as the transite panels will be packaged and disposed according to existing site procedure, namely Industrial Hygiene and Safety Manual IH&S-IH-03, "Control of Work Involving Asbestos."

Hazardous and/or Mixed Waste

Currently neither hazardous nor mixed wastes have been confirmed; however, additional analyses are in progress for the purpose of determining if any hazardous and/or mixed wastes will need to be managed as a result of this removal action. Should hazardous or mixed waste be found, these wastes will be appropriately containerized and labelled in accordance with 40 CFR 262, Subpart C. The containerized waste will be handled as required by 40 CFR 264, Subpart I and placed in an existing on-site RCRA storage facility. These stored wastes will be processed along with all of the other stored mixed wastes in accordance with the remedial solution chosen for these wastes.

Residues

All residues currently housed within the silos as well as residues generated as a result of a cleaning process will be drummed. The disposition of these residues will depend on their meeting NTS acceptance criteria. Subsection 8.3 discusses sampling requirements.

HEPA Filters

Spent HEPA filters will not be thrown loosely into sealed containers. To meet NTS acceptance criteria, spent filters will have all particulates immobilized. If this is impractical, then the filters will need to be contained in one of the following acceptable waste packaging criteria:

1) Overpacking
2) Steel box with no liner
3) Wooden box with a minimum of 6 mil sealed plastic liner
4) Steel drum with a minimum of 6 mil sealed plastic liner

6.7 Regulatory Requirements

This removal action is being undertaken pursuant to Section IX of the Consent Agreement issued under CERCLA Section 106. As such, this removal action is to attain compliance with Applicable or Relevant and Appropriate Requirements to the extent practicable considering the exigencies of the situation (see 40 CFR 300.415(i)). In determining whether compliance with ARARs is practicable, the DOE may consider the urgency of the situation and the scope of the removal action to be conducted. In addition to the ARARs, other federal and state advisories, criteria, or guidance (known as To-Be-Considered (TBC)) may, as appropriate, be considered in formulating the removal action.

The ARARs and TBCs for this removal action are presented in Table 6-1. Included with the ARARs (or TBCs) is the strategy for compliance. The dismantling operations involve asbestos removal, handling of low-level radioactively contaminated material, material characterization, size reduction, packaging of radioactive waste materials, and shipment to an approved disposal site.

Table 6-1 - Plant 1 Silos Removal Action ARARs and TBCs

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
29 CFR 1910.120	Employers will develop and implement a written safety and health program for their employees involved in hazardous waste operations.	Applicable	This removal action will be conducted in accordance with the provisions of the FMPC Site Health and Safety Plan (WEMCO, June 1990). As required by 29 CFR 1910.120(b)(4), a task-specific health and safety plan was developed for this removal action (Reference: Health and Safety Plan for the Plant 1 Ore Silos Removal Action, October 1991).
29 CFR 1926	Safety and health standards for general construction.	Applicable	This removal action will be conducted in accordance with applicable general construction standards of the OSHA. The specific requirements are identified in the task-specific health and safety plan.
40 CFR 61, Subpart H	Emissions of radionuclides to the ambient air from DOE facilities will not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem per year.	Applicable	Provide local containment and a ventilation system with HEPA filtered exhaust for potentially contaminated work areas. Compliance will be demonstrated by local Continuous Air Monitors (CAMs) provided in addition to those already existing at the site boundary. A conservative estimate of exposure to the nearest off-site receptor is presented in Table 6-2 and indicates that the predicted exposure is many orders of magnitude below the 10 mrem/yr standard.

Table 6-1 - Plant 1 Silos Removal Action ARARs and TBCs (Continued)

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
40 CFR 262.11	A person who generates a solid waste must determine if that waste is a hazardous using the procedures identified in 40 CFR 262.11.	Applicable	Based upon sample analyses to date and process history, the waste residues and silo structures associated with this removal action are assumed to be nonhazardous waste. Samples of the waste residues contained within the silos were collected and are currently being analyzed to provide analytical data for determining if the waste is characterized as hazardous. The analytical results for this determination are to be available by February 1, 1992. These results and other available process information will be compiled in order to determine if the waste residue and/or silo structures are excluded (40 CFR 261.4), a listed waste (40 CFR 261 Subpart D), or a characteristic waste (40 CFR 261 Subpart C). Should the waste residues or silo structures be determined to be a hazardous waste, the provisions of this work plan will be modified accordingly.
49 CFR 171-179	Any waste shipped off site must be packaged, marked, and labelled in accordance with these DOT shipping requirements.	Applicable	All of the waste to be shipped off site will contain radionuclides and will be classified as a low specific activity waste. These waste materials will be packaged in accordance with applicable United States Department of Transportation (DOT) regulations for off-site shipment to the Nevada Test Site. The waste containers will be marked and labelled as required by these DOT regulations.
OAC 3745-15-07	The emission or escape into open air from any source whatsoever in such a manner or in such amounts as to endanger the health, safety, or welfare of the public or to cause unreasonable injury or damage to property will be declared a public nuisance and is prohibited.	Applicable	The potential for emissions will be controlled by providing local containment and a ventilation system with HEPA filtered exhaust for potentially contaminated work areas.

Table 6-1 - Plant 1 Silos Removal Action ARARs and TBCs (Continued)

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
OAC 3745-20-05	Asbestos waste generated must be disposed of in accordance with OAC 3745-20-06. No visible emissions during the collection, processing, packaging, transporting, or deposition of any asbestos-containing waste material. Waste material will be sealed into durable leak-tight disposal containers or an approved alternative disposal system. Containers must be labeled in accordance with this section.	Applicable	Current form of asbestos is nonfriable. Should the material become friable, one of the methods below will be used: 1. Adequately wet asbestos-containing waste material and seal the material into durable leak-tight disposal containers or enclosure system in accordance with Paragraph (C) of this rule. 2. For facilities demolished in accordance with Paragraph (A)(1)(a) of Rule 3745-20-04 or Paragraph (C) of Rule 3745-20-04 of the Administrative Code, where asbestos was not removed prior to dismantling, keep asbestos-containing dismantling debris adequately wet or encapsulated until collected for disposal in accordance with Paragraph (c)(5) of this rule. 3. Process friable asbestos-containing waste material into nonfriable forms, such as nonfriable pellets or other shapes.
10 CFR 20.101 to 20.105 OAC 3701-38	Radiation doses, levels, and concentrations for restricted and unrestricted areas will not exceed specified limits.	Relevant & Appropriate	Work crews will be required to dress appropriately as outlined in the Health and Safety Plan. Work areas will be surveyed for radiation level and dosimeters will be worn, as required, to monitor work exposure.

Table 6-1 - Plant 1 Silos Removal Action ARARs and TBCs (Continued)

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
40 CFR 50.6 and 50.12	The National Ambient Air Quality Standard for particulate matter is 150 ug/m^3 for a 24-hour average concentration and 50 ug/m^3 for an annual arithmetic mean. The National Ambient Air Quality Standard for lead is 1.5 ug/m^3, maximum arithmetic mean average over a calendar quarter.	Relevant & Appropriate	The potential for emissions will be controlled by providing local containment and a ventilation system with HEPA filtered exhaust for potentially contaminated work areas. Based upon estimations of the maximum amounts of particulate matter and lead which could be generated by this removal action, no impact to the ambient air quality is expected. A program for monitoring particulate matter in the ambient air is already established for the FEMP. No additional ambient air monitoring is proposed for this removal action.
40 CFR 264, Subpart I	Waste containers are to be inspected weekly and maintained in good condition. The waste must be compatible with the container or liner. The container must always be closed during storage expect when it is necessary to add or remove waste. The containers are to be handled to prevent rupture. The storage area must be provided with containment as specified in 40 CFR 264.175. Special handling is required for ignitable and incompatible waste.	Relevant & Appropriate	Any containerized waste materials determined to be a hazardous or mixed waste will be placed into an existing RCRA interim storage facility. The hazardous and mixed waste will be containerized and labelled in accordance with 40 CFR 262, Subpart C, and handled as required by 40 CFR 264, Subpart I. The storage area selected will comply with the requirements of 40 CFR 264.175. These containers will be incorporated into current weekly inspection programs. No ignitable or incompatible waste is to be handled during this removal action. Waste materials for which analytical characterization results are pending will also be placed into interim storage.
OAC 3745-17-08	Requires the minimization or elimination of visible emissions of fugitive dust generated during grading, loading, or construction operations and other practices which emit fugitive dust.	Relevant & Appropriate	Fugitive dust emissions will be controlled by providing local containment and a ventilation system with HEPA filtered exhaust for potentially contaminated work areas.

Table 6-1 - Plant 1 Silos Removal Action ARARs and TBCs (Continued)

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
DOE Order 5400.5, Chapter II, Section 1.a	The exposure of members of the public to radiation sources as a consequence of all routine DOE activities will not cause, in a year, an effective dose equivalent greater than 100 mrem from all exposure pathways.	To Be Considered	Precautions will be taken to minimize exposure through the use of local containment of contaminated areas. All residues and debris will be stored in covered containers. Compliance will be based on site-wide monitoring at the site boundary.
DOE Order 5400.5, Chapter II, Section 1.d	Provide a level of protection for persons consuming water from a public drinking water supply operated by the DOE. Such persons consuming water from the supply will not receive an effective dose equivalent grater than 4 mrem in a year. For multiple radionuclides, the sum of the effective dose equivalents from the radionuclides (excluding radium-226, radium-228, and radon) will not exceed 4 mrem in a year from drinking water.	To Be Considered	Contaminated debris will be contained to prevent runoff from becoming contaminated from removal activity. Waste liquid generated will be contained and, as appropriate, treated under the requirements of the NPDES permit in the FEMP Waste Water Treatment Unit.
DOE Order 5400.5, Chapter IV	The management and free release of wastes, residues, structures, equipment, and other property will adhere to the radiological protection requirements and guidelines described in DOE Order 5400.5. The requirements of this section will apply for surface contamination of existing structures and equipment (Figure IV-1).	To Be Considered	Radiation surveys will be performed prior to releasing any potentially contaminated materials off-site to demonstrate compliance with the specified standards.
DOE Order 5480.11	Radiation doses, levels, and concentrations for restricted and unrestricted areas will not exceed specified limits.	To Be Considered	Work crews will be required to dress appropriately as outlined in the site-specific Health and Safety Plan. Work areas will be surveyed for radiation level and dosimeters will be worn, as required, to monitor work exposure.

Table 6-1 - Plant 1 Silos Removal Action ARARs and TBCs (Continued)

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
DOE Order 5820.2A, Chapter III.3.c	Technical and administrative controls will be used to reduce the quantity and/or radioactivity of the waste generated. Uncontaminated waste will be segregated from low-level waste to facilitate cost effective treatment and disposal.	To Be Considered	The amount of new waste required to be added to implement this removal action will be minimized to the extent practicable. No radioactivity will be added to the existing waste materials. Uncontaminated and decontaminated wastes will be segregated from the low-level radioactive wastes.
DOE Order 5820.2A, Chapter III.3.d and III.3.m	Low-level waste will be characterized with sufficient accuracy to permit proper segregation and management. Waste characterization and shipping/management information is to be recorded. This information includes the physical and chemical characteristics, waste volume, waste weight, concentrations of major radionuclides, and historical records of generation, treatment, storage, shipping and disposal.	To Be Considered	Waste characterization is in process. This characterization information will be recorded as required.
DOE Order 5820.2A, Chapter III.3.g	Off-site shipment (including labelling) will comply with DOE Order 1540.1. The number and volume of containers will be minimized. Advance approval from the recipient and certification that the waste meets the receiving facility's waste acceptance criteria.	To Be Considered	The amount of new waste required to be added to implement this removal action will be minimized to the extent practicable. Uncontaminated and decontaminated wastes will be segregated from the low-level radioactive wastes. Shipments will be per DOE Order 1540.1. Advanced approval from Nevada Test Site (NTS) will be obtained. The waste shipments will be certified that they meet the NTS waste acceptance criteria.
US NRC Regulatory Guide 1.86	A reasonable effort shall be made to eliminate residual contamination and to achieve the acceptable surface contamination levels as stated in the US NRC Regulatory Guide 1.86.	[To Be Considered]	Radiation surveys will be performed prior to releasing any potentially contaminated materials (including silo rubble and remediation facility components) off site to demonstrate compliance with the specified standards. These surveys should show compliance averaged over limited areas rather than point-by-point compliance.

Table 6-2 - Estimated Airborne Concentrations compared to 10 mrem/yr to the Public[1]

Isotope	Airborne Concentrations (μCi/ml) Estimated[2]	Dose Equivalent for 10 mrem/yr[3]	Fraction of Dose Equivalent
Th - 230	1.5×10^{-27}	1.4×10^{-15}	1.1×10^{-12}
Ra - 226	2.3×10^{-30}	1.4×10^{-13}	1.7×10^{-17}
Th - 232	2.7×10^{-29}	2.3×10^{-16}	1.2×10^{-13}
Ra - 228	7.6×10^{-30}	2.3×10^{-13}	3.3×10^{-17}
U - 238	1.2×10^{-29}	9.1×10^{-15}	1.3×10^{-15}
U - 234	1.1×10^{-29}	9.1×10^{-15}	1.2×10^{-15}
			1.2×10^{-12}

Notes:

1 The dose equivalent of 10 mrem/yr to any member of the public is the standard for DOE facilities given in 40 CFR 61.93.

2 Estimated airborne concentrations are based on:

1) Relatively dusty conditions or a dust loading of 0.2 mg/m^3. This is the default value from the Argonne National Laboratory version of RESRAD[2]
2) Radionuclide concentration of dust is assumed from an analysis of samples taken from residue found in Silo 5 which had the highest radionuclide concentrations
3) A HEPA filtration efficiency of 99.97%
4) A meteorological estimate of dilution factor (chi/Q) of 1.8×10^{-13} to the nearest off-site receptor at 1,700 meters from Building 67 (See Figure 6-6).

3 Dose equivalent for nearest off-site receptor is based on inhaled air lung retention class W (weeks or 10 to 100 days) from DOE 5480.11. (Note: The concentrations given in DOE 5480.11 are for radiation workers at DOE facilities or for a dose equivalent of 5,000 mrem at 2,000 hours exposure. The dose equivalents given in this table are adjusted to 10 mrem equivalent at 8,760 hours exposure. This is conservative because removal actions are not expected to be on a 24-hour basis.)

[2]Yu, C. et al., *A Manual for Implementing Residual Radioactive Material Guidelines*, DOE/CH/8901, Argonne National Laboratory, U.S. Department of Energy, June, 1989.

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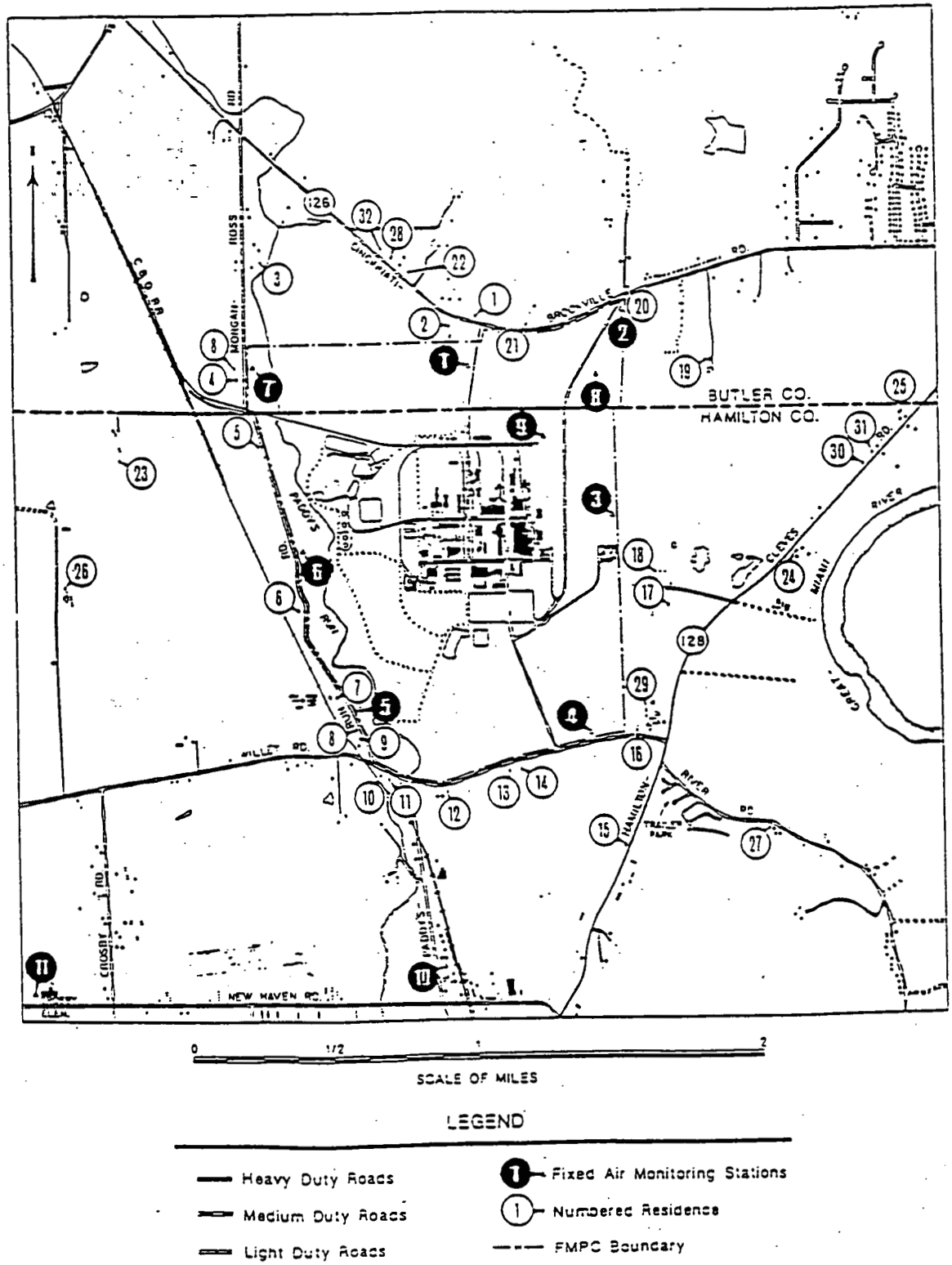

Figure 6-6 - FMPC Environmental Residential Census, 1989

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SECTION 7

PROGRAM MANAGEMENT

7.1 Responsibilities

The DOE has been the lead agency for this removal action and will coordinate and execute continuation of this removal action. As stated in the Consent Agreement under CERCLA 120 and 106(a), if the DOE determines under Section 104 that any activities or work being implemented under this Consent Agreement may create an imminent threat to human health or the environment from the release or threat of release of hazardous substance, pollutant, contaminant, or hazardous constituent, it may stop any work or activities for such period of time as needed to respond and take whatever action is necessary to abate the danger. Reporting to the US EPA will be in accordance with Section XXIII of the Consent Agreement.

US EPA and Ohio EPA will review, comment and approve the work plan and follow progress through meetings and the Consent Agreement progress reports.

Westinghouse Environmental Management Company of Ohio (WEMCO) will coordinate, manage, implement, monitor activities and prepare all reports associated with the removal action in a manner consistent with DOE and regulatory guidance.

This removal action will be managed by the Operable Unit 3 team, to ensure compatibility with the final remedial action(s) selected for Operable Unit 3. Data and results from this removal action will be used to evaluate the final remedial options for Operable Unit 3. Fernald site personnel will manage the project using FMPC-2201 Topical Manual, Project Management Procedures.

All personnel involved will be trained in accordance with 29 CFR 1910.120, the standard operating procedures for the work involved, and with the requirements of the approved work plans. The effectiveness and integrity of the containment, monitoring, and other equipment installations will be assessed on a periodic basis. This will be accomplished by personnel normally assigned those duties. Environmental Compliance will monitor and report to WEMCO management on runoff samples outside the controlled area and Maintenance will inspect and repair the facility as determined to be necessary.

Resources

1) Ground movement of containers in the work area will be routinely performed by WEMCO forces.

2) All supply, surveying, and QA compliance activities involving containers will be performed by WEMCO personnel.

3) All monitoring, surveying, and QA compliance activities of the project will be performed by WEMCO personnel.

4) All monitoring, maintenance, and QA compliance activities of the dust collectors will be performed by WEMCO personnel.

5) Installation of concrete barriers will be performed by contractor's personnel.

6) All erection and dismantling of equipment and structures will be performed by a subcontractor working to drawings and specifications.

7) The subcontractor will maintain a clean working area at all times to minimize the potential for release of contaminants.

8) All installation of repairs to items to remain will be performed by a subcontractor working to drawings and specifications.

9) Title III support services for changes to drawings and specifications will be performed by Parsons.

7.2 Schedules

A proposed schedule has been developed and key milestones of this schedule are given in Table 7-1. The design will be issued as a construction bid package four weeks following the work plan approval. The schedule provides 26 months for completion after start of field activities.

Table 7-1 - Key Milestones of Proposed Project Schedule

	Duration (months)	Accumulated Duration (months)
Work Plan Approval	0	0
Complete Design	1	1
Initiate Field Activities	4	5
Complete Removal Action	26	31
Issue Final Report	12	43

7.3 Approvals and Reporting

As required under Section IX of the 1990 Consent Agreement, the US EPA is to approve the Work Plan prior to commencing the removal action. The basic components of the approval procedure for the Work Plan is as follows:

1) The DOE will submit a Work Plan to the US EPA which provides a concise description of the activities to be performed. The Work Plan contains a sampling and analysis plan, a quality assurance plan, and a schedule.

2) The US EPA and the Ohio EPA will review and approve the Work Plan and provide any comments to the DOE within 30 days.

3) The DOE will submit a revised Work Plan, addressing all US EPA and Ohio EPA comments, to the US EPA within 30 days.

Upon receiving US EPA approval, the DOE will initiate the removal action. The removal action is to be implemented in accordance with the approved work plan and schedule.

The progress of the removal action will be reported to the US EPA in the Consent Agreement/Amended Consent Decree progress report on a monthly basis. A final report will be issued using 40 CFR 300.165, "OSC Reports," as a guide for compiling information. This report will be issued within 1 year of project completion.

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SECTION 8

SAMPLING AND ANALYSIS PLAN

8.1 Sampling Objectives

As identified in Section 4.0, some sampling has previously been conducted within the Plant 1 Ore Silos Complex. The analytical results are summarized in Table 4-1. Additional sampling and environmental monitoring are proposed to support the Plant 1 Ore Silos Removal Action to achieve the following objectives:

1) Ensure continued protection of human health and the environment through sampling and environmental monitoring throughout the duration of the construction activities, and through the routine environmental monitoring program after the completion of the removal action. Any noted environmental impact as a result of the Plant 1 Ore Silos Removal Action will support any related remedial activities.

2) Verify radionuclide concentrations to ensure that radioactive waste materials which are taken off site for disposal at NTS will comply with the requirements of the NTS waste acceptance criteria, DOE Order 5820.2A, and DOT transportation requirements.

3) Gain additional TCLP metal analysis to perform a hazardous waste determination on the materials to be generated as a result of the Plant 1 Ore Silos Removal Action.

8.2 Pre-Dismantling Sampling

Pre-construction sampling will be conducted to determine the disposition of the concrete and tile silo materials. WEMCO Site Media Sampling (SMS) will also obtain three core samples from the tile silo material and three core samples from the concrete silos. The sample locations will be determined based on accessibility. The six core samples will be subjected to TCLP Metals Analysis, which will be utilized in qualifying acceptance at NTS. This sampling will be performed in accordance with the Sitewide CERCLA Quality Assurance Project Plan (Procedure FM-MISC-0010, see Appendix C).

All samples will be prepared and containerized in a sample preparation area to be established in the control zone. Egress from the controlled area will be permitted only after a field survey of personnel, equipment, and samples has been performed. Any equipment contaminated in the control zone will be decontaminated and monitored by Radiological Safety for free release from the control zone (per

WEMCO Procedure SP-P-35-010, see Appendix C). Personnel decontamination, if necessary, will be conducted inside the established control zone.

8.2.1 Support Activities

Support activities include involvement from several organizations on site: FEMP Fire and Safety; FEMP Radiological Safety; FEMP Industrial Hygiene; FEMP Site Media Sampling; FEMP Operations Maintenance; and FEMP Quality Control/Quality Assurance.

FEMP Fire and Safety will conduct on-going field inspections of the operations pertinent to the sampling initiative to ensure compliance with the Health and Safety Plan. FEMP Fire and Safety will also be responsible for the inspection and approval of safety belts, lanyards, and mechanical machinery to be utilized during the extraction of all samples.

FEMP Radiological Safety will establish a control zone based on a radiological survey. All personnel will comply with all Radiological Safety precautions and administrative controls established for the protection of personnel health and safety. FEMP Radiological Safety will evaluate Personal Protective Equipment (PPE) as outlined in the Health and Safety Plan, upgrading or downgrading as required.

FEMP Industrial Hygiene (IH) will perform a preliminary survey of the work area, and will supply, as needed, continued IH technical support and evaluation of the activities to be incorporated by the involved disciplines.

8.3 Removal Action Sampling and Monitoring

The sampling and analysis activities during removal activities will consist of environmental sampling and waste management sampling.

8.3.1 NTS Acceptance Criteria

Nevada Test Site, NVO325 Acceptance Criteria

The analytical requirements for material sent to NTS are described in "Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements," NVO-325. Restrictions and requirements from this document applicable to FEMP waste are listed below:

1) "Cyanide and sulfide-bearing wastes in concentrations greater than ten percent by weight as CN or S will not be accepted."

2) Low-level waste disposal at the NTS waste management sites shall contain as little free liquids as is reasonably achievable, but in no case shall the liquid equal or exceed 0.5 percent by volume of the external waste container. If sorbent materials are added to a waste to control free liquids, the quantity will be calculated to equal at a minimum of twice the calculated volume of the liquid.

3) "PCB-contaminated waste will not be accepted for disposal at NTS unless the PCB concentration meets municipal solid waste disposal levels."

4) The form required for each waste stream is called the "Waste Stream Characterization Data Sheet." See Appendix C, "Completing the Material Evaluation Form."

5) Radioactive constituents will be measured through direct readings and analysis.

8.3.2 Environmental Sampling

All activities within the scope of this removal action are above-grade, and occur within a contained area to prevent fugitive air emissions and fugitive surface water runoff. Even though there will be institutional controls in-place throughout the duration of the removal action, sampling and monitoring will include air, surface water runoff, groundwater, and soils.

To ensure that there are no fugitive air emissions, perimeter High Volume Grab samplers will be set up as well as monitoring stations in occupied work areas. Belt samplers will also be utilized, ensuring occupational safety. Air samples will be collected daily during work periods and analyzed for gross alpha and gross beta concentrations by Radiological Safety. Effluent monitoring will be performed on the exhaust of the HEPA (High Efficiency Particulate Air) filtered ventilation systems servicing containment areas. Engineering controls and additional health and safety measures will be instituted if elevated concentrations are detected.

Nearby groundwater wells will also be monitored for any increases in total uranium and total thorium under the routine Environmental Monitoring Program. Surface water samples will be collected from stormwater runoff collected and drummed from the temporary dike provided at the base of the containment areas. If contaminants are found in these samples, the water will be pumped to the treatment plant prior to discharging. All samples of the stormwater run-off will be analyzed for total and isotopic uranium and total and isotopic thorium. Based on process knowledge and historical data, uranium and thorium are the only two constituents detectable due to dilution from precipitation.

Air Monitoring

Air monitoring will be conducted throughout the removal action. Perimeter monitoring points will be established and equipped with high volume grab samples. Air monitoring equipment will also be sampling within containment work areas.

All air entering the containment areas will be exhausted through HEPA filters. These filters will be monitored daily and replaced immediately if one of the following is detected:

1) Leak
2) Drop in pressure (checked daily)
3) Life expectancy expired

Groundwater Monitoring

At this time all six wells are being sampled by Groundwater Program. The wells are sampled according to WEMCO Fernald Environmental Monitoring Procedures. Table 8-1 describes the type of analysis and analytical method performed on each well sampled. The wells within the immediate area of the Plant 1 Ore Silos are as follows: 1352, 1353, 1356, 1357, 1358, and 1359.

Due to institutional controls maintained throughout the dismantling activities, fugitive runoff to soil and groundwater is not expected, however, there are a number of routine groundwater monitoring locations in the vicinity of the Plant 1 Ore Silos. These monitoring locations are within an 80-foot radius of the Silos on the west, south, and east sides. The monitoring locations are screened between 15 and 20 feet below grounds surface (BGS). The results from these monitoring wells for pre and post dismantling will be compared to assess any environmental impacts resulting from the Plant 1 Ore Silos Removal Action. Although soils and groundwater are not within the scope of this project, they will be monitored for any environmental impact as a result of the removal action. In the event a spill does occur, it will be contained and the area sampled to characterize the additional contaminants to the soil. If environmental impacts have resulted from this removal action, they will be addressed under the RI/FS and remediation for Operable Units 3 and 5.

Table 8-1 - Plant 1 Silo Monitoring Wells, Sampling, and Analysis

Type of Analysis	Analytical Method
Total Organic Carbon	9060
Total Organic Halogen	9020
Total Metals:	
Barium	7080
Mercury	7470
Arsenic	7061
Cadmium	7131
Chromium	7191
Lead	7421
Selenium	7741
Silver	272.2 *Note 1
Sulfate	4500-SO4 *Note 2
Nitrate	353.2 *Note 1
Fluoride	340.2 *Note 1
pH	9040
Specific Conductivity	9050
Volatile Organics	8240
Total Uranium	OSH-P34-011 *Note 3
Isotopic Uranium	4018, 6006 *Note 3
Total Thorium	3059 *Note 3
Isotopic Thorium	9048 *Note 3

Note 1 - Methods of Chemical Analysis EPA-600/4-79-020.
Note 2 - Standard Methods 17th Edition.
Note 3 - WEMCO Fernald Procedure Number

Radiological Analysis will be performed for Total Uranium, Isotopic Uranium, Total Thorium, and Isotopic Thorium.

These wells are sampled semi-annually in June and December.

Soil

On a monthly basis Radiological Technicians will survey and collect direct radiological soil readings. These readings will be compiled and monitored to verify that no additional contamination develops as a direct result of the removal action.

Stormwater Runoff

Surface water accumulating at the base of the containment dike will be vacuumed up and lot sampling will be conducted based on the amount of drums. If containments are detected within the samples, the water will be transported to the treatment plant. The samples will be tested as outlined in the following table:

Table 8-2 - Stormwater Sample Analysis

Type of Analysis	Analytical Method
Total Metals:	
Barium	7080
Mercury	7470
Arsenic	7061
Cadmium	7131
Chromium	7191
Lead	7421
Selenium	7741
Silver	272.2 *Note 1
Total Uranium	OSH-P34-011 *Note 2
Isotopic Uranium	4018, 6006 * Note 2
Total Thorium	3059 *Note 2
Isotopic Thorium	9048 *Note 2

Note 1 - Methods of Chemical Analysis EPA-600/4-79-020.
Note 2 - WEMCO Fernald Procedure Number

Once it has been determined that the water is free of containments either through negative sampling results or completion of treatment plant, it can be discharged into the storm sewer system.

8.3.3 Waste Management Sampling

This sampling program provides the requirements for each waste stream. Management procedures and flow charts indicating when sampling will occur are described in Section 6.

Due to the pre-construction sampling and analysis being performed and the availability of existing data (see RSE, Appendix A) it is not anticipated that any additional concrete/tile samples will need to be taken during the dismantling/removal phase. However, new waste streams generated as a result of the construction activities will be sampled to determine their final disposition.

Structural Steel

All steel less than 1/4-inch thick will be size reduced for packaging in sealed containers. The steel will be certified for NTS acceptance criteria.

Steel with greater than 1/4-inch thick will be stabilized for transportation to the D&D facility. The materials disposition chart in Section 6 provides a diagram for material tracking purposes only. The actual D&D of the structural steel is outside the scope of this remedial action. However, radiological contamination surveys will be conducted as required for ensuring worker safety.

The primary means of determining compliance with the free release criteria of NRC Guide 1.86 will be the results from smear testing and direct reading field instruments. The smear samples will be analyzed using a Tennelec Automatic Low Background Counting System to meet the 20 dpm (alpha)/100 cm^2 limit for removable contamination specified in Guide 1-86. As outlined in the NRC Acceptable Surface Contamination levels table for transuranics, the average of all readings taken within 1 square meter will not exceed 100 dpm/100 cm^2 as outlined in the table note "C". Likewise, no single measurement shall exceed 300 dpm/100 cm^2 for an area not more than 100 cm^2. Based upon the results of smear tests and field measurements, a determination will need to be made as to the disposition of the item.

Transite

Transite materials were utilized in a structure within the Plant 1 ore silos. The transite will be removed without any size reduction and packaged in prepared boxes per FEMP site procedure IHS-IH-03. The transite will be sent to NTS.

Gear Box Lubricants

NTS acceptance criteria requires that all free liquids be removed as reasonably as possible, or that if absorbent is added it will equal twice that of the volume of the liquid. The site maintenance group will drain any fluids and add the liquids to existing satellite containers. The drained liquids will become part

of an existing waste stream designed to accept spent fluids. The fluids will be sampled and a MEF SSOP-0002 will be completed for the final disposition.

Concrete and Tile Rubble

During the pre-construction stages, a coring saw will draw three samples from the concrete silos and three samples from the tile silos. These six samples will be submitted for TCLP metals analysis as well as Gross Alpha and Gross Beta/Gamma. These results will verify acceptance criteria for NTS.

TCLP metals analysis will be conducted in accordance with the Sitewide CERCLA Quality Assurance Project Plan (SCQ) section FM-MISC-0010.

The Gross Alpha and Gross Beta/Gamma tests will be conducted through direct reading field instruments. Site radiological technicians will conduct these surveys in accordance with procedure SP-P-35-023, Appendix C.

Waste Residues

Once all residues have been drummed, FMPC Procedure-2185 will provide guidance for lot sampling. Ten percent of the drums will have samples collected for determining waste disposition.

Waste residues will be subjected to TCLP analysis for waste characterization. Testing will be done in accordance with SCQ Procedure FM-MISC-0010. They will also be submitted for Gross Alpha and Gross Beta/Gamma tests. These determinations will be made using direct reading field instruments as described in the radiological contamination surveys (SP-P-35-023). This analysis will be used to demonstrate meeting acceptance criteria at NTS.

Radiological contamination surveys will be conducted as required to ensure worker safety. All surveys will be conducted as detailed in WEMCO's Radiological Contamination Surveys Procedure (SP-P-35-023).

A summary Table 8-3 provides an overview of the sampling and analysis requirements.

8.3.4 Contaminant Control Monitoring

Support activities include involvement from several organizations on site: FEMP Radiological Safety; FEMP Industrial Hygiene; FEMP Site Media Sampling; and FEMP Quality Control/Quality Assurance.

All personnel will comply with all Radiological Safety precautions and administrative controls established for the protection of personnel health and safety. FEMP Radiological Safety will evaluate Personal

Protective Equipment (PPE) as outlined in the Health and Safety Plan, upgrading or downgrading as required.

FEMP Industrial Hygiene will perform a preliminary survey of the work area, and will supply, as needed, continued IH technical support and evaluation of the activities to be incorporated by the involved disciplines.

If additional hold-up material is encountered or anticipated, FEMP SMS will be responsible for all sampling activities.

The FEMP routine Environmental Monitoring Program will provide all post-dismantling sampling activities. Results from this program for groundwater monitoring and soils will be used to detect any fugitive releases to the environment.

Table 8-3 - Sampling and Analysis Requirements

Sample Media	Sampling Methodology	Frequency of Sampling	Rationale for Sampling	Parameters	Analytical Methodology
Waste Materials					
Waste Residue	Grain Sampler	10 percent lot	HW Determination	TCLP	FM-MISC-0010*
	Direct Reading Field Instruments	As required	NTS Certification	Gross Alpha, Beta/Gamma	
Air		Constant flow through filter	Prevention of particulate matter release		
Concrete/Title	Coring Saw Direct Reading Field Instruments	1 time As Required	HW Determination Disposition	TCLP Metals Gross Alpha, Beta/Gamma	FM-MISC-0010*
Steel less than 1/4-inch	Direct Reading Field Instruments	As Required	NTS Certification	Gross Alpha, Beta/Gamma	
Scaffolding	Swipe Direct Reading Field Instruments		Free Release Free Release	Gross Alpha, Beta/Gamma	Tenneles Automatic Low Background Counting System
Transite	None				
Lead Paint	Grain Sampler	10 percent lot	HW Determination	TCLP Metals	FM-MISC-0010*
Gear Box Lubricants	None-Drained by maintenance and added to existing satellite accumulcation container				
Environmental					
Groundwater Monitoring	Bailer	Semi-annual	Assess environmental impact	See Table 8-1	See Table 8-1
Soil Monitoring	Alpha/Beta Probes	1 per month	Assess environmental impact	Gross Alpha, Beta/Gamma	Direct Reading
Stormwater Runoff	COLIWASA	Dependent on weather	Verify no contamination	See Table 8-2	See Table 8-2
Contaminant Control					
Radiation Surveys	Field Instrumentation	As required	Worker protection and contaminant control	Gross Alpha, Beta/Gamma	

* Procedure as defined in the Sitewide CERCLA Quality Assurance Project Plan (SQC).

6

SECTION 9

HEALTH AND SAFETY PLAN

The removal action will be conducted in accordance with the provisions of the FEMP site-wide health and safety program (WMCO June 1990). The removal action will also be performed consistent with the task-specific Health and Safety Plan prepared for this removal action. A copy of the Health and Safety Plan is available. The Health and Safety Plan identifies, evaluates, and controls all safety and health hazards. In addition, it provides for emergency response for hazardous operations. The plan is consistent with 29 CFR 1910.120 and the FMPC Site Health and Safety Plan.

Additional safety documentation will be prepared as necessary according to FMPC-2116 Topical Manual "Implementing FMPC Policies and Procedures for System Safety Analysis." FMPC-2116 has been prepared to implement DOE Order 5481.1B, Safety Analysis and Review System, and DOE Order 901, Guidance for Preparation of Safety Analysis Reports.

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SECTION 10

QUALITY ASSURANCE PLAN

The overall quality assurance program is conducted under the requirements set forth in the FEMP Quality Assurance Program Plan (QAPP), PL-3014. The QAPP was developed in accordance with the criteria specified in the American Society of Mechanical Engineers (ASME) NQA-1, US EPA Guideline QAMS-004/80, and DOE Orders 5700.6 and 5400.1.

The Consent Agreement, Subsection X.B, requires the inclusion of a QA plan within the Removal Action Work Plan. This QA plan addresses the specific actions required to implement the removal action consistent with the requirements of the QAPP. The QA requirements identified for this removal action include procedures for collecting and analysis of waste and environmental samples, and conducting field radiation surveys.

The specific QA procedures are already provided in the RI/FS, the Sitewide CERCLA Quality Assurance Project Plan (SCQ), WEMCO Fernald Procedures, and SW-846, which are hereby incorporated as part of this Work Plan reference. No additional QA requirements or deviations have been identified. The US EPA is in the process of reviewing the SCQ, which addresses all FEMP sampling and analysis activities. On approval, the SCQ will be followed in lieu of the RI/FS QAPjP. The specific sampling and analytical procedures identified as "FM-MISC" in Table 8-3 are referenced to the SCQ in anticipation of its approval.

The FEMP Quality Assurance/Quality Control (QA/QC) group will be responsible for periodically monitoring and conducting surveillances at the project site to verify that all measurements are conducted to ensure the quality of the samples collected in accordance with the SCQ.

A

APPENDIX A

PLANT 1 ORE SILOS REMOVAL SITE EVALUATION

Removal Site Evaluation

Plant 1 Ore Silos

Fernald Site Office (FSO)
Fernald, Ohio

September 1991

U. S. DEPARTMENT OF ENERGY

REMOVAL SITE EVALUATION

PLANT 1 ORE SILOS

FERNALD SITE OFFICE (FSO)

FERNALD, OHIO

SEPTEMBER, 1991

U. S. DEPARTMENT OF ENERGY

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1.0 INTRODUCTION

The Plant 1 Ore Silos were constructed in 1953. The earliest use of these bins was to store Q11 ore concentrate for use in the refinery, Plant 2/3. The last operational use during 1955-1958 was to store overflow cold metal oxides which were primarily transferred from Plant 2/3 to Silo 3 in the Waste Storage Area. In 1962, the Plant 1 Ore Silos were emptied and the material was shipped off-site.

There are four 44 feet high silos and four 10 feet high silos constructed of glazed tile mounted on a steel structure. There are also six 10 feet high reinforced concrete silos. The structures elevate the silos, so the bases are above the ground level for material handling purposes. The supporting structures for the tile silos are about 38 feet high as shown in Figure 1. Figure 2 is a map which shows the configuration of the Silos and their spacial relationship to various surrounding structures at the Fernald Site (FS). Figure 3 is a plan drawing which includes the equipment number, F2-25 etc.; and the number sequence (1-14) used to designate each one of the Silos.

The Silo contents included residues which were the cold metal oxide by-products from the processing of pitchblende and lower grade ores. As part of the refinery processes, the more soluble radionuclide forms, including isotopes of radium, were dissolved from feed material. At times, the Silos contained the Q-11 ore concentrates prior to processing.

The analytical data for these residues is limited. Since there are process similarities, the silo residues may resemble those in Silo 3. If so, the materials can be expected to be approximately 25% phosphate salts, 25% sulfate salts and 17% silicon dioxide (percentage by weight). In addition, about 30% is in the form of metals including iron, magnesium, calcium, sodium, and aluminum.

The processing of these materials ceased during the 1960's, and the silos were declared to be "abandoned in place." Residues remaining in the silos range from negligible quantities to an approximate depth of 3.5 feet in the conical bases.

1.1 Status of Plant 1 Ore Silos

On February 6, 1991, leakage of residues from the Silos was discovered and reported (CERCLA Section 302). Approximately 2,600 pounds of residues had been released and were located below Silos 1, 2 and 5. These residues were sampled and cleaned-up (recovered). In addition, plates were welded at the base of each silo to prevent any further release, and plates were also placed at the tops of the Silos to prevent intrusion of precipitation and to assure containment.

During mid-March, more detailed radiation surveys were made, and samples were collected from the silos to characterize the contents. Subsequent sampling continued through May 1, 1991.

The preliminary assessment of the silos included a structural analysis. Wind load stresses are critical for the 44 feet tall tile

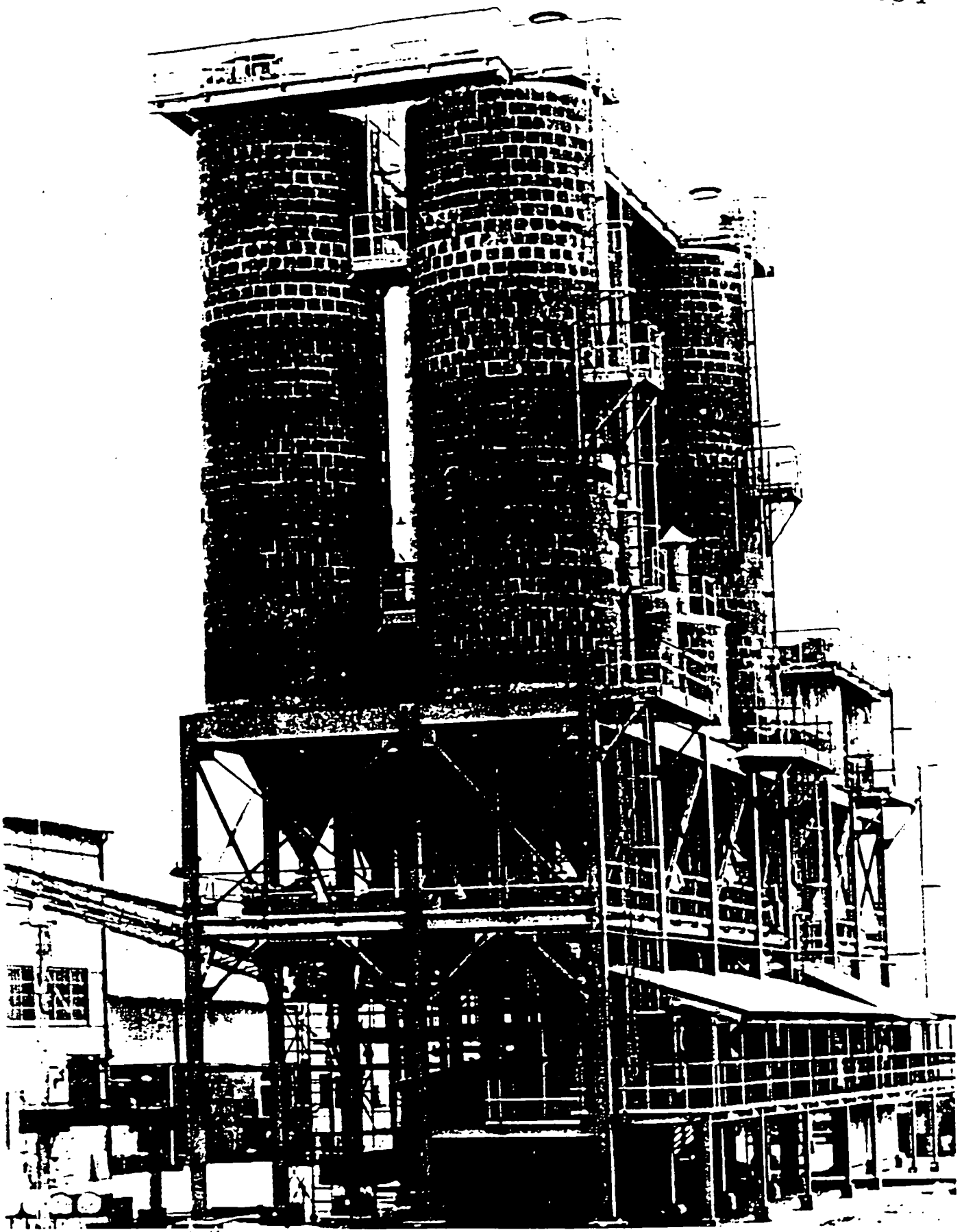
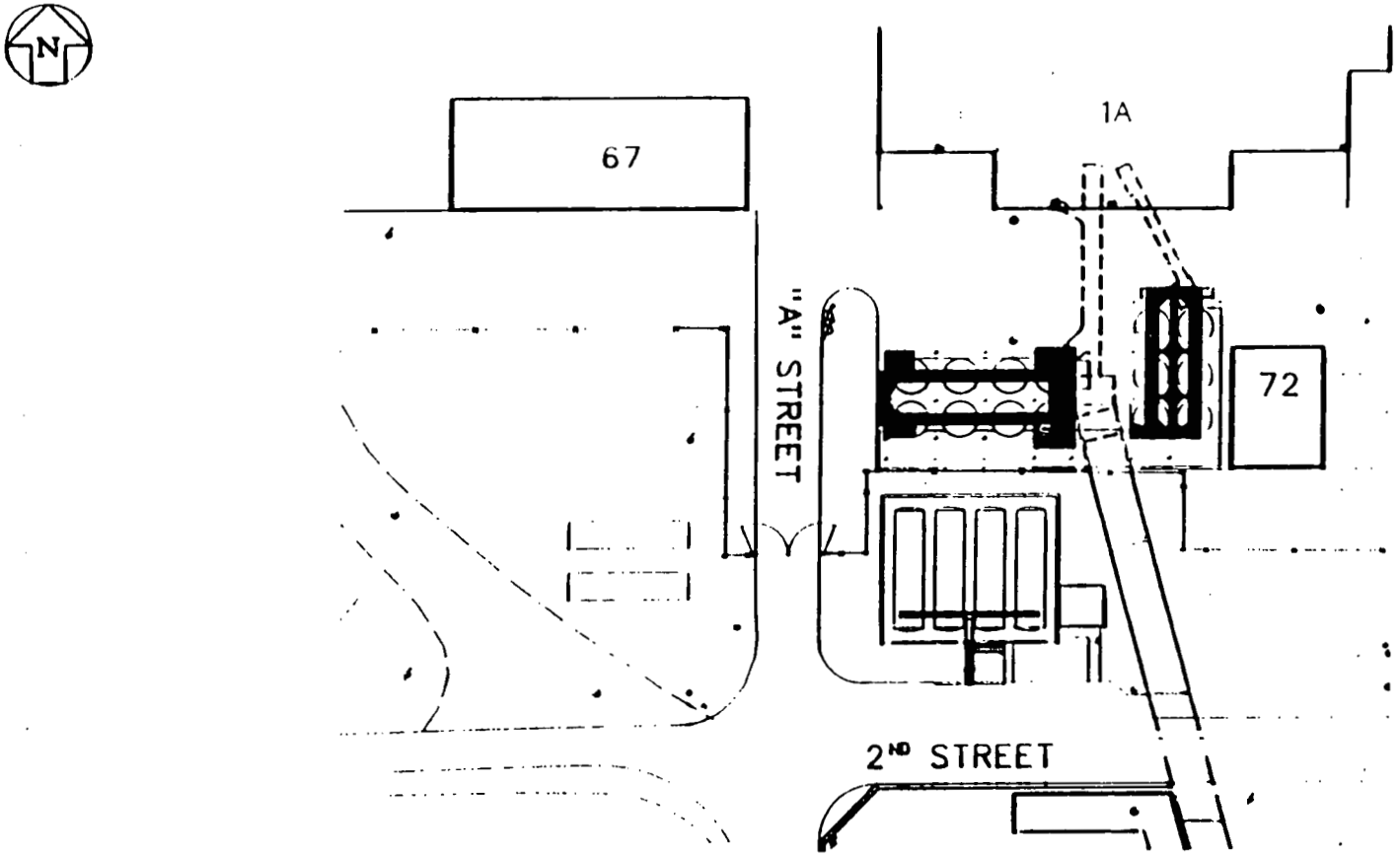


FIGURE 1

Overview of Plant 1 Silos Looking East



APPROVALS		
CHEMICAL		
CIVIL & STR.		
ELECTRICAL		
ENGINEER		
INSTRUMENT		
MECHANICAL		
CHECKED		

Executive Resource Associates, Inc.
A Technical Services Company
10991 HAMILTON CLEVES HIGHWAY • OAKRIDGE INDUSTRIAL PARK

PLANT ONE SILOS
FIGURE 2
SCALE: 1" = 64'

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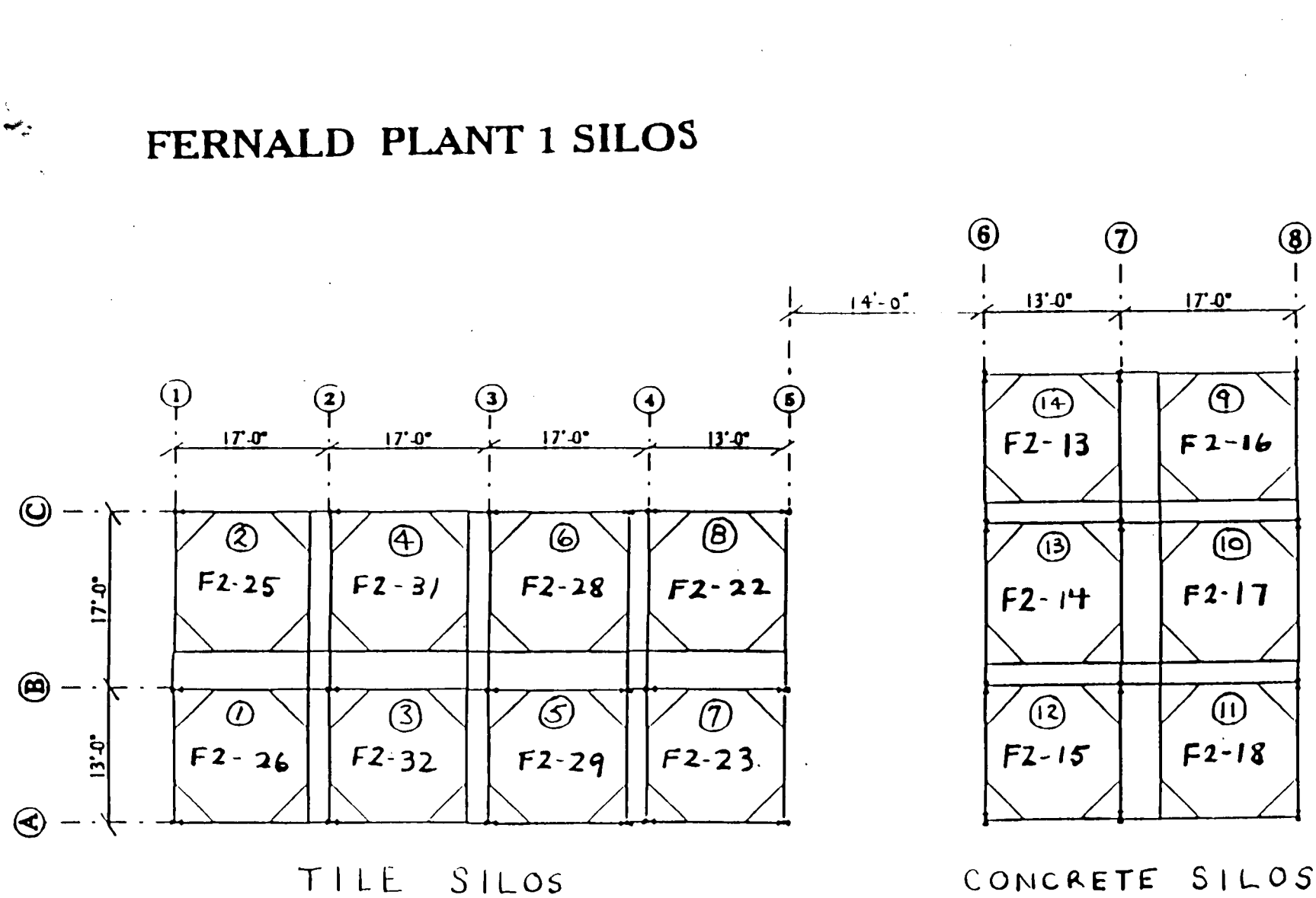
FERNALD PLANT 1 SILOS



NTS

FIGURE 3

silos. They could fail by overturning at the base if subjected to 90 mph basic wind speed loading. Relative to all eight of the tile silos, the support beams are adequate to support the empty silos and to transmit lateral forces to the braced frame lines by weak axis bending without overstress. However, the end connections of these beams are inadequate for the axial loads induced by truss action. The weakest points are the eccentric single plate connections of the diagonal beams and has a directional aspect. The longitudinal frame action is adequate for east-west winds. Transverse frame action of the end frames is inadequate to resist north-south wind loads. In addition, the lower platform level floor deck plate connections have been degraded by rust, and there is some breaking of welds with plate displacement. If the Silos are left in place, and/or while being dismantled, there is some threat to four adjacent facilities: 1) Uranyl Nitrate Tanks; 2) Building 67; 3) Building 72; and 4) Plant 1.

1.2 Status of Adjacent Facilities

1.2.1 Uranyl Nitrate Tanks

There are 15 tanks containing uranyl nitrate solutions in the area. These are the subject of another Removal Site Evaluation - Processing of Refinery Solutions[1]. Four of these tanks F2-605, F2-606, F2-607, and F2-608 are about 30 feet immediately south of the eight tile silos. If demolition of the Silos is pursued, it would be reasonable to first remove the uranyl nitrate solutions from the four nearby tanks.

1.2.2 Building 67

The second nearby facility, Building 67, is a thorium storage warehouse. The contents are approximately 6,000 drums of thorium oxides and other forms of thorium. Building 67 is part of another Removal Site Evaluation - Thorium Storage Warehouses[2]. The possible collapse of a silo (as is or during dismantling) is not an immediate threat to Building 67 because the nearest corner of the building is more than 70 feet to the northwest of the closest tile silo (Silo #2/F2-25). However, the nature of the contents of Building 67 must be considered for potential effects during any adjacent demolition or stabilization activities.

1.2.3 Building 72

Building 72 is to the east, immediately adjacent (about 10 feet) from the concrete, Plant 1 Ore Silos (#9, 10 & 11). This building could be easily damaged because of its proximity. Slightly enriched uranium (2% to 19.9% U-235) is stored in Building 72. This material is stored in approximately 88 containers, including 10, 30 and 55 gallon sizes, and a number of uranium rods in "birdcages" (framed container to allow standoff).

1.2.4 Plant 1

Plant 1 is the "sampling plant" for the Fernald Site, and due to the proximity to the silos, this building could be damaged. Plant 1 is the location for sampling of uranium metal, process residue, and waste materials. At any point in time, there are three or four skids of drums (four drums per skid) in Plant 1. Enriched uranium is stored on the third floor of Plant 1; there are approximately 220 containers (many are "birdcages") including metals, oxides, and uranium rods.

1.3 Basis for the Removal Site Evaluation

This Removal Site Evaluation is developed in accordance with 40 CFR 300.410. Section 2.0 characterizes the source term for any potential release. Appendix A summarizes analytical data for residue samples, and Appendix B summarizes the data used to estimate the Source Term. Section 3.0 evaluates the potential threat through any release of the source term.

2.0 SOURCE TERM

Visual inspection of the contents of each silo, after the February release, permitted an estimate of residue volumes. These are presented in Table 1. There are two identifiers for each silo: one is a numbering system (1-14) that was developed during the facility operation, and the second is the equipment identification noted in the plan view. Both of the silo identifiers are also shown on Figure 3. Tile silos 1, 2, 7 and 8 are 44 feet high, the tile silos 3-6 are 10 feet high, and the concrete silos are 10 feet high.

Table 1. Estimated Residue Volumes in the Plant 1 Silos

Tile Silo Identification	Est. Volume (cubic ft.)	Concrete Silo Identification	Est. Volume (cubic ft.)
#1 F2-26	Empty	#9 F2-16	Empty
#2 F2-25	1.0	#10 F2-17	8.9
#3 F2-32	0-29.7*	#11 F2-18	20.9
#4 F2-31	14.0	#12 F2-15	1.0
#5 F2-29	0-29.7*	#13 F2-14	1.0
#6 F2-28	8.9	#14 F2-13	8.9
#7 F2-23	29.7		
#8 F2-22	3.0		

* inspection not possible

Silo 1 did not contain any cold metal oxide residue on February 6, 1991. Maintenance personnel could "see daylight" from the bottom before sealing with a welded plate. The laboratory analytical data that are shown in Appendix A.1 and utilized in the Appendix B Source Term are the results of the analyses of the material that had leaked from Silo 1 and was discovered underneath this silo on February 6. Since this residue had the highest concentration, it is used for the "unknown silos."

It was not possible to see inside to inspect the contents of Silos 3 and 5. Thus, a range is assumed which extends from empty to the largest quantity which was observed in Silo 7. Although it was not possible to estimate the volume of residue in these two silos, a sample of the

residues was obtained from the bottom of the silo before a plate was welded in place. A visual inspection of Silo 8 was made and residues were observed; but the bottom was already closed and a sample could not be obtained. Thus, the activity determined for the maximum sample (Silo 1) has been used.

Silo 9 was also determined to have no residues, and only evidence of roosting birds was observed.

The maximum estimated total residues for all Silos is 156.7 cubic feet (5.8 cubic yards), and the minimum estimate, based on observable residues, is 97.3 cubic feet (3.6 cubic yards).

The complete analytical results for residue samples are given in Appendix A. An estimate of the radionuclide inventory in each Silo is made by:

1. Multiplying the estimated volumes by an estimated density of the material.

2. Multiplying the resultant mass by the specific radionuclide concentration from the analytical data. (Appendix A.1).

Since the residues are similar to those found in Silo 3, a density of 2.5 g/cc was used as a basis for the calculations. Four samples from Silo 3 average 2.33 g/cc and one composite showed 2.75 g/cc.

Table 2. Estimated Radionuclide Quantities
Total for All Silos
(millicuries)

Isotope	Maximum	Minimum
Thorium-230	406	81
Radium-226	6.6	5.8
Thorium-232	6.0	0.72
Radium-228	0.23	.125
Thorium-228	1.9	0.42
Uranium-238	2.7	0.20
Uranium-234	2.5	0.19

At most, the total inventory is less than 0.5 Ci, and there may be less that 100 mCi. At the present time, there are relatively limited chemical analytical results for residue samples. Appendix A.2 provides those results. As expected from the processes, there are relatively few organic compounds with concentrations exceeding the detection limits. There are significant concentrations of metals in the residues, and those are summarized in the following Table 3.

The analytical results indicate detection of low concentrations of plutonium-239,40, technetium-99, and neptunium-237. From process knowledge, it is not possible that these radionuclides are present. The analytical discrepancies will not be resolved since they are an insignificant component of the source term.

Table 3. Metals Concentrations in Silo Residues (micrograms per kilogram)

Silo No.	As	Ba	Cd	Cr	Pb	Se	Hg
1	<15	216	<0.5	<4.6	441	<2.1	<0.05
2	960	64.4	<0.5	733	7780	891	0.883
3	<15	<0.3	<0.5	95.3	739	<2.1	<0.05
4	<15	<0.3	<0.5	46.5	354	<2.1	0.295
5	64.4	119	6.1	305	8730	4090	1.8
6	<15	30.7	<0.5	70.6	386	<2.1	<0.05
7	<15	47	3.8	152	3370	81	0.1
8	(Silo closed, no sample taken)						

The only sample data available for Toxicity Characteristic Leaching Procedure (TCLP) concentrations, at this time, are for samples from the concrete silos. Those results are summarized in the following Table 4.

Table 4. Sample Concentrations Compared to TCLP Results

Silo No.	Parameter	Residue Concentration (ug/g)	TCLP Concentration (ug/L)	(Limit)	*Ratio (ug/L ug/g)
9	(Silo empty, no sample taken)				
10	Lead	1043	441	(5,000)	0.42
	Barium	34.4	216	(100,000)	6.3
11 (Dup.)	Selenium	114	<420	(1,000)	<3.7
	Lead	896	462	(5,000)	0.52
	Barium	15.4	252	(100,000)	16
11 (Dup.)	Selenium	161	738	(1,000)	4.6
12	Lead	556	462	(5,000)	0.83
	Barium	115	252	(100,000)	2.2
13	Lead	561	203	(5,000)	0.36
14	Barium	10.4	213	(100,000)	20

* Note the "dilution" of roughly 500 if the sample density is 2 g/cc and the TCLP solution density is 1 g/cc.

There is no current evidence that the residues are radioactive mixed RCRA wastes. The volume of residues is estimated to be less than six cubic yards. They would have to be placed in appropriate containers and then sampled. Analytical results, coupled with process knowledge, will permit a conclusion and proper disposition.

Source terms that are related to adjacent facilities include the four tanks containing uranyl nitrate solutions located immediately south of the tile silos. The inventories within those tanks are summarized in the following Table 5.

Table 5. Uranyi Nitrate Storage Tank Contents

Tank No.	U-238 (Ci)	U-235 (Ci)	U-234 (Ci)	Pu-239 (mCi)	Np-237 (mCi)
F2-605	1.88	0.12	1.88	5.1	1.8
F2-606	2.96	0.19	2.96	8.1	2.8
F2-607	1.92	0.12	1.92	5.1	1.8
F2-608	2.33	0.15	2.33	6.3	2.2

The thorium storage Building 67 is northwest of the Plant 1 Silos and contains the inventory given in Table 6.

Table 6. Contents of Building 67
(6,004 containers: oxides and other forms)

Thorium-232	16 Ci
Radium-228	16 Ci
Thorium-228	16 Ci
Thorium-230	2 Ci
Uranium-233	0.2 Ci

The contents of Building 72, 10 feet to the east of the concrete silos #9, 10 & 11 and Plant 1 are generally described in paragraphs (1.2.3 and 1.2.4)

Process material conveyers appear in Figures 1 and 2 which enter Building 1A; thus, any activity in Building 1A may be affected by a removal action.

3.0 EVALUATION OF POTENTIAL THREAT

There is a remote, but finite, probability that a tile silo could collapse and cause the release of the uranyl nitrate solution from the adjacent storage tanks. There is a concern for occupational exposure to chemicals. From the Thorium Storage Building RSE, average meteorology estimates a dilution factor (CHI/Q) of 1.8E-13 to the nearest off-site receptor at 1,700 meters from Building 67. (See Figure 4). Given conditions, a small fraction of the uranium would become airborne for transport off-site. The pH of the solution would be raised when contacted with soil and penetration to ground water, or surface water runoff, would be slowed. The spill would be cleaned up relatively quickly and result in minimal environmental impact. In the context of this RSE, it would be logical to first remove the uranyl nitrate solutions from the tanks prior to activities with the tile silos.

Actions following the February spill prevented any subsequent or ongoing releases from the silos. Some other action, such as earthquakes, high winds, or tornadoes, might cause the collapse of one of the tile silos. It is possible that the further degradation of tile silo structures could result in "spontaneous" collapse or similar failure as the result of relatively minor forces.

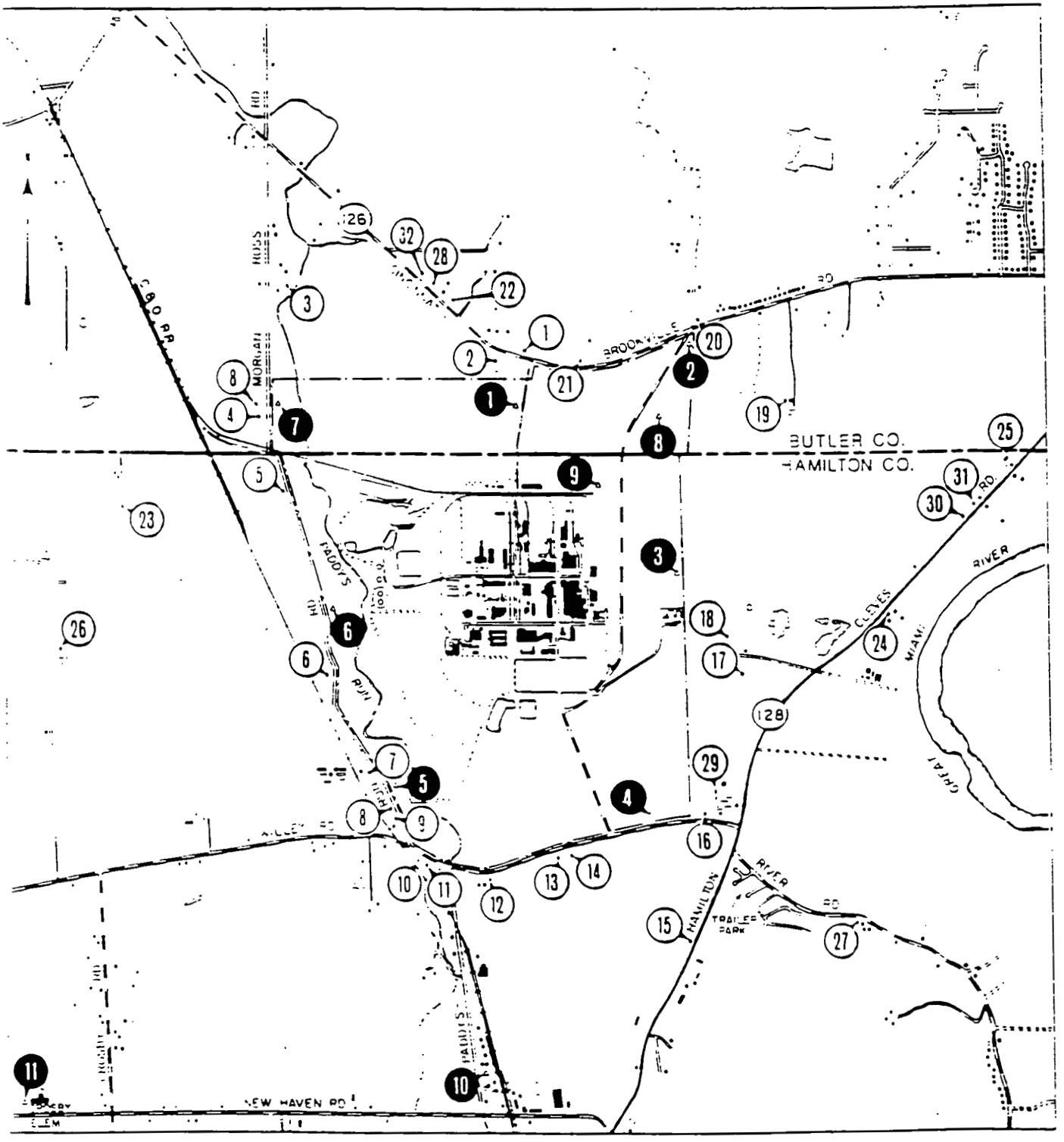
The extent of such a potential threat can be assessed using the contents of Silo residues. The highest potential occupational exposure would likely occur with the failure of Silo 5 because it contains the highest radionuclide concentrations. With relatively dusty conditions, air mass loading can be estimated to be 0.2 mg/m3. This is the default value from the Argonne National Laboratory version of RESRAD[3]. Given these assumptions, the expected airborne concentrations can be calculated and compared to the airborne limits for occupational exposure from DOE Order 5480.11[4]. Table 7 provides that comparison.

Table 7. Estimated Airborne Concentrations Compared to Table 1 of Attachment 1 of DOE Order 5480.11

	Airborne Concentrations (uCi/ml)		
Isotope	Estimated	DOE Order 5480.11	Fraction
Th-230	2.8E-11	3.0E-12	9.3E+00
Ra-226	4.2E-14	3.0E-10	1.4E-04
Th-232	5.0E-13	5.0E-13	1.0E+00
Ra-228	1.4E-13	5.0E-10	2.8E-04
U-238	2.2E-13	2.0E-11	1.1E-02
U-234	2.0E-13	2.0E-11	1.0E-02
			10.3

These airborne concentrations from an accidental release would be temporary while the DOE Order values are based upon continuous occupational exposure. However, the comparison shows that the total represents 10.3 times the DOE airborne limits. The use of respiratory protection would limit occupational exposure during the limited work period.

FMPC ENVIRONMENTAL RESIDENTIAL CENSUS, 1989



0 1 2 3

SCALE OF MILES

LEGEND

- Heavy Duty Roads
- Medium Duty Roads
- Light Duty Roads
- Fixed Air Monitoring Stations
- Numbered Residence
- FMPC Boundary

FIGURE 4

A conservative estimate of the potential threat to the public can be made using the silo with the largest estimated quantity of radionuclides. While a sample was collected and analyzed from Silo 5, it was not possible to view the residues to estimate the volume. It was, therefore, assumed to have residues equal to the largest quantity observed among all silos (Silo 7). An estimate of the potential dose to the nearest off-site receptor (1700 meters) can be made by assuming the estimated contents of Silo 5 are released and that ten percent become airborne and are transported to the receptor. Only the two most abundant isotopes, thorium-230 and thorium-232 are used for this analysis. The atmospheric diffusion calculations from the Thorium Storage Building RSE can be used to estimate the airborne concentration, the radiation dose equivalent and the risk by both the HEAST Slope Factors and by the NCRP risk coefficient. Table 8 summarizes those results.

Table 8. Risk and Dose Equivalent for Potential Release from the Silo 5 Estimated Source Term

	Thorium-230	Thorium-232
Ten Percent Release	29 mCi	0.53 mCi
Receptor Airborne	5.2E-03 pCi/m3	9.5E-05 pCi/m3
HEAST Slope Factor	3.1E-08	1.1E-07
HEAST Risk	1.3E-06	8.4E-08
Dose Equivalent	10.9 mRem	0.88 mRem
	HEAST total risk	1.4E-06
	NCRP total risk	1.5E-06

The EPA has indicated that the acceptable risk range is from 1E-04 to 1E-06[5]; and this calulated risk is near the lower end of that range.

Therefore, the NCP lists a lifetime cancer risk to an individual to a range of 1E-04 to 1E-06. It is emphasized that this estimate in Table 8 was based upon the Silo 5 contents which are not confirmed. Silo 7 contains the largest known quantities which is roughly one tenth of the Silo 5 estimate.

4.0 ASSESSMENT OF THE NEED FOR A REMOVAL ACTION

The Plant 1 Ore Silos represent a minimal risk based upon the assessment of the contaminated residue contents. Collapse of the 44 foot tile silos is possible with injury of workers in the vicinity and with the potential to damage adjacent uranyl nitrate storage tanks which could result in a release of their contents. Nitric acid fumes would result in an immediately dangerous environment to workers in that area. Any release to the off-site population would be minimal given conditions and the likelihood of prompt cleanup. Potential problems could be removed by removal and treatment of the uranyl nitrate solutions. This is the subject of another RSE which might be further motivated by the poor structural condition of the tile silos. Once completed, residues could be removed from the Plant 1 Ore Storage Silos, hazardous structures dismantled, and the present minimal risk reduced to near zero.

Consistent with Section 40 CFR 300.410 of the National Contingency Plan, the DOE shall determine the appropriateness of a removal action. The eight factors to be considered in this determination are listed in 40 CFR 300.415 (b) (2). The following apply to the Plant 1 Ore Silos:

Sub-paragraph (iii)
Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release.

Sub-paragraph (viii)
Other situations or factors that might pose threats to public health or welfare or the environment.

Relative to (viii) is the potential for collapse of the tile silos with:

the potential for serious injury to workers
and
the potential to damage adjacent uranyl nitrate storage tanks with exposure to workers.

5.0 APPROPRIATENESS OF A RESPONSE

If it is determined that response actions are appropriate due to current conditions, a number of actions may be required to address the situation.

If a planning period of less than six months exists prior to initiation of a response action, DOE will issue an Action Memorandum. The Action Memorandum will describe the selected response(s) and provide supporting documentation for the decision(s).

If it is determined that there will be a planning period of greater than six months before response(s) is initiated, DOE will issue an Engineering Evaluation/Cost Analysis (EE/CA) Approval Memorandum. This Memorandum is to be used to document the threat to public health and to the environment and to evaluate viable alternative response actions. It will also serve as a decision document to be included in the Administrative Record.

Based upon evaluation of all of the above factors, a Time Critical Removal Action is required.

REFERENCES

Removal Site Evaluation - Processing of Refinery Solutions, WMCO:EMT:91-154, June 27, 1991.

Removal Site Evaluation - Thorium Storage Buildings, WMCO:EMT:91-279, June, 1991.

Yu, C. et. al., A Manual for Implementing Residual Radioactive Material Guidelines, DOE/CH/8901, Argonne National Laboratory, U.S. Department of Energy, June, 1989.

DOE Order 5480.11, Radiation Protection for Occupational Workers, U.S. Department of Energy, December 21, 1989.

National Emission Standards for Hazardous Air Pollutants; Radionuclides; Final Rule and Notice of Reconsideration, 40 CFR Part 61. Fed. Reg. Vol. 54, No. 240, 51654-51715, December 15, 1989.

APPENDIX A
(APPENDIX A.1 & A.2 TO FOLLOW)

RESIDUE SAMPLE ANALYTICAL RESULTS

APPENDIX A

Appendix A.1 provides the Radiochemical Analytical Results and Appendix A.2 provides the Chemical Analytical Results.

The last table in Appendix A.1 provides the typical or expected analytical sensitivities for the specific radionuclides. Analytical results for samples may show concentrations lower than the analytical sensitivities when a specific analytical procedure has had unusually beneficial experience. For example, chemical recoveries may be higher than typical, backgrounds may be lower than typical, and occasionally analyses will have larger than normal sample aliquots and may have experienced longer count times. In a similar fashion, some analytical results may show sensitivities that are high in comparison to the expected analytical sensitivities. The adversity may be due to lower than expected chemical yield, background may be higher than usual, and the sample quantity may restrict the size of the sample aliquot used for a procedure.

APPENDIX A.1

RADIOCHEMICAL ANALYTICAL RESULTS

PLA. 1 ORE SILOS

Summary

Radiochemical Results (pCi/g)

		Thorium-230	Radium-226	Thorium-232	Radium-228	Thorium-228	Uranium-238
Fraction Detectable	[1]	(14/14)	(14/14)	(14/14)	(14/14)	(14/14)	(11/14)
Mean + 1 Std. Dev	[2]	31558 + 58538	516 + 577	377 + 858	31 6 + 38 6	189 3 + 440 1	183 + 318 9
High	[3]	180000(EM-2001)	1600(EM-2001)	2500(EM-2507)	130(EM-2001)	1600(EM-2504)	1100(EM-2507)
Low	[3]	630(EM-2510)	25(EM-2508)	7 4(EM-2575)	3 6(EM-2508)	5(EM-2574)	6 3(EM-2505)
Concentrations Greater Than Mean + 1 Std. Dev	[3]	100000(EM-2504) 140000(EM-2504) 180000(EM-2507)	1200(EM-2509) 1200(EM-2570) 1400(EM-2571) 1600(EM-2001)	2300(EM-2504) 2500(EM-2507)	76(EM-2570) 83(EM-2571) 130(EM-2001)	660(EM-2507) 1600(EM-2504)	1100(EM-2507)

		Uranium-234	Uranium-235	Uranium-236	Plutonium-238	Plutonium-239	Plutonium-239,40
Fraction Detectable	[1]	(11/14)	(11/14)	(11/14)	(14/14)	(6/14)	(14/14)
Mean + 1 Std. Dev	[2]	187 4 + 291 2	8 36 + 14 2	0 433 + 0 579	0 18 + 0 085	0 517 + 0 355	0 33 + 0 20
High	[3]	1000(EM-2507)	49(EM-2507)	2 1(EM-2507)	0 4(EM-2508)	1 2(EM-2571)	1 2(EM-2571)
Low	[3]	1 6(EM-2505)	0 24(EM-2505)	0 001(EM-2570)	0 14(EM-2573)	0 37(EM-2573)	0 12(EM-2001) 0 12(EM-2504) 0 12(EM-2505) 0 12(EM-2507) 0 12(EM-2509)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	1000(EM-2507)	49(EM-2507)	2 1(EM-2507)	0 4(EM-2508)	1 2(EM-2571)	1 2(EM-2571)

		Neptunium-237	Technetium-99	Cesium-137
Fraction Detectable	[1]	(12/14)	(12/14)	(2/14)
Mean + 1 Std. Dev	[2]	5 06 + 4 75	18 5 + 16 1	3 1 + 0
High	[3]	13(EM-2507)	55(EM-2572)	3 1(EM-2571) 3 1(EM-2571)
Low	[3]	0 4(EM-2574)	5 2(EM-2504) 5 2(EM-2508)	3 1(EM-2571) 3 1(EM-2571)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	10(EM-2570) 11(EM-2504) 13(EM-2507)	43(EM-2571) 55(EM-2572)	

[1] Detected / Total Samples
[2] + = Tolerance, plus or minus with 68% confidence
[3] Sample number in parenthesis

PLANT 1 TILE SILO RESIDUES

(picocures per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	Th-230	Ra-226	Th-232	Th*tot	Ra-228	Th-228	U-238	U*tot
1 F2-26	EM-2001 910207-059	160,000	1,600	64	592	130	64	280	832
2 F2-25	EM-2504 910318-077	100,000	560	2,300	453	6.1	1,600	140	427
3+ F2-32	EM-2505 910318-078	960	30	21	<45	<7.4	24	5.3	16
3+ F2-32	EM-2510 910318-83	630	39	18	<45	7.8	43	24	73
4 F2-31	EM-2506 910318-79	1,400	25	49	48	3.6	17	10	31
5 F2-29	EM-2507 910318-080	140,000	210	2,500	2,402	29	660	1,100	3,281
6 F2-28	EM-2508 910318-081	3,900	59	96	<45	5.7	97	25	74
7 F2-23	EM-2509 910318-082	14,000	1,200	170	111	14	85	90	271
8 F2-22	(SILO CLOSED NO SAMPLE)								

PLANT 1 TILE SILO RESIDUES
(picocures per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	U-234	U-235	U-236	Pu-238	Pu-239,40	Np-237	Tc-99
1 F2-26	EM-2001 910207-059	310	13	<0.53	<0.17	<0.12	---	---
2 F2-25	EM-2504 910318-077	140	6.5	0.16	<0.17	<0.12	11	<5.2
3+ F2-32	EM-2505 910318-078	1.6	0.24	0.048	<0.17	<0.12	---	---
3+ F2-32	EM-2510 910318-083	18	1.1	0.34	<0.19	<0.20	0.77	8.5
4 F2-31	EM-2510 910318-079	13	0.66	0.18	<0.18	0.56	0.74	<5.2
5 F2-29	EM-2507 910318-80	1,000	49	<2.1	<0.17	<0.12	13	<5.4
6 F2-28	EM-2508 910318-081	20	1.2	0.18	<0.40	<0.20	<0.76	<5.4
7 F2-23	EM-2509 910318-082	80	4.1	0.42	<0.17	<0.12	3.3	11
8 F2-22	(SILO CLOSED NO SAMPLE)							

Duplicate Sample

PLANT 1 CONCRETE SILO RESIDUES
(picocures per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	Th-230	Ra-226	Th-232	Th tot	Ra-228	Th-228	U-238	U tot
10 F2-17	EM-2570 910501-040	4,700	1,200	12	417 ppm	79	14	75	225 ppm
11+ F2-18	EM-2571 910430-112	4,800	1,400	18	491 ppm	83	8.4	250	750 ppm
11+ F2-18	EM-2575 910430-111	4,200	436	7.4	583 ppm	31	10	N/A	584 ppm
Rinseate**	EM-2576 910501-044	<0.010*	<0.0006*	<0.010*	<0.0004 g/L	<0.003*	0.013*	N/A	.0001 g/L
Rinseate**	EM-2577 910501-045	<0.003*	<0.0007*	<0.004*	<0.0004 g/L	<0.0024*	0.011*	<0.83*	<1 ppm
12 F2-15	EM-2572 910501-041	1,700	81	9.1	152 ppm	7.4	13	14	42 ppm
13 F2-14	EM-2573 910501-042	3,600	310	15	225 ppm	32	9.7	N/A	36 ppm
14 F2-13	EM-2574 910501-043	1,900	79	9.2	101 ppm	6.4	5	N/A	24 ppm

* = pci/ml
+ = [illegible]plicate Sample

PLANT 1 CONCRETE SILO RESIDUES
(picocures per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	U-234	U-235	U-236	Pu-238	Pu-239,40	Pu tot	Np-237	Cs-137	Tc-99
10 F2-17	EM-2570 910501-040	61	3.5	<0.001	<0.15	<0.38	<0.53	10	N/A	<19
11+ F2-18	EM-2571 910430-112	170	12	<0.48	<0.15	1.2	<1.4	9.8	<3.1	<43
11+ F2-18	EM-2575 910430-111	N/A	N/A	N/A	<0.15	<0.38	<0.53	4.9	<3.1	<19
Rinseate**	EM-2576 910501-044	N/A	N/A	N/A	<0.0004*	<0.001*	<0.0014*	0.01	N/A	<0.66
Rinseate**	EM-2577 910501-045	<0.87*	<0.018*	<0.019*	<0.0004*	<0.001*	<0.0014*	0.04*	N/A	<0.66*
12 F2-15	EM-2572 910501-041	28	0.64	0.32	<0.15	<0.38	<0.53	<0.40	N/A	<55
13 F2-14	EM-2573 910501-042	N/A	N/A	N/A	<0.14	<0.37	<0.51	5.7	N/A	<18
14 F2-13	EM-2574 910501-043	N/A	N/A	N/A	<0.15	<0.39	<0.54	<0.40	N/A	<27

* = pci/ml
+ = Duplicate Sample

RI Analytical Detection
(Soil Samples)

Radionuclide Containment	Detection Limit	Background Concentrations
	(mg/kg)	(mg/kg)
Total U	1	0.29-11 (2.7)
Total Th	18	
Isotope	(pCi/g)	(pCi/g)
Cs137	<1.0	<1
Np237	<0.1	<0.1
Pb210	<1.0	<2.5
Pu238	<0.1	<0.1
Pu239,240	<0.1	<0.1
Ra226	<1.0	<1.5
Ra228	<4	<4
Sr90	<0.5	<0.5
Tc99	9	<1
Th228	1	<1
Th230	<1	<0.1
Th232	<11	<11
U234	1	0.1-4.0 (0.9)
U235	1	<1
U235,236	1	<1
U238	1	0.1-4.0 (0.9)

APPENDIX A.2

CHEMICAL ANALYTICAL RESULTS

PLAN. ORE SILOS

Summary
Chemical Results

METALS (ug/g)		Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
Fraction Detectable	[1]	(8/14)	(14/14)	(9/14)	(13/14)	(15/15)	(9/14)	(6/14)	(11/14)
Mean + 1 Std. Dev.	[2]	166 7 + 321 5	52 5 + 59 3	16 0 + 9 1	188 1 + 178 0	3973 + 8342	664 3 + 1328 3	15 91 + 4.31	0 66 + 0 48
High	[3]	960(EM-2504)	216(EM -2001)	24 6(EM-2572)	733(EM-2504)	32518(EM-2584)	4090(EM-2507)	21.69(EM-2575)	1.8(EM-2507)
Low	[3]	27 9(EM-2574)	7 92(EM-2573)	3 2(EM-2504)	43 9(EM-2510)	354(EM-2508)	3 5(EM-2574)	11 69(3M-2573)	0 1(EM-2509)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	960(EM-2504)	115(EM-2572) 119(EM-2507) 216(EM-2001)		733 (EM-2504)	32518(EM-2584)	4090(EM-2507)	20 53(EM-2572) 21 69(EM-2575)	1 8(EM-2507)

TCLP EXTRACT (mg/l)		Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
Fraction Detectable	[1]	(0/14)	(4/14)	(0/14)	(0/14)	(4/14)	(0/14)	(0/14)	(1/14)
Mean + 1 Std. Dev.	[2]		233 3 + 21 7			392 + 126			0 2 + 0
High	[3]		252(EM-2572) 252(EM-2575)			462(EM-2572) 462(EM-2575)			0 2(EM-2571)
Low	[3]		213(EM-2574)			203(EM-2573)			0 2(EM-2571)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]								

ORGANICS (ug/g)		Methyl Ethyl Ketone	Tetrachloroethane	Acetone	Toluene	Cyclohexanone	2-Nitropropane	Total Xylenes
Fraction Detectable	[1]	(1/14)	(3/14)	(1/14)	(2/14)	(1/14)	(1/14)	(1/14)
Mean + 1 Std. Dev.	[2]	83 + 0	86 0 + 86 1	31 + 0	16 + 4 24	263 + 0	34 + 0	14 + 0
High	[3]	83(EM-2571)	181(EM-2509)	31(EM-2507)	19(EM-2509)	263(EM-2508)	34(EM-2508)	14(EM-2509)
Low	[3]	83(EM-2571)	13(EM-2508)	31(EM-2507)	13(EM-2507)	263(EM-2508)	34(EM-2508)	14(EM-2509)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]		181(EM-2509)					

[1] Detected / Total Samples
[2] + = Tolerance, plus or minus with 68% confidence
[3] Sample number in parenthesis

PLANT 1 TILE SILOS RESIDUES
(micrograms per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	PARAMETER	DETECTION LIMIT	CONCENTRATION
1	EM-2001	Barium	200	216
F2-26	910207-059	Lead	200	441
2	EM-2504	Arsenic	15	960 N
F2-25	910318-077	Barium	0 3	64.4
		Cadmium	0 5	3.2 N
		Chromium	4 6	733
		Lead	9	7,780
		Selenium	2 1	891 N
		Mercury	0.05	0.883
3	EM-2505	Barium	0.3	21.4
F2-32	910318-078	Chromium	4.6	95.3
		Lead	9	739
4	EM-2506	Tetrachlorethene	5	13
F2-31	910318-079	Barium	0 3	16.8
		Chromium	4.6	46.5
		Lead	9	354
		Mercury	0.05	0.295
5	EM-2507	Acetone	10 3	31
F2-29	910318-080	Toluene	5.1	13
		Arsenic	15	64.4
		Barium	0.3	119
		Cadmium	0.5	6.1 N
		Chromium	4.6	305
		Lead	9	8,730
		Selenium	2.1	4,090
		Mercury	0.05	1.8

+ = Duplicate Sample

PLANT 1 TILE SILOS RESIDUES

(micrograms per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	PARAMETER	DETECTION LIMIT	CONCENTRATION
6	EM-2508	Cyclohexanone	10.1	263
F2-28	910318-081	2-Nitropropane	20.2	34
		Tetrachloroethene	5.1	64
		Barium	0.3	30.7
		Chromium	4.6	70.6
		Lead	9	386
7+	EM-2509	Toluene	5.1	19
F2-23	910318-082	Tetrachloroethene	5.1	181
		Total Xylenes	5.1	14
		Barium	0.3	47
		Cadmium	0.5	3.8 N
		Chromium	4.6	152
		Lead	9	3,370
		Selenium	2.1	81 N
		Mercury	0.05	0.1
7+	EM-2510	Barium	0.3	15.9
F2-23	910318-083	Chromium	4.6	43.9
		Lead	9	464
		Mercury	0.05	0.199
8	(SILO CLOSED			
F2-22	NO SAMPLE)			

PLANT 1 CONCRETE SILOS RESIDUES
(micrograms per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	PARAMETER	CONCENTRATION
10 F2-17	EM-2570 910501-040	Arsenic	43.8
		Mercury	0.3
		Selenium	35
		Lead	1042.68
		Silver	16.03
		Barium	34.37
		Cadium	17.3
		Chromium	125.72
11+ F2-18	EM-2575 910430-111	Arsenic	79.9
		Mercury	1.08
		Selenium	114
		Lead	895.69
		Silver	21.69
		Barium	15.35
		Cadmium	19.99
		Chromium	170.61
11+ F2-18	EM-2571 910430-112	Arsenic	95.2
		Mercury	0.76
		Selenium	161
		Lead	1218.04
		Silver	20.53
		Barium	21.16
		Cadmium	20.78
		Chromium	183.9

+ = Duplicate Sample

PLANT 1 CONCRETE SILOS RESIDUES
(micrograms per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	PARAMETER	CONCENTRATION	
Rinseate	EM-2576 910501-044	Arsenic	<10	ug/L
		Mercury	<0.2	ug/L
		Selenium	<17	ug/L
		Lead	<6	ug/L
		Silver	<3.0	ug/L
		Barium	<25000	ug/L
		Cadium	<200	ug/L
		Chromium	<1000	ug/L
Rinseate	EM-2577 910501-045	Arsenic	<10	ug/L
		Mercury	<0.2	ug/L
		Selenium	<17	ug/L
		Lead	<6	ug/L
		Silver	<3.0	ug/L
		Barium	<25000	ug/L
		Cadmium	<200	ug/L
		Chromium	<1000	ug/L
Silo Paint	EM-2584 910502-072	Lead	32518.6	

PLANT 1 CONCRETE SILOS RESIDUES
(micrograms per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	PARAMETER	CONCENTRATION
12	EM-2572	Arsenic	30.2
F2-15	910501-041	Mercury	0.57
		Selenium	8.41
		Lead	555.81
		Silver	12.53
		Barium	115.03
		Cadium	24.6
		Chromium	171.98
13	EM-2573	Arsenic	32.2
F2-14	910501-042	Mercury	0.56
		Selenium	18
		Lead	560.52
		Silver	11.59
		Barium	7.92
		Cadmium	24.16
		Chromium	182.06
14	EM-2574	Arsenic	27.9
F2-13	910501-043	Mercury	0.67
		Selenium	3.5
		Lead	546.81
		Silver	13.09
		Barium	10.44
		Cadmium	24.32
		Chromium	165.03

TCLP ANALYSIS OF
PLANT 1 TILE CONCRETE SILO RESIDUES
(ug/L)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	PARAMETER	DETECTION LIMIT*	CONCENTRATION*	REGULATORY LIMIT
9 F2-16	(SILO EMPTY NO SAMPLE)				
10 F2-17	EM-2510 910501-040	Barium	200	216	100,000
		Lead	200	441	5,000
11+ F2-18	EM-2575 910430-111	Barium	200	252	100,000
		Lead	200	462	5,000
11+ F2-18	EM-2571 910501-112	Methyl Ethyl Ketone	50	83	200,000
		Selenium	420	738	1,000
		Mercury	0.2	0.2	200
12 F2-15	EM-2572 910501-041	Barium	200	252	100,000
		Lead	200	462	5,000
13 F2-14	EM-2573 910501-042	Lead	200	203	5,000
14 F2-13	EM-2574 910501-043	Barium	200	213	100,000

Duplicate Sample

APPENDIX B

SOURCE TERM

APPENDIX B SOURCE TERM
TABLE 1
INVENTORY OF PRINCIPLE RADIONUCLIDES IN THE TILE SILOS

	SILO 1 EMPTY		SILO 2 7.08E+04g		SILO 3 2.1E+06g*		SILO 4 9.91E+05g	
	CONCENTRATION (pCi/g)	TOTAL (mCi)	CONCENTRATION (pCi/g)	TOTAL (mCi)	CONCENTRATION (pCi/g)	TOTAL (mCi)	CONCENTRATION (pCi/g)	TOTAL (mCi)
Th-230			1.00E+05	7.1E+00	9.60E+02	2.0E+00	1.40E+03	1.4E+00
Ra-226			5.60E+02	4.0E-02	3.0E+01	6.3E-02	2.5E+01	2.5E-02
Th-232			2.30E+03	1.6E-01	2.1E+01	4.4E-02	4.9E+01	4.9E-02
Ra-228			6.1E+00	4.3E-04	<7.4E+00	<1.5E-02	3.6E+00	3.6E-03
Th-228			1.60E+03	1.1E-01	2.4E+01	5.0E-02	1.7E+01	1.7E-02
U-238			1.40E+02	9.9E-03	5.3E+00	1.1E-02	1.0E+01	9.9E-03
U-234			1.40E+02	9.9E-03	1.6E+00	3.4E-03	1.3E+01	1.3E-02

	SILO 5 2.1E+06g*		SILO 6 6.30E+05g		SILO 7 2.10E+06g		SILO 8** 2.12E+05g	
	CONCENTRATION (pCi/g)	TOTAL (mCi)	CONCENTRATION (pCi/g)	TOTAL (mCi)	CONCENTRATION (pCi/g)	TOTAL (mCi)	CONCENTRATION (pCi/g)	TOTAL (mCi)
Th-230	1.40E+05	2.9E+02	3.90E+03	2.5E+00	1.40E+04	2.9E+01	1.60E+05	3.4E+01
Ra-226	2.10E+02	4.4E-01	5.9E+01	3.7E-02	1.20E+03	2.5E+00	1.60E+03	3.4E-01
Th-232	2.50E+03	5.3E+00	9.6E+01	6.0E-02	1.70E+02	3.6E-01	6.4E+01	1.4E-02
Ra-228	2.9E+01	6.1E-02	5.7E+00	3.6E-03	1.4E+01	2.9E-02	1.30E+02	2.8E-02
Th-228	6.60E+02	1.4E+00	9.7E+01	6.1E-02	8.5E+01	1.8E-01	6.4E+01	1.4E-02
U-238	1.10E+03	2.3E+00	2.5E+01	1.6E-02	9.0E+01	1.9E-01	2.80E+02	5.9E-02
U-234	1.00E+03	2.1E+00	2.0E+01	1.3E-02	8.0E+01	1.7E-01	3.10E+02	6.6E-02

* Quant[illegible]nknown. Assumed to be Equal to the Maximum Observed (Silo[illegible]

APPENDIX B SOURCE TERM
TABLE 2
INVENTORY OF PRINCIPLE RADIONUCLIDES IN THE CONCRETE SILOS

	SILO 9 EMPTY		SILO 10 1.48E+06g		SILO 11(A) 1.48E+06g	
	CONCENTRATION (pCi/g)	TOTAL (mCi)	CONCENTRATION (pCi/g)	TOTAL (mCi)	CONCENTRATION (pCi/g)	TOTAL (mCi)
Th-230			4.70E+03	7.0E+00	4.5E+03	6.7E+00
Ra-226			1.20E+03	1.8E+00	9.18E+02	1.4E+00
Th-232			1.2E+01	1.8E-02	1.3E+01	1.9E-02
Ra-228			7.9E+01	1.2E-01	5.7E+01	8.4E-02
Th-228			1.4E+01	2.1E-02	9.2E+00	1.4E-02
U-238			7.5E+01	1.1E-01	1.9E+01(E)	2.8E-02
U-234			6.1E+01	9.2E-02	1.9E+01(E)	2.8E-02

	SILO 12 7.08E+04g		SILO 13 7.08E+04g		SILO 14 6.30E+05g	
	CONCENTRATION (pCi/g)	TOTAL (mCi)	CONCENTRATION (pCi/g)	TOTAL (mCi)	CONCENTRATION (pCi/g)	TOTAL (mCi)
Th-230	1.7E+03	1.2E-01	3.6E+03	2.5E+01	1.90E+03	1.2E+00
Ra-226	8.1E+01	5.7E-03	3.1E+02	2.2E-02	7.9E+01	5.0E-02
Th-232	9.1E+00	6.4E-04	1.50E+01	1.1E-03	9.2E+00	5.8E-03
Ra-228	7.4E+00	5.2E-04	3.2E+01	2.3E-03	6.4E+00	4.0E-03
Th-228	1.3E+01	9.2E-04	9.7E+00	6.9E-04	5.0E+00	3.2E-03
U-238	1.4E+01	1.0E-03	1.5E+01(E)	1.1E-03	8.0E+00(E)	5.0E-03
U-234	2.8E+01	2.0E-03	1.5E+01(E)	1.1E-03	8.0E+00(E)	5.0E-03

(E) Estimated, Analyses Not Completed.

APPENDIX B SOURCE TERM
TABLE 3
ESTIMATED TOTALS OF PRINCIPLE RADIONUCLIDES

	TILE SILOS		CONCRETE SILOS		ALL SILOS	
	MAXIMUM (mCi)	MINIMUM* (mCi)	MAXIMUM (mCi)	MINIMUM* (mCi)	MAXIMUM (mCi)	MINIMUM* (mCi)
Th-230	366	41	40	40	406	81
Ra-226	3.4	2.6	3.2	3.2	6.6	5.8
Th-232	6	0.68	0.04	0.04	6	0.72
Ra-228	0.14	0.04	0.09	0.09	0.23	0.13
Th-228	1.7	0.38	0.02	0.02	1.7	0.4
U-238	2.6	0.06	0.14	0.14	2.7	0.20
U-234	2.4	0.07	0.12	0.12	2.5	0.19

* Minimum assumes that Silos 3 & 5 are empty and the concentrations in Silo 8 are minimum, e.g., + Silo 4 contents analyses rather than the maximum = Silo 1 the recovered residue analyses.

APPENDIX B

PLANT 1 SILOS STRUCTURAL EVALUATION

INTRODUCTION

The Plant 1 silos installation was constructed in the early nineteen fifties to store metal oxides. The silos were emptied in the early nineteen sixties. In the nineteen seventies, spalling of tile face shells was first observed, and has continued to date. The structural steel support structures exhibit signs of corrosion: rust is evident throughout. The structural integrity and safety of the silos, ladders, stairs and platforms has been questioned.

In September 1990, the U.S. Department of Energy directed Parsons to perform a structural evaluation of the Plant 1 silos. The objectives of this evaluation are:

1. Determine the adequacy of the silos and their supporting structures to withstand gravity and lateral loads.
2. Make recommendations for remedial action, if required.

Diagrams of the structures, seismic zone tabulations, a seismic zoning reference map, and the engineering calculations generated in the study are attached.

STRUCTURE

The Plant 1 silos consist of two structural steel frame support structures with spread footing foundations. The westerly structure supports eight clay tile silos. The easterly structure supports six concrete silos.

On the westerly structure, four silos are 10 ft. tall and four are 44 ft. tall. The supporting structure has 15 primary columns and two primary framing levels. The lower platform level is approximately 23 ft. above the foundations and the silo support level is approximately 37 ft. above the foundations. The upper silo support level is not braced horizontally or solidly decked

over to provide diaphragm action. However, the horizontal framing that serves primarily as a gravity load support for the silos, provides diaphragm action by Vierendeel truss action inducing weak axis bending in the members. The lower platform level is solidly decked with steel floor plate, forming a horizontal diaphragm. The three longitudinal (east-west) structural frame lines are braced between the upper and lower levels, forming rigid frame bents to resist lateral forces. The transverse (north-south) frame lines are braced between the upper and lower levels at the east and west end frame lines only. Therefore, intermediate transverse frames are braced only by the upper and lower level diaphragms which transmit their lateral loads to the end frames. The end frames transmit transverse lateral loads to the foundations.

On the easterly structure, the six concrete silos are each 10 ft. tall. This structure has 12 primary columns, and two primary levels that match those of the westerly structure. The upper silo support level is not braced or decked but does provide horizontal diaphragm action through Vierendeel truss action. The lower platform level is continuously decked with steel floor plate, except for two large openings adjacent to the south end frame. The perimeter frames are braced between the lower platform level, and the upper silo support level, forming rigid frame bents to resist lateral forces. The south end frame is braced by a full length reinforced concrete wall from grade to the lower platform level. The first transverse (east-west) frame, north of the south end, is knee braced at both the upper and lower platform levels. The remaining intermediate transverse frame is braced only by the diaphragms, which transmit lateral loads from this frame to the adjacent braced frames. The intermediate longitudinal (north-south) frame is braced only by the diaphragms which transmit loads from this frame to the east and west side braced frames.

ANALYSIS

Original design drawings and field investigation were used to model the existing structures. Gravity and lateral loads were calculated. Computer modeling and two dimension frame analyses were performed for critical systems. MathCad and hand calculations were performed to

determine maximum stresses in critical elements. The silos and their support structures were analyzed for dead load combined with wind or earthquake loading, whichever was greater. To determine the magnitude of the lateral loads, the structures were considered to be "General Use" structures, not critical facilities. The earthquake loading used, is as specified in TM 5-809-10, "Seismic Design for Buildings", Zone 1, Importance Factor of 1.0. Wind loads were determined in accordance with ANSI A58.1-82, using basic wind speed of 90 mph, Exposure C, and Importance Factor of 1.0. We estimate the exceedance probability over a period of 10 years to be 3% for the calculated earthquake loads and 2% for the wind loads used. The silos and their support structures were checked for the existing condition of the silos being empty.

Silos at the westerly eight silo structure are constructed of hollow clay tile with circumferential reinforcing at each course line. Wind load stresses are critical in the 44 ft. tall tile silos. Significant vertical tension (tension across bed joints) will be induced by wind loads in the walls at the base. There is no vertical reinforcing in these walls and the mortar joints have experienced degradation from weathering. Therefore, the 44 ft. tall tile silos could fail by overturning at the base if subjected to 90 mph basic wind speed loading. Lateral load stresses (wind or seismic) are low in the 10 ft. tall silos. No tension is induced in the walls. Compression and shear stresses in the walls are less than allowable stresses for unreinforced masonry. Silos at the easterly six silo structure are constructed of concrete with circumferential reinforcing, and widely spaced vertical rebars. Stress levels in these silos are very low.

Wind loads are the governing lateral forces for the westerly eight silo structure. Silo support beams are adequate to support the empty silos and to transmit lateral forces to the braced frame lines by weak axis bending (Vierendeel truss action) without overstress. However, end connections of these beams are inadequate under the axial loads induced by the Vierendeel truss action. The most severe deficiency occurs at the connections of the diagonal beams supporting the silos. These are eccentric, single plate connections with low axial load capacity. Longitudinal frame action is adequate to resist east-west wind loads without exceeding allowable stresses. However, transverse frame action of the end frames is inadequate to resist north-south

wind loads. The frame columns and base anchorages would be stressed beyond yield limit by north-south wind loads. Also, the lower platform level floor deck plate connections have been degraded by rust accumulation, in some cases breading the welds and displacing the plates. Therefore, the diaphragm capacity of this floor decking is questionable. Without the upper and lower diaphragms, the intermediate unbraced frames would be unstable under strong lateral loading and would collapse.

Wind loads are the governing lateral forces for the easterly six silo structure. The longitudinal frames are adequate to resist north-south wind loading. However, the north end frame is inadequate to resist east-west wind loading. The lower platform level floor plate diaphragm connections are suspect. Also, the silo support beam framing connections are inadequate for Vierendeel truss diaphragm action. If these diaphragms do not function, the intermediate unbraced frames (Lines C and 7) would be unstable and would fail under strong lateral loading.

CONCLUSIONS AND RECOMMENDATIONS

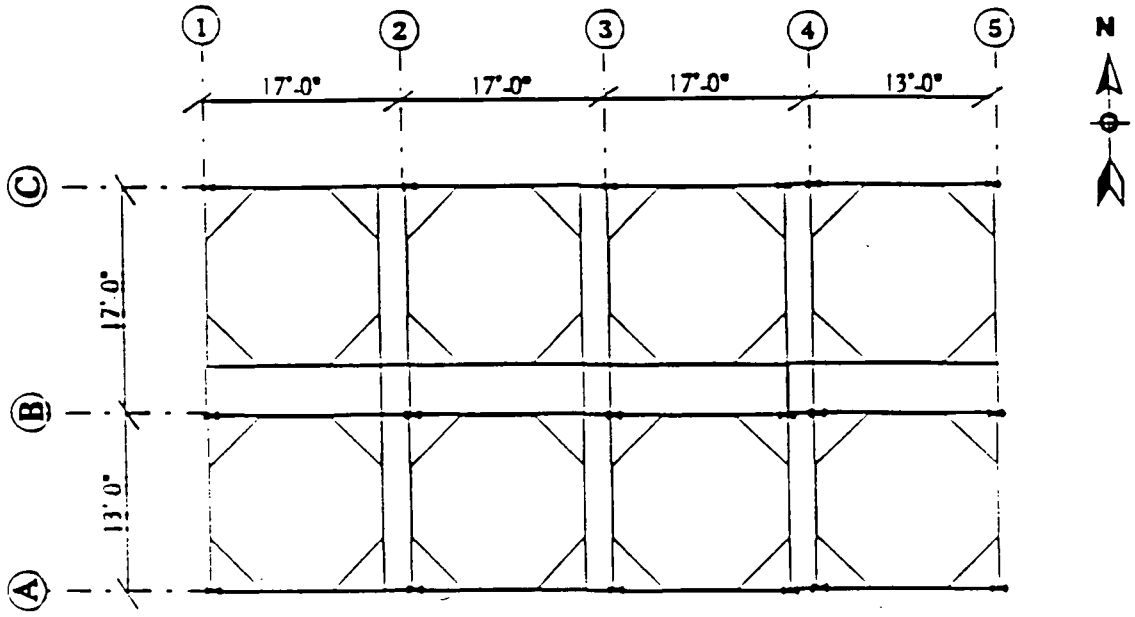
The tall (44 ft.) hollow clay tile silos on the west (eight-silo) structure are inadequate to resist 90 mph basic wind speed lateral loading. The transverse end frames on this structure would be severely overstressed under wind loading. The diaphragm capacity of the silo support beam framing, and the lower level platform floor plate is suspect. It is recommended that corrective action be taken to assure the structural safety of the westerly eight silo facility. The following alternatives would be acceptable:

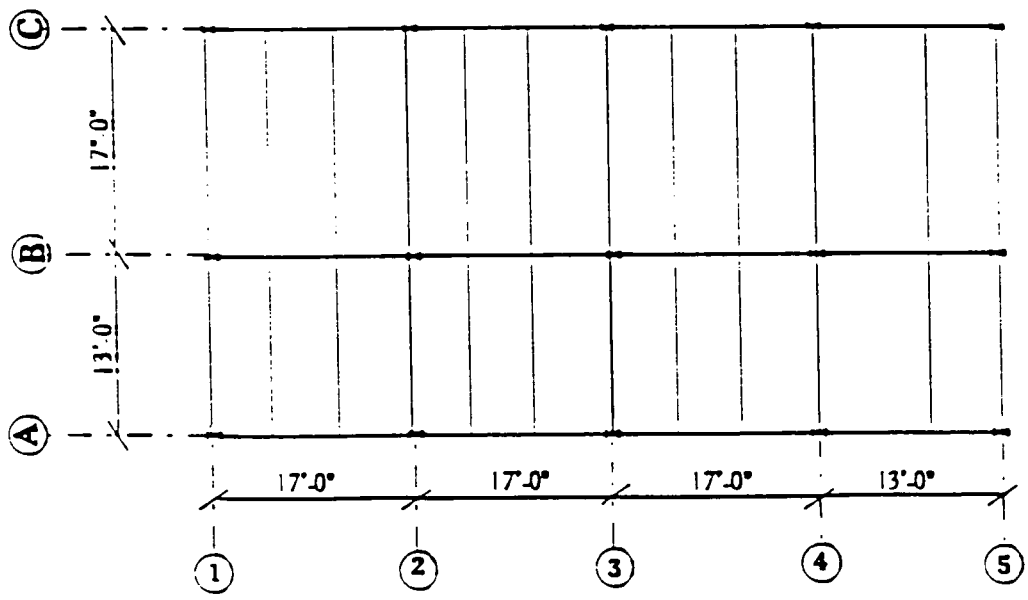
1. Demolish the entire facility.
2. Demolish the tall (44 ft.) tile silos. Inspect and repair as required the lower level platform decking plate connections and reinforce diagonal silo support beam connections, or add horizontal diaphragm bracing.
3. Demolish the tall (44 ft.) tile silos and add vertical bracing at the unbraced intermediate transverse frames.

The east (six-silo) structure is inadequate to resist 90 mph basic wind speed loading in the transverse (east-west) direction. The transverse frame at the north end of this structure would be significantly overstressed under wind loading. The diaphragm capacity of the silo support framing and lower level platform plate is suspect. It is recommended that corrective action be taken to assure the structural safety of the six-silo facility. The following alternatives would be acceptable:

1. Demolish the entire facility.
2. Inspect and repair as required the lower platform decking plate connections, reinforce diagonal silo support beam connections or add horizontal diaphragm bracing, and add vertical bracing at the north end frame.

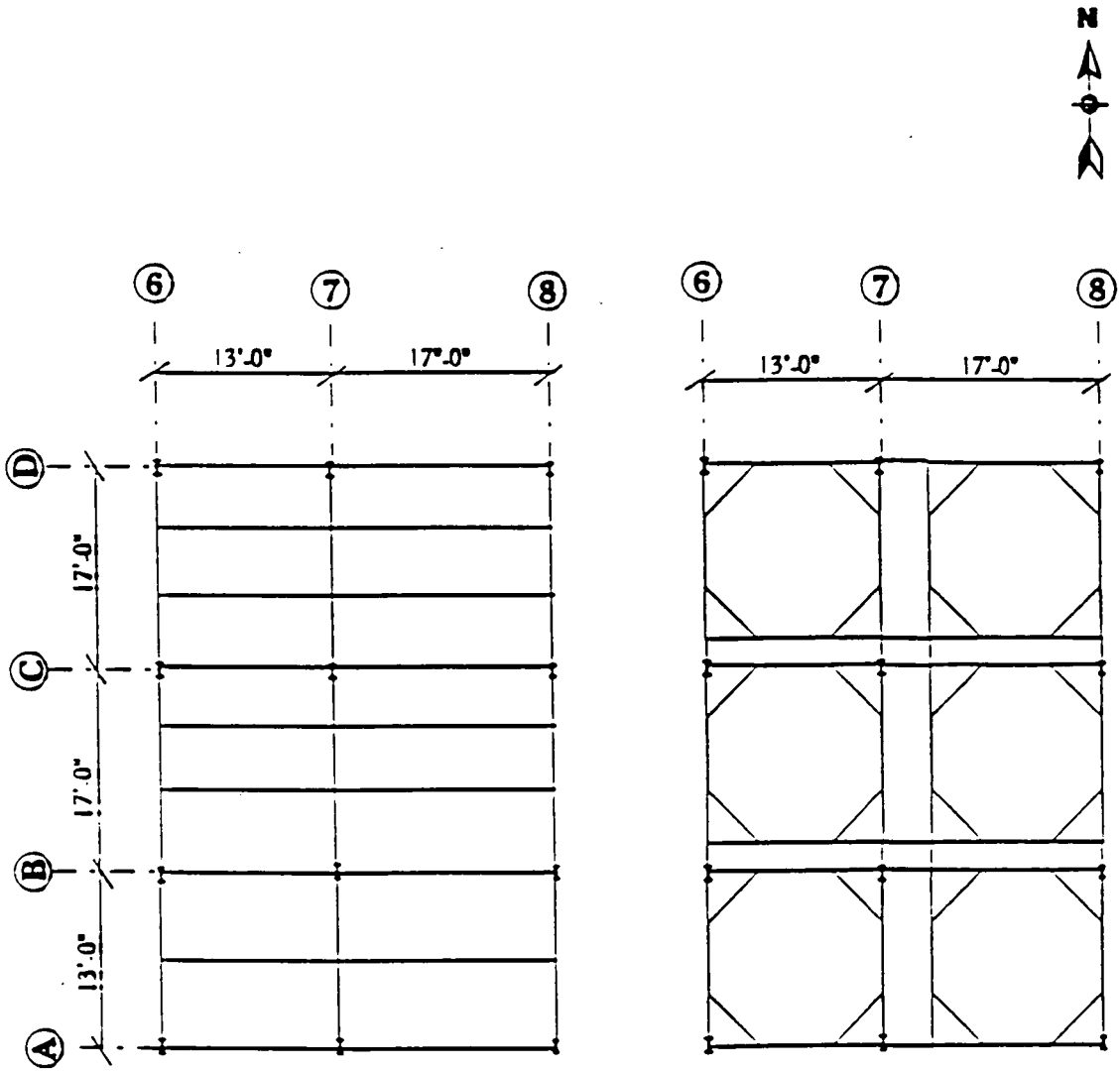
FERNALD PLANT 1 SILO INVESTIGATION





8 - SILO (WEST) STRUCTURE

FERNALD PLANT 1 SILO INVESTIGATION



6 - SILO (EAST) STRUCTURE

*Table 3-6. Seismic Zone Tabulation, U.S.**

MASSACHUSETTS
- Boston 2
- Fort Devens 2
- L. G. Hanscom Field 2
- Otis AFB 2
- Westover AFB 2

MICHIGAN
- Detroit 1
- Kincheloe AFB 1
- K. I. Sawyer AFB 1
- Selfridge AFB 1
- Wurtsmith AFB 1

MINNESOTA
- Duluth 1
- Minneapolis 1
- Oscoda AFB 1

MISSISSIPPI
- Biloxi 0
- Columbus AFB 1
- Jackson 1
- Keesler AFB 0
- Meridian 1

MISSOURI
- Kansas City 2
- Lake City AAP 2
- Fort Leonard Wood 1
- St. Louis 2
- Richards Gebaur AFB 2
- Whiteman AFB 1

MONTANA
- Helena 3
- Malmstrom AFB 2
- Missoula 2

NEBRASKA
- Cornhusker AAP 1
- Lincoln 1
- Offutt AFB 1

NEVADA
- Carson City 3
- Fallon 4
- Hawthorne 4
- Las Vegas 2

NEW HAMPSHIRE
- Hanover 2
- Pease AFB 2
- Portsmouth 2

NEW JERSEY
- Atlantic City 1
- Bayonne 2
- Picatinny Arsenal 2
- McGuire AFB 1
- Fort Monmouth 2

NEW YORK
- Albany 2
- Buffalo 2
- Fort Drum 2
- Griffiss AFB 2
- New York 2
- Niagara Falls IAP 2
- Plattsburg AFB 2
- Syracuse 1
- West Point Military Reservation 2
- Watervliet 2

NORTH CAROLINA
- Fort Bragg 1
- Charlotte 2
- Camp Lejeune 1
- Greensboro 2
- Pope AFB 1
- Seymour Johnson 1
- Sunny Point Ocean Terminal 1

NORTH DAKOTA
- Bismarck 1
- Fargo 1
- Grand Forks AFB 1
- Minot AFB 1

OHIO
- Cincinnati 1
- Cleveland 1
- Columbus 1
- Ravenna AAP 1
- Wright-Patterson AFB 1

OKLAHOMA
- Enid/Vance AFB 1
- Fort Sill 2
- Tinker AFB 2
- Tulsa 1

OREGON
- Coos Bay 1
- Eugene 1
- Portland 1
- Umatilla AD 1

PENNSYLVANIA
- Carlisle Barracks 1
- Harrisburg 1
- Letterkenny AD 1
- Philadelphia 2
- Pittsburgh 1
- Scranton 2

NEW MEXICO
- Albuquerque 2
- Cannon AFB 1
- Holloman AFB 2
- White Sands MR 2

RHODE ISLAND
- Newport .....
- Providence .....

SOUTH CAROLINA
- Charleston .....
- Fort Jackson .....
- Parris Island .....
- Shaw AFB .....

SOUTH DAKOTA
- Ellsworth AFB .....
- Pierre .....
- Sioux Falls .....

TENNESSEE
- Chattanooga .....
- Holston AAP .....
- Memphis .....
- Milan AAP .....
- Nashville .....

TEXAS
- Austin/Bergstrom AFB .....
- Corpus Christi .....
- Dallas .....
- Dyess AFB .....
- Ellington AFB .....
- El Paso .....
- Galveston .....
- Fort Hood .....
- Houston .....
- Lone Star AAP .....
- Reese AFB .....
- San Antonio .....
- Fort Worth .....
- Wichita Falls .....

UTAH
- Dugway P.G. .....
- Hill AFB .....
- Salt Lake City .....
- Tooele Army Depot .....

VERMONT
- All .....

VIRGINIA
- Fort Belvoir .....
- Fort Eustis .....
- Fort Meyer .....
- Norfolk .....
- Petersburg/Fort Lee .....
- Quantico .....
- Radford AAP .....
- Richmond .....

*Refer to table 3-1 for prescribed values of Z.

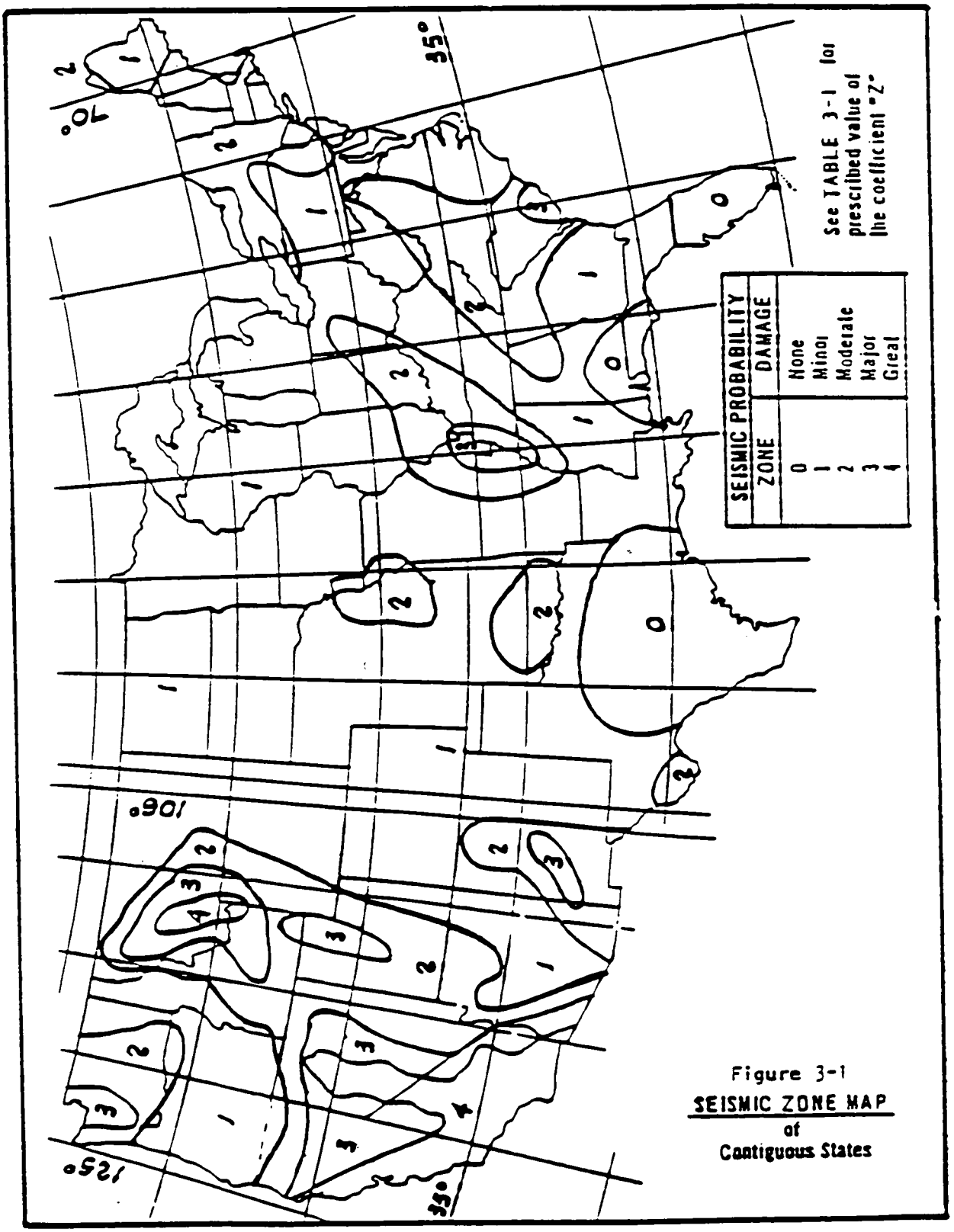


Figure 3-1
SEISMIC ZONE MAP
of
Contiguous States

115A

APPENDIX C

IH&S-IH-03 WMCO INDUSTRIAL HYGIENE AND SAFETY MANUAL, CONTROL OF WORK INVOLVING ASBESTOS

SP-P-35-010 - UNRESTRICTED RELEASE OF MATERIALS FROM THE FMPC

FM-MISC-0010 - TOXICITY CHARACTERISTIC LEACHING PROCEDURE

SP-P-35-023 - RADIOLOGICAL CONTAMINATION SURVEY

SSOP-0002-COMPLETING THE MATERIAL EVALUATION FORM

Westinghouse Materials Company of Ohio

INDUSTRIAL HYGIENE AND SAFETY MANUAL

CONTROL OF WORK INVOLVING ASBESTOS

Industrial Hygiene

IH&S-IH-03	Date: 03-20-89	Rev: 0	

1.0 PURPOSE

To describe the requirements and methods to be used to ensure that exposures of employees to asbestos are within applicable limits and are controlled to levels which are As Low As Reasonably Achievable (ALARA).

2.0 SCOPE

This procedure establishes responsibilities regarding work involving asbestos, and provides information on asbestos hazard awareness, and requirements covering how asbestos work is to be controlled. This procedure applies to all WMCO personnel, subcontractors and/or others at the FMPC.

3.0 DEFINITIONS

3.1 Asbestos - a fibrous material suitable for use as an incombustible, non-conducting, or chemically resistant material; includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

3.2 Asbestos Fiber - a particulate form of asbestos, 5 micrometers or more in length, with a length-to-diameter ratio of at least 3 to 1.

3.3 Asbestos Work Area - any area in which asbestos work is being done.

3.4 Asbestos Worker - personnel who may be exposed to airborne asbestos fibers as a part of their defined or assigned job.

3.5 Assistant Emergency Duty Officer (AEDO) - the AEDO is the onsite management authority for all shifts and for all abnormal events. This position is filled by a Utilities Engineer.

3.6 Demolition - the wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations.

3.0 DEFINITIONS (continued)

3.7 Demolition/Renovation Project Asbestos Removal Form - a form provided by Environmental Compliance which is completed by a Planner of Asbestos Work, Supervisor-In-Charge of Asbestos Workers, or a Project Engineer providing information to Environmental Compliance in advance of any asbestos removal or demolition job.

3.8 Emergency Renovation - a renovation operation that was not planned but results from a sudden, unexpected event. This term includes operations necessitated by non-routine failures of equipment which must be addressed to minimize downtime on essential process equipment and those operations necessary to mitigate potential human health risk.

3.9 Friable Asbestos Material - any material containing more than one percent asbestos by weight, that hand pressure can crumble, pulverize, or reduce to powder when dry.

3.10 Glove Bag - a polyethylene plastic bag fitted with arms through which work can be performed, and which allows workers to remain completely isolated from the asbestos material being removed.

3.11 HEPA Vacuum - a portable vacuum cleaner equipped with a high efficiency particulate air (HEPA) filter designed to be 99.97% efficient at collecting 0.3 micron size particles.

3.12 Incidental (Demolition and/or Renovation) - extremely small, minor removals which are necessary to facilitate normal conduct of business. These projects could not have reasonably been foreseen or planned, and do not constitute classification as emergency removals.

3.13 Planned Major (Demolition and/or Renovation) - non-emergency removals involving the removal of friable asbestos materials from at least 260 linear feet of pipes or at least 160 square feet of other facility components such as transite.

3.14 Planned Minor (Demolition and/or Renovation) - non-emergency removals involving the removal of friable asbestos materials from less than 260 linear feet of pipes or 160 square feet of other facility components such as transite.

3.15 Planner of Asbestos Work - person responsible for planning jobs involving work with asbestos (e.g., job planner - estimator, project engineer, maintenance supervisor).

3.16 Renovation - altering in any way one or more facility components. Operations in which load-supporting structural members are wrecked or taken out are specifically excluded.

3.17 Small-scale, short duration operations - work activities which have a reduced potential for elevated levels of asbestos fibers being generated due to the small scale or short duration of the operation (See Section 5.2.4.5 for criteria).

3.0 DEFINITIONS (continued)

3.18 Supervisor-In-Charge - the person(s) supervising the employee(s) performing the work required.

4.0 RESPONSIBILITIES

4.1 Facility Owner

4.1.1 Ensures prompt maintenance/repair of deteriorated or damaged insulation or other asbestos containing material.

4.1.2 Contacts Industrial Hygiene for regulation of areas containing deteriorated or damaged insulation until repairs can be made.

4.1.3 Contacts Industrial Hygiene for sampling of insulation or other material to determine asbestos content.

NOTE: Asbestos cannot be identified by the human eye. All existing insulation shall be considered as containing asbestos unless identified by labeling or analysis as non-asbestos.

4.2 Planner of Asbestos Work

4.2.1 Minimizes use of asbestos-containing materials by ordering asbestos-free substitutes whenever possible.

4.2.2 Notifies Environmental Compliance of each asbestos-related or suspected asbestos-related operation to be performed, by completing and forwarding the Demolition/Renovation Project Asbestos Removal Form (Attachment B) as required by Environmental Compliance.

4.2.3 The initiator of emergency or unplanned jobs involving asbestos work shall notify Environmental Compliance and the Industrial Hygiene Technician prior to the start of the job.

NOTE: If the work does not involve a job planner-estimator, it is the responsibility of the supervisor-in-charge of the work force to complete and forward the Demolition/Renovation Project Asbestos Removal Form to Environmental Compliance.

4.3 Supervisor-In-Charge of Asbestos Workers

4.3.1 Submits names of asbestos workers to the Medical Service Section and the Industrial Hygiene Subsection of the OS&H Department.

4.3.2 Assures a minimum use of asbestos-containing material, by using asbestos-free substitutes.

4.0 RESPONSIBILITIES (continued)

4.3.3 Verifies that all personnel working with asbestos have completed the appropriate asbestos worker training programs.

4.3.4 Verifies that all personnel identified as asbestos workers are respirator fit-tested once every six months.

4.3.5 Instructs personnel in proper methods of working and handling asbestos-containing materials and ensures compliance.

4.3.6 Initiates a FMPC Work Permit Form (OS&H form 2939) per Site Procedure FMPC-516 for any work resulting in the handling of any asbestos-containing material. Contacts Industrial Hygiene Technician to issue FMPC Asbestos Work Permit (OS&H form 2940, Attachment C). Verifies that the completed Work Permit and Asbestos Work Permit is posted at the asbestos work site.

4.3.7 Shall attend the appropriate asbestos training courses before supervising any asbestos work permit job.

4.3.8 Verifies the asbestos work site is posted with asbestos warning signs, and that the area is segregated from other work areas by rope, barrier tape or plastic sheeting. Verifies compliance with the Asbestos Work Permit requirements.

4.3.9 Assures use of proper personal protective equipment and the proper disposal of bagged clothing, bagged scrap, and labeling of such materials.

4.3.10 Ensures that no free standing liquid is contained in the bagged asbestos waste.

4.4 Asbestos Worker

4.4.1 Performs jobs in accordance with requirements set forth on the Asbestos Work Permit.

4.4.2 Shall not perform any work with asbestos until successfully completing the asbestos worker training program.

4.4.3 Shall report any situation to their immediate supervisor regarding potential exposure to friable asbestos material.

4.4.4 Shall immediately report any signs of heat stress from co-workers or themselves to the supervisor-in-charge.

4.4.5 Wears personal air sampling equipment when directed by supervision or Industrial Hygiene.

4.0 RESPONSIBILITIES (continued)

4.5 Industrial Hygiene

4.5.1 Reviews and concurs with specifications for subcontract/vendor work involving asbestos and with selected bid package.

4.5.2 Verifies, through contact with Environmental Compliance for each asbestos job, that regulatory notification has been completed and that approval to begin work has been granted before issuing Asbestos Work Permit.

4.5.3 Authorizes and provides special precautions and work practices for each asbestos job by completing and returning the Asbestos Work Permit to the supervisor-in-charge of asbestos workers (job supervisor).

4.5.4 Specifies the use of proper personal protective equipment required for each asbestos job.

4.5.5 Ensures adequate monitoring by sampling selected job operations based on duration and degree of potential exposure and provides notification of air sampling results as required.

4.5.6 Evaluates effectiveness of control measures and/or engineering controls in maintaining the required asbestos TLV.

4.5.7 Notifies supervision when personnel identified as asbestos workers are due for six month fit-testing and conducts the fit-testing.

4.5.8 Provides training and instruction to personnel in the proper methods of working with, and handling asbestos-containing materials.

4.5.9 Performs periodic inspections of asbestos work-sites to ensure compliance with acceptable asbestos work practices.

4.5.10 Reviews the use of asbestos-containing materials and recommends asbestos-free replacements whenever possible.

4.5.11 Regulates areas when asbestos containing materials are found in extremely poor condition to reduce the potential for exposure to individuals working in the immediate area of the damaged materials.

4.5.12 Performs inspections of buildings and surrounding areas to identify areas where asbestos containing materials are present.

4.5.13 Conducts routine air monitoring to ensure that airborne levels are within acceptable levels.

4.0 RESPONSIBILITIES (continued)

4.5.14 Collects samples of suspect asbestos materials for positive identification by laboratory analysis and tags sampled areas for future reference.

4.6 Medical Services

4.6.1 Performs annual physical examination on all personnel identified as asbestos workers, provides medical guidance concerning these employees, and makes recommendations based on medical condition and medical history.

4.6.2 Retains asbestos workers' medical files for the duration of their employment, plus thirty years.

4.7 Procurement

4.7.1 Verifies Industrial Hygiene concurrence prior to award of subcontracts for construction/engineering projects involving work with asbestos and prior to issuance of Purchase Orders to vendors involving work with asbestos.

4.7.2 Procures or modifies procurement specifications as directed by the requisitioner and/or OS&H to ensure use of asbestos-free materials whenever possible.

4.8 Project Engineer

4.8.1 Reviews all construction/engineering projects to identify as early as possible if any asbestos will be involved in the project.

4.8.2 Includes requirements for compliance with all asbestos regulatory requirements in project specifications for jobs involving work with asbestos and provides specifications to Industrial Hygiene for review.

4.8.3 Includes requirement for submittal of an acceptable Asbestos Work Plan in project specifications involving work with asbestos.

4.8.4 Specifies asbestos-free substitutes whenever possible.

4.8.5 Notes on drawings when asbestos is required or removed.

4.8.6 Completes a Demolition/Renovation Project Asbestos Removal Form (Attachment B) and submits to Environmental Compliance whenever construction projects involve the demolition and/or removal of asbestos containing materials.

4.8.7 Ensures proper FMPC Asbestos Work Permits are obtained during the course of the work.

4.0 RESPONSIBILITIES (continued)

4.9 Waste Operations

4.9.1 Provides interim storage, transport and disposal of asbestos waste material.

4.9.2 Recommends and provides approved containers for disposal of asbestos waste material.

4.10 Waste Technology

Establishes guidelines for interim storage, transport and disposal of asbestos waste material.

4.11 Environmental Compliance

4.11.1 Reviews, recommends and approves, in cooperation with responsible organizations, control and disposal methods for compliance with EPA regulations.

4.11.2 Provides notification to Industrial Hygiene when regulatory approval has been granted for an asbestos demolition or renovation project to commence.

4.11.3 Provides direction and any required training to all personnel required to complete the Demolition/Renovation Project Asbestos Removal Form.

4.12 Assistant Emergency Duty Officer (AEDO)

4.12.1 Classifies an event and determines if it is reportable to DOE as an emergency or non-routine event.

4.12.2 May direct OS&H personnel to perform analysis and monitoring efforts.

4.12.3 Logs all events and ensures that all original reports, forms, and logs are placed in Emergency Preparedness files.

4.12.4 Ensures that areas of damaged asbestos are regulated, repaired and cleaned up in an expeditious manner after an asbestos related event.

5.0 GENERAL

5.1 Asbestos Awareness and Hazard Control

5.1.1 Asbestos refers to a group of fibrous silicate minerals which are valued for their ability to withstand heat, insulate, and to reinforce other materials. When the FMPC was built, and in later years, asbestos was widely used in steam pipe insulation, asbestos-cement pipes, corrugated asbestos-cement board (transite) and furnace insulation.

5.0 GENERAL (continued)

Asbestos dust may be generated when such equipment is damaged, repaired or replaced. Asbestos may also be present in floor tile/sheeting, valve packing, gaskets, brake linings, and other materials.

5.1.2 Asbestos cannot be identified by the human eye. All existing insulation and other items listed in Section 5.1.1 shall be considered as containing asbestos unless identified by labeling or analysis as non-asbestos.

5.1.3 To identify the presence or absence of asbestos, contact the Industrial Hygiene Technician for sample collection or for results of prior analysis. Previously sampled locations are marked with an identification tag and analytical results are available from Industrial Hygiene for these samples. An example of the sample location identification tag is shown in Attachment A.

NOTE: Use of this asbestos sample tag was initiated in October 1988. Before this tag was used, asbestos bulk sample locations were identified using plastic tape with a six digit number indicating the sample number.

5.1.4 Airborne asbestos dust, consisting of microscopic fibers, constitutes a known respiratory hazard, because asbestosis, mesothelioma, and cancer of the lungs or other body organs may result from inhalation of asbestos fibers after a latency period. Therefore asbestos dust exposures and releases to the environment must be minimized even though extra time and effort are required.

5.1.5 Since airborne asbestos fibers are a known respiratory hazard, it is important to maintain asbestos containing materials (specifically pipe insulation) in good condition in order to reduce the potential for employee exposure to airborne asbestos fibers.

5.1.6 All personnel must be alert for the presence of damaged asbestos containing materials and notify the Facility Owner who shall ensure proper repairs are made and shall contact Industrial Hygiene for posting of hazard warnings if appropriate.

NOTE: If insulation or other asbestos containing material has been seriously damaged creating a potential for exposure to dust contact the AEDO and Industrial Hygiene immediately for proper regulating of the area, clean-up, and repair. (See Section 5.7).

5.1.7 Industrial Hygiene performs periodic inspections of buildings to identify areas where pipe insulation or other suspect asbestos containing structures are damaged and in a

5.0 GENERAL (continued)

friable condition. The Facility Owner is informed of the findings for corrective action and the area may be identified with hazard warnings if necessary.

5.1.8 An FMPC Asbestos Work Permit must be obtained and its requirements followed, for any work with asbestos-containing materials at the FMPC.

5.2 Planning for Work/Projects Which May Involve Asbestos

5.2.1 General

Asbestos is present in many building materials found at the FMPC. Many construction and maintenance activities involve the disturbance of asbestos containing materials. For this reason, all construction/maintenance activities should be evaluated as early as possible to determine if any suspect asbestos containing materials are present and may be disturbed during the course of the work activity.

5.2.1.1 If materials suspected of containing asbestos are present, Industrial Hygiene shall be contacted to collect samples to determine if the suspect materials contain asbestos or are asbestos-free.

NOTE: If suspect asbestos containing materials are to be disturbed as part of construction/maintenance activities, and time does not allow for sampling of the suspect materials, the materials shall be handled as asbestos.

5.2.1.2 For work to be performed by a subcontractor or vendor, requirements for compliance with FMPC controls for work with asbestos shall be included in procurement documents and an Asbestos Work Plan shall be submitted by the subcontractor/vendor for any work which involves asbestos and shall be provided to Industrial Hygiene for review and concurrence. (See Section 5.2.2)

NOTE: For minor asbestos work such as drilling holes in floor tile or transite, an Asbestos Work Plan is not required. (See Section 5.2.2.3 Note)

5.2.1.3 For all asbestos work the need for a Demolition/Renovation Project Asbestos Removal Form (Attachment B) shall be evaluated and the form filed if required. (See Section 5.2.3)

5.0 GENERAL (continued)

5.2.1.4 An OSHA "competent person" shall be assigned to supervise the asbestos work project, except small-scale, short-duration work. (See Section 5.2.4)

5.2.1.5 For all asbestos work an FMPC Asbestos Work Permit shall be obtained. (See Section 5.2.5)

5.2.2 Subcontract/Vendor Specifications and Work Plan:

For any project/construction activity which involves work with asbestos the procurement documents shall include the following:

5.2.2.1 Requirements for compliance with all applicable regulatory requirements involving work with asbestos including those of OSHA, EPA and the State of Ohio.

5.2.2.2 The requirement that subcontractor/vendor shall submit documentation of proper respirator fit-testing, medical certification and training in the use of respirators for all involved workers to Industrial Hygiene prior to the start of work.

5.2.2.3 The requirement for submittal of an Asbestos Work Plan as part of the bid.

NOTE: For minor asbestos work such as drilling holes in transite or floor tile, an Asbestos Work Plan is not required. However, before the start of these minor asbestos work activities, Industrial Hygiene shall be presented documentation as specified in Section 5.2.2.2 and documentation that all workers have attended knowledge level asbestos worker training as specified by OSHA.

5.2.2.3.1 This Work Plan shall be submitted to and approved by WMCO Industrial Hygiene prior to the start of work and shall include the scope of the proposed asbestos work, the proposed asbestos abatement methods to be used during the asbestos work, engineering controls that will be used to control the release of asbestos fibers, personnel and clearance air monitoring procedures, protective equipment to be used including respiratory protection and protective clothing, and the employee training program.

5.0 GENERAL (continued)

5.2.2.3.2 All subcontractor/vendor employees required to supervise or perform asbestos removal work shall be licensed for asbestos removal in accordance with the laws of the State of Ohio. Records of this licensing shall be submitted with the Asbestos Work Plan.

5.2.2.3.3 The subcontractor/vendor must submit with the Work Plan evidence that the company is certified by the State of Ohio as an Asbestos Hazard Abatement Contractor.

5.2.3 Required Notifications:

Before any asbestos demolition or renovation may commence, certain regulatory requirements must be met. (Contact Environmental Compliance for additional information.) Written notification shall be provided to Environmental Compliance well in advance of commencing work (30 to 40 days prior to the start of planned demolition or renovation). The written notification shall be in the form of a Demolition/Renovation Project Asbestos Removal Form (see Attachment B).

5.2.3.1 For a Planned Major Demolition or Renovation project involving friable asbestos, a minimum of 30 days written notification must be given to Environmental Compliance prior to commencing work.

5.2.3.2 For a Planned Minor Demolition project, a minimum of 40 days written notification must be given to Environmental Compliance prior to commencing work.

5.2.3.3 For a Planned Minor Renovation project, the Asbestos Removal Form is to be completed and forwarded to Environmental Compliance prior to commencing work.

5.2.3.4 Emergency and Incidental Demolitions are not recognized by the regulators. All demolition activities are to be reported in accordance with sections 5.2.3.1 and 5.2.3.2.

NOTE: If a situation arises where such a removal is necessary to mitigate potential human health risks, the project manager or supervisor shall immediately contact Environmental Compliance.

5.0 GENERAL (continued)

5.2.3.5 Emergency Renovation removals must be orally reported directly to Environmental Compliance prior to the removal, if practical, or immediately thereafter.

NOTE: When an Emergency Renovation must be accomplished on an off-shift or weekend, notification to Environmental Compliance must occur as soon as practical afterwards.

5.2.3.6 Incidental Renovation removals must be orally reported directly to Environmental Compliance prior to the removal.

5.2.3.7 When completing the Asbestos Removal Form, it is necessary to be as accurate as possible with the starting date of an asbestos removal project since it is the most likely date of an inspection by an off site regulatory agency. When the proposed starting date must be changed, immediate oral notification shall be made to Environmental Compliance.

NOTE: Any questions or concerns regarding EPA regulations and reporting requirements shall be addressed to the Environmental Compliance Subsection of the OS&H Department.

5.2.4 Supervision of Asbestos Work:

The supervisor of an asbestos work project (except small-scale, short duration work) shall be qualified as a "competent person" as defined in the OSHA Asbestos Standard. The term "competent person" as defined by OSHA means one who has passed an OSHA approved training course, is capable of identifying existing asbestos hazards in the workplace and who has the authority to take prompt corrective measures to eliminate them. See Section 5.6.1.5 for the training requirements for the assigned "competent person".

5.2.4.1 The assigned "competent person" for an asbestos work activity must be a supervisory level individual and must be physically present at the work site as long as workers are inside the asbestos work area.

5.2.4.2 The duties of the "competent person" include at least the following: establishing the asbestos work area, ensuring its integrity (when an enclosure is constructed), and controlling entry and exit from the asbestos work area.

5.0 GENERAL (continued)

5.2.4.3 The "competent person" is responsible for supervising any employee air sampling, ensuring that all employees working inside the asbestos work area wear the appropriate personal protective equipment, ensuring that these employees are trained in the use of appropriate methods of exposure control, and ensuring that these workers use the proper decontamination procedures when exiting the asbestos work area.

5.2.4.4 The "competent person" is also responsible for ensuring that engineering controls in use during the asbestos work are in proper operating condition and are functioning properly.

5.2.4.5 For small-scale, short-duration operations, a trained "competent person" is not required to supervise the asbestos work because there is a reduced potential for elevated levels of asbestos fibers being generated. See Section 5.6.1.4 for the training requirements for the supervisor of a small-scale, short-duration asbestos work activity.

5.2.4.5.1 Small-scale, short-duration operations are maintenance or renovation tasks, where the removal of asbestos containing materials is not the primary goal of the job (e.g., pipe insulation repair, valve replacement, drilling holes in transite to mount conduit, installing electrical conduits or piping through transite, etc.).

5.2.4.5.2 A small-scale, short-duration operation is any activity where employees' exposures to asbestos can be kept below the OSHA action level via worker isolation techniques, such as glove bags, mini-enclosures, or the removal of an entire asbestos-covered pipe or structure. Activities such as the removal of up to 160 square feet of transite or the removal of up to 30 feet of pipe insulation by glove bag are known to result in employee exposures less than the OSHA action level. Removals which exceed these size limits shall not be classified as small-scale, short-duration.

5.0 GENERAL (continued)

5.2.4.5.3 Asbestos work not fitting the small-scale, short-duration criteria of 5.2.4.5.2 cannot be reduced in size by creating two or more small scale operations.

5.2.4.5.4 All of the requirements of 5.2.4.5.1 through 5.2.4.5.3 must be met for a maintenance or renovation task requiring the removal of asbestos to be classified as a small-scale, short-duration operation.

5.2.5 Authorization to Perform Work - Asbestos Work Permit:

After all regulatory requirements have been met, Industrial Hygiene shall be contacted to issue an FMPC Asbestos Work Permit (Attachment C). An Asbestos Work Permit is required for all activities involving work with asbestos, and shall be posted at the perimeter of the asbestos work area prior to the start of work.

NOTE: The permit shall be posted outside the actual work area so it can be viewed without entering the asbestos work area.

5.3 Proper Asbestos Work Practices

5.3.1 When working with asbestos, certain precautions are required to ensure the health and safety of the asbestos workers and building occupants.

NOTE: A stock of safety supplies required to perform asbestos abatement activities are available through Inventory Control & Warehousing. See Attachment D.

5.3.2 Before start of asbestos work activity, the supervisor-in-charge shall identify the proper disposal methods for asbestos waste, and the final on-site destination of the containerized waste (contact Waste Operations).

5.3.2.1 Waste containers from Waste Operations shall be available at the asbestos work site before the start of work.

5.3.2.2 All material removed during asbestos work, shall be wetted, double bagged in plastic (at least 12 mil total plastic), sealed, placed in white 55 gallon drums or wooden boxes supplied by Waste Operations, suitably labeled, and disposed of in accordance with disposal requirements of Waste Technology.

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5.0 GENERAL (continued)

NOTE: All waste shall have sufficient absorbent material added to it in order to be able to absorb two (2) times the volume of liquid in the container.

5.3.2.3 The final on-site destination of the containerized waste shall be determined by Waste Operations.

5.3.3 The asbestos work area shall be segregated such that other personnel will not be subjected to asbestos. This shall be accomplished by roping-off the area, using banner-guard tape, or by using plastic sheeting to totally enclose the work area. The manner of segregating the work area shall be approved by Industrial Hygiene and will depend on the size of the job and exposure potential. When total enclosure of the work area is required the need for use of a HEPA filtered negative pressure ventilation system and for special clearance air sampling shall be evaluated and approved by Industrial Hygiene.

NOTE: When a HEPA filtered negative pressure ventilation system is used as part of a total enclosure job, the system shall be operated continuously in order to constantly clean the air inside the enclosure of asbestos fibers. The HEPA ventilation shall continue to operate until clearance air sampling shows acceptable results.

NOTE: Nearby building occupants shall be notified before asbestos work begins to prevent unauthorized access to the work area.

5.3.4 All asbestos work areas shall be posted with asbestos warning signs. See Attachment E for required wording.

NOTE: After completion of the job the work area shall remain segregated and warning signs posted until approval is obtained from Industrial Hygiene indicating that final inspection of work area is completed.

5.3.5 Requirements of the Asbestos Work Permit for clearing the work area of extraneous items, and use of plastic sheeting to prevent contamination of equipment and surfaces shall be complied with.

5.0 GENERAL (continued)

5.3.6 Any local ventilation systems which have the potential to spread asbestos fibers in the immediate work area or throughout the building shall be tagged and locked out of service, or otherwise protected, until the asbestos removal and clean-up is completed. After the ventilation system has been shut down, ventilation duct openings shall be sealed with plastic when there is the potential for asbestos contamination to get into the building ventilation system.

5.3.7 Smoking, chewing tobacco/gum, eating or drinking shall not be permitted in the asbestos work area.

5.3.8 Personnel working in asbestos work areas shall use approved respiratory protection.

5.3.8.1 Only the same brand and size of respirator with which the person was fitted shall be worn.

5.3.8.2 The respirator requirements specified for each asbestos job by Industrial Hygiene on the Asbestos Work Permit shall be complied with.

5.3.9 All personnel inside the asbestos work area shall comply with protective clothing requirements and respirator requirements as posted and as stated on the Asbestos Work Permit and the FMPC Work Permit.

5.3.9.1 At the completion of the asbestos work or whenever exiting the asbestos work area, any visible asbestos shall be vacuumed from disposable clothing using a HEPA-filtered vacuum cleaner (approved for asbestos use) before removal of disposable clothing.

NOTE: HEPA vacuums used for asbestos work must be labeled for use with asbestos only. When a HEPA vacuum previously used for asbestos work is to be used for clean-up of non-asbestos materials, the paper disposal bag and cloth main filter must be removed and disposed of as asbestos waste and refitted with clean replacements.

5.3.9.2 Disposable protective clothing shall be removed upon leaving the asbestos work area, placed in 12-mil plastic bags, labeled as asbestos waste, sealed, and placed with other asbestos waste in white 55 gallon drums marked with proper asbestos identification labels.

5.0 GENERAL (continued)

5.3.9.3 When removing disposable protective clothing, continue using respiratory protection until all disposable protective clothing has been sealed in plastic bags.

5.3.9.4 Personnel working inside the asbestos work area shall decontaminate as per steps 5.3.9.1 through 5.3.9.3 at each departure from the work area and shall shower before lunch and at the end of their shift.

5.3.10 Friable asbestos scrap material is not allowed to be handled in a dry condition. All asbestos containing materials shall be adequately wetted before removal (i.e., thoroughly soaked before removal is attempted). Use of surfactants to improve the wetting properties of water is recommended. The water or wetting agent shall be applied by a gentle spray or mist so as not to disturb the asbestos and generate airborne fibers. It may be necessary to continue the wetting process until the asbestos material is bagged and sealed.

5.3.11 During demolition of items insulated with or otherwise containing friable asbestos, items shall be removed so as to minimize stripping of insulation, i.e., insulated piping can be removed in sections by removing small areas of insulation at set intervals, sealing exposed insulation, wrapping piping in plastic, cutting through piping where asbestos has been removed, and placing cut sections of insulated piping into waste containers. Items (pipes, ducts, structural members, etc.) that are covered with materials containing asbestos, shall not be dropped or thrown to the ground, but shall be carefully lowered to the ground.

5.3.12 When removing asbestos pipe insulation, plastic glove bags shall be used whenever feasible during the removal to minimize the escape of asbestos fibers. The glove bag allows for total enclosure of the asbestos removal while isolating the worker from any significant exposure to the asbestos being removed.

NOTE: Glove bags cannot be used on pipes at temperatures above 130 degrees Fahrenheit because the plastic will melt. Every effort should be made to cool the piping before removing the insulation. When this is not practical, wet methods shall be used to remove the insulation.

5.3.13 After completion of all stripping/removal work, surfaces from which asbestos containing materials have been removed shall be cleaned to remove all visible residue. After cleaning, a sealant shall be used on the cleaned surface to lock down any remaining fibers.

5.0 GENERAL (continued)

5.3.14 Any asbestos debris on the floor or other surfaces in the work area shall be immediately removed by a HEPA vacuum (approved for asbestos use) or wetted and removed by wet wiping to avoid suspension.

NOTE: Sweeping, be it wet or dry, with or without sweeping compound, is not allowed.

5.3.15 When the asbestos work is completed, the work area shall be thoroughly cleaned to remove any visible asbestos debris. Clean-up should be accomplished using either a HEPA vacuum (approved for asbestos use) or wet methods for clean-up.

5.3.16 After clean-up of the work area is completed, the Industrial Hygiene Technician shall be contacted to conduct a visual inspection of the work area to verify that no visible asbestos debris is present. The Technician shall inform the supervisor or workers of any deficiencies found and then reinspect the area after recleaning. This process shall be repeated until acceptable clean-up conditions are obtained. The work area shall remain segregated and warning signs posted until the results of visual inspection are acceptable.

5.3.17 For total enclosure jobs only, general area air samples are required after final clean-up of the work site to determine that airborne asbestos levels inside the enclosure are at acceptable levels. (See paragraph 5.5.3). Clearance air samples will be collected only after a visual inspection of the enclosure is acceptable.

5.3.18 The Industrial Hygiene Technician shall notify the Supervisor-In-Charge or his designee when the final clean-up is acceptable (visual inspection and clearance sampling, if required), and that all remaining barriers and signs can be removed.

5.3.19 Deviations in the requirements of this section may be approved by the Industrial Hygiene Technician issuing the specific permit for the job with prior authorization from the Manager, Industrial Hygiene.

5.4 Work Practices for Work Involving Transite

5.4.1 Specific procedures are required when working with transite due to its unique characteristics. Transite is not as difficult to work with because the asbestos fibers are bonded in concrete until damaged, cut, etc.

5.4.2 The work area shall be isolated and defined by posting warning signs and securing warning tape. Additional isolation may be specified on the Asbestos Work Permit.

5.0 GENERAL (continued)

5.4.3 All personnel inside the asbestos work area shall comply with protective clothing requirements and respirator requirements as posted and as stated on the Asbestos Work Permit and the FMPC Work Permit.

5.4.4 Transite panels shall be removed whole whenever feasible and handled with care to avoid breakage.

5.4.5 As bolts are removed from each panel, they should be wet down to minimize any dust which may be generated.

5.4.6 Once removed, panels shall be wrapped with two layers of plastic and then placed in labeled wood or metal boxes (supplied by Waste Operations) for storage and shipment. When panels are larger than the container they are placed in, they shall be loosely double-wrapped in plastic, sealed, then broken in half and folded over. The broken panels shall then be wrapped with one more layer of plastic and sealed before they are placed into containers. Contact Waste Operations for additional information regarding waste handling.

NOTE: All waste containers shall have sufficient absorbent material added to absorb two times the volume of liquid present.

5.4.7 When cutting or drilling through transite the use of a HEPA filtered vacuum at the location of the penetration is required. This may be achieved by the use of a HEPA-filtered vacuum cleaner or power tools fitted with "point-of-cut" HEPA exhaust ventilation. The use of amended water shall also be employed at the penetration to minimize dusting. Deviations from these requirements must be approved by the Industrial Hygiene Technician.

NOTE: When cutting or drilling through transite the opposite side of the transite wall shall be sealed with plastic if there is a potential for generation of dust on the other side of the wall.

5.4.8 After removal of transite all surfaces adjacent to or in contact with the transite shall be thoroughly cleaned by wiping down with a wet rag or by vacuuming with a HEPA filtered vacuum approved for use with asbestos.

NOTE: If the surfaces appear to be contaminated with asbestos, they should be thoroughly cleaned before working with the transite.

5.4.9 After all asbestos jobs, the Industrial Hygiene Technician shall be contacted to perform a visual inspection of the work site to determine if the area has been cleaned up properly. (See paragraph 5.3.17)

5.0 GENERAL (continued)

5.4.10 For total enclosure jobs only, general area air samples are required after final clean-up of the work site to determine that airborne asbestos levels inside the enclosure are at acceptable levels. (See paragraph 5.5.3)

5.4.11 Approval shall be obtained from the Industrial Hygiene Technician before barriers and warning signs can be removed at the work site. (See paragraph 5.3.19)

5.4.12 Deviations in the requirements of this section may be approved by the Industrial Hygiene Technician issuing the specific permit for the job with prior authorization from the Manager, Industrial Hygiene.

5.5 Air Monitoring Requirements for Asbestos Work Activities

5.5.1 Determination of employee exposure to asbestos shall be made from breathing zone air samples collected during asbestos work activities as required by OSHA regulations. This air sampling shall be used to evaluate the effectiveness of control measures and/or engineering controls in maintaining the required asbestos exposure levels inside the segregated work area. The determination of whether such air sampling is required for a particular job shall be made by Industrial Hygiene.

5.5.1.1 Employees shall be notified of results of personal air samples collected on them during asbestos work activities.

5.5.2 General area air samples shall be collected as necessary outside the segregated work area during asbestos work activities to evaluate the effectiveness of the control measures in maintaining asbestos exposure levels outside the segregated work area to below the OSHA action level of 0.1 fibers per cubic centimeter. The determination of whether such air sampling is required for a particular job shall be made by Industrial Hygiene.

5.5.3 When total enclosure of the work area is required general area clearance air samples shall be collected. Results of asbestos clearance sampling shall be less than the EPA recommended 0.01 fibers per cubic centimeter (considering background).

5.6 Training and Qualification of Workers

NOTE: The training requirements covered in this section apply only to WMCO personnel. Subcontractor/vendor personnel shall meet the training requirements for asbestos workers and supervisory personnel as specified by the laws of the State of Ohio and shall provide documentation of such to WMCO.

5.0 GENERAL (continued)

NOTE: For minor asbestos work, such as drilling holes in transite or floor tile, subcontractor/vendor personnel shall have attended knowledge level asbestos worker training as specified by OSHA and shall provide documentation of such training to WMCO.

5.6.1 When working with asbestos, the asbestos workers and their supervisors are required to have completed specific training classes designed to meet regulatory requirements.

5.6.1.1 All individuals working with asbestos shall have completed a knowledge level asbestos worker training program prior to performing the work. This classroom training informs the worker of the requirements for handling asbestos and of the hazards associated with asbestos exposure.

5.6.1.2 All employees assigned to remove asbestos materials by glove bags must have attended hands-on glove bag training.

5.6.1.3 All employees assigned to work with asbestos materials that are required to wear negative pressure air-purifying respirators must have been respirator fit-tested in the last six (6) months and must have proper respirator training.

5.6.1.4 Supervisors assigned to supervise small-scale, short-duration asbestos work must have training equivalent to the training requirements for the workers doing the job. If the job is a glove bag removal of pipe insulation, the supervisor must have attended hands-on glove bag training.

5.6.1.5 Any supervisor assigned to supervise an asbestos work project (except small-scale, short duration work) must have completed the required training to qualify as an OSHA "competent person". This training consists of 32 hours of classroom and hands-on training and must be approved by the State of Ohio.

5.7 Handling Spills or Incidents Involving Asbestos

5.7.1 Any spill or incident which results in the potential for release of asbestos fibers shall be reported immediately to the Facility Owner, the AEDO, and to Industrial Hygiene. The affected area shall be evacuated immediately if airborne asbestos fibers are likely to be present.

5.7.2 The requirements of FMPC-503, "FMPC Spill Incident Reporting and Cleanup", shall be complied with as appropriate.

5.0 GENERAL (continued)

5.7.3 The AEDO and Industrial Hygiene shall evaluate the damaged asbestos and determine the appropriate corrective action which must be taken. When damaged asbestos is friable and could result in exposures to personnel (e.g., is in an occupied area, in a traffic area, or in the vicinity of a building ventilation system) immediate corrective actions are required, and the following steps must be followed.

5.7.3.1 The area shall be regulated using asbestos warning tape or other barriers to control access into the area in order to prevent exposure to, and the spread of asbestos contamination. Any person requiring entry into the regulated area must comply with respirator and protective clothing requirements specified by the Industrial Hygiene Technician.

5.7.3.2 All building ventilation systems in the immediate area shall be turned off or sealed off to prevent the spread of asbestos contamination.

5.7.3.3 The Facility Owner or the AEDO shall ensure that the area of damaged asbestos is repaired and clean-up is completed in an expeditious manner.

5.7.3.4 After repairs and clean-up of the area have been completed, Industrial Hygiene shall perform a visual inspection of the area to ensure that clean-up has been completed.

NOTE: As part of this inspection, general area air samples may be collected to measure levels of airborne fibers.

5.7.3.5 After the Industrial Hygiene inspection has determined the area to be properly cleaned, the warning barriers may be removed and the area reoccupied.

6.0 PROCEDURE

None

7.0 APPLICABLE DOCUMENTS

7.1 29 CFR 1910.1001, "Asbestos Guidelines for General Industry".

7.2 29 CFR 1926.58, "Asbestos Guidelines for the Construction Industry".

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7.0 APPLICABLE DOCUMENTS (continued)

7.3 40 CFR 61, subpart M, "USEPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) Asbestos Regulations".

7.4 Regulatory Compliance Guide SW:2, "Asbestos Removal Notification".

7.5 Ohio Department of Health "Asbestos Hazard Abatement Rules", Chapter 3701-34, Ohio Administrative Code, (effective July 20, 1987).

7.6 FMPC-503, "FMPC Spill Incident Reporting and Cleanup".

7.7 FMPC-516, "Control of Permits for Hazardous Work".

7.8 OS&H SOP OSH-P-41-006, "Issuing Permits for Asbestos Work".

8.0 FORMS USED

8.1 Demolition/Renovation Project Asbestos Removal Form, Form #(To be determined).

8.2 FMPC Work Permit, Form #FMPC-OS&H-2939

8.3 FMPC Asbestos Work Permit, Form # FMPC-OS&H-2940.

9.0 ATTACHMENTS

9.1 Attachment A, Asbestos Bulk Sampling Identification Tag

9.2 Attachment B, Demolition/Renovation Project Asbestos Removal Form.

9.3 Attachment C, FMPC Asbestos Work Permit.

9.4 Attachment D, Asbestos Safety Supplies Available Through Stores.

9.5 Attachment E, Asbestos Warning Sign

ATTACHMENT A

ASBESTOS BULK SAMPLING IDENTIFICATION TAG

CAUTION

DO NOT REMOVE THIS TAG

This material has been
sampled to determine
whether or not it contains

ASBESTOS

Before working with this
material, contact
Industrial Hygiene
(ext. 6207)
and request the results for

ASBESTOS SAMPLE
NUMBER

A 1009

FMPC-OS&H-3030 (9/13/88) A

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IH&S-IH-03	Date: 03-20-89	Rev: 0

ATTACHMENT B

DEMOLITION/RENOVATION PROJECT ASBESTOS REMOVAL FORM

DEMOLITION/RENOVATION PROJECT
ASBESTOS REMOVAL FORM
FEED MATERIALS PRODUCTION CENTER

Owner: U.S. Department of Energy

Operator: Westinghouse Materials Company of Ohio
7400 Willey Road
Fernald, Ohio 45030

Description of Facility (Item) Being Demolished/Renovated: Size: _____ Age: _____ Prior Use: _____

Estimated Quantity of Asbestos to Remove[1]: Linear feet[2]: _____ Square feet[3]: _____

* NOTE: Quantities > 260 L.F. of pipe or > 160 S.F. of surface area require notification of regulatory authorities prior to commencing work. Do not begin work unless written notification from Environmental Compliance is received.

Location of Facility (Item): (Include Room # or physical location with BLD/Plant #) _____

Demolition/Renovation (circle one) Start Date: _____

Schedule: Completion Date: _____

Does this include the wrecking or taking out of any load supporting structural member of a facility with any related demolition operations? (circle one) yes / no If yes, explain.

_____

Nature of Planned Demolition/Renovation Methods to be Used: _____

Removal Procedures (Wetting, Containing, etc.): _____

Name and Location of Storage/Disposal Sites: _____

Authority Requiring Removal: _____

WMCO Project Number: _____

Project Contact: _____ Ext. _____

* NOTE: Quantities > 260 L.F. and > 160 S.F. of surface area require notification of regulatory authorities prior to commencing work. Do not begin work unless written notification from Regulatory Compliance is received.

Completed by: _____ Name (Typed) _____ Title

Date of Form Completion: _____ Ext. _____

Signature: _____ Date

Additional Information (if applicable):

Footnotes:

1 If Quantity to be removed is less than 260 linear feet on pipes or 160 square feet on surface area, please indicate techniques of estimation.

2 Estimate for linear feet based on length of pipe insulation being removed.

3 Estimate for square feet based on surface area of asbestos being removed.

cc: Waste Management
Industrial Hygiene

Any questions, please contact S. G. Schneider at extension 6672.

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ATTACHMENT C

FMPC ASBESTOS WORK PERMIT

This permit is only valid when it is attached to the FMPC Work Permit Form which has Section A through D completed.

FMPC WORK PERMIT NO.

Sections A & B contain descriptive information about the job and the qualifications of personnel. This information should be obtained from the supervisor-in-charge.

SECTION A - BACKGROUND AND REGULATORY INFORMATION (To be completed by supervisor-in-charge)

1. Exact location:
2. Exact description of work to be conducted:
3. Amount of asbestos to be removed (in linear or square feet):
4. Regulatory approval received to begin work. ☐ YES ☐ DNA
   (For information, supervisor should contact Environmental Compliance)
5. Supervisor(s):

SECTION B - EMPLOYEE INFORMATION

1. Employee(s) assigned to job. NAME / BADGE NO.

	YES	NO
2. Employee(s) assigned to job have attended asbestos worker training in past twelve (12) months.		
3. Employee(s) assigned to job have attended glovebag training (applicable to glovebag removal only).		
4. Employee(s) assigned to job have been respirator fit-tested in last six(6) months.		
5. Employee(s) have been instructed by supervisor of proper asbestos methods		

Section C contains items which shall be complied with on the job as indicated.

SECTION C - PRE-JOB REQUIREMENTS SPECIFIED BY: _____ (TECHNICIAN INITIALS) _____ (DATE) _____ (TIME)

PREPARATION OF WORK SITE (All Asbestos Jobs)

	REQ'D	DNA
1. Work area barricaded and/or roped off		
2. Asbestos warning signs posted at work site		
3. All small items removed from designated work area		
4. Large equipment secured and covered with plastic		
5. Floor and ledges covered with plastic		
6. Area ventilation systems locked and tagged out		
7. Nearby occupants shall be notified of asbestos work to prevent unauthorized access to work area		
8. Contact IH Technician to inspect work area preparation before asbestos removal begins		

PREPARATION OF WORK SITE (For Total Enclosure Jobs Only)

	REQ'D	DNA
1. Floor and wall containments covered and taped		
2. Negative air enclosure set-up around work area		
3. Negative air machine operating continuously		
4. General area air samples taken before work begins		

RESPIRATORY PROTECTION REQUIRED

☐ HALF-MASK ☐ FULL-FACE ☐ AIRLINE
☐ OTHER: _____

FILTER TYPE REQUIRED:

☐ HIGH EFFICIENCY DUST (PURPLE)
☐ OTHER

WORK PRACTICES

	REQ'D	DNA
1. Personnel air samples removed (samples collected for entire shift when possible)		
2. No smoking, eating or drinking permitted in work area		
3. HEPA-filtered vacuum required for cleanup		
4. HEPA vacuum required at point of cut/drilling		
5. Glove bag removal of pipe insulation required		
6. Tyvekes porter shall be removed where		
7. Asbestos material shall not be allowed to dry		
8. Overalls clothing shall be periodically inspected for rips and tears		
9. Amended water shall be used to wet down material		
10. Asbestos material thoroughly wet down before removal		
11. Removed material promptly bagged (not allowed to dry out)		
12. Surfaces shall be cleaned with a solvent to breakdown any remaining fibers		
13. Work area cleaned after completion of work each day		
14. Tools and equipment shall be cleaned of all residual dust before removal from work area.		
15. Personnel to decontaminate at each exit from work area		
16. Bag contaminated clothing and waste promptly		
17. Bagged waste material shall be placed in white drums or wooden boxes and labeled as asbestos waste (exterior of containers shall be clean and asbestos-free)		
18. Shower before lunch and at end of shift		

APPROVAL TO BEGIN WORK

IH TECHNICIAN SIGNATURE:	DATE:	SUPERVISOR-IN-CHARGE SIGNATURE:	BADGE NUMBER:
	TIME:		DATE:

SECTION D - FINAL INSPECTION REQUIREMENTS SPECIFIED BY: _____ (TECHNICIAN INITIALS) _____ (DATE) _____ (TIME)

	REQ'D	DNA
1. Visual inspection of work area for residual dust required after completion of job (contact IH Technician)		
2. General area air samples required after completion of job (contact IH Technician)		
3. Obtain IH Technician approval before removal of barriers & warning signs		

NO.	DISTRIBUTION OF COPIES
1	POST AT JOB SITE
2	IH&S (RECORD COPY)
3	IH&S (FIELD COPY)

APPROVAL TO REMOVE BARRIERS AND WARNING SIGNS

IH TECHNICIAN SIGNATURE:	DATE:
	TIME:

FMPC-OSAH-2040 (REV 3/15/88)

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ATTACHMENT D

ASBESTOS SAFETY SUPPLIES AVAILABLE THROUGH INVENTORY CONTROL & WAREHOUSING

Stores #	Item Description
S-00222	Label, "Danger-Asbestos", for placement on disposal packages containing asbestos materials.
S-00225	Sign, "Danger-Asbestos", for posting at asbestos work areas.
S-00258	Barrier tape, with "Danger-Asbestos" wording, red 3"x 1000' roll.
S-00051	Polyethylene sheeting, 6 mil thickness, 12'x100' long, for placement on the ground and to cover items in an asbestos work area. Can be used for construction of a mini-enclosure.
S-00219	Polyethylene, 30 gallon drum liners (6 mil), can be used for disposal of asbestos waste.*
S-00234	Polyethylene, 55 gallon drum liners (6 mil), can be used for disposal of asbestos waste.*
	* Asbestos waste must be disposed of in 12 mil thickness of plastic, then placed in plastic lined white drums or wood boxes for shipment to NTS. White drums and wood boxes are supplied by Waste Operations.
M-00639	Medium size, Disposable coveralls, white, KleenGuard
M-00640	Large size, Disposable coveralls, white, KleenGuard
M-00641	X-Large size, Disposable coveralls, white, KleenGuard
M-00642	XX-Large size, Disposable coveralls, white, KleenGuard
M-00653	Shoe covers, white paper booties, KleenGuard
M-00485	Size 12, T-cut white plastic shoe covers, can be worn over white paper booties.
M-00486	Size 13, T-cut white plastic shoe covers, can be worn over white paper booties.
M-00487	Size 14, T-cut white plastic shoe covers, can be worn over white paper booties.
M-00488	Size 15, T-cut white plastic shoe covers, can be worn over white paper booties.
M-00643	Disposable hood, white, KleenGuard

ATTACHMENT D (continued)

ASBESTOS SAFETY SUPPLIED AVAILABLE THROUGH INVENTORY CONTROL & WAREHOUSING (continued)

Stores #	Item Description
G-01366	Plastic tape, 2"x100' long roll
G-04459	Duct tape, 2"x60 yard long roll
M-00781	Glove bag (vertical), for removal of pipe insulation from vertical piping up to 10" diameter.
M-00785	Glove bag (horizontal), for removal of pipe insulation from horizontal piping up to 8" diameter.
G-04486	Asbestos encapsulant, BWE-3000 penetrating blue solution, 24 ounce spray bottle, for sealing damaged areas of pipe insulation until permanent repairs can be made.
G-04487	Asbestos surfactant, BWE-5000 penetrating pink solution, 24 ounce spray bottle, for use in wetting down asbestos containing materials prior to removal.
G-04488	Asbestos surfactant, Asbesto-Wet wetting solution, to be mixed 1/2 ounce per gallon of water. Place mixture in garden sprayer, use for wetting down insulation prior to removal.
GZ-16733	Paper disposal bags for Nilfisk GS-80 vacuum cleaner
GZ-19090	Paper disposal bags for Nilfisk GS-81 vacuum cleaner
GZ-16735	Paper disposal bags for Nilfisk GS-82 vacuum cleaner
GZ-16738	Cloth microfilter to cover motor unit on all models of Nilfisk vacuum cleaners.

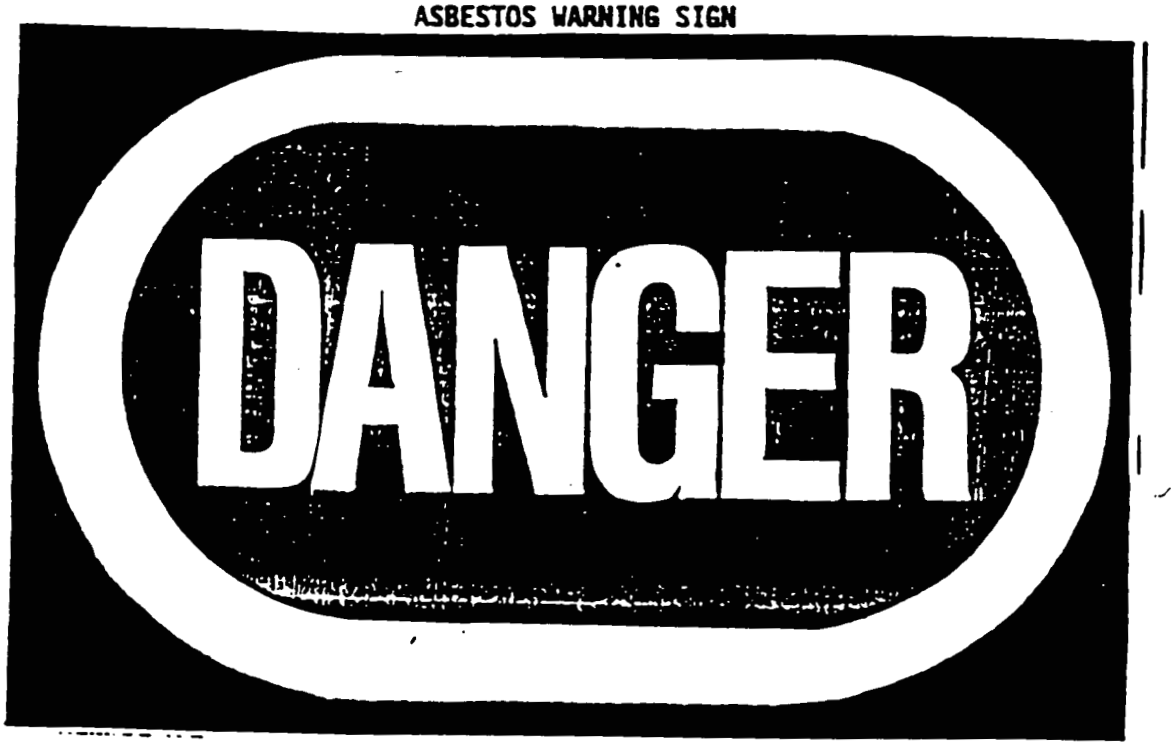
Garden sprayers (3) for use during glove bag removal and other removal projects are available through the Pipe Shop.

Nilfisk HEPA vacuums for asbestos work are available through the Pipe Shop (extension 6436 or radio 219), Waste Operations (extension 6708 or radio 708) or through Industrial Hygiene (extension 6207 or radio 357).

IH&S-IH-03	Date: 03-20-89	Rev: 0

ATTACHMENT E

ASBESTOS WARNING SIGN



ASBESTOS

CANCER & LUNG DISEASE

HAZARD

AUTHORIZED PERSONNEL ONLY

RESPIRATORS & PROTECTIVE

CLOTHING

ARE REQUIRED IN THIS AREA

WARNING DO NOT BREATH ASBESTOS FIBERS

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ISSUE AND REVISION RECORD

DATE OF ISSUE	REVISION NUMBER	EFFECTED PAGES	REASON FOR CHANGE
	0		Original issue of the procedure

146

Control Number:_____

WESTINGHOUSE MATERIALS COMPANY OF OHIO

Revision: 2

SAFETY PROCEDURES	Title: Unrestricted Release of Materials from FMPC	SP-P-35-010 Department: IRS&T Section: RS
Authorization:		Supersedes: Issue Date: 3/13/90

1.0 PURPOSE

To assign responsibility and establish the procedure for unrestricted release of materials from FMPC.

2.0 SCOPE

This procedure establishes the requirements and criteria necessary for unrestricted release of materials from FMPC. This procedure does not apply to release of bulk materials such as soil and concrete.

3.0 DEFINITIONS

3.1 Material - An all-inclusive term used to refer to building materials, tools, articles, etc. This procedures does not apply to bulk materials such as soil and concrete.

4.0 RESPONSIBILITIES

4.1 The manager(s) of personnel required to perform work per this procedure shall assure that affected personnel are informed or trained to the extent necessary, prior to initiation of that work.

4.2 The Radiological Safety Technicians (RST) are responsible for performing all radiation/contamination surveys required by this procedure.

4.3 The Manager of Radiological Safety shall appoint a Radiological Engineer to be responsible for review and approval of survey methods for unrestricted release of materials.

4.0 RESPONSIBILITIES (continued)

4.4 The responsible Radiological Engineer(s) shall determine the applicable survey methods and determine the applicable gross alpha and beta-gamma limits for unrestricted release of materials.

5.0 GENERAL

5.1 Radiological control must be adequate to prevent release of material from the FMPC exceeding the contamination limits of attachment A.

5.1.1 Good radiological practices (with minimum survey requirements established by the responsible radiological engineer) must be followed. The history of use of an item shall be considered in establishing minimum survey requirements.

5.2 Acceptable surface contamination levels are set forth in Attachment A for known radionuclides. Three "level" classifications of limits as well as "normal/site limits" are specified.

5.2.1 Application of level 1, 2, or 3 limits to gross alpha and beta-gamma contamination measurements on material at the FMPC requires a knowledge of the radionuclides present.

5.2.2 The predominant radionuclides of concern at the FMPC are natural and low-enriched uranium and their short-lived decay products. Contamination with thorium and radium is also possible in some areas.

5.2.3 The most restrictive limits (level 1) shall apply as gross alpha and/or beta-gamma limits whenever level 1 radionuclides are expected to be present. The normal site limits identified in attachment A shall otherwise apply unless the responsible radiological engineer prescribes the application of level 2 or level 3 gross alpha and beta-gamma limits.

6.0 PROCEDURE

6.1 Radiation/contamination surveys shall be performed with equipment which is in calibration. Instrument surveys for both total (fixed plus removable) alpha and beta/gamma contamination shall be performed. The following types of equipment shall be used:

Type of measurement	Equipment Type
Alpha	Alpha Scintillation Counter
Beta/Gamma	Pancake G-M Probe Count Rate Meter

6.0 PROCEDURE (continued)

6.2 When contacted to perform a radiation survey of a material, the RST shall complete a Radiological Survey Report form (Attachment B). The RST shall perform a survey, then complete the appropriate sections of the form.

6.2.1 When material is surveyed for unrestricted release at locations other than Controlled Area exits, material identification and control shall be maintained in either of the following ways:

6.2.2 An Article Surveyed Tag (Attachment C) shall be attached for the information of the RST at the Controlled Area exit, or

6.2.3 An Equipment and Material Pass (Attachment E) shall be provided to the custodian of the material when material is to be taken from the survey location directly to the Controlled Area exit and this material transport is verifiable by RSTs.

6.3 Release material from the FMPC only after survey results adequately demonstrate compliance with release limits.

6.3.1 For materials to be released as unrestricted, minimum survey requirements, as established by the responsible radiological engineer, must be met. Surfaces which are likely to be contaminated but are of such size, construction or location as to make them inaccessible for survey shall be assumed to exceed the limits for unrestricted release.

6.3.2 The RST shall consult the responsible radiological engineer or pre-established requirements generated by the responsible radiological engineer for application of the correct gross alpha and beta-gamma limits.

6.4 Material determined to be radioactive shall be tagged with a Radioactive Material tag (example in Attachment D). Disposition of the item shall be coordinated with Waste Technology, as appropriate.

6.4.1 Certification to individuals that material may not be released is provided by the form in Attachment F.

7.0 REFERENCES

7.1 DOE Order 5400.XX, Draft, 3-18-88, "Radiation Protection of the Public and the Environment".

7.2 U. S. Atomic Energy Commission, Regulatory Guide 1.86, June 1974, "Termination of Operating Licenses for Nuclear Reactors".

7.3 American National Standards Institute, Inc., N13.12, August 1978, "Draft American National Standard Control of Radioactive Surface Contamination of Materials, Equipment and Facilities to be Released for Uncontrolled Use".

8.0 FORMS USED

8.1 Radiological Survey Report, FMPC-OSH-1993-1.

8.2 Article Surveyed Tag, FMPC-IRS&T-1545.

8.3 Equipment and Material Pass

8.4 Certification for Contaminated Items Withheld.

9.0 ATTACHMENTS

9.1 Attachment A, Acceptable Surface Contamination Levels.

9.2 Attachment B, Radiological Survey Report.

9.3 Attachment C, Article Surveyed Tag, FMPC-IRS&T-1545.

9.4 Attachment D, Caution, Radioactive Material, Tag.

9.5 Attachment E, Equipment and Material Pass.

9.6 Attachment F, Certification for Contaminated Items Withheld.

ATTACHMENT A

ACCEPTABLE SURFACE CONTAMINATION LEVELS

	NUCLIDE[a]	AVERAGE[b c]	MAXIMUM[b d]	REMOVABLE[b e]
(3)	U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm^2	15,000 dpm α/100 cm^2	1,000 dpm α/100 cm^2
(1)	Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
(2)	Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm^2	3000 dpm/100 cm^2	200 dpm/100 cm^2
(3)	Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm $\beta\gamma$/100 cm^2	15,000 dpm $\beta\gamma$/100 cm^2	1000 dpm $\beta\gamma$/100 cm^2

NORMAL SITE LIMITS

<100 maximum counts per minute greater than background with an alpha survey instrument.

<100 average counts per minute greater than background with a pancake G-M probe count rate meter.

<300 maximum counts per minute greater than background with a pancake G-M probe count rate meter.

<20 dpm/100 cm^2 removable alpha

<100 dpm/100 cm^2 removable beta-gamma

[a]Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b]As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c]Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d]The maximum contamination level applies to an area of not more than 100 cm^2.

[e]The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

(1) Level 1 Limits

(2) Level 2 Limits

(3) Level 3 Limits

ATTACHMENT B

FMPC

OPERATIONS SAFETY & HEALTH - RADIOLOGICAL SAFETY

RADIOLOGICAL SURVEY REPORT

Date:	LOCATION:	SET:	Page of
Time:	LEVEL:		

REASON FOR SURVEY: ☐ ROUTINE ☐ SPECIAL REQUEST ☐ RWP ☐ INCIDENT

COMMENTS:

INSTRUMENTS				
MODEL	SERIAL NUMBER	CALIBRATION DATE	BKRD.	EFF.

ANALYZE FOR: ☐ ALPHA ☐ BETA-GAMMA ☐ OTHER _____

TYPE OF SURVEY: ☐ CONTAMINATION ☐ RADIATION ☐ OTHER _____

FOLLOW-UP SURVEY ATTACHED ☐YES ☐NO

SURVEY MAP ATTACHED ☐YES ☐NO

ITEM NUMBER	GRID COORDINATES	DESCRIPTION	CORRECTED DOSE RATE (mRem/hr)				DPM ALPHA		DPM BETA-GAMMA	
			γ	β/γ	γ	β/γ				
			CONTACT	CONTACT	3 FT.	3 FT.	100 CM²	PROBE	100 CM²	PROBE

NO.	DISTRIBUTION OF COPIES
1	Radiological Safety Technician Supervisor
2	Radiological Safety Engineer
3	Facility Supervisor

NOTIFICATION OF SURVEY RESULTS					
SUPERVISOR NOTIFIED	TIME	DATE	NOTIFIED BY	REVIEWED BY	DATE

FMPC-OSH-RSH-1 (REV 11/1/88)

ATTACHMENT C

FMPC
IRS&T

Article Surveyed

DESCRIPTION:

ALPHA	BETA-GAMMA
Fixed & Removable: dpm/frisk	Fixed & Removable: dpm/frisk
Removable: dpm/100 cm²	Removable: dpm/100 cm²

COMMENTS:

DATE:	TIME:

RST (PRINTED):

RST (SIGNATURE):

FMPC-IRS&T-1546 (1/15/90)

ATTACHMENT D

C A U T I O N

RADIOACTIVE MATERIAL

ACCOUNTABILITY NO. _____ OR ☐ NONE REQUIRED

DESCRIPTION OF MATERIAL

CONTAMINATION DATA

SURFACE CONTAMINATION ON MATERIAL

Beta-Gamma _____ DPM/100 cm2

Alpha _____ DPM/100 cm2

RADIATION DATA

SURFACE DOSE RATE

_____ mrem/hr

ESTIMATED CURIE CONTENT

_____ millicuries

SPECIAL INSTRUCTIONS

SIGNED	DATE

C A U T I O N

RADIOACTIVE MATERIAL

D. A. SERVICES, INC.

Form RM 1-Rev. 2-Std. Ptg. Co.

ATTACHMENT E

FMPC

EQUIPMENT AND MATERIAL PASS

PRESENT TO RADIOLOGICAL SAFETY TECHNICIAN AT EXIT

COMPANY:

LOCATION OF WORK OR MATERIAL STAGING AREA:

DESCRIPTION OF EQUIPMENT AND MATERIAL:

Material may be released as per SP-P-35-010.

[redacted]

ATTACHMENT F

FMPC
CERTIFICATION
FOR CONTAMINATED ITEMS WITHHELD

ITEM	DISPOSITION

ISSUE AND REVISION RECORD

DATE OF CHANGE	REVISION NUMBER	AFFECTED PAGES	REASON FOR CHANGE
10/25/88	0		Original issue of procedure.
11/17/88	1	1&2	To correct limits for unrestricted release.
3/13/90	2	All	To assign limits for unrestricted release based on radioisotopic data.

Toxicity Characteristic Leaching Procedure

Working Linear Range: Method- and analyte-specific
Reporting Limit: See list in Section 1.4
Reporting Units: mg/L
Matrix: Liquid or solid

1.0 Scope and Application

1.1 The TCLP is an analytical method designed to simulate the climatic leaching action expected to occur in landfills. Ideally, it determines the mobility of both organic and inorganic target analytes present in liquid, solid, and multiphasic wastes. The target analyte list includes 25 organic compounds (volatiles, semivolatiles, pesticides, and herbicides) and 8 metals.

1.2 Rather than defining a method detection limit and working range, the TCLP rule invokes a regulatory limit, when exceeded causes the waste to be deemed hazardous. For the target analytes of this operating procedure, the regulatory levels at which the waste is deemed hazardous are:

Target Analyte	Limit (mg/L)
Arsenic	5.0
Barium	100.0
Benzene	1.0
Cadmium	1
Carbon Tetrachloride	0.5
Chlordane	0.03
Chlorobenzene	100.0
Chloroform	6.0
Chromium	5.0
o-Cresol	200.0
m-Cresol	200.0
p-Cresol	200.0
2,4-D	10.0
1,4-Dichlorobenzene	7.5
1,2-Dichloroethane	0.5
1,1-Dichloroethene	0.7

Target Analyte	Limit (mg/L)
2,4-Dinitrotoluene	0.13 **
Heptachlor (and its hydroxide)	0.008
Endrin	0.02
Hexachlorobenzene	0.5 **
Hexachloro-1,3-butadiene	0.5
Hexachloroethane	3.0
Lead	5
Lindane	0.4
Mercury	0.2
Methoxychlor	10.0
Methyl ethyl ketone	200.0
Nitrobenzene	2.0
Pentachlorophenol	100.0
Pyridine	5.0 **
Selenium	1
Silver	5
Tetrachloroethene	0.7
Toxaphene	0.5
Trichloroethylene	0.5
2,4,5-Trichlorophenol	400.0
2,4,6-Trichlorophenol	2.0
2,4,5-TP (Silvex)	1.0
Vinyl Chloride	0.2

*If o-, m-, and p-cresol concentrations cannot be differentiated, then total cresol concentration is used. The regulatory level for total cresol is 200 mg/L.

**Quantitation limit is greater than the regulatory level. The quantitation limit therefore becomes the regulatory level.

1.3 If an analysis of any one of the liquid fractions of the TCLP extract indicates that a regulated compound is present at such high levels that even after accounting for dilutions from the other fractions of the extract the concentration would be above the regulatory threshold for that compound, then the waste is hazardous and it is not necessary to analyze the remaining fractions of the extract.

1.4 If an analysis of extract obtained using a bottle extractor shows that the concentration of any regulated volatile contaminant exceeds the regulatory threshold for that compound, then the waste is hazardous and extraction

using zero headspace extraction (ZHE) is not necessary. However, the extract from a bottle extractor cannot be used to demonstrate that the concentration of volatile compounds is below the regulatory threshold.

1.5 The analytical methods must have a method detection limit less than the regulatory limit.

1.6 If a total analysis of the waste demonstrates that individual contaminants are not present in the waste, or that they are present at such low concentrations that the appropriate regulatory thresholds could not possibly be exceeded, the TCLP need not be run.

2.0 Method Summary

Two extraction methods are detailed in this procedure: one for volatiles compounds only, the other for the remaining target compounds. The overall process is broken down into four major steps:

- Determining percent solids
- Identifying the appropriate extraction solution
- Extracting the sample
- Analyzing the sample for target compounds

3.0 Interferences

Potential interferences that may be encountered during analysis are discussed in the individual analytical methods.

4.0 Safety Precautions

4.1 The analyst must practice laboratory safety procedures as outlined in the laboratory-specific hygiene plan as specified by OSHA regulation 29 CFR Part 1910.1450. Any hazardous waste generated during the procedure, or samples determined to be hazardous, will be disposed of in accordance with applicable federal, state, and local regulations.

4.2 Because hazardous chemicals are used during the method, procedures for handling acids must be practiced. The procedure should be performed in a fume hood or other vented area. Personal protective equipment must

include goggles for eye protection, gloves for skin protection, and a lab coat or apron for clothing protection.

5.0 Sample Collection and Handling

Minimum sample size, container, and preservative requirements are detailed in Section 6.7 and Appendix K of the Sitewide QAPP.

Sample Maximum Holding Times (Days)

	From: Field Collection	From: TCLP Extraction	From: Preparative Extraction	
Analyte	**To: TCLP Extraction**	**To: Preparative Extraction**	**To: Determinative Analysis**	**Total Elapsed Time**
Volatiles	14	NA	14	28
Semivolatiles	14	7	40	61
Mercury	28	NA	28	56
Metals, except mercury	180	NA	180	360

6.0 Apparatus

Note: Only EPA-approved TCLP equipment will be used.

6.1 Agitation Apparatus: Capable of rotating extraction vessel end-over-end at 30 ± 2 rpm.

6.2 Bottle Extraction Vessel: Borosilicate or Teflon bottle with sufficient capacity to hold sample and extraction fluid.

6.3 Zero Headspace Extraction Unit (ZHE): 500- to 600-mL, equipped to accommodate a 90- to 110-mm filter. For mobility of volatile organic compounds only. The ZHE is an extraction vessel that allows for liquid/solid separation within the device and effectively precludes headspace.

The piston within the ZHE must be able to be moved with approximately 15 psi or less. The ZHE must be checked after every extraction.

6.4 ZHE Collection Devices.

6.5 ZHE Extraction/Fluid Transfer Devices.

6.6 Filter and Filter Holder: Glass filter of borosilicate glass fiber with an effective pore size of 0.6 to 0.8 μm. Any filter holder capable of supporting the glass fiber filter and able to withstand the pressure needed to accomplish separation may be used. Suitable filter holders range from simple vacuum units to relatively complex systems capable of exerting pressures of up to 50 psi or more. Choice of filter holder is dependent upon the physical characteristics of the filtered material.

6.7 pH Meter: Accurate to ± 0.05 unit.

6.8 Laboratory Balance: Accurate to ± 0.01 gram.

6.9 Borosilicate Beakers.

6.10 Hot Plate/Magnetic Stirrer Unit.

7.0 Routine Preventive Maintenance

7.1 Perform routine preventive maintenance for extraction units and pH meter according to the manufacturers' directions.

7.2 All instrument maintenance must be documented in the instrument-specific maintenance logbook, as specified in Section 13 of the Sitewide QAPjP.

7.3 Examine glassware before each use for scratches and cracks, and replace as necessary.

8.0 Reagents and Calibration Standards

8.1 Water: All references to water assume the use of ASTM Type II water.

8.2 Hydrochloric Acid (HCl), 1 N: Slowly, and while stirring, add 82 mL concentrated HCl to about 500 mL water. Dilute to 1 liter. **Caution:** Heat-liberating reaction.

8.3 Nitric Acid (HNO_3), 1 N: Slowly, and while stirring, add 63 mL concentrated HNO_3 (16 M) to about 500 mL water. Dilute to 1 liter. **Caution:** Heat-liberating reaction.

8.4 Sodium Hydroxide (NaOH), 1 N: Dissolve 40 grams of NaOH in about 500 mL water. Dilute to 1 liter and mix well.

8.5 Glacial Acetic Acid (CH_3COOH): Reagent grade or better.

8.6 Extraction Fluid No. 1: Add 5.7 mL glacial acetic acid to 500 mL of water. Then add 64.3 mL of 1 N NaOH and dilute to 1 liter. When correctly prepared, the pH of solution must be 4.93 ± 0.05.

8.7 Extraction Fluid No. 2: Dilute 5.7 mL glacial acetic acid with water to a final volume of 1 liter. When correctly prepared, the pH of this solution should be 2.88 ± 0.05; if not, prepare the solution again.

9.0 Calibration Procedure

No instruments are used for the extraction procedure, but a pH meter is used. Calibration of the pH meter is discussed in Method No. FM-CON-0110.

10.0 Sample Preparation

10.1 If the sample consists of more than one phase, each phase must be analyzed separately and the results combined arithmetically. Therefore, if the analysis of any phase indicates that a target analyte is present at a concentration greater than the regulatory limit, the waste is deemed hazardous and it is not necessary to analyze the other liquid extracts.

10.2 Determination of Percent Solids

10.2.1 Percent solids is defined as that fraction of a waste sample (as a percentage of the total sample) from which no liquid may be forced out by an applied pressure, as described below.

10.2.2 If a sample is essentially solid and under applied pressure will not yield any liquid, then proceed directly to Section 10.3.

10.2.3 Preweigh filter and container that will receive filtrate and record weights.

10.2.4 Assemble filter holder and filter following manufacturer's directions. Place filter on support screen and secure.

10.2.5 Weigh out approximately 100 grams of waste sample, and record weight.

10.2.6 Quantitatively transfer waste sample to filter holder. If necessary, spread sample evenly over filter.

10.2.7 Gradually apply vacuum or gentle pressure of 1 to 10 psi until air or pressurizing gas moves through filter. If this point is not reached under 10 psi and if no additional liquid has passed through the filter for 2 minutes, slowly increase pressure to a maximum of 50 psi in 10-psi increments. Wait at least 2 minutes at each increment for pressurizing gas to move through filter.

Note: Instantaneous application of high pressure can degrade the glass fiber filter and may cause premature plugging.

10.2.8 When pressurizing gas begins to move through filter or when liquid flow has ceased at 50 psi, stop filtration.

10.2.9 The material left in the filter holder is defined as the solid phase of the waste. The filtrate is defined as the liquid phase.

10.2.10 Weigh container holding filtrate. The weight of the filtrate solution is the difference in weight between the container before and after filtration. Record weight of filtrate.

10.2.11 Weigh filter. The weight of the solid phase is the difference in weight between the liquid phase and the total waste sample. Record weight of the filter.

10.2.12 Calculate percent solids using the equation:

$$\% \text{ Solids} = \frac{\text{Weight of solids (step 10.2.11)}}{\text{Total weight of waste (step 10.2.5)}} \times 100 \qquad (1)$$

If the percent solids calculated above is < 0.5%, proceed directly to Section 11. If calculated percent solids is ≥ 0.5%, continue.

10.2.13 Remove solid phase and filter from filtration apparatus.

10.2.14 Dry the filter and solid phase in a 100° ± 20°C oven until two successive weighings yield the same value within ± 1%. Record all weights.

10.2.15 Calculate percent dry solids using the equation:

$$\% \text{ Dry solids} = \frac{\text{(Wt. of dry waste + filter) - wt. of filter}}{\text{Initial wt. of waste}} \times 100 \qquad (2)$$

If the percent dry solids calculated above is < 0.5%, proceed directly to Section 11. If the percent dry solids is ≥ 0.5%, continue.

10.3 Evaluating Particle Size

10.3.1 Weigh out approximately 100 grams of waste sample and record weight on bench sheet.

10.3.2 Sieve the sample through a 0.375-inch Teflon-coated screen (9.5 mm). If all the sample passes through the screen, then proceed to Section 10.2.3.

10.3.3 If all the sample is not able to pass through the screen, reduce particle size by crushing, cutting, or grinding the waste until it pass through the screen. Extraction requires a sample of at least 100 grams.

11.0 Sample Analysis

11.1 Choosing Extraction Fluid for Nonvolatiles

11.1.1 Weigh a 250-mL borosilicate beaker and note the weight.

11.1.2 Weigh out approximately 5 grams of sample left on filter after pressure filtration in tared beaker and note weight. If necessary, reduce particle size of sample by crushing, cutting, or grinding. Ideally, the particles should be less than 1 mm in diameter. The weight of the sample is the difference in the beaker weight.

11.1.3 Add 96.5 mL of water to beaker and cover with watch glass. Stir vigorously for 5 minutes using magnetic stirrer.

11.1.4 Measure pH using the procedure outlined in the pH operating procedure. If pH is < 5, proceed to step 11.2.6.

11.1.5 If pH is > 5, add 3.5 mL 1 N HCl, slurry briefly, and cover with watch glass. Place on hot plate and heat to 50°C. After 10 minutes, remove beaker from hot plate and cool to room temperature. Measure the pH.

11.1.6 If pH is < 5, use extraction fluid No. 1. If pH is ≥ 5, then use extraction fluid No. 2.

11.2 Preparing Sample for Extraction

11.2.1 If the waste contained less than 0.5% dry solids as determined in Section 10.2, extract sample as outlined in Section 11.4.

11.2.2 If sample is liquid or multiphasic, liquid and solid must be separated using the filtration device. Be sure to use a large enough waste sample so that after filtration there are at least 100 grams of solid material for extraction.

11.2.3 If waste sample is sludge, allow it to sit overnight to allow solids to settle and liquid to separate. Decant liquid and analyze phases separately.

11.2.4 If waste will not yield any liquid when subjected to pressure filtration, weigh out 100 grams of solid and prepare sample as outlined in Step 11.4.

11.2.5 Weigh filter and container that will receive filtrate and note the weight.

11.2.6 Assemble filter holder and filter following manufacturer's directions. Place filter on support screen and secure.

11.2.7 Weigh out approximately 100 grams of waste sample and record the weight.

11.2.8 Quantitatively transfer waste sample to filter holder. If necessary, spread sample evenly over filter.

11.2.9 Gradually apply vacuum or gentle pressure of 1 to 10 psi, until air or pressurizing gas moves through filter. If this point is not reached under 10 psi and if no additional liquid has passed through filter for 2 minutes, slowly increase pressure to a maximum of 50 psi in 10-psi increments. Wait at least 2 minutes at each increment for pressurizing gas to move through filter.

Note: Instantaneous application of high pressure can degrade the glass fiber filter and may cause premature plugging.

11.2.10 When pressurizing gas begins to move through filter or when liquid flow has ceased at 50 psi, stop filtration.

11.2.11 The material left in the filter holder is defined as the solid phase of the waste. The filtrate is defined as the liquid phase.

11.2.12 Weigh filtrate container. The weight of the filtrate solution is the difference in weight between the filtrate container before and after filtration. Record weight of filtrate container on bench sheet. Filtrate may now be either analyzed or stored at 4° ± 2°C until time of analysis.

11.2.13 Weigh filter. The weight of the solid phase is the difference in weight of the filter container before and after filtration. Record the weight of the filter.

11.2.14 Sieve the sample through a 0.375-inch Teflon-coated screen (9.5 mm). If all the sample passes through the screen, proceed to Section 11.4.

11.2.15 If all the sample is not able to pass through the screen, reduce particle size by crushing, cutting, or grinding the waste until it is able to pass through the screen.

11.3 Extracting the Sample

11.3.1 Zero Headspace Extraction for Volatile Compounds Only

Note: Only extraction fluid No. 1 is used for ZHE.

11.3.1.1 The ZHE device is used to obtain extracts for volatile analysis only. Extracts obtain using the ZHE shall not be used to evaluate the mobility of nonvolatile analytes (e.g., metals, pesticides). The ZHE has an internal capacity of about 500 mL. It is charged with sample only once and is not opened until the final extract has been collected. Although the following procedure allows for particle size reduction during the procedure, this could result in the loss of volatile compounds. If possible, particle size should be reduced as the sample is being taken but it may be performed during the procedure. In carrying out the following steps, do not allow the soil to be exposed to the atmosphere for any more time than is absolutely necessary. The materials should be handled when cold (4°C) to minimize loss of volatiles. Weigh the evacuated container that will receive the filtrate, and set aside. If using a Tedlar® bag, all air must be expressed from the device.

11.3.1.2 Place ZHE piston within the body of the ZHE (it may be helpful first to moisten the piston O-rings slightly with extraction fluid). Adjust the position within the ZHE body to a height that will minimize the distance the piston will have to move once it is charged with sample. Secure the gas inlet/outlet flange (bottom flange) onto the ZHE body in accordance with the manufacturer's instructions. Secure the glass fiber filter between the support screens and set aside. Set liquid inlet/outlet flange (top flange) aside.

11.3.1.3 Quantitatively transfer waste to the ZHE. Weight is determined using the following equation for wastes > 5% dry solids:

$$\text{Weight of waste} = \frac{25}{\%\ \text{Solids}} \times 100 \qquad (3)$$

Secure filter and support screens into top flange of the device, and secure flange to ZHE body in accordance with the manufacturer's directions. Tighten all ZHE fittings and place device in vertical position (gas inlet/outlet flange on the bottom). Do not attach the extraction collection device to the top plate. Attach a gas line to the gas inlet/outlet valve (bottom flange) and, with the liquid inlet/outlet valve (top flange) open, begin applying gentle pressure of 1 to 10 psi to a maximum of 50 psi to force most of the headspace out of the device.

11.3.1.4 With ZHE in vertical position, attach a line from the extraction fluid reservoir to the liquid inlet/outlet valve. The line used shall contain fresh extraction fluid and should be preflushed with fluid to eliminate air pockets in the line. Release gas pressure on the ZHE piston (from the gas inlet/outlet valve), open liquid inlet/outlet valve, and begin transferring extraction fluid into ZHE until the appropriate amount of fluid has been introduced into the device.

11.3.1.5 After extraction fluid has been added, close inlet/outlet valve immediately and disconnect extraction fluid line. Check ZHE to ensure that all valves are in closed positions. Physically rotate device end-over-end two or three times. Reposition ZHE in vertical position with liquid inlet/outlet valve on top. Put 5 to 10 psi behind piston (if necessary) and slowly open liquid inlet/outlet valve to bleed into a fume hood any headspace that may have been introduced by the addition of extraction fluid. Bleeding must be done quickly and stopped at the first appearance of liquid from the valve. Repressurize ZHE with 5 to 10 psi and check all ZHE fittings to ensure that they are closed.

11.3.1.6 Place ZHE in rotary extractor apparatus and rotate ZHE at 30 ± 2 rpm for 18 ± 2 hours. Ambient temperature will be maintained at 22° ± 3°C during agitation.

11.3.1.7 Following the 18-hour agitation period, check the pressure behind the ZHE piston by quickly opening and closing the gas inlet/outlet valve and noting the escape of gas. If pressure has not been maintained (i.e., no gas release observed), the device is leaking. Check ZHE for leaking and redo extraction with a new sample of soil. If pressure within device has been maintained, material in the extractor vessel is separated into its component liquid and solid phases.

11.3.1.8 Attach evacuated, weighed filtrate collection container to liquid inlet/outlet valve and open the valve. Begin applying gentle pressure of 1 to 10 psi to force liquid phase into filtrate collection container. If no additional liquid has passed through the filter in any 2-minute interval, slowly increase pressure in 10-psi increments to a maximum of 50 psi. After each incremental increase of 10 psi, if no additional liquid has passed through the filter in any 2-minute interval, proceed to the next 10-psi increment. When liquid flow has ceased and continued pressure filtration at 50 psi does not result in any additional filtrate within any 2-minute period, filtration is stopped. Close inlet/outlet valve, discontinue pressure to piston, and disconnect filtration collection container.

Note: Instantaneous application of high pressure can degrade the glass fiber filter and may cause premature plugging.

11.3.1.9 Following collection of the extract, aliquots for analysis should be prepared immediately and stored with minimal headspace at 4°C until analyzed. The extract will be prepared and analyzed according to the appropriate analytical methods.

11.3.2 Extraction for Nonvolatile Compounds

11.3.2.1 Calculate amount of extraction fluid to add to extractor vessel as follows:

$$\text{Weight of extraction fluid} = \frac{20\ (\%\ \text{solids})(\text{wt. of filtered waste})}{100} \qquad (4)$$

11.3.2.2 Slowly add appropriate extraction fluid to extractor vessel. Note volume of extraction fluid.

11.3.2.3 Close extractor bottle tightly using Teflon tape to ensure a tight seal. Place extractor bottle in rotary agitation device and secure.

11.3.2.4 Rotate bottle at 30 ± 2 rpm for 18 ± 2 hours. Note start and finish time. Ambient temperature in the room must be maintained at 23° ± 2°C during extraction period.

Note: During agitation, pressure may build within extractor bottle. To relieve excess pressure, extractor bottle may be opened periodically (e.g., after 15 minutes, 30 minutes, 1 hour) and vented into a fume hood. Note on the bench sheet any time the extractor bottle is opened.

11.3.2.5 At the end of the 18-hour extraction period, the extractor bottle contents are filtered to separate the solid and liquid phases.

11.3.2.6 Weigh filter and container that will receive filtrate. Note the weights.

11.3.2.7 Assemble filter holder and filter following the manufacturer's directions. Place filter on support screen and secure.

11.3.2.8 Transfer contents of extractor bottle to filter holder. If necessary, spread sample evenly over the filter.

11.3.2.9 Gradually apply vacuum or gentle pressure of 1 to 10 psi, until air or pressurizing gas moves through filter. If this point is not reached under 10 psi and if no additional liquid has passed through filter for 2 minutes, slowly increase pressure to a maximum of 50 psi in 10-psi increments. Wait at least 2 minutes at each increment for pressurizing gas to move through filter.

Note: Instantaneous application of high pressure can degrade glass fiber filter and may cause premature plugging.

11.3.2.10 When pressurizing gas begins to move through filter or when liquid flow has ceased at 50 psi, stop filtration.

11.4 Preparation of TCLP Extraction

11.4.1 If the waste contained no initial liquid phase, then the filtered liquid obtained from extraction is the TCLP extract.

11.4.2 If the waste sample originally was two phases, solid and liquid, combine the original liquid with the TCLP extraction liquid. Do not combine liquid phases if there is any chance of incompatibility.

11.4.3 If there are two liquid phases due to incompatibility, treat each liquid as a separate extraction liquid.

11.4.4 Measure the pH of the liquids according to the pH operating procedure and record the pH.

11.4.5 Transfer an aliquot of the extraction liquid to a clean sample container and preserve with several drops of concentrated nitric acid to pH < 2. This sample is for metals analysis.

11.4.6 Transfer the remaining extraction liquids to a clean sample container and store in refrigerator until it can be analyzed for hexachloroethane.

12.0 Calculations

12.1 If individual phases liquid/liquid or liquid/solid were analyzed separately, the results can be combined to yield a total TCLP result using the calculation:

$$\text{Final analyte conc.} = \frac{(V_1)(C_1) + (V_2)(C_2)}{V_1 + V_2} \quad (5)$$

Where:

V_1 = volume of first phase (L)
C_2 = concentration of analyte in second phase (mg/L)
V_2 = volume of second phase (L)
C_1 = concentration of analyte in first phase (mg/L)

12.2 Measured values for samples must be corrected for analytical bias using the equation:

$$X_c = \frac{X_u}{\%R} \times 100 \quad (6)$$

Where:

X_c = corrected sample value
X_u = measured value of unspiked sample

13.0 Data Package Deliverables

Data package deliverables are determined by the method, Analytical Support Levels, and project-specific Sampling and Analysis Plan and are discussed in the General Laboratory Requirements.

14.0 Quality Control Requirements

Quality control requirements are determined by the method, Analytical Support Levels, and project-specific Sampling and Analysis Plan. A specific discussion of each type of quality control sample is presented in the Sitewide QAPjP (Section 2) or the analytical method. There are no QC samples or acceptance limits for this procedure.

15.0 References

40 CFR Part 261, Appendix II.

FERNALD/tclp.51

CONTROL COPY

Control Number 354

Safety Procedures	Title: Radiological Contamination Surveys.	SP-P-35-023
		Department: IRS&T Section: RS

Authorization: [signature]

Supersedes: None
Revision Date: 1/22/92

1.0 PURPOSE

Assign responsibilities and establish the procedure for performing radiological contamination surveys.

2.0 SCOPE

This procedure defines the method to schedule, perform, and document contamination surveys.

3.0 DEFINITIONS

3.1 Contamination - Radioactive material that is not contained or is present where it is unwanted. Classified as:

3.1.1 Removable - Loose contamination that readily transfers to a smear with moderate pressure.

3.1.2 Fixed - Contamination that does not readily transfer to a smear.

3.2 Frequency - The time frame in which a scheduled survey shall be completed.

3.2.1 Daily - Shall be completed each calendar day, with the exception of weekends and holidays.

3.2.2 Weekly - Shall be completed between 0000 hours Monday and 2400 hours the following Sunday.

3.2.3 Monthly - Shall be completed during the calendar month.

3.0 DEFINITIONS (continued)

3.2.4 Quarterly - Shall be completed four times per year, once in each calendar quarter. The calendar quarters are:

1st - January 1 to March 31.
2nd - April 1 to June 30
3rd - July 1 to September 30
4th - October 1 to December 31

3.2.5 Semi-Annual - Shall be completed two times per year; once between January 1 and June 30, and the other between July 1 and December 31 each calendar year.

3.2.6 Annual - Shall be completed during the calendar year.

3.3 Minimum Detectable Activity (MDA) - The amount of activity which must be surpassed for a sample to be considered above background.

3.3.1 The MDA for Geiger-Mueller (G-M) pancake probes is considered to be:

3.3.1.1 1000 dpm/100 cm^2 (100 cpm above background) for direct survey techniques.

3.3.1.2 400 dpm/probe area (100 cpm above background) for smear techniques.

3.3.2 The MDA for alpha-scintillator type probes is considered to be:

3.3.2.1 200 dpm/100 cm^2 (20 cpm above background) for direct survey techniques.

3.3.2.2 200 dpm/probe area (20 cpm above background) for smear techniques.

3.4 Gross Area Smears - Large area smears taken as an indication of the presence or absence of contamination.

4.0 RESPONSIBILITIES

4.1 The Manager(s) of personnel required to perform work per this procedure shall ensure that affected personnel are informed and/or trained to the extent necessary prior to initiation of that work.

4.0 RESPONSIBILITIES (continued)

4.2 RS Supervisor(s) shall be responsible for scheduling and reviewing all surveys as prescribed by this procedure.

4.3 The RSTs shall be responsible for performing and documenting surveys in accordance with the requirements of this procedure.

5.0 GENERAL

5.1 The purposes of contamination surveys are:

5.1.1 Characterize the levels of contamination in an area.

5.1.2 Provide documentation of radiological conditions.

5.1.3 Detect trends and build-up of contamination in areas.

5.1.4 Provide a base for contamination control.

5.2 Frequencies of surveys in areas not stated in this procedure shall be determined by the responsible RST Supervisor. Frequency is based on:

5.2.1 Changes in work routine.

5.2.2 Changes in the occupancy of the area.

5.2.3 Changes in personnel access to the area

5.2.4 Construction, demolition or decommissioning work that requires a Radiation Work Permit.

5.2.5 History of area contamination.

6.0 PROCEDURE

6.1 For fixed contamination surveys for depleted or natural uranium beta-gamma instruments alone may be used for activity determination.

6.2 Direct frisk with a G-M pancake probe

6.2.1 If the background exceeds 300 cpm, the item being surveyed should be moved to an area where the background is <300 cpm if possible. If this is not possible the background should be noted on the survey form.

6.0 PROCEDURE (continued)

6.2.2 The probe shall not be moved faster than 3 inches per second to detect 100 cpm above background.

6.2.3 Beta-gamma probes shall be within 1/2" of the surface that is being monitored.

6.2.4 Frisk desired area, determine average reading in cpm, subtract background cpm, and multiply result by four to determine dpm per probe area.

6.2.5 To determine dpm per 100 cm^2 using a G-M pancake probe, multiply cpm above background times ten.

6.2.6 Record the contamination level in the "Fixed Plus Removable" column of the Radiological Survey Report (Attachment A).

6.2.7 Dry smears shall be taken whenever direct frisk indicates activity exceeding applicable limits for removable activity.

6.3 Direct frisk with an alpha instrument

6.3.1 If the background exceeds 20 cpm, the item being surveyed should be moved to an area where the background is < 20 cpm if possible. If this is not possible the background should be noted on the survey form.

6.3.2 The probe shall be held stationary for 5 seconds. If an audible signal or meter movement is detected, hold the probe stationary for an additional 15 seconds.

6.3.3 Alpha probes must be within 1/8" of the surface being frisked.

6.3.4 Frisk the desired area and determine the average reading in cpm.

6.3.5 Subtract the background cpm, and multiply the result by ten to determine dpm per probe area. For alpha scintillator probes dpm per 100 cm^2 shall be considered equal to dpm per probe area.

6.3.6 Record the contamination level on the Radiological Survey Report (Attachment A).

6.3.7 Dry smears shall be taken whenever direct frisk indicates activity exceeding applicable limits for removable activity.

6.4 Smears

6.4.1 Protective gloves should be worn when taking smears.

6.0 PROCEDURE (continued)

6.4.2 Dry Smooth Surface Smears

6.4.2.1 Using dry paper or cloth smears, trace approximately a 40 cm (16") long "s" figure or approximately a 100 cm^2 area unless otherwise required by a specific procedure.

6.4.2.2 Apply moderate pressure with at least two fingers.

6.4.2.3 Analyze smears as outlined in step 6.4.5.

6.4.2.4 Record analysis data for the area smeared in the "Removable" column of the Radiological Survey Report (Attachment A). For areas where it is not feasible to smear 100 cm^2 a comment shall be included indicating the approximate area smeared.

6.4.3 Gross-area Smears

6.4.3.1 Wipe a large area, several hundred square centimeters or greater, with a standard smear or a large absorbent cloth, such as masslin.

6.4.3.2 Frisk the smear directly with a portable alpha or beta/gamma survey instrument for indication of the presence of contamination. Removable contamination detected should be averaged over the area smeared.

6.4.3.3 Gross-area smears that indicate no detectable contamination can be used to confirm that removable contamination is less than the MDA of the instrument used to count the smear divided by the area smeared.

6.4.3.4 Gross-area smear results shall be reported in the "Removable" column of the Radiological Survey Report (Attachment A). A comment shall be included indicating that a large area smear was used and the approximate area smeared.

6.4.4 Smears on other surfaces

6.4.4.1 Conduct surveys as described in step 6.4.2, except cloth smears shall be used when the material to be smeared is too coarse to adhere to smear paper, the surface is rough and porous, or the contamination loosely adheres to the surface.

6.4.4.2 It is permitted to smear wet areas, inside spill-area boundaries, or areas where loose surface contamination is expected but is not detectable using dry smears. Wet smears shall be allowed to dry before counting.

6.0 PROCEDURE (continued)

6.4.5 Smear Sample Analysis

6.4.5.1 Smears taken to detect activities above the portable instrument MDA should be counted with field survey instruments as outlined in procedure SP-P-35-046 "Counting Smears with Field Survey Instruments".

6.4.5.2 Smears taken to detect activities less than the MDA of the portable survey instrument shall be counted on a low background counting system per SP-P-35-37,"Operation of the Tennelec Automatic Low Background Counting Systems (LB5100 Series II/III and LB5100/5500.)".

6.5 Documentation

6.5.1 Radiological contamination surveys shall be documented using the Radiological Survey Report (Attachments A and B) or equivalent.

6.5.2 Any unusual events or conditions that may influence the survey results shall be noted on the survey form (i.e., porous surface, wet smears).

6.5.3 All reported readings shall be clearly specified as dpm/probe area, dpm/100 cm^2 or dpm/area smeared for gross-area smears.

6.5.4 All instruments used in performing the survey shall be recorded on the Radiological Survey Report. Documentation of the inspection and performance test of the instruments may be recorded on the survey report in accordance with procedure SP-P-35-028 "Inspection and Performance Testing of Portable Radiation Survey Instruments."

6.5.5 Maps should be used wherever possible so that survey locations can be accurately documented. Each map page shall be included in the total pages of the survey report.

6.5.6 Readings less than MDA shall be recorded as "< MDA". The value(s) for MDA for each instrument used shall be recorded on the survey report.

6.5.7 When information is to be entered into the Flow Gemini Database, grid coordinates shall be used to identify the survey location.

6.5.8 All analysis data printouts shall be attached to the survey report.

6.5.9 All survey forms shall be signed and dated by the RST(s) performing the survey.

6.0 PROCEDURE (continued)

6.5.10 Completed Radiological Survey Reports shall be reviewed, dated and initialed in the provided box by the responsible RST supervisor.

6.5.10.1 The RST Supervisor shall inform the RST of follow-up requirements and/or surveys when required.

6.5.10.2 The RST shall notify the facility supervisor, radiological safety technician supervisor, and Radiological Assessment promptly of any areas requiring decontamination.

6.5.11 A copy of all survey reports shall be on file for one quarter in the custody of the RST Supervisor. All reports exceeding one quarter of date of the survey shall be removed from the files and prepared for long term storage in the vault.

6.5.12 Copies of the completed Radiological Survey Report shall be distributed as required per the distribution list at the bottom of the form.

6.6 Schedule

6.6.1 Unless otherwise specified by this procedure, all scheduled surveys shall be for loose contamination only. More frequent surveys or performing fixed plus removable surveys may be specified by the responsible RST supervisor or Radiological Engineer through the RST supervisor.

6.6.2 Controlled Areas

6.6.2.1 At least quarterly.

6.6.2.2 Break rooms, offices, and drinking areas within controlled areas shall be surveyed at least weekly. Fixed plus removable surveys shall be performed at least annually.

6.6.2.3 Approved eating areas within controlled areas shall be surveyed at least daily. Fixed plus removable surveys shall be performed at least annually.

6.6.3 Regulated Areas

6.6.3.1 At least monthly. Fixed plus removable surveys shall be performed at least annually.

6.6.3.2 Drinking fountains and water coolers within Radiological Areas shall be surveyed daily.

6.0 PROCEDURE (continued)

6.6.4 Contamination Areas

6.6.4.1 At least annually.

6.6.5 Radiation Areas

6.6.5.1 At least semi-annually. Fixed plus removable surveys shall be performed at least annually.

6.6.6 High Radiation Areas

6.6.6.1 At least annually. Surveys shall be performed prior to work being performed in the area.

6.6.7 Control Points (from contamination areas)

6.6.7.1 Based on usage. Control points used on a daily basis shall be surveyed daily.

6.6.8 Control Points (from regulated areas)

6.6.8.1 At least weekly.

6.6.9 Control Points (from controlled areas)

6.6.9.1 At least daily

NOTE: In cases that two classifications apply, such as an areas that is a contamination area and a radiation area, the more frequent survey requirements of the two classifications apply.

7.0 APPLICABLE DOCUMENTS

7.1 SP-P-35-046, "Counting Smears with Field Survey Instruments".

7.2 SP-P-35-028, "Inspection and Performance Testing of Portable Radiation Survey Instruments".

7.3 SP-P-35-37, "Operation of the Tennelec Automatic Low Background Counting Systems (LB5100 Series II/III and LB5100/5500.)".

8.0 FORMS USED

8.1 FS-F-1993-1, Radiological Survey Report

8.2 FS-F-1993-2, Radiological Survey Report (Continuation Sheet)

9.0 ATTACHMENTS

9.1 Attachment A, Radiological Survey Report

9.2 Attachment B, Radiological Survey Report (Continuation Sheet)

ATTACHMENT A

RADIOLOGICAL SURVEY REPORT

Fernald Site
IRS&T - RADIOLOGICAL SAFETY
RADIOLOGICAL SURVEY REPORT

DATE:	LOCATION:	PRINT NAME:	PAGE:
TIME:	LEVEL:	SIGNATURE:	1 of ___

REASON FOR SURVEY: _____

INSTRUMENTS

MODEL	SERIAL NUMBER	TYPE (α, β, γ)	CALIBRATION-DUE DATE	BKGD. (cpm)	EFF./CF	MDA (dpm)	INSP./PERFORMANCE TEST SATT	
							YES	NO

ITEM NUMBER	LOCATION AND/OR DESCRIPTION	DPM/100cm² ALPHA		DPM/100cm² BETA-GAMMA		CORRECTED DOSE RATE (MREM/HR)			
		REMOVABLE	FIXED PLUS REMOVABLE	REMOVABLE	FIXED PLUS REMOVABLE	γ CONTACT	β/γ CONTACT	γ AT ___ FT.	β/γ AT ___ FT.

NO.	DISTRIBUTION OF COPIES
1	Radiological Safety Supervisor
2	Facility Supervisor
3	Operable Unit Manager

NOTIFICATION OF SURVEY RESULTS

SUPERVISOR NOTIFIED	TIME	DATE	NOTIFIED BY	REVIEWED BY	DATE

FS-F-1993-1 (REV. 11/7/91)

ATTACHMENT B

RADIOLOGICAL SURVEY REPORT (CONTINUATION SHEET)

Fernald Site
IRS&T - RADIOLOGICAL SAFETY

RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET Page ____ of ____

ITEM NUMBER	LOCATION AND/OR DESCRIPTION	DPM/100cm² ALPHA		DPM/100cm² BETA-GAMMA		CORRECTED DOSE RATE (MREM/HR)			
						γ	β/γ	γ	β/γ
		REMOVABLE	FIXED PLUS REMOVABLE	REMOVABLE	FIXED PLUS REMOVABLE	CONTACT	CONTACT	AT ____ FT.	AT ____ FT.

FS-F-1993-2 (REV. 11-7-91)

ISSUE AND REVISION RECORD

DATE OF CHANGE	REVISION NUMBER	AFFECTED PAGES	REASON FOR REVISION
01/02/91	0	ALL	Original issue of procedure
06/21/91	1	ALL	To include procedure for performing Gross-area smears and to recommend field counting smears wherever applicable.
01/22/92	2	ALL	To denote that the MDA for direct frisk is different than the MDA of smear counting when using portable instrumentation, to allow direct frisks in higher background provided it is documented, to reformat schedule to be based on area classification, and to update Radiological Survey Report Form.

3494

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1.0 PURPOSE

The purpose of this document is to provide the procedure for completing the Material Evaluation Form (MEF) to classify material as RCRA or NON-RCRA.

2.0 APPLICABILITY

This procedure shall apply to the classification of raw, process, excess, and waste material.

3.0 RESPONSIBILITIES

3.1 The Material Generator shall be responsible for the following:

3.1.1 Completing Section I, with input from IRS&T, of the Material Evaluation Form.

3.1.2 Maintaining a copy of the completed MEF for each generated stream.

3.1.3 Determining if a prior MEF has been submitted.

3.1.4 Completing a new MEF if changes occur to a previously evaluated material stream.

3.2 Facilities and Materials Evaluation (F&ME) shall be responsible for the following:

3.2.1 Completing Section II of the MEF per this procedure.

3.2.2 Determining that sufficient information exists to classify material as RCRA or NON-RCRA.

3.2.3 Recommending to Environmental Monitoring additional information that is required to complete a RCRA determination.

3.2.4 Maintaining the original of the completed form on file.

3.2.5 Establishing a primary and alternate contact within F&ME responsible for replying to inquiries on the completing and utilization of the Material Evaluation Form.

3.3 Environmental Engineering shall be responsible for the following:

3.3.1 Completing Section III of the MEF per this procedure.

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3.0 RESPONSIBILITIES (cont.)

3.3.2 Maintaining a record of the completed form.

3.4 Material Control and Accountability (MC&A) shall be responsible for the following:

3.4.1 Retaining a record copy of Section IV for each Material Evaluation Number.

3.4.2 Maintaining a listing that relates inventory numbers to the Material Evaluation Number.

3.4.3 Assisting Material Generator in maintenance of Material Evaluation files and tracking the Material Evaluation form.

3.5 Facilities & Warehousing (F&W) shall be responsible for the following:

3.5.1 Providing a Material Evaluation Number to generator upon request.

3.5.2 Maintaining a log of Material Evaluation Numbers.

3.5.3 Retaining a record copy of Section IV for each Material Evaluation Number.

3.6 Industrial, Radiological Safety, and Training (IRS&T) shall be responsible for the following:

3.6.1 Reviewing data provided by the Material Generator to establish the Health & Safety requirements applicable to the sampling, handling, packaging processing or transportation of material.

3.6.2 Reviewing, after completion of Section I and II of the MEF, the additional information and identifying additional personnel safety requirements.

3.7 Toxic and Solid Waste Programs (TSWP) shall be responsible for the following:

3.7.1 Providing the Department of Transportation (DOT) shipping name.

3.7.2 Providing the DOT hazard class.

3.7.3 Specifying required labels.

3.7.4 Providing DOT identification No.

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3.0 RESPONSIBILITIES (cont.)

3.7.5 Providing EPA waste No.

3.7.6 Providing applicable reactivity group codes.

3.7.7 Filling out Section IV of the MEF.

4.0 DEFINITIONS

4.1 Material Generator - a person at the originating facility who is authorized to prepare raw material, process material, and waste material for transfer.

4.2 Resource Conservation and Recovery Act (RCRA) - The congressional act which established safe and environmentally acceptable management practices for specific wastes. RCRA requires strict "cradle to grave" control and proper management of hazardous waste.

4.3 Hazardous Waste - A discarded material which is listed in the Environmental Protection Agency Hazardous Waste List which exhibits characteristics of ignitability, corrosivity, or reactivity. Both "listed" and "characteristic" wastes are regulated under RCRA.

4.4 Ignitable - Liquid waste with closed-cup flash points < 60°C (140°F), or non-liquid waste capable of causing fire through friction, absorption of moisture, or spontaneous chemical changes.

4.5 Corrosive - Aqueous (water based) wastes with a pH $\leq$ 2 or $\geq$ 12.5.

4.6 Reactive - Waste that exhibits properties such as reacting violently, forming potentially explosive mixtures or generating toxic gases when mixed with water, generating toxic gases (cyanide or sulfied) at pH between 2 and 12.5, or detonating or exploding at standard temperature and pressure or when heated under confinement.

4.7 Authorized Personnel - Personnel who have successfully completed all training requirements to perform work related to this procedure and have been authorized by the Facility Owner to perform the work.

4.8 Controlled Holding Area - The area designated for holding uncharacterized material and staging characterized material (excluding backlog material and material generated from a soil boring activity) for a maximum period of 90 calendar days.

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4.0 DEFINITIONS (cont.)

4.9 Fingerprint Analysis - An analytical process providing a brief description of material parameters as listed in Table 5.

4.10 Raw Material - A non-manufactured substance at the FEMP.

4.11 Process Material - A substance which has gone through a physical state of change.

4.12 Excess Material - A substance which has exceeded its recommended shelf life or intended use.

4.13 Waste Material - A substance which has expended its usefulness, non-recyclable and non-recoverable.

5.0 GENERAL

5.1 General Instructions for Completing the Material Evaluation

5.1.1 Fill in all items of each section. If an item cannot be answered, enter "NOT KNOWN".

5.1.1.1 If an item is not applicable to the material stream being evaluated, indicate as "N/A".

5.1.2 If there is not enough space on the form to record the required data, proceed as follows:

5.1.2.1 Prepare an attachment sheet with the MEF number (and Revision Number, if applicable) and date.

5.1.2.2 Enter the Item Number that corresponds to the Item Number on the MEF.

5.1.2.3 Enter the required data on the attachment sheet.

5.1.2.4 Sign the attachment sheet.

5.1.2.5 In the item block on the MEF, enter "See attachment".

5.1.2.6 Fasten the attachment sheet to the MEF.

5.1.3 Refer questions regarding the form to F&ME.

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6.0 PROCEDURE

6.1 Identification of Material

MATERIAL GENERATOR

6.1.1 If no information is known on the material and the container has no identification, contact F&ME and IRS&T for direction.

6.1.2 Obtain a Material Evaluation Number from F&W.

6.1.3 Record the Material Evaluation Number at the top of each sheet of the Material Evaluation, Form FMPC-OPR-3252 (See Figure 1).

6.1.4 Complete Section I, Items 1 thru 16b, of the Material Evaluation Form per Table 1.

6.1.5 When Section I (Items 1 thru 16b) is completed, forward the form to IRS&T.

NOTE: The material being evaluated shall remain in the generator area until direction is received from F&ME for disposition.

6.2 Establish Safety Requirements

IRS&T

6.2.1 Review the data provided in Section I of the MEF.

6.2.2 Determine potential health or safety concerns that may be encountered while sampling, handling, or processing the material.

6.2.3 In Item 16c specify protective gear that must be used while sampling, handling, or processing material (such as protective clothing, respirator, gloves).

6.2.4 Sign Item 16d and return the MEF to the Material Generator.

6.3 Identification of Material

MATERIAL GENERATOR

6.3.1 Complete Section I of the MEF and forward the form to F&ME.

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6.0 PROCEDURE (cont.)

6.4 Evaluation of Material

F&ME

6.4.1 Ensure an evaluation has not been previously completed for this material type per the source and material type code (Item 1 of Section 1). F&ME may use entire lot codes to designate a waste stream.

6.4.2 Complete Section II of the Material Evaluation form per Table 2.

6.4.3 When Section II is complete, proceed as follows:

6.4.3.1 If the material is classified RCRA or additional information is required for the classification (refer to Item 7 of Section IV), forward the form to Environmental Engineering and Material Generator.

6.4.3.2 If the material is classified as NON-RCRA or exempt (refer to Item 7 of Section II), retain the original form on file and transmit copies to distribution.

NOTE: The Material Generator shall respond by moving the drum to the designated storage area.

6.5 Material Analysis/Disposition Determination

F&ME

6.5.1 Refer to Section II and complete the following applicable substep.

6.5.1.1 If the material had been classified, proceed to Item 6.8.

6.5.1.2 If additional information is required to classify the material, complete items 13 and 14 of Section II.

6.5.1.3 Forward MEF to IRS&T to determine any additional safety requirements.

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6.0 PROCEDURE (cont.)

6.6 Establish Safety Requirements

IRS&T

6.6.1 Review additional information for safety concerns and identify any additional safety requirements.

6.6.2 Sign and forward the MEF to F&ME.

6.7 Additional Requirements

F&ME

6.7.1 Forward a copy of Section II to the Material Generator as authorization to prepare uncharacterized material for transfer to the Controlled Holding Area and a copy to Environmental Monitoring to identify and authorize sampling requirements.

NOTE: The original form shall be retained until the required information is received.

6.7.2 When additional information is received, proceed as follows:

6.7.2.1 Fill in the completion date (Item 15 of Section II).

6.7.2.2 Ensure that Section II is complete.

6.7.2.3 Initial and date each revision of Section II.

6.7.2.4 Briefly explain any corrections made (Item 2 of Section II) to the information contained in Section II.

6.7.2.5 Forward the Material Evaluation and analysis results to Environmental Engineering.

6.8 Classified Material

ENVIRONMENTAL ENGINEERING

NOTE: Refer to Item 7 of Section II for material classification.

6.8.1 If the material is classified as NON-RCRA, proceed as follows:

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6.0 PROCEDURE (cont.)

6.8.1.1 For material in storage, transmit the original Material Evaluation form to F&ME, a copy to the Facility Owner of the Controlled Holding Area, and a copy to the material generator.

6.8.1.2 For material being held at the generator area, forward the original Material Evaluation form to F&ME and a copy to the material generator.

6.8.2 If the material is classified as RCRA, proceed as follows:

6.8.2.1 Complete Section III per Table 3.

6.8.2.2 Forward the Material Evaluation Form to Toxic & Solid Waste Programs.

6.9 Material Identification

TSWP

NOTE: DELETED

6.9.1 Complete Section IV per Table 4.

6.9.2 Review section IV and confirm container information is correct.

6.9.3 Forward the MEF to FM&E.

6.10 Revising the Material Evaluation

MATERIAL GENERATOR, F&ME, OR ENVIRONMENTAL ENGINEERING

6.10.1 Determine a revision to the MEF is required.

6.10.2 Notify the appropriate departments of the numbered MEF requiring change and the revision required.

MATERIAL GENERATOR

6.10.3 Obtain file copy of the specified MEF and a new MEF.

6.10.4 Obtain a revision number from Waste Management.

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6.0 PROCEDURE (cont.)

6.10.5 Record the original MEF number and the revision number on the new MEF.

6.10.6 Complete Section I of the new MEF incorporating the necessary revisions and submit to F&ME.

6.10.6.1 If the revision requested is not applicable to Section I, complete Section I per the original MEF and forward to F&ME.

F&ME/ENV. ENG./TSWP/IRS&T

6.10.7 If the revision is applicable to Section II, III, or IV, complete the new MEF incorporating the revision.

7.0 APPLICABLE DOCUMENTS

7.1 Drivers

None

7.2 Reference Documents

None

8.0 APPLICABLE FORMS

8.1 FS-F-3252, "Material Evaluation Form"

TABLE 1
INSTRUCTIONS FOR COMPLETING MATERIAL EVALUATION FORM - (SECTION I)

ITEM NO	DESCRIPTION
1	Record the FEMP Source Code (SRC), Material Type Code (MTC), and the 15 digit Lot Code.
2	Designate the Plant/Building/Site location where material was generated.
3	Specify the process/building area which generates the material.
4	Provide the name of equipment generating the material.
5	Record the approximate date of generation (year, month, day) as specifically as possible.
6	Indicate the physical state of the material.
7	Estimate net weight of the material.
8	Indicate whether the material contains more than one substance (such as contaminated gloves, coveralls, booties, or other contaminated items).
9	Indicate whether the material is a waste.
10	Provide common names of the material.
11	Provide chemical names associated with the material.
12	Indicate sources of the common and chemical names.
13	Specify alternate material name (For example, identical material generated by different equipment).
14	Record alternate codes (source or material codes) used for material which is chemically identical to this material.
15	Indicate any substance, such as pesticides, solvents, or heavy metals, which is contained or suspected to be contained in the material.
16	a) Specify the reason for suspecting the substance indicated and quantity of suspect material[1]. b) List sources of information utilized for identifying the suspect substances indicated.

[1] Attach a copy of the MSDS as applicable.

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TABLE 1 (cont.)
INSTRUCTIONS FOR COMPLETING MATERIAL EVALUATION FORM - (SECTION I)

ITEM NO	DESCRIPTION
16 (cont.)	c) Identify safety concerns & special safety requirements. d) Sign and date the form
17	If a fingerprint visual inspection (Table 5) of the material was completed, attach to the Material Evaluation Form.
18	Record and describe the number of solid/liquid/gas layers within the material.
19	Record the pH of liquid material or liquid phase of material[2].
20	Record the flashpoint of liquid material or liquid phase[2].
21	If the material is a wet solid (sludge) and a paint filter test has been completed, specify test results (solid or liquid)[2].
22	Indicate if material is considered reactive. Include an explanation.
23	If the material is not a liquid, indicate if material is ignitable. Include an explanation.[2]
	DELETED
24	Provide additional information that may be used to evaluate the material.
25	List additional sources (such as phone call, specification, procedures, or other input) of information used to complete this form.
26	a) Provide the name and extension number of the individual responsible for responding to questions regarding Section I. b) Record the date Section I is completed.

[2] Attach results if available. Identify source, such as a sample plan.

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TABLE 2
INSTRUCTIONS FOR COMPLETING MATERIAL EVALUATION FORM - (SECTION II)

ITEM NO	DESCRIPTION
1	Indicate if material is waste (discarded, used, by- product).
2	Indicate if waste is excluded under 261.4(a) (CWA pointsource discharge, irrigation return flow, AEC source, special nuclear or by-product material, insitu mining waste).
3	Indicate if waste excluded from regulation under 264.1(b).
4	If the waste is listed in 261 Subpart D, or material contains a waste listed in subpart D, indicate the list and the waste number.
5	Indicate if waste exhibits characteristics specified in 261 Subpart C. List the characteristic exhibited.
6	Indicate if the material is a possible RQ hazardous substance. If yes, list the RQ amount in Lbs.
7	Indicate material classification. If material can not be classified indicate that the material needs further action and provide recommendations regarding information required.
8	Indicate if classification was based on data from Section I or an evaluation of an identical waste stream. If based on previous evaluation, list the Material Evaluation # and lot code of stream.
9	Indicate whether or not the material is subject to land ban restrictions and the effective date if applicable.
10	Distribute to the Departments listed in Section IV (Item 9).
11	List additional sources of information (phone calls, manufacturing specification, reference) used in this evaluation.
12	Provide the name and phone extension of the individual responsible for responding to questions regarding Section II and the date that Section II was completed.books).
13	Indicate if sampling is required (Refer to Section II Item 7).
14	Indicate if amount of time necessary for sampling and analysis require transfer of material to a controlled holding area. If yes, record date that the material was authorized for transfer.
15	Indicate date that additional information was included.
16.a	Identify any additional safety concerns and requirements.
16.b	Sign and date the form.

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TABLE 3
INSTRUCTIONS FOR COMPLETING MATERIAL EVALUATION FORM - (SECTION III)

ITEM NO	DESCRIPTION
	DELETED
	DELETED
	DELETED
1	Based on Section I and II (or recent information) indicate container recommended (such as carbon steel, stainless steel, polyethylene).
2	Based on Section I and II (or recent information) indicate the reactivity group codes associated with the material.
3	List additional sources of information used to complete the form (phone calls, material specifications, reference material).
4	Provide the name and extension of the individual responsible for responding to questions regarding Section III and the date that Section III was completed.

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TABLE 4
INSTRUCTIONS FOR COMPLETING MATERIAL EVALUATION FORM - (SECTION IV)

ITEM NO	DESCRIPTION
1	Provide the D.O.T. Shipping Name for material.
2	Provide the D.O.T. Hazard Class for material.
3	List required D.O.T. drum labels.
4	Provide the D.O.T. Identification No. (UN or NA) and prefix.
5	Provide the EPA Waste No. noted for material.
6	List applicable reactivity group codes (Refer to Section III, Item 2).
7	Record the FEMP lot code (Refer to Section I, Item 1).
8	Indicate whether a revision is required to the MEF.
9	Distribution.
10	Provide the name and extension of the individual responsible for responding to questions regarding Section IV and the date that Section IV was completed.

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TABLE 5
FINGERPRINT ANALYSIS PARAMETERS

PARAMETER	APPLICABILITY	TEST METHOD/REQUIREMENTS
Visual inspection	Required for all waste streams	To include, at a minimum, a discussion of the following: general description material color(s) particle size apparent stains multiple phases probe drum with pipe to ensure consistency
Liquid content	Required for waste suspected of containing free liquids	SW-846-9095: Paint Filter Liquids Test (PFLT)
pH	Required for waste streams with a free liquid phase (as determined by the PFLT)	SW-846-9040: pH Electrometric Method FMPC Method No. 3033[1]
Flash point	Required for waste with a free liquid phase (as determined by the PFLT)	Flash point meter
Density/specific gravity	Required for homogeneous wastes only; density for solid wastes, specific gravity for liquid wastes	Gravimetric for Density/ASTM D 1217 for Specific Gravity FMPC Method Nos. 1004 and 1005[1]

[1] These references are included for information, not for operational use.

Fernald Site
MATERIAL EVALUATION FORM

MEF NO. _____

MEF REV. NO.: _____

SECTION I - MATERIAL GENERATOR

1. FEMP SRC. | MTC
2. PLANT AND/OR BULDING NO.
3. PROCESS AREA
4. EQUIPMENT NAME(S).
5. MEF NO DATE | MEF REV DATE
6. MATERIAL PHYSICAL STATE. ☐ Liquid ☐ Gas ☐ Wet Solid (Sludge) ☐ Dry Solid
7. APPROXIMATE NET WEIGHT OF FULL CONTAINER? ☐ <100 lbs. ☐ 100 to 1000 lbs ☐ >1000 lbs.
8. DOES MATERIAL CONSIST OF MORE THAN ONE SUBSTANCE? ☐ YES ☐ NO
9. IS MATERIAL A WASTE? ☐ YES ☐ NO
10. COMMON NAMES. _____
11. CHEMICAL NAMES. _____
12. COMMON/ CHEMICAL NAME SOURCE ☐ Process Information ☐ MSDS ☐ Container Label ☐ FEMP Lot Code
OTHER. _____
13. SIMILAR MATERIAL NAME
14. SIMILAR MATERIAL LOT CODE(S)
15. SUBSTANCES SUSPECTED

☐ Aerosols	☐ Cresol	☐ Endrine	☐ Methylene Chloride	☐ TBP/Kerosene
☐ Arsenic	☐ m-Cresol	☐ Heptachlor	☐ Motor/Engine Oil	☐ Tetrachloroethylene
☐ Barium	☐ o-Cresol	☐ Hexachlorobenzene	☐ Nitrobenzene	☐ 1,1,1-Trichloroethane
☐ Benzene	☐ p-Cresol	☐ Hexachloroethane	☐ Other Organics	☐ 2,4,5-TP (Silvex)
☐ Cadmium	☐ 2,4-D	☐ Hexachloro-1,3-butadiene	☐ Paint Stripper	☐ 2,4,5-Trichlorophenol
☐ Carbon Tetrachloride	☐ Degreaser	☐ Hydraulic Oil	☐ Paint Thinner/Mineral Spirits	☐ 2,4,6-Trichlorophenol
☐ Chlordane	☐ 1,4-Dichlorobenzene	☐ Ink	☐ Pentachlorophenol	☐ Toxaphene
☐ Chlorobenzene	☐ 1,2-Dichloroethane	☐ Lead	☐ Perchloroethylene	☐ Trichloroethylene
☐ Chloroform	☐ 1,1-Dichloroethylene	☐ Lindane	☐ Pyridine	☐ Unknown
☐ Chromium	☐ 2,4-Dinitrotoluene	☐ Mercury	☐ Selenium	☐ Vinyl Chloride
☐ Coolants	☐ Enamel	☐ Methoxychlor	☐ Silver	☐ Xylene
		☐ Methyl ethyl ketone	☐ Synthetic oil	☐ Oil

16. a. REASON FOR SUSPECTING ALL SUBSTANCES AND QUANTITY
16. b. SOURCE FOR REASON AND QUANTITY (Attach MSDS if Available)
☐ MSDS ☐ Prior Evaluation of Similar Material
☐ Personnel Interviews ☐ AEDO Log ☐ Container Label
☐ Historical Records ☐ Physical Evidence ☐ Sump Report
☐ FEMP Lot Code ☐ Process Information ☐ Soil Database
What Material: _____
SRC: _____ MTC _____
16. c. HEALTH AND SAFETY CONCERNS/ REQUIREMENTS
16. d. SIGNATURE AND DATE
17. HAS THE "FINGERPRINT" VISUAL INSPECTION BEEN COMPLETED? ☐ YES ☐ NO
18. NUMBER OF PHASES
19. pH (IF KNOWN) (Attach Lab Results)
20. FLASH POINT (IF KNOWN) (Attach Lab Results)
21. HAS A PAINT FILTER TEST BEEN COMPLETED? ☐ YES ☐ NO
22. IS IT REACTIVE? ☐ YES ☐ NO EXPLAIN
23. IS IT IGNITABLE? ☐ YES ☐ NO EXPLAIN
24. OTHER INFORMATION: (Example: Is the Material a Product or Waste?)
25. ADDITIONAL SOURCES OF INFORMATION
26. PRIMARY CONTACT INDIVIDUAL | EXTENSION | DATE COMPLETED

NOTE: Form shall be completed using ink or a typewriter
NOTE: Only WEMCO employees shall sign this form

FS-F 3252 (REV 10-10-91) Sheet 1

MATERIAL EVALUATION FORM
FORM NO. FS-F-3252
Figure 1 (Sheet 1 of 2)

R - MATERIAL REVISED, ADDED, OR DELETED.

Fernald Site

MATERIAL EVALUATION FORM
(Continued)

MEF NO

MEF REV NO

SECTION II - FACILITY AND MATERIALS EVALUATION

1. IS MATERIAL A WASTE? ☐ YES ☐ NO
2. IS IT EXCLUDED UNDER 261.4(a)? ☐ YES ☐ NO
3. IS IT EXCLUDED UNDER 261.4(b)? ☐ YES ☐ NO
4. DOES IT CONTAIN A LISTED WASTE AS PER 261 SUBPART D? ☐ a ___ ☐ b ___ ☐ c ___ ☐ d ___ ☐ not listed
5. DOES IT EXHIBIT ANY CHARACTERISTICS AS PER 261 SUBPART C? ☐ YES ☐ NO EXPLAIN
6. IS IT A RQ HAZARDOUS SUBSTANCE? ☐ YES ☐ NO POUNDS
7. CLASSIFICATION AS A WASTE
   ☐ RCRA Hazardous Waste
   ☐ Source Exempt
   ☐ Non-RCRA Waste
   ☐ Radioactive
   ☐ Needs Further Action (re sampling)
   EXPLAIN:
8. PRIMARY BASIS FOR CLASSIFICATION
   ☐ Generator Information
   ☐ Prior material evaluation
   WHAT MATERIAL?
   LOT NUMBER
9. IS IT SUBJECT TO LAND BAN RESTRICTIONS?
   ☐ NO ☐ YES Effective Date
10. DISTRIBUTE PER SECTION IV, ITEM 9
11. OTHER INFORMATION SOURCES USED
12. PRIMARY CONTACT INDIVIDUAL — EXTENSION — DATE COMPLETED
13. IS SAMPLING REQUIRED? ☐ YES ☐ NO
14. IS TRANSFER TO CONTROLLED HOLDING AREA REQUIRED? ☐ YES ☐ NO — DATE
15. INFORMATION ACTION COMPLETION DATE
16. HEALTH AND SAFETY CONCERNS REQUIREMENTS
18. B. SIGNATURE AND DATE

SECTION III - ENVIRONMENTAL ENGINEERING

1. RECOMMENDED STORAGE CONTAINER MATERIAL ☐ Carbon Steel ☐ Stainless Steel ☐ Polyethylene ☐ Other
2. APPLICABLE REACTIVITY GROUP CODES ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H
3. OTHER INFORMATION SOURCES USED
4. PRIMARY CONTACT INDIVIDUAL — EXTENSION — DATE COMPLETED

SECTION IV - TOXIC AND SOLID WASTE PROGRAMS

1. PROPER D.O.T. SHIPPING NAME
2. D.O.T. HAZARD CLASS
3. REQUIRED LABELS
4. D.O.T. IDENTIFICATION NO ☐ UN ☐ NA — SUFFIX
5. EPA WASTE NO
6. APPLICABLE REACTIVITY GROUP CODES *(COPY FROM SECTION III, ITEM 2)*
7. FEMP SRC AND MTC *(COPY FROM SECTION I, ITEM 1)* — SRC — MTC
8. IS A REVISION TO MEF REQUIRED? ☐ YES ☐ NO
9. DISTRIBUTION
   - MATERIAL GENERATOR — DATE
   - ENVIRONMENTAL ENGINEERING — DATE
   - ENVIRONMENTAL MONITORING — DATE
   - MC&A — DATE
   - IPS&T — DATE
   - FACILITIES AND WAREHOUSING — DATE
   - F&ME — DATE
   - CONTROLLED HOLDING AREA — DATE
10. PRIMARY CONTACT INDIVIDUAL — EXTENSION — DATE COMPLETED

FS-F-3252 (REV 10/10/91) Sheet 2

MATERIAL EVALUATION FORM
FORM NO. FS-F-3252
Figure 1 (Sheet 2 of 2)

R - MATERIAL REVISED, ADDED, OR DELETED.

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
01-11-91	0	Instructions for completing the Material Evaluation form required per Request No. P90-292, initiated by K. Nuhfer.
04-16-91	1	Revised to update form and include steps to allow for an MEF revision per Request No. P91-093, initiated by J. Ogg.
06-20-91	2	Revised to update technical content and form per Request No. P91-235, initiated by R. Henderson.
10-22-91	3	Revised to insert correct form per Request P91-390, initiated by L. Hamblin.

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APPENDIX D

MANAGEMENT IMPLEMENTATION PLAN

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

Fernald Environmental Management Project

U. S. Department of Energy

Fernald, Ohio

September 12, 1991

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

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MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

1.0 Introduction

Background

Plant 1 is the "Sampling Plant" for the Fernald site and was therefore involved in the sampling of large amounts of uranium metal process residues and waste materials prior to further processing. Plant 1 Ore Silos were constructed in 1953 for the purpose of blending ore concentrates for feed into the refinery, Plant 2/3, for initial processing after sampling was completed. This system proved to be inefficient and was terminated from use for the original purpose. In approximately 1955, the silos were utilized as overflow storage for the cold metal oxides stream which is a by-product of ore processing. These silos have not been actually used since late 1962 when the majority of the contents were removed.

Description

This plan will provide the roadmap for completing the Plant 1 Ore Silo Removal Action. The work to be performed under this action includes preparation of the RSE, preparation of the Work Plan, preparation of the dismantling design documentation, implementation of the Work Plan, and preparation of the final project report.

Objectives

The primary objective of the plan is to provide an overall technical and management approach to the dismantling of the Plant 1 Ore Silos. This plan will provide the basis for DOE to concur with the best approach for facilitating the removal action. The secondary objective is to identify critical issues to be resolved during planning for the removal action. Issues identified to date include uranyl nitrate hydrate (UNH) hazard mitigation, sequence of work, containment of contaminants, and minimization of interferences.

The objective for the action is to mitigate the potential threat posed by the glazed tile structure for additional releases of the residues from one or more of the silos, due to the current state of deterioration of these units. The potential threat is for 1) exposure via inhalation to on-site personnel; 2) potential migration to previously uncontaminated areas; 3) releases to the stormsewer system, and 4) air release of radionuclides. The mechanism for transport is via wind, rainwater run-off and land use of the area. Additional hazards exist due to on-going structural deterioration of both the tile and concrete silos and the supporting steel structure.

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The implementation of this action will eliminate this source of a potential release and will eliminate the safety hazard due to the structural deterioration of the silos and their supporting structure.

2.0 Site Characterization

Site Background

The Fernald site is currently undergoing a Remedial Investigation and Feasibility Study (RI/FS) which is required prior to site remediation. The Plant 1 Ore Silos are part of Operable Unit 3, Former Production Area and Suspect Areas. Preliminary structural analysis studies have already been completed on the silos and indicated a substantial degradation which could result in the structure collapsing. Based on this preliminary analysis, planning was initiated to examine the potential of implementing a removal action to address potential environmental concerns.

On February 6, 1991, a spill was observed on the ground level under Silo Number 2 during routine inspections by plant personnel. It is hypothesized that heavy rain on the previous day wetted the residues to the point of flow from this silo. Further inspections also indicated the collection of residues under Silos 1, 2, and 5 on the mezzanine of the silo structure. Condensation, coupled with freezing and thawing, could have loosened any remaining residues which have collected in the silo bottoms and eventually leaked through the caps as they became corroded to the point of failure. The spill was cleaned up with the residues being placed into drums prior to analysis and storage.

After the residues were cleaned up, further inspection and emergency maintenance activities of sealing the silo vents was performed to prevent the influx of wind and rain thus reducing the potential for further releases. Caps were fabricated, sealed with room temperature vulcanizing (RTV) material, and held in position with clamps or sandbags. After collection of representative samples for the silos, maintenance work on the bottoms of the silos involved installation of boxes to catch any remaining residues and installation of cover plates over the sampling/inspection ports.

All work on the silos was performed with Level 2 personal protective equipment (PPE) to ensure worker protection from radiological/chemical hazards and the workers tied off to prevent falls. The workers were required to work from scaffolding pics, again to ensure safety on the corroded flooring.

As a result of the inspections and structural integrity concerns, the DOE has directed immediate actions be initiated to prepare for decontamination and demolition of the silos. Additional characterization is being performed through

historical research and the collection of residues which have been sent to the laboratory for analysis.

Site Setting

The Plant 1 Ore Silos include the two groups of silos in an area directly south of Plant 1, consisting of the eight glazed tile silos to the west and the six reinforced concrete silos to the east. Four of the glazed tile silos are 44 feet tall and the remaining four are 10 feet tall. The six reinforced concrete silos which are 10 feet tall and the eight glazed tile silos sit on separate superstructures which are approximately 38 feet tall and are connected by a mezzanine. The estimated height of material in each of the eight glazed tile silo cones ranges from 1 - 4 feet. The material in the concrete silos is minimal.

The silo area is bounded on the south by four UNH tanks which presently contain approximately 100,000 gallons of ~ 1% U-235 UNH in weak nitric acid solution. Building 72, which contains slightly enriched uranium material, and Plant 1 waste shipping dock are located on the east side. Building 67 Thorium Warehouse is on the west side. Significant material handling activities, Thorium overpacking, waste shipping, and Plant 1 Pad Continuing Release Removal Action construction activities will be on-going during the same time frame as the Plant 1 Ore Silo work.

The work planned for the material in the UNH tanks (part of another action) involves removal, stabilization, and interim storage pending a decision for further processing. The tanks will be left in an industrial and environmentally safe condition upon completion of this effort.

The containers of Thorium material in Building 67 (part of another action) will be stabilized through overpacking and pH adjustment as appropriate from earlier characterization activities. This is an intense effort involving significant material handling and exposure control methods.

Waste shipping is an on-going operation from the Plant 1 dock. This involves the preparation, inspection, and documentation of 80,000-350,000 pounds of material each week. Building 72 is currently used for storage of 88 containers of uranium materials with enrichments from 2.0% to 19.9% U-235. The higher enrichments constitute a small volume of uranium contamination on miscellaneous waste materials.

The Plant 1 Pad Continuing Release construction activities involve the movement of approximately 3300 cubic yards of soil, installation of approximately 450,000 square feet of new or capped concrete pad, and erection of 102,000 square feet of tension support structures.

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Analytical Data

On March 16, 1991, WEMCO measured the dose rate, took smear samples from the silo surfaces, and collected grab samples from inside the tile silos. The contact dose rates ranged from <0.5 to 7.5 mrem/hr, with the highest reading at the base of the northwest silo, Silo 1. At 3 feet from the silos, the highest dose rate was 2 mrem/hr at Silo 5. The smear samples ranged from non-detectable to 12,101 dpm alpha/100 cm^2 and 4754 dpm beta-gamma/100 cm^2 on the floor underneath Silo 1. The highest levels measured on the surfaces of the silos were 3253 dpm alpha/100 cm^2 and 1002 dpm beta-gamma/100 cm^2 also found on Silo 1. The results of grab samples taken are listed in Table 1 in the Appendix. Silos 1 and 8 did not have grab samples taken because there was not enough sample matrix present in Silo 1 and the openings in Silo 8 were covered.

Asbestos, lead, polychlorinated biphenyls (PCBs), crystalline silica, and other unknown materials were identified during the industrial hygiene investigation survey conducted on March 27, 1991. Possible asbestos containing materials are the tiles, tile mortar, electrical wire insulation, pipe insulation, and building transite panels. Lead has been confirmed to exist in the paint on the steel structures and in the contents of the residue in the silos. PCBs may exist in the transformers, capacitors, and switchgear in the panelboard located on the south side of the silo mezzanine. These determinations are in progress and will be required to finalize the disposition of these materials of concern.

Sampling will be performed on the drummed materials from the spill cleanups. All materials removed during the release cleanups were containerized and are currently stored on Plant 1 Pad pending their evaluation. Additional sampling and analysis will be performed as outlined in the Sampling and Analysis Plan which will prepared as part of the Work Plan. Table 1 of the Appendix shows the preliminary estimates of rubble to be generated as part of this removal action. The summary results of sample analyses to date are in Tables 2 and 3 of the Appendix.

3.0 Removal Action Objectives

Prior to the initiation of this removal action, activities associated with the characterization of the materials, the development and approval of removal action documentation required by the National Contingency Plan and the CERCLA Section 120 and 106(a) Consent Agreement (CA) and development and approval of National Environmental Policy Act (NEPA) of 1969 documentation will be implemented.

This removal action is an interim measure to mitigate potential threats of release and hazards from structural instability. In parallel with the dismantling of the facility, any residual material in these fourteen silos will be removed, containerized, characterized, and disposed of, pending sampling results.

This action consists of the removal of the eight tile silos, six concrete silos, their supporting steel structure, and ancillary equipment. This removal action will also address the segregation, size reduction, decontamination (if possible), packaging, certification, shipping and disposal of only low-level radioactive waste scrap metal and masonry rubble. The pad and surrounding soil are not included in this removal action because they have not been identified as having a potential for release. The remediation of the remaining items will be part of the final cleanup action.

Incidental to performing the work, there are several release pathways to the environment such as:

1) Air - Fugitive dust emissions

2) Surface water - Particles of contamination being carried to the storm sewer

3) Groundwater - Particles of contamination being driven into the soils beneath the pad

Fugitive dust from the removal activities will be controlled. Possible control measures could include negative pressure containments, weather covers, wind barriers, and management of water resulting from storms. The potential for material to be carried from the pad with runoff to the surrounding soil and/or the storm sewer system will be mitigated by daily collection of the loose materials and appropriate barriers for control of potentially contaminated stormwater. The potential for groundwater contamination is minimal. Surface water control methods are in place and additional measures will be implemented if necessary during the field work to minimize the potential for any new or existing contaminants to be carried into the adjacent soils.

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The potential threat associated with the existing configuration and waste generation of the Plant 1 Ore Silos demolition arises from the potential spillage of material during removal or from fugitive emissions from the Plant 1 Ore Silos dismantling activities. These threats will be appropriately minimized through the use of administrative controls for storage and handling of waste material and the implementation of focused actions to ensure safety during the implementation of the plan.

The issues to be resolved as part of this work are further described as follows:

1) Sequence of Work

- Order of dismantling
- Advantages/disadvantages for each alternative

2) Access Restrictions

- Plant 1 Pad work
- Thorium overpacking activities
- UNH removal/processing
- Waste shipment activities
- Enriched uranium storage in Building 72

3) UNH Removal

- Risk of tank damage
- Method of protection
- Working space congestion

4) Containment of fugitive emissions

- During disassembly
- During size reduction
- During containerization
- During storm events

5) Material/residue disposition requirements

- Characterization
- Interim storage
- Segregation
- Size reduction
- Containerization
- Disposal

6) Design constraints

- Accessibility
- Scaffolding
- Ventilation
- Incident due to dismantling
- Remote activities to allow work completion

7) Interfaces

- Between organizations
- Between analytical data and work progression
- At the work area boundaries

4.0 Removal Action Alternatives

General Alternatives

1) No action.

The "no action" alternative involves taking no pro-active measures to deal with source control or mitigation of potential releases. This alternative would leave the silos abandoned-in-place until final remediation activities. The silo openings have been sealed, the area will remain cordoned off, and routine inspection will continue.

2) Containment/reinforcement

This action would leave the silos and structures in place but provide for enhanced stability and source control. This alternative involves the necessary design and construction of a containment to contain the contaminants until final remediation which also includes sufficient reinforcement of the structure to minimize the potential for collapse. This work would include any bracing and/or sealing necessary to maintain structural stability and control of potential contaminant releases until final remediation.

3) Removal/disposal

This alternative involves the necessary design and field activities to remove and dispose of the contaminant source. Removal/disposal was determined to be the general action most consistent with all requirements

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This alternative would completely remove all 14 silos, supporting structures, and associated equipment down to the concrete pad. The concrete piers would be removed to just below the pad surface and the pad surface refurbished. The work area will be decontaminated and sampled for residual contaminants.

Field Work

Plant 1 Ore Silos dismantling is a stand alone action which must be integrated with all other activities which may be impacted by its implementation. The following requirements will be discussed during the evaluation of each specific removal/disposal alternative in Section 5.0:

- Protectiveness of Human Health and Environment.
  This section will include discussion of the following:
  - *Environmental elements*; air, water, soil
  - *Human Health*; industrial safety, rad dose
  - *Protectiveness*; materials, equipment, or adjacent structures

- Compliance with ARARs.
  Self-explanatory.

- Consistency with Final Action.
  Self-explanatory.

- Reduction of Toxicity, Mobility, or Volume of Contaminant.
  This section will include discussion of the following:
  - *Control Measures*
  - *Containerization*
  - *Storage/Disposal*

- Technical Feasibility.
  This section will include discussion of the following:
  - *Work Area*
  - *Vertical Access*
  - *Method of Removal*
  - *Method of Packaging*
  - *Integration with other activities*

- Schedule.
  This section will include discussion of the following:
  - *Procurement*
  - *Dismantlement period*
  - *Resources*

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Assumptions

Materials

- Collected silo contents include process equipment contents and decontamination wastes and are assumed to be only radioactive material not otherwise specified (NOS) based on preliminary evaluation of sample analyses. No hazardous/mixed wastes are present in this work effort.

- Silo rubble is assumed as all low specific activity (LSA) based on the premise that silo internals will be sufficiently decontaminated during the dismantling activity.

- All dismantled materials which are contaminated will be boxed and shipped to Nevada Test Site (NTS). Nevada Operations (NVO) critieria will be adhered to for all shipments.

- Twenty percent of structural steel is assumed to be LSA, and eighty percent free release based on preliminary evaluation of radiological surveys.

- Construction wastes would include discarded gloves, anticontamination clothing, plastic and wood used for containment. The assumption of five type 7A containers is an arbitrary judgement amounting to about four percent of the total LSA waste.

Site Conditions

- Activities in the Plant 1 Ore Silo Area other than dismantling will not be cause for unforeseen delays due to interferences from space or access requirements of adjacent activities.

- The work area for silo dismantling will minimize impact on other adjacent activities.

Resources

- A subcontractor will provide all necessary equipment, materials, and qualified personnel to perform the dismantling work.

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- WEMCO will perform the ground support work for the dismantling activities. This will include supply, preparation as per procedure, inspection, and transportation of containers and maintenance of dust collectors and monitoring equipment.

- WEMCO will provide site health and safety surveys, rad/con surveys, and waste container certification.

Criteria

Documentation

- CERCLA, DOE, and WEMCO documentation requirements will be implemented.

- Documentation requirements include a Removal Site Evaluation, a Management Implementation Plan, a Work Plan, a CFC design package, and a final report documenting the removal action. The Management Implementation Plan is a prerequisite to completing the other work except the RSE.

- The work plan is to be submitted for DOE/EPA approval which will also include the approved RSE and Sampling and Analysis Plan.

- The Title I/II effort will provide biddable drawings and specifications, a government estimate, a description of WEMCO construction support, a safety assessment, and a risk assessment.

- All construction drawings and specifications will meet requirements of DOE Order 6430.1A and Fernald Site criteria.

Health and Safety

- DOE, OSHA, and WEMCO health and safety requirements will be implemented.

- The site will be surveyed for determination of the level of PPE.

- Personnel will be monitored at the egress points of the exclusion zone.

- All construction equipment will be required to pass inspection requirements.

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Characterization

- The work area will be routinely surveyed for hazards and PPE requirements.
- Containers and equipment will be surveyed for contamination before leaving the controlled area.
- Materials in containers which have not been adequately characterized will be sampled for RCRA determinations.
- The work area will be surveyed (sampled) for contaminants as indicated in the Sampling and Analysis section of the approved Work Plan.

Work Site

- Structures to remain (Buildings 1A, 67, and the UNH Tanks) will be protected from flying debris or other inadvertent damage.
- Fugitive emissions, solid, particulate, or liquid, will be controlled to ALARA principles within the construction area during the work.
- Other activities in the area will have access between Plant 1 Pad and 2nd street.
- Dismantling interfaces at the work area boundaries and/or equipment removed to facilitate the work will be repaired to as was or construction specification requirements to assure worker safety and weather resistance.
- Planning for shipment/storage of inventories of product, residue, and/or construction debris will be completed prior to initiation of the field work.

Shipping

- Materials from this project will be appropriately prepared for loading in shipping containers per the applicable site procedure. The issues to be addressed are free liquids, respirable fines, waste category, and condition of container as to meet NVO criteria.

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- Shipping containers will be of the type 7A, drum overpack, or sea/land container. Typical capacity for the 7A containers is 6000 pounds. Sea/Land container dimensions are approximately 8' x 8' x 20' with a pay-load capacity of 38,000 pounds.

- Shipping containers will be surveyed and documented prior to leaving the work area.

Specific Alternatives

In response to the general alternative of removal/disposal, several specific alternatives were evaluated. The types of activities which were addressed included containment, demolition methods, demolition sequence, container loading, and disposition of materials. Table 4 of the Appendix provides a summary list of ARARs.

5.0 Evaluation of Alternatives

Discussion

5.1 NO ACTION

- Protectiveness of Human Health and Environment

This alternative leaves the potential hazard unchanged. This is unacceptable for the following reasons:

(1) The silos, in their severely deteriorated condition, pose an imminent threat of catastrophic failure. Such failure could result in personal injury and/or loss of life, spread of radioactive contamination, and damage to nearby facilities. Of particular concern, relative to nearby facilities, are the four (4) uranyl nitrate hydrate (UNH) storage tanks.

(2) The silos are also a potential source of chronic release of contaminants. Significant releases have already occurred from the tile silos and the mitigation of the release was temporary. The impact of the release and potential of future release is principally the contamination of water and soil through rain water run-off. A secondary impact on the environment is the potential spread by the wind. The principal contaminant

is natural uranium present, although thorium-230 was present to 1.5 percent. Conclusion: Not acceptable.

- Compliance with ARARs.

  Not applicable.

- Consistency with Final Action

  This alternative does not interfere with or contribute to final action. Conclusion: No effect.

- Reduction of Toxicity, Mobility, or Volume of Contaminant

  This option does not reduce toxicity, mobility, or volume of contaminant. Conclusion: No effect.

- Technical Feasibility

  Not applicable.

- Schedule

  Not applicable.

5.2 CONTAINMENT / REINFORCEMENT

- Protectiveness of Human Health and Environment

  The principle impact of this option is the industrial safety of workers providing containment/reinforcement. The workers would be exposed to potential injury in the event of failure of the existing structure during modification. However, with proper design and work planning the risk can be made acceptable. Conclusion: Acceptable.

- Compliance with ARARs

  Alteration of the existing structure would require compliance with applicable ARARs. These would include enclosure of work areas where spread of contamination is a potential threat. Conclusion: Acceptable.

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- Consistency with Final Action

  A strong objection to this alternative is the fact that it is not consistent with the final action for the facility. Containment/reinforcement does not contribute to the final action of silo removal. Indeed, containment/reinforcement would be a temporary measure and, in the final analysis, would add to eventual waste volume. Also, this alternative would add significantly to the cost. Conclusion: Not acceptable.

- Reduction of Toxicity, Mobility, or Volume of Contaminant

  This alternative includes an enclosure which would reduce the mobility of contaminants; but, in the final analysis, the added materials would probably become contaminated and add to the total volume of low specific activity (LSA) radioactive waste. Conclusion: Adds to LSA waste.

- Technical Feasibility

  Containment/reinforcement could be accomplished, but would be an expensive option. The same work approach could be used for this option as for the removal action. Work would have to be accomplished without depending on the existing structure for work platform or scaffolding support. However, new materials and erection of containment/reinforcement would constitute added expense (at least compared with the final action of removal). Conclusion: Expensive compared to removal/disposal alternative.

- Schedule

  The schedule for this alternative would be much longer than that required for removal. The design would be more extensive and the installation of containment/reinforcing would require more time. A significant extension of the schedule compared to the schedule for the removal alternative would be in the time required for materials procurement. Conclusion: Completion long compared to removal/disposal alternative.

5.3 REMOVAL/DISPOSAL

This action will remove the threat to the environment posed by the potential for leakage of residual contaminants and is, therefore, consistent with the final action planned for the silos facility. The key issues of concern with the removal activity include protection of human health and the environment, compliance with ARARs, reduction of contaminants, technical feasibility, and schedules. Several other site specific issues as listed in Section 3 will also be addressed during the design phase.

The silos, their structural supports and other appurtenances, and concrete piers will be dismantled, decontaminated (to the extent practical), size reduced, and packaged in accordance with the required controls for protection of the environment and human health. The packaged materials will be transported and disposed per the requirements of the waste category. The control measures implemented during the removal action will be consistent with requirements at the FEMP, DOE, DOT, and EPA for the handling of low level wastes materials. The potential for worker exposure, radionuclide releases, and construction related accidents will be assessed. The results of the assessment will be factored into the planning activity to qualify controls. The project planning, engineering design, and administrative controls will effectively reduce the risks of personnel exposure and environmental insult to acceptable levels. The removal is being planned and designed by the standards as would govern a final remedial action and is, thereby, consistent with requirements anticipated with the terms and conditions of a respective Consent Agreement.

There are a few key factors which will predominate the concerns for safety and environmental protection. These are mentioned below and are being considered in the project's planning activities.

5.3.1 Sequence of Work

a. The tile silos, four of which are taller than the other silos, are located in close proximity (within impact range if silos collapse) of the UNH storage tanks.

b. The tile silos are considered to be in worse structural condition because of the deteriorated masonry evidenced in the spalling of several tiles. These tiles have fallen to the decking below and in some cases have fallen to the foundation slab at ground level. The monolith construction of the concrete silos does not present this problem. The ste

structural supports for the tile and concrete silos are believed to be in an equally deteriorated condition as exhibited in rust spots and broken welds.

c. Expediting the silo removal will minimize the threat of collapse and potential for continuing release. In that regard, the sequence of tile and concrete silos removal with respect to which comes first is not a primary concern since the time between removal of the respective facilities is very short (months).

The following preliminary sequence of work and the associated rationale are being developed to accommodate the requirements of the project and are in consideration of the factors listed above.

1. Isolate the project area with appropriate signage, fencing, and concrete barriers.

   The proposed project area will need to be marked in accordance with site requirements for the prevention of intrusion of unauthorized personnel from the project site.

2. Provide the necessary utilities to support the planned work.

   Electrical power, process air, process and potable water will be required at varied intervals during the project.

3. Facilities which are to remain and are in close proximity to this project will be shielded against damage due to falling members or projectiles from the dismantling of the silos.

   Design features for physical shielding from potential falling members or projectiles will be incorporated where it is necessary. These physical design features include deflection shielding over the UNH tanks, concrete abutments between the silos and any buildings containing hazardous materials, etc. The shielding media will be designed around a reasonable risk scenario as envisioned to occur during the performance of the project. The design will be supported by engineering calculations and standard review cycles.

4. Containment structures for the dismantling, size reduction, and packaging operations will be constructed.

   Areas within the project site will be isolated for siting of a size reduction building and a separate packaging building for the project. The buildings will be sized per the anticipated capacity requirements of the project. ~~All~~ The ~~containments~~ will be designed and constructed to operate in a flow-through manner while providing the appropriate containment. A negative air pressure will be maintained with HEPA filtration to assist with this containment provision. Other ventilation filters and blowers will be put in place to support localized containment at points of actual disassembly work on the silos. Airborne particles will be controlled by forced air flows, contained by physical barriers, and captured in filters for packaging and disposal with other silo materials. All emission points will be sampled or calculations performed to assure compliance with ARARs.

5. Check structural framework and install temporary bracing as necessary.

   The checking of framework will include a thorough inspection to locate extensive deterioration in structural members which might subject a member to premature failure during the disassembly work. Methods of bracing or repair which will not add additional stresses to the structure will be employed. The structure will not be used for support or anchors during the course of the project.

6. Install scaffolding as needed for the initial sequenced disassembly work at the tile silos.

   This will include the installation of scaffolding up to work levels as required above grade to remove non-load bearing structures and equipment which would interfere with the placement of the primary scaffold structure. The scaffolding will be self-supporting with no dependence on anchors off of the silos structures and with minimum guy wire interferences. Shop drawings will be submitted by the subcontractor for approval prior to field work initiation.

7. Process support equipment, non-essential enclosures, and non-load bearing structures at ground level will be removed.

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The ground level area underneath and around the silos in the project area will be cleared of potential obstructions. This will be done in a manner to insure that load-bearing structural members are not disturbed.

8. Remove the conveyors which extend between Building 1A and the silos.

   The two conveyor systems will be disassembled as in Section 9 with similar provisions for containment and sealing of exposed surfaces.

9. Remove the structures and equipment located on the top of the tile silos.

   This will include the removal of platforms, catwalks, handrails, conveyors, hoppers, and motors. The removal will be conducted by accessing the silos from the north side of the facility. Containment will be provided by the erection of localized physical enclosures at the points of disassembly. The enclosures will be furnished with a negative airflow forced through HEPA filters as a means of secondary containment and to provide a measure of comfort to the workers. The appropriate FEMP Procedures for cutting, working in enclosed areas, and employment of HEPA filters will be observed. Exposed process surfaces and end cuts will be wrapped and sealed with plastic and tape as they are removed to the ground level.

   A large crane will be employed to remove the heavy equipment and sections of the structure. The crane will remain in place to be used in follow on work. The weights of items to be handled are being calculated as part of detailed design to determine the size crane required. Analyses of access routes, space requirements, and potential interferences (motion studies) during removal will be performed as a function of design.

10. Remove the checker plate decking, the decking support structure below the silo bottom cones, and the bottom cones from the tile silos.

    This will provide the opening needed to hoist the packaging (shipping boxes) through the bottoms of the tile silos to the level of disassembly activity. This will facilitate placing tiles into the boxes without generating excessive amounts of

debris. Reinforcing of the silos structures will be installed as determined by design engineering to compensate for the checker plate and decking supports. This is intended to avoid premature failure of the structural members during disassembly. The residues remaining in the hoppers will be drummed and the hoppers then size reduced.

11. Remove the structure and equipment located on top of the concrete silos.

    This activity will be conducted as in Section 9. above.

12. Remove the concrete silos.

    The complete cap of each silo will be removed as a unit. The individual concrete silos will be removed as units. They will be secured in a specially designed lifting device prior to the disassembly from current anchors. They will be lowered to ground level to an area designated for size reduction. Motion studies for determining clearances to avoid interferences with other structures are being conducted as part of detailed design. Each cap weighs approximately 5 tons. Each silo weighs approximately 15 tons.

13. Remove the caps from the tile silos.

    The complete cap of each silo will be removed as a unit. A sequence of activities as with the concrete silos is being developed. The caps will be lowered to ground level and moved to the area designated for size reduction operations. Newly exposed surfaces will be wrapped and sealed. Each cap weighs approximately 5 tons.

    After the removal of the caps, the large crane will be dismissed.

14. Complete the installation of the physical enclosure for containment of the tile silos.

    The enclosure will be supported by the scaffold structure. Ventilation will be extended to this additional section of enclosure to provide further containment of particulates and to serve as a measure of comfort to the workers. The cylindrical configuration of the silos will be used as a downdraft chimney. A specially designed hood arrangement will enhance the enclosure effect to allow forced air to be

directed through the silo being disassembled and to the HEPA filters at the ground level.

15. Remove the tile silos.

The tile silos will be disassembled, tile-by-tile, to minimize particulate migration. The tall tile silos will be removed first and will progress from north to south. The previously described hoist system for raising shipping boxes to a level near the disassembly activity will be employed during this part of the work. A specially designed lifting platform, lifting fixture, and loading chute arrangement will be used.

The shipping boxes will be removed at the ground level by a dolly jack through an air lock. The air lock will double as a decontamination area prior to moving the boxes from the controlled area.

16. Remove the remaining structural steel.

The remaining structural steel will be disassembled in a progression from north to south as with the tile silos removal described above. Once the remaining structural steel of the tile silos is removed, the work will shift to the remaining structure of the concrete silos. The exposed surfaces will be surveyed and wrapped and sealed as required. Localized containment via physical enclosures, controlled air, and HEPA filtration will be furnished as necessary to minimize the migration of particulates. This group of materials has the greatest potential for free release. These materials will be surveyed and decontaminated to maximum extent practical.

17. Remove the concrete supporting piers and refurbish the concrete surface of the existing support pad.

The concrete piers will be demolished. The debris will be loaded into shipping boxes and removed. The appropriate containment will be developed by design engineering with similar provisions being planned as with the physical enclosures, controlled air, and HEPA filtration described above. The applicable FEMP Procedures for work involving dust and being conducted in enclosed areas will be observed.

18. Remove the temporary demolition structures, protective barriers, and the demolition area isolation barriers.

The temporary structures and barriers will be disassembled. Components will be decontaminated as possible. Where decontamination is not possible, the components will be disposed with silo debris. The area will be cleared of all equipment and materials in the same manner. All surfaces in the construction area will be restored to their intended condition after work is complete. The applicable FEMP Procedures for monitoring of exiting vehicles and equipment will be observed. The area will be returned to the administrative control of FEMP Site Services after final inspection.

5.3.2 Access Restrictions

Access, work-around, and lay-down areas for materials, heavy equipment, scaffolding, temporary containment structures for size reduction operations, staging, etc., are limited. The enriched uranium stored in Building 72 will be relocated by WEMCO. The other access issues will be resolved during the design. Several methods on how to access the high level work were considered. This included use of the existing platforms, manbaskets supported by cranes or manlifts, and scaffolding. Only the scaffolding alternative would support the necessary requirements for safety, containment, and accessibility.

5.3.3 UNH Removal

The risk of tank damage will be minimal based on the proposed design of scaffolding and engineered tank protection. The details will be completed during the detailed design phase of the activity.

5.3.4 Containment of fugitive emissions

The issues of containment during disassembly, size reduction, and containerization are addressed in Section 5.3.1. Contaminant control during storm events will be addressed by the detailed design. Stormwater runoff from the work area will be controlled to contain suspended solids and the clarified water discharged to the storm sewer system. Debris from dismantling work will be prevented from inadvertent exit from the work area through the use of appropriate barriers.

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5.3.5 Material/residue disposition requirements

Characterization of materials will be completed prior to initiation of dismantling activities. The disposition requirements will be addressed during the detailed design. This activity will be performed on materials as appropriate to the next step of disposition. Personal protective equipment will dispositioned per site procedures. Tools and equipment used in the dismantling work will be cleaned to "free release" or disposed with other contaminated materials.

Silo material (tile and concrete) will be cleaned of loose residues prior to dismantling. Structural steel will be cleaned to permit "free release" to the extent practicable. Residues in the silos, hoppers, or conveyors will be placed in drums for appropriate disposition. Process equipment will be cleaned sufficiently to permit shipment as LLW. The equipment which cannot be decontaminated to "free release" will be size reduced to fit in sea/land containers. The tiles will be loaded directly in Type 7A shipping containers for shipment offsite after appropriate characterization. The concrete silos and silo tops will be size reduced in on-ground containments and placed in Type 7A containers.

Interim storage of empty containers will be managed by WEMCO. The full containers will be inspected, closed, and transported to storage by WEMCO awaiting shipment. Locations for potential storage will be identified in order to evaluate the traffic patterns for this work.

5.3.6 Design constraints

The major impetus for this design effort is to resolve the issues listed in this plan. Extremes in the weather conditions outside the prevailing patterns may present additional hazards to the work force, add destructive loads to the silos structural supports, or act as media for migration of contaminants. Premature failure of structural supports and collapse of a silo will require an alternative response to minimize the risks to personnel and the environment.

5.3.7 Interfaces

The nature of the removal work may require a division of labor functions among organizations. Coordination of several contracted work forces will be necessary.

Summary

Removal/Disposal is the alternative which is the most acceptable for all of the criteria of selection listed in Section 4.0. A summary of acceptability of each alternative for these criteria is given in Table 5 of the Appendix.

The conclusion is also made that the removal action can proceed independently of the removal of UNH from the storage tanks south of the tile silos and any other activities in the Plant 1 area. The key basis for this recommendation is that the control measures that will be implemented during the removal action will avoid increasing the risk of release of UNH or any other contaminant.

6.0 Roles/Resources

The DOE has been the lead agency for this removal action and will coordinate and execute continuation of this removal action. As stated in the Consent Agreement under CERCLA 120 and 106(a), if the DOE determines under Section 104 that any activities or work being implemented under this Consent Agreement may create an imminent threat to human health or the environment from the release or threat of release of hazardous substance, pollutant, contaminant, or hazardous constituent, it may stop any work or activities for such period of time as needed to respond and take whatever action is necessary to abate the danger. Reporting to the USEPA will be in accordance with Section XXIII of the Consent Agreement.

USEPA and OEPA shall review, comment and approve the work plan and follow progress through meetings and the Consent Agreement progress reports.

Westinghouse Environmental Management Company of Ohio (WEMCO) will coordinate, manage, implement, monitor activities and prepare all reports associated with the removal action in a manner consistent with DOE and regulatory guidance.

This removal action shall be managed by the Operable Unit 3 team, to ensure compatibility with the final remedial action(s) selected for Operable Unit 3

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Data and results from this removal action will be used to evaluate the final remedial options for Operable Unit 3. Fernald site personnel will manage the project using FMPC-2201 Topical Manual, Project Management Procedures.

All personnel involved will be trained in accordance with 29 CFR 1910.120, the standard operating procedures for the work involved, and with the requirements of the approved work plans. The effectiveness and integrity of the containment, monitoring, and other equipment installations will be assessed on a periodic basis. This will be accomplished by personnel normally assigned those duties. Environmental Compliance will monitor and report to WEMCO management on runoff samples outside the controlled area and Maintenance will inspect and repair the facility as determined to be necessary.

Resources

- Ground movement of containers in the work area will be routinely performed by WEMCO forces.
- All supply, surveying, and QA compliance activities involving containers will be performed by WEMCO personnel.
- All monitoring, surveying, and QA compliance activities of the project will be performed by WEMCO personnel.
- All monitoring, maintenance, and QA compliance activities of the dust collectors will be performed by WEMCO personnel.
- Installation of concrete barriers will be performed by WEMCO personnel.
- All erection and dismantling of equipment and structures will be performed by a subcontractor working to drawings and specifications.
- The subcontractor shall maintain a clean working area at all times to minimize the potential for release of contaminants.
- All installation of repairs to items to remain will be performed by a subcontractor working to drawings and specifications.
- Title III support services for changes to drawings and specifications will be performed by Parsons.

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Section 7.0

Appendices

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TABLE 1

Preliminary Estimated Weights
Construction Waste

	Weight	Material Activity	Container Type	Number
Collected Silo Contents	2.5 Ton	NOS	Drums	12
Tile Silo Rubble	290 Ton	LSA	7A	100
Concrete Silo Rubble	90 Ton	LSA	7A	30
Structural Steel (Contaminated)	19 Ton	LSA	Sea Land	3
Structural Steel (Decontaminated)	90 Ton	Free Release	---	---
Construction Wastes	15 Ton	LSA	7A	5

1) Weights are preliminary estimates base on information from existing drawings, photographs, and field surveys.

TABLE 2
PLANT 1 SILO
Summary
Radioanalytical Results (pCi/g)

		Uranium-238	Thorium-230	Radium-226	Thorium-232
Fraction Detectable	[1]	(11/14)	(14/14)	(14/14)	(14/14)
Mean + 1 Std. Dev.	[2]	183 + 318.9	31556 + 56538	516 + 577	377 + 858
High	[3]	1100(EM-2507)	160000(EM-2001)	1600(EM-2001)	2500(EM-2507)
Low	[3]	5.3(EM-2505)	630(EM-2510)	25(EM-2506)	7.4(EM-2575)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	1100(EM-2507)	100000(EM-2504) 140000(EM-2504) 160000(EM-2507)	1200(EM-2509) 1200(EM-2570) 1400(EM-2571) 1600(EM-2001)	2300(EM-2504) 2500(EM-2507)

		Radium-228	Thorium-228	Plutonium-239,40	Plutonium-238
Fraction Detectable	[1]	(14/14)	(14/14)	(14/14)	(14/14)
Mean + 1 Std. Dev.	[2]	31.6 + 38.6	189.3 + 440.1	0.33 + 0.29	0.18 + 0.065
High	[3]	130(EM-2001)	1600(EM-2504)	1.2(EM-2571)	0.4(EM-2508)
Low	[3]	3.6(EM-2506)	5(EM-2574)	0.12(EM-2001) 0.12(EM-2504) 0.12(EM-2505) 0.12(EM-2507) 0.12(EM-2509)	0.14(EM-2573)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	79(EM-2570) 83(EM-2571) 130(EM-2001)	660(EM-2507) 1600(EM-2504)	1.2(EM-2571)	0.4(EM-2508)

		Neptunium-237	Cesium-137	Technetium-99	Plutonium-239
Fraction Detectable	[1]	(12/14)	(2/14)	(12/14)	(6/14)
Mean + 1 Std. Dev.	[2]	5.06 + 4.75	3.1 + 0	18.5 + 16.1	0.517 + 0.355
High	[3]	13(EM-2507)	3.1(EM-2571) 3.1(EM-2571)	55(EM-2572)	1.2(EM-2571)
Low	[3]	0.4(EM-2574)	3.1(EM-2571) 3.1(EM-2571)	5.2(EM-2504) 5.2(EM-2506)	0.37(EM-2573)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	10(EM-2570) 11(EM-2504) 13(EM-2507)	-	43(EM-2571) 55(EM-2572)	1.2(EM-2571)

		Uranium-234	Uranium-235	Uranium-236
Fraction Detectable	[1]	(11/14)	(11/14)	(11/14)
Mean + 1 Std. Dev.	[2]	167.4 + 291.2	8.36 + 14.2	0.433 + 0.579
High	[3]	1000(EM-2507)	49(EM-2507)	2.1(EM-2507)
Low	[3]	1.6(EM-2505)	0.24(EM-2505)	0.001(EM-2570)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	1000(EM-2507)	49(EM-2507)	2.1(EM-2507)

[1] Detected / Total Samples
[2] + [illegible]olerance, plus or minus with 68% confidence
[3] S[illegible] number in parenthesis

TABLE 3
PLANT 1 SILO
Summary

METALS (ug/g)		Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
Fraction Detectable	[1]	(8/14)	(14/14)	(9/14)	(13/14)	(15/15)	(9/14)	(6/14)	(11/14)
Mean + 1 Std. Dev.	[2]	166.7 + 321.5	52.5 + 59.3	16.0 + 9.1	188.1 + 178.0	3973 + 8342	664.3 + 1328.3	15.91 + 4.31	0.66 + 0.48
High	[3]	960(EM-2504)	216(EM-2001)	24.6(EM-2572)	733(EM-2504)	32518(EM-2584)	4090(EM-2507)	21.69(EM-2575)	1.8(EM-2507)
Low	[3]	27.9(EM-2574)	7.92(EM-2573)	3.2(EM-2504)	43.9(EM-2510)	354(EM-2506)	3.5(EM-2574)	11.59(EM-2573)	0.1(EM-2509)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	960(EM-2504)	115(EM-2572) 119(EM-2507) 216(EM-2001)	-	733(EM-2504)	32519(EM-2584)	4090(EM-2507)	20.53(EM-2572) 21.69(EM-2575)	1.8(EM-2507)

TCLP EXTRACT (ug/L)		Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
Fraction Detectable	[1]	(0/14)	(4/14)	(0/14)	(0/14)	(4/14)	(0/14)	(0/14)	(1/14)
Mean + 1 Std. Dev.	[2]		233.3 + 21.7			392 + 126			0.2 + 0
High	[3]		252(EM-2572) 252(EM-2575)			462(EM-2572) 462(EM-2575)			0.2(EM-2571)
Low	[3]		213(EM-2574)			203(EM-2573)			0.2(EM-2571)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]		-			-			-

ORGANICS (ug/g)		Methyl Ethyl Ketone	Tetrachlorethane	Acetone	Toluene	Cycloheranone	2-Nitropropane	Total Xylenes
Fraction Detectable	[1]	(1/14)	(3/14)	(1/14)	(2/14)	(1/14)	(1/14)	(1/14)
Mean + 1 Std. Dev.	[2]	83 + 0	86.0 + 86.1	31 + 0	16 + 4.24	263 + 0	34 + 0	14 + 0
High	[3]	83(EM-2571)	181(EM-2509)	31(EM-2507)	19(EM-2509)	263(EM-2508)	34(EM-2508)	14(EM-2509)
Low	[3]	83(EM-2571)	13(EM-2506)	31(EM-2507)	13(EM-2507)	263(EM-2508)	34(EM-2508)	14(EM-2509)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	-	181(EM-2509)	-	-	-	-	-

[1] Detected / Total Samples
[2] + = Tolerance, plus or minus with 68% confidence
[3] Sample number in parenthesis

Table 4 - List of Potential Hazards, Requirements and Assumed ARAR Compliance

POTENTIAL HAZARD	REQUIREMENT	ARAR
1. Radionuclide Emissions (Except Airborne Radon-222)	40CFR61, Subpart H	Applicable
2. Radiation Dose Limit (All Pathways)	DOE Order 5400.5, Chapter II, Section 1.a	To Be Considered
3. Radiation Dose Limit (Drinking Water Pathway)	DOE Order 5400.5, Chapter II, Section 1.d	To Be Considered
4. Radionuclides in Drinking Water	40CFR 141.15 OAC 3745-81-15 40CFR 141.16 OAC 3745-81-16	Relevant and Appropriate

Table 4 - List of Potential Hazards, Requirements and Assumed ARAR Compliance

POTENTIAL HAZARD	REQUIREMENT	ARAR
5. Radionuclide Emissions	DOE 5820.2H Chapter 3	To Be Considered
6. Hazardous Waste Determination	40CFR 261	Relevant and Appropriate
7. Hazardous Waste Determination	40CFR 262.11	Relevant and Appropriate
8. Radiation Hazard	10CFR 20	Relevant and Appropriate
9. Fugitive Dust	OAC 3745-17-08	Relevant and Appropriate

Additional ARARs will be identified and added as part of the work plan.

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Notes: A brief summary of requirements is given as follows:

1. 40CFR61, Subpart H

   Emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem per year.

2. DOE Order 5400.5, Chapter II, Section 1.a

   The exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall not cause, in a year, an effective dose equivalent greater than 100 mrem from all exposure pathways.

3. DOE Order 5400.5, Chapter II, Section 1.d

   Provide a level of protection for persons consuming water from a public drinking water supply operated by the DOE so that persons consuming water from the supply shall not receive, for multiple radionuclides, the sum of the effective dose equivalents from the radionuclides (excluding Radium-226, and Radon-228, and Radon) exceeding 4 mrem in a year from drinking water.

4. 40CFR141.15, OAC 3745-81-15

   Maximum Contaminant levels (MCLs) for radioactivity in community water systems are set as follows:

5 pCi/l of combined Radium-226 and Radium-228	15 pCi/l of gross alpha particle activity (including Radium-226 but excluding radon and uranium).

   40CFR141.16, OAC 3745-81-16

   The average annual concentration of beta particle and photon (i.e., gamma) radioactivity from man-made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 mrem. The concentration limit for Strontium-90 is 8 pCi/l.

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Summary of requirements is continued as follows:

5. DOE Order 5820.2H

Radionuclide waste at DOE facilities shall be managed in accordance with the specified criteria.

6,7. 40CFR 261, 40CFR 262.11

This requirement involves the identification and management of materials which are similar to RCRA hazardous waste.

8. 10CFR 20

Provide a level of protection for persons working with radionuclide materials at these sites so that persons shall not receive, for multiple radionuclides, the sum of the effective dose equivalents from the radionuclides.

9. OAC 3745-17-08

Emissions of fugitive dust to the ambient air from work at these facilities shall be appropriately controlled.

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Table 5 - Summary of Acceptability of General Alternatives Evaluated

Criteria of Acceptability / General Alternatives	No Action	Containment / Reinforcement	Removal/Disposal
1. Protectiveness of Human Health and Environment	Not Acceptable	Acceptable	Acceptable
2. Compliance with ARAR's	Not Applicable	Acceptable	Acceptable
3. Consistency with Final Action	No Effect	Not Acceptable	Acceptable
4. Reduction of Toxicity, Mobility, or Volume of Contaminant	No Effect	Adds to LSA Waste	Acceptable
5. Technical Feasibility	Not Applicable	Expensive Compared to Removal/Disposal Alternative	Acceptable
6. Schedule	Not Applicable	Completion Long Compared to Removal/Disposal Alternative	Acceptable

APPENDIX E

SSOP-0003 RECEIVING, ON-SITE MOVEMENT AND OFF-SITE SHIPMENT OF NONRADIOACTIVE HAZARDOUS MATERIAL
PP-0314 PACKAGING, ON-SITE MOVEMENT AND OFF-SITE SHIPMENT OF MATERIAL

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM	SITE STANDARD OPERATING PROCEDURE Page 1 of 15 3494
Title: **RECEIVING, ON-SITE MOVEMENT AND OFF-SITE SHIPMENT OF NONRADIOACTIVE HAZARDOUS MATERIAL**	DOCUMENT NO: SSOP-0003 REVISION NO. 1
Authorization: H. F. Daugherty, President Supersedes: None	Effective Date: 04-30-92

1.0 PURPOSE

This document defines the procedure for receiving, on-site movement, and off-site shipment of nonradioactive hazardous material.

2.0 SCOPE

This procedure applies to organizations involved in the receiving, on-site movement, and off-site shipment of nonradioactive hazardous material.

3.0 DEFINITIONS

3.1 Control Person - A facility owner or designee accountable for nonradioactive hazardous material or receiving nonradioactive hazardous material at their facility.

3.2 Hazardous Material - A material or substance, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, or property during transport.

3.3 Material Safety Data Sheet (MSDS) - A written document provided by the manufacturer of a chemical that identifies the constituents, health hazards, exposure limits, necessary precautions and controls, and emergency first aid procedures associated with the chemical.

3.4 Nonradioactive Hazardous Material - A material or substance, including a hazardous substance, that has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, or property during transport that has a specific activity of 0.002 microcuries per gram or less per DOT Regulations (Title 49 CFR).

3.5 Off-Site - All areas of the FEMP outside the boundaries of the main perimeter security fence that are not controlled at all times by guards and security fences allowing limited access.

3.6 On-Site - All areas of the FEMP inside the main perimeter security fence that are controlled at all times by guards and security gates allowing limited access.

3.7 Packaging - The assembly of containers and any other components attached thereto, including inner receptacles, absorbent material, supporting structure, thermal insulation, and supplementary attached equipment.

3.8 Package - The package, together with its contents, as presented for transportation.

3.0 DEFINITIONS (cont.)

3.9 Shipment Originator - The person or WEMCO section who initiates an on-site movement or off-site shipment of nonradioactive hazardous material.

3.10 Working Quantity - An amount of material that can be carried to the jobsite (for example, the quantity needed for one work day).

4.0 RESPONSIBILITIES

4.1 Facilities & Warehousing - Responsible for assigning personnel and equipment for receiving, on-site movement, and off-site shipment of nonradioactive hazardous materials.

4.2 Inventory Control and Warehousing - Responsible for Warehouse Attendants who inspect and verify the accuracy of shipments of nonradioactive hazardous material, affixes applicable placards to carrier trailer if required, and verifies marking and labeling of packages as required. Also responsible for receiving, inspecting and expediting incoming shipments of nonradioactive hazardous materials against applicable receiving document.

4.3 Logistics Administration (Traffic) - Responsible for ensuring compliance with all Federal, State and local regulations, DOE Orders and Directives, and for reviewing support documentation, preparing bill of lading and other shipping documentation as required, providing guidance on the requirements for packaging, marking, labeling, and shipping of nonradioactive hazardous materials including coordinating the scheduling of off-site shipment(s) with carriers.

4.4 Materials Control and Accountability - Responsible for reviewing all documentation associated with off-site shipments including quality assurance documentation.

4.5 Radiological Safety - Responsible for conducting radiological surveys of materials, packages, and carrier vehicles that will be used for off-site shipments, documenting results of surveys, and providing copies of the results as required.

4.6 Shipment Originator - Responsible for accumulating and coordinating the packaging of nonradioactive hazardous materials and preparing documentation for materials for off-site shipment.

4.0 RESPONSIBILITIES (cont.)

4.7 Site-Wide Quality Assurance - Responsible for verifying the packaging processes for nonradioactive hazardous materials and other related materials and for conducting periodic inspections of packaging operations. Coordinate all required Quality Assurance review activities including conducting annual audits of the packaging and transportation of hazardous material shipments.

5.0 GENERAL

5.1 Nonradioactive hazardous materials received on-site in DOT specification packaging shall be transported on-site in the same packaging.

5.2 Empty DOT specification packaging(s) shall be retained at the on-site delivery point for use in future on-site movements of the same nonradioactive hazardous material.

5.3 WEMCO shall have a Material Safety Data Sheet (MSDS) for each nonradioactive hazardous material which is used. Copies of the required MSDS for each material shall be maintained in the workplace and be readily accessible during each work shift to employees when they are in their work areas.

5.4 All non-routine shipments and/or receipts not covered by specific procedure shall have formal plans developed that describe the process, requirements and organizational interface before work proceeds.

6.0 INDUSTRIAL HEALTH AND SAFETY REQUIREMENTS

None

7.0 PROCEDURE

7.1 Receiving Material

SITE SERVICES, INVENTORY CONTROL & WAREHOUSING

7.1.1 Receive nonradioactive hazardous material per applicable department procedures.

7.2 On-Site Movement of Nonradioactive Hazardous Material

SHIPMENT ORIGINATOR

7.2.1 Identify and quantify material by completing Form FMPC-OPR-3292 (See Figure 1).

7.0 PROCEDURE (cont.)

SHIPMENT ORIGINATOR

7.2.2 Contact Site Services or Inventory Control & Warehousing to package material.

7.2.3 Notify Radiological Safety when package is complete and ready for a radiological survey.

NOTE: A radiological survey does not have to be conducted if the material is being moved from a lower radiological control area to a higher radiological control area.

7.2.4 Complete a Nonradioactive Hazardous Material Shipment Approval Tag (FMPC-OPR-2947) (See Figure 2) and attach to the package.

7.2.5 Attach to the package the vendor supplied MSDS for the Nonradioactive Hazardous Material.

7.2.6 Attach a copy of the Radiological Survey Report (FS-F-1993-1) (See Figure 3) to Logistics Administration's copy of the WMCO Hazardous Material Transfer On-Site Shipment (FMPC-OPR-3292) (See Figure 1).

7.2.7 Notify Facilities & Warehousing for movement of the material.

7.2.8 Provide Facilities & Warehousing with Form FMPC-OPR-3292 (See Figure 1).

7.2.9 If the material is not immediately moved, temporarily store material per the requirements of Table 1.

FACILITIES & WAREHOUSING

7.2.10 Move packaged material per applicable department procedure.

7.3 Receipt of Requested Nonradioactive Hazardous Material from On-site Location

7.3.1 Check that the material received corresponds to the material identified by form FMPC-OPR-3292 (See Figure 1).

7.3.2 If discrepancies are found notify supervisor.

7.3.3 Ensure that the attached MSDS matches material as identified on form FMPC-OPR-3292 (See Figure 1).

7.0 **PROCEDURE** (cont.)

7.3.4 Sign the WMCO Hazardous Material Transfer On-Site Shipment (FMPC-OPR-3292) (See Figure 1) and distribute copies to the sections indicated on the lower left portion of the form.

7.4 Off-Site Shipment

SHIPMENT ORIGINATOR

7.4.1 Provide Logistics Administration with minimum 24 hour advance notice of off-site shipment of material.

7.4.1.1 Identify and quantify material by completing form FMPC-CONT-3388 (See Figure 4).

7.4.1.2 Provide Logistics Administration with the information required to determine applicable shipping requirements.

7.4.1.3 Contact Facilities & Warehousing or Inventory Control & Warehousing to package material for shipment.

7.4.1.4 Notify Radiological Safety when the packaging is complete and ready for a radiological survey.

7.4.1.5 Obtain appropriate signatures from Radiological Safety on form FMPC-CONT-3388, indicating that packaged material is not radioactive.

7.4.1.6 Complete Nonradioactive Hazardous Materials Shipment Approval tag (FMPC-OPR-2947) (See Figure 2) and attach to the package.

7.4.1.7 Attach a vendor supplied MSDS to the package for nonradioactive hazardous material.

7.4.1.8 Submit the completed Shipping Order for Hazardous Materials/ Hazardous Waste-Non-Nuclear (FMPC-CONT-3388) (See Figure 4) to Materials Control and Accountability for approval.

7.4.1.9 Attach a copy of the Radiological Survey Report (FS-F-1993-1) (See Figure 3) to the approved Shipping Order for Hazardous Materials/Hazardous Waste-Non-Nuclear (FMPC-CONT-3388) (See Figure 4) and forward the documentation to Site Services Logistics Administration so that a bill of lading may be prepared for off-site shipment.

7.0 PROCEDURE (cont.)

SHIPMENT ORIGINATOR

7.4.1.10 Notify Facilities & Warehousing when the material is ready to be moved to the predetermined loading dock.

7.4.1.11 Provide Facilities & Warehousing with Form FMPC-CONT-3388 (See Figure 4).

7.4.1.12 If the material is not immediately moved, temporarily store per requirements of Table 1.

INVENTORY CONTROL & WAREHOUSING

7.4.2 Conduct inventory control activities of nonradioactive hazardous materials packages per applicable department procedure.

LOGISTICS ADMINISTRATION

7.4.3 Notify carrier to dispatch driver to FEMP for shipment pick-up when the load is ready for shipment.

7.4.4 Verify that the vehicle inspections are conducted and documented on the OFFSITE LOADING - TIE DOWN INSPECTION - VEHICLE INSPECTION (FMPC-SAML-2495) (See Figure 5).

7.4.5 Request Radiological Safety to conduct a radiological survey of the carrier vehicle trailer.

7.4.6 Verify that the Radiological survey results comply with applicable regulations and are documented on the Vehicle Radiation Monitoring Report (FS-IRS&T-1596-1).

7.4.7 Upon receipt of the Shipping Order for Hazardous Materials/Hazardous Waste-Non-Nuclear, prepare a bill of lading as applicable.

NOTE: A bill of lading is required for common carrier transportation.

7.4.8 Request Radiological Safety to conduct a radiological survey of carrier vehicle tractor prior to site departure as required per applicable departmental procedure(s).

7.4.9 Sign bill of lading and Shipping Order.

7.0 PROCEDURE (cont.)

MATERIALS CONTROL AND ACCOUNTABILITY

7.4.10 After receipt of all associated shipment documentation, review and document.

7.4.11 Sign shipping order to authorize release of off-site shipment of non-radioactive hazardous materials.

RADIOLOGICAL SAFETY

7.4.12 Perform a radiological survey of transport vehicle tractor as required by applicable department procedure(s).

7.4.13 Complete Vehicle Radiation Monitoring Report (FS-IRS&T-1596-1) and forward to Logistics Administration.

SHIPMENT ORIGINATOR

7.4.14 Sign the Shipping Order For Hazardous Materials/Hazardous Waste-Non-Nuclear (FMPC-CONT-3388) (See Figure 3) authorizing information provided on the form is correct.

LOGISTICS ADMINISTRATION

7.4.15 Provide the Carrier/Driver with the written driver instruction packet, containing specific instructions regarding controls for hazardous material shipments if required.

7.4.16 Verify that applicable placards have been placed on the front and back, and opposite sides of carrier vehicle if applicable.

7.4.17 Complete and return Shipping Order for Hazardous Materials/ Hazardous Waste-Non-Nuclear (FMPC-CONT-3388) (See Figure 1) to Materials Control and Accountability the day of shipment departure.

8.0 APPLICABLE DOCUMENTS

8.1 Drivers

8.1.1 DOE 1540.1, "Materials Transportation and Traffic Management"

8.1.2 OR 1540.1B, "Materials Transportation and Traffic Management"

8.1.3 DOE 1540.2, "Hazardous Material Packaging for Transport - Administrative Procedures"

8.0 **APPLICABLE DOCUMENTS** (cont.)

8.1.4 DOE 5480.3, "Safety Requirements for the Packaging and Transportation of Hazardous Materials"

8.1.5 DOE 5700.6B, "Quality Assurance"

8.1.6 40 CFR Parts 116 -117, "Designation of Hazardous Substances and Their Reportable Quantities"

8.1.7 49 CFR Parts 100-199, "Hazardous Material Regulations"

8.1.8 49 CFR Parts 383-397, "Federal Motor Carrier Safety Regulations"

8.2 Reference Documents

None

9.0 **APPLICABLE FORMS**

9.1 Hazardous Material Transfer On-site Shipment, FMPC-OPR-3292 (Figure 1)

9.2 Nonradioactive Hazardous Materials Shipment Approval Tag, FMPC-OPR-2947 (Figure 2)

9.3 Radiological Survey Report, FS-F-1993-1 (Figure 3)

9.4 Shipping Order for Hazardous Material/Hazardous Waste-Non-Nuclear (Figure 4)

9.5 Off-Site Loading Tie-Down Inspection, Vehicle, Form FMPC-SAML-2495 (Figure 5)

10.0 **FIGURES**

10.1 Figure 1, "WMCO Hazardous Material Transfer On-Site Shipment"

10.2 Figure 2, "Nonradioactive Hazardous Materials Shipment Approval"

10.3 Figure 3, "Radiological Survey Report"

10.4 Figure 4, "Shipping Order for Hazardous/Materials Waste-Non-Nuclear"

10.5 Figure 5, "Off-Site Loading Tie-Down Inspection, Vehicle"

TABLE 1
HAZARDOUS MATERIALS SEGREGATION/SEPARATION CHART

HAZARDOUS MATERIALS STORAGE REQUIREMENTS

(The Letter "X" Indicates that these Materials MUST NOT be Loaded or Stored Together"

NUMBER	HAZARDOUS MATERIAL	1	2	3	4	5	COMMENTS
1	Flammable Liquids or Flammable Gases; Flammable Liquid or Flammable Gas Label					X	
2	Flammable Solids; Flammable Solid Label; Oxidizer; Oxidizer Label; Organic Peroxide; Organic Peroxide Label			X		X	
*3	Corrosive Liquids; Corrosive Label		X			X	*3-Corrosive liquids must not be loaded above or adjacent to flammable solids, or oxidizing materials, except that shippers loading truckload shipments of corrosive liquids and flammable solids or oxidizing materials packages and who have obtained prior approval from the Department may load such materials together when it is known that the mixture of contents would not cause a dangerous evolution of heat or gas.
4	Nonflammable Gases; N.F.G. Label						
5	Poisonous Gases or Liquids in Tank Car Tanks, Cylinders; Poison Gas Labels	X	X	X			

WMCO
HAZARDOUS MATERIAL TRANSFER
ON-SITE SHIPMENT

In the event more information is needed to complete this form, call Traffic on extension 040.

DATE	ORIGINAL P.O. NUMBER *From Receiver attached to shipment*	VEHICLE NUMBER *To be completed by RSS driver*
MOVE FROM	CONSIGNED TO	

TO BE COMPLETED BY SHIPPER

LINE NO *(P.O.)*	QUANTITY	MATERIAL DESCRIPTION *From Receiver attached to shipment*

This is to certify that the above named materials are classified, described, packaged, marked and labeled, and are in proper condition for transportation according to applicable regulations of the Department of Transportation.

PER	DATE	TIME	PER
signature			
PER	DATE	TIME	
TITLE			*FACILITIES SERVICES DRIVER*

Upon completion of the move, one copy must be sent to Traffic, MS 49.

NO.	DISTRIBUTION OF COPIES
1	SHIPPER
2	RECEIVER
3	TRAFFIC

FMPC-OPR-3292 (10/91)

WMCO HAZARDOUS MATERIAL TRANSFER ON-SITE SHIPMENT
FORM FMPC-OPR-3292
Figure 1

3494

Nonradioactive Hazardous Materials Shipment Approval

This shipment has been inspected and approved for shipment.

Name: _____

Date: _____

FMPC-OPR-2947 (REV. 5/16/90)

NONRADIOACTIVE HAZARDOUS MATERIALS SHIPMENT APPROVAL
FORM FMPC-OPR-2947
Figure 2

FMPC

ENVIRONMENT SAFETY & HEALTH - ENVIRONMENTAL & RADIOLOGICAL MONITORING

RADIOLOGICAL SURVEY REPORT - PLANT 5

Date: _____ LOCATION: Plant 5 Production Offices

Time: _____

FROM:

ROUTE TO: D. E. Ames, A. B. Colquhoun

REASON FOR SURVEY: ☑ ROUTINE ☑ SPECIAL REQUEST _____ SOP# _____

COMMENTS: Weekly Contamination Survey of Plant 5 Production Offices

INSTRUMENTS

MODEL	SERIAL NUMBER	BKRD.	EFF.

ANALYZE FOR: ☑ ALPHA ☑ BETA-GAMMA ☐ TOTAL U ☐ PARTICULATE

TYPE OF SURVEY: ☐ CONTAMINATION ☐ STACK FILTER ☐ RADIATION ☐ OTHER _____

SAMPLE: NUMBER	ITEM NUMBER	DESCRIPTION	DOSE RATE CONTACT	DOSE RATE 3 FT	DPM ALPHA 100 CM²	DPM ALPHA PROBE	DPM BETA-GAMMA 100 CM²	DPM BETA-GAMMA PROBE
	1	Step Off Pad						
	2	Cabinet Top						
	3	Floor						
	4	Desk Top						
	5	Top of Light Fixture						
	6	Cabinet Top						
	7	Floor						
	8	Floor						
	9	Desk Top						
	10	Floor						
	11	Floor						
	12	Window Sill						
	13	Ledge						
	14	Step Off Pad						
	15	Floor						
	16	Desk Top						

NO.	DISTRIBUTION OF COPIES
1	Environment, Safety & Health
2	Health Physics
3	Supervisor

RADIOLOGICAL SURVEY REPORT
FORM FS-F-1993-1
Figure 3

Westinghouse Environmental Management Company of Ohio

SHIPPING ORDER FOR HAZARDOUS MATERIALS/HAZARDOUS WASTE—Non-Nuclear

Date Prepared _____

SHIP TO		ROUTING			SHIPPING ORDER NO
STREET		PREPAID	CAR OR TRAILER NO	SEAL NO.	SHIPPED FROM PLANT-WAREHOUSE	ORIGINATOR NO
CITY	STATE	COLLECT	BILL OF LADING NO WASTE MANIFEST NO	HAZARDOUS MATERIAL SHIPPING DOCUMENT NO	DATE SHIPPED
MATERIAL DESCRIPTION				ORIGINATOR'S SIGNATURE	TIME SHIPPED

APPROVALS: SHIPMENT AUTHORIZATION ECAQA IHMT. WCML

ORIGINATOR'S DATA

FROM COST CODE	JAMA NUMBER	P.O. NO.	LOT NUMBER	QUANTITY	WEIGHT (LBS) GROSS	TARE	NET	ANALYSES ATTACHED	ADDITIONAL INFORMATION

DISTRIBUTION OF COPIES

1 MC&A RECORD COPY	6 Industrial Hygiene
2 Traffic	7 Environmental Compliance
3 Quality Engineering	8 Radiological Safety
4 Environmental Engineering	9 Facilities and Warehousing
5 Originator of Shipping Order	

FS CONT 3388 (REV 6 3 91)

I _____ certify that this shipment was made on the above date after complying with all regulatory requirements

SHIPPING ORDER FOR HAZARDOUS/MATERIALS WASTE-NON-NUCLEAR
FORM FMPC-CONT-3388
Figure 4

FMPC
OPERATIONS DEPARTMENT - TRANSPORTATION SECTION
OFFSITE LOADING — TIE DOWN INSPECTION — VEHICLE INSPECTION

Date _____

COMMODITY	CARRIER	TRAILER NO.	SEAL NO
			FA-[illegible]CO

BALE/BOX/DRUM/SEA LAND CONTAINER NUMBERS:

	DISCREPANCIES DETECTED	CORRECTED? YES	CORRECTED? NO	SHIPMENT REJECTED YES	SHIPMENT REJECTED NO
LSA					
LSA-RQ					
LD					
LD-RQ					
TOTAL					

CHECKED BY _____ SIGNATURE - DRIVER

TIE-DOWN INSPECTION AND CHECK-OFF SHEET

INSPECTION ITEM	YES	NO
Wood shoring installed to prevent longitudinal or lateral movement		
Steel strapping around the cargo securing as a stable shipment		
When weight dictates, containers divided into two units, one front and one rear of trailer not exceed no approximately 20,000 pounds each		
[illegible] steel strapping utilized (5450 lbs. minimum tensile strength)		
____ each anchor plates or [illegible] bolts fastened to underframe (____ each side of units placed and secured for ____ transverse bands over units)		
Four each brakeman plates or [illegible] bolts fastened to underframe (two for each hand) placed under each unit and secured for two longitudinal bands, securing the boxes skids into one front unit anchored to the floor of the trailer		
Two Signode seals No. 100 crimped whenever two bands are used on an end over end lap joint		
Anchor and brakeman plates secured with eight each 2 [illegible] bolts		
Sea Land Containers		

4 each nylon straps (____)
Chains (____)
DX 45 (____)

VEHICLE INSPECTION REPORT

CONDITION	PASS - FAIL	CONDITION	PASS - FAIL	CONDITION	YES	NO
Condition of Floor		Condition of Sides		Detected Sabotage Devices		
Condition of Interior		Condition of Exterior		Detected Evidence of Sabotage		
Condition of Roof		Condition of Rear Doors				
Overall appearance		General Comments				

Accepted. _____ Rejected _____

Checked By _____ SIGNATURE - TRANSPORTATION SUPERVISOR

NO.	DISTRIBUTION OF COPIES
[illegible]	Transportation Section (RECORD COPY)

FMPC-OPR-2495 (REV. 7/19/90)

OFF-SITE LOADING TIE-DOWN INSPECTION, VEHICLE
FORM FMPC-SAML-2495
Figure 5

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
01-30-91	0	SSOP required for receiving and transporting nonradioactive hazardous material per Request No. P91-025, initiated by C. S. Stapleton.
04-30-92	1	Revision required to implement DOE Order 1540.1, Rev. 4 per Request No. S92-097, initiated by C. S. Stapleton.

1.0 POLICY

It is the policy of the Westinghouse Environmental Management Company of Ohio (WEMCO) to ensure that the packaging, on-site movement and off-site shipment of hazardous and non-hazardous materials, including radioactive materials, is conducted in a safe manner that provides for the protection of the public and the environment, and is in compliance with the applicable federal, state, and local regulations, Department of Energy (DOE) Orders and Directives, and WEMCO policies and procedures.

2.0 SCOPE

This procedure identifies, defines, and establishes the policies and responsibilities that govern the packaging, on-site movement, and off-site shipment of materials. Provisions of this document are applicable to all WEMCO Sections involved in the packaging, on-site movement, and off-site shipment of non-hazardous materials and hazardous materials, including hazardous substances, hazardous wastes, nuclear, and radioactive materials.

3.0 DEFINITIONS

3.1 Carrier - Any person engaged in the transportation of passengers or property as common, contract, or private charter, or freight forwarder, as defined in the Interstate Commerce Act, as amended, or by the United States Postal Service.

3.2 Consignee - The person or organization designated in the shipping papers to receive a shipment.

3.3 Hazardous Material - A material or substance, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, or property during transport.

3.4 Hazardous Substance - A material, including its mixtures and solutions, as defined in 49 CFR 171.8, section 101 (14) and 102 of CERCLA, section 311 (b) (2) (a) of the CWA.

3.5 Hazardous Waste - Any waste material that is designated as hazardous by the Administrator of the Environmental Protection Agency (EPA) in 40 CFR Part 261 and that is subject to the Hazardous Waste Manifest requirements of 40 CFR Part 262.

3.6 Material - For purposes of this procedure, any material classified as non-hazardous items or hazardous materials, including hazardous substances, hazardous wastes, nuclear, and radioactive materials.

3.0 DEFINITIONS (cont.)

3.7 Off-Site - All areas outside the main perimeter security fence that are not controlled at all times by guards and security gates.

3.8 On-Site - All areas inside the main perimeter security fence that are controlled at all times by guards and security gates to gain entrance to the Fernald Environmental Management Project (FEMP) Site.

3.9 Package - A packaging plus its contents as presented for transportation.

3.10 Packaging - The assembly of one or more containers and any other components necessary to ensure compliance with the minimum packaging requirements of 49 CFR.

3.11 Radioactive Material - Any material having a specific activity greater than 0.002 microcuries per gram per 49 CFR.

3.12 Radioactive Source - For the purpose of this procedure any source used as a standard for the radiation it emits sealed in a capsule or having a bonded cover in which the capsule or cover is strong enough to prevent contact with, or dispersion of, the radioactive material under normal conditions of use, including a one-meter drop onto an unyielding surface.

3.13 Radioactive Waste - Solid, liquid, or gaseous material that contains radionuclides regulated under the Atomic Energy Act of 1954, as amended, and of negligible economic value when the costs of recovery are considered.

3.14 Shipment Originator - The person, or WEMCO Section, who initiates an on-site movement or off-site shipment of material.

3.15 Waste Originator - Any person, or WEMCO Section, whose operation or process generates hazardous waste, radioactive waste, or a mixed waste.

3.16 Nuclear Material - Collective term that includes all such materials designated by the DOE. A listing of designated nuclear materials may be found in DOE Order 5633.3; however, at the FEMP site, nuclear materials shall mean depleted, normal, or enriched (less than 20% U-235 by weight) uranium or thorium.

4.0 RESPONSIBILITIES

4.1 Centralized Training - Responsible for the proper development of training activities to comply with mandatory training requirements and to enable employees to qualify, requalify, or enhance their ability to perform job duties and tasks. Responsible for appropriate documentation and maintenance of training activities, development of in-house audio/video training aids, providing assistance in the development/section training, maintaining and administering the TRMS', maintaining the TMR, including the maintenance of subcontractor training records supplied to centralized training by technical instructors or by the manager of the contracting department.

4.2 Maintenance/Garage - Responsible for the inspection of inbound carrier vehicles that will be used for outbound shipments, providing for the inspection used for on-site shipments, and the preventative maintenance of all such government vehicles at FEMP, and documenting all maintenance and inspections.

4.3 Radiological Safety - Responsible for conducting radiological surveys of materials, packages, and carrier vehicles that will be used for outbound shipments, documenting results of surveys, and providing copies of the results as required. Radiological Safety is also to be notified so surveys can be performed on all on-site movements of materials.

4.4 Facilities and Warehousing - Responsible for packaging materials for on-site movement, packaging uranium metals, oxides, and related products for off-site shipment, providing support documentation, and assigning the personnel and equipment required for on-site movements, loading off-site shipments, and spotting/loading carrier trailers and freight containers.

4.5 Material Control and Accountability - Responsible for the nuclear materials control and accountability program at FEMP.

4.6 Procurement/Materials Management - Responsible for the review and approval of off-site miscellaneous shipping documentation.

4.7 Analytical Section (of Site Services) - Responsible for providing analytical documentation of material samples and the packaging of samples for off-site analysis.

4.8 Logistics Administration - Responsible for developing and updating transportation related procedures ensuring compliance with all Federal, State and Local regulations, Doe Orders and Directives.

4.0 RESPONSIBILITIES (cont.)

4.9 Site-Wide Quality Assurance - Responsible for verifying the packaging processes for uranium metals, oxides, and other related materials and for conducting periodic inspections of packaging operations. Coordinate all required Quality Assurance review activities including conducting annual audits of the packaging and transportation of hazard material shipments.

4.10 Radioactive Source Controller - Responsible for controlling and the coordination of radioactive source for shipment off-site.

4.11 Safeguards and Security - Responsible for the coordination of security and safeguard measures for off-site shipments.

4.12 Shipment Originator - Responsible for preparing documentation of materials for on-site movement or off-site shipment.

4.13 Transportation Safety Committee - Responsible for the evaluation of WEMCO policies and procedures for packaging and transport of all materials, exchange knowledge and experience in resolution of transportation safety problems, uniform interpretation and implementation of Federal, State, and Local regulations, including OSHA safety requirements, DOE Orders, and WEMCO guidelines as applicable to transportation safety.

4.14 Traffic Control - Responsible for providing guidance on the requirements for the on-site movement of hazardous materials. Responsible for preparing bills of lading, coordinating the loading of off-site shipments, and coordinating the scheduling of off-site shipments.

4.15 Waste Originator - Responsible for accumulating and packaging waste for storage or disposal and for making the proper notifications when accumulated wastes must be transported to on-site storage facilities.

4.16 Facilities and Material Evaluation - Responsible for providing assistance to waste generators, arranging for waste sampling, and categorizing waste.

4.17 Waste Operations - Responsible for packaging hazardous and radioactive wastes for off-site shipment.

4.18 Waste Shipping Coordinator - Responsible for preparing and reviewing waste shipment documentation for off-site shipments.

4.19 Waste Shipping - Responsible for preparing waste packages and packaging waste for off-site shipment.

4.0 **RESPONSIBILITIES** (cont.)

4.20 Safe Shutdown - Responsible for controlling order requirements for nuclear materials disposition activities at the FEMP for off-site shipment.

5.0 **GENERAL**

5.1 Sections responsible for the activities assigned herein shall develop implementing procedures, and perform operational and oversight functions that are consistent with internal WEMCO operating policies and procedures.

5.2 Shipment generators for off-site shipments must prepare a nuclear, radioactive, hazardous material/hazardous waste - non-nuclear, or miscellaneous shipping order and have the order processed and approved by the appropriate sections before material will be set up for off-site shipment. In addition, all packages must have been monitored by the Radiological Safety section for removable contamination, radiation levels, per the applicable departmental procedures and provide appropriate documentation to Traffic Control.

5.3 PACKAGING PROVISIONS

Package Description Per Pkg.	Material Description	Authorized Gross Weight
DOT Spec 17C metal 5-gal. drum (DOT 7A Type A)	samples, bulk type radioactive material	100 lbs.
DOT Spec 17H metal 30-gal. drum (DOT 7A Type A)	samples, bulk type radioactive material	500 lbs.
DOT Spec 17H metal 55-gal. drum (DOT 7A Type A)	samples, bulk type radioactive material	900 lbs.
FEMP Family of wooden Boxes DOT 7A Type A:		
Model No. G-4214	uranium metal products	1,260 lbs.
Model No. G-4245	uranium metal products	225 lbs.
Model No. G-4255	uranium metal products	1,470 lbs.
Model No. G-4273-5	uranium metal products	3,045 lbs.
Model No. G-4273-6	uranium metal products	3,540 lbs.
Model No. G-4292	uranium metal products	1,330 lbs.
Strong Tight Containers	LSA Material consigned as exclusive use Limited Quantity Material	Dependent on container per applicable department procedure

5.0 GENERAL (cont.)

5.3.1 No special packaging provisions are required for the on-site movement and off-site shipment of nonhazardous miscellaneous materials.

5.3.2 PCB substances which are regulated by the Toxic Substances Control Act (TSCA) and the Clean Air Act (CAA) and shall be controlled the same as RCRA waste material.

5.3.3 WEMCO shall respond to incoming emergency calls concerning an accident involving hazardous materials shipped from the FEMP or in transit in the area, supporting the agency with authority, as requested per FMPC-125, "Emergency Management."

6.0 PROCEDURE

6.1 Packaging Operations

CENTRALIZED TRAINING

6.1.1 Approve departmental lesson plans for the personnel in each organization that are involved with the packaging of hazardous materials, hazardous wastes, and radioactive materials.

6.1.2 Verify that the results of lesson plans are documented and that training qualifications records are included in the employee's personnel record and entered into Centralized Training computer files.

ANALYTICAL SECTION (of Site Services)

6.1.3 Analyze the samples to determine the hazardous constituents of the waste.

6.1.4 Document the waste analysis results on the Report of Analysis form.

6.1.5 Provide analytical data to Environmental Management, and the Project Engineer (if requested) for use in characterizing the waste.

6.1.6 Package samples in accordance with applicable Sampling Plan and Departmental procedures. Ensure compatibility of materials in one package meets all criteria of Title 49 CFR, Subpart C, 177.848.

6.0 **PROCEDURE** (cont.)

ANALYTICAL SECTION (of Site Services)

6.1.7 Request that Radiological Safety monitor the samples and packages according to departmental procedures and provide the appropriate documentation.

SITE-WIDE QUALITY ASSURANCE

6.1.8 For all hazardous and radioactive packaging, verifies compliance with regulations, specifications, plans and procedures through review of documentation, witnessing of activities, and examination. Verifies identification of packaged uranium metals, oxide and related products against the Shipping Order for Nuclear Material. Conduct internal and independent audits of the packaging of hazardous materials including hazardous substances, hazardous wastes, and nuclear and radioactive materials according to the appropriate DOE requirements.

6.1.9 Conduct periodic inspections of packaging operations per applicable departmental procedures, to verify compliance with applicable DOT/DOE/EPA regulations, WEMCO policies and procedures, and document inspections.

6.1.10 Verify that radiological surveys have been conducted for materials.

6.1.11 Review radiological survey results and verify that the radiation readings for packages are within the limits established by 49 CFR; document the review on Form FEMP-IRS&T-1993.

TRAFFIC CONTROL

6.1.12 Verify that hazardous material is packaged for off-site shipment according to the applicable Safety Analysis Report for Packaging and Certificate of Compliance supplied by the Traffic Control.

SHIPMENT ORIGINATOR

6.1.13 Verify that personnel have been properly trained to package hazardous materials, hazardous substances, hazardous wastes, and nuclear and radioactive materials.

6.0 **PROCEDURE** (cont.)

SHIPMENT ORIGINATOR

6.1.14 Obtain approval from Nuclear Safety before packaging off-site shipments of enriched radioactive materials to ensure criticality concerns are addressed according to applicable regulations. Verify that each package used for on-site movement or off-site shipment of hazardous materials, hazardous substances, hazardous wastes, nuclear and radioactive materials is correctly assembled and that all components of the packaging are sufficiently secured.

6.1.15 Ensure packaging is free of rust, dents or other conditions making it unsuitable for loading material.

6.1.16 Package non-hazardous materials, hazardous materials, hazardous substances, hazardous wastes, and nuclear and radioactive materials for on-site movement or off-site shipment per applicable WEMCO procedures.

6.1.17 Inspect all hazardous materials packages to verify that it has been packaged properly. Notify supervisor if any defects or deficiencies are detected.

6.1.18 Verify that packaging has the capability that will enable the use of mechanical loading equipment, items may be placed on pallets to meet this requirement.

6.1.19 Verify that a radiological survey has been conducted on all packagings that will be used for the off-site shipment of nuclear or radioactive material before the packaging is used.

NOTE: Packagings that are contaminated above the levels specified in Title 49 CFR 173.443 may not be used for off-site shipments unless they are cleaned or refurbished.

6.1.20 Verify that inner packaging is suitably cushioned in the outer packaging with an adequate quantity of material to prevent breaking and shifting during transport, as directed by Traffic Control.

6.0 PROCEDURE (cont.)

SHIPMENT ORIGINATOR

6.1.21 Apply and Verify that all packages for on-site movement or off-site shipping, including samples, are marked and/or labeled according to the requirements of 49 CFR and the written instructions provided by the Traffic Control.

NOTE: Selection of the proper DOT shipping name is based on process knowledge of the waste stream, laboratory analysis, or the Material Evaluation Form provided by EA & QA.

6.1.22 Verify that all packages of material are monitored for external removal contamination and radiation levels.

RADIOACTIVE SOURCE CONTROLLER

6.1.23 Request Radiological Safety to conduct radiological surveys of the radioactive source material and packaging.

6.1.24 Review radiological survey results to verify compliance with applicable regulations.

6.1.25 Maintain constant surveillance of radioactive source material.

WASTE ORIGINATOR

6.1.26 Accumulate and package waste for storage and/or disposal according to all applicable EPA/DOT/DOE regulations and WEMCO procedures.

6.1.27 Notify Facilities and Materials Evaluation when accumulated waste is packaged for on-site storage facilities.

6.1.28 Request radiological surveys of wastes and packages as necessary.

6.1.29 Provide waste tally sheet to Environmental Compliance for use in preparing Material Evaluation forms.

FACILITIES AND MATERIALS EVALUATION

6.1.30 Provide assistance to waste generators with characterization and packaging of wastes for storage and/or disposal.

6.0 PROCEDURE (cont.)

ENVIRONMENTAL COMPLIANCE

6.1.31 Characterize waste according to Resource Conservation and Recovery Act (RCRA) guidelines and DOE requirements based on the results of the waste analysis conducted by Analytical Laboratories.

RADIOLOGICAL SAFETY

6.1.32 Conduct radiological surveys of materials and packages.

6.1.33 Document survey results on the appropriate forms according to departmental procedures.

6.1.34 Forward copies of the surveys to the Shipment Originator, Waste Originator, and Site-Wide Quality Assurance as required.

TRANSPORTATION SAFETY COMMITTEE

6.1.35 Evaluate policies for packaging safety at the FEMP for compliance with applicable federal, state and local regulations.

6.1.36 Ensure packaging policies and practices are conducted in accordance with all FEMP and OSHA safety requirements.

WASTE OPERATIONS

6.1.37 Package hazardous waste and radioactive waste.

6.1.38 Ensure that hazardous waste has been packaged according to EPA/DOT/DOE regulations and WEMCO Guidelines.

6.1.39 Verify that hazardous waste, radioactive, or mixed waste is packaged according to 49 CFR.

6.1.40 Request radiological surveys of packaged waste as required.

WASTE SHIPPING

6.1.41 Prepare waste packaging for use by the Waste Originator according to departmental procedures.

6.1.42 Prepare packages of waste according to departmental procedures and specific consignee requirements.

6.1.43 Request radiological surveys of waste containers as required.

6.0 **PROCEDURE** (cont.)

6.2 On-Site Movements

CENTRALIZED TRAINING

6.2.1 Approve departmental lesson plans for the personnel in each organization involved with the loading, and transporting of hazardous materials on site, hazardous wastes, and radioactive materials.

6.2.2 Verify that the results of lesson plans are documented and that training qualifications records are included in the employee's personnel record and entered into Centralized Training computer files.

ANALYTICAL SECTION (of Site Services)

6.2.3 Ensure that samples are properly identified and quantified in order to determine on-site transport requirements.

6.2.4 Ensure that temporary storage of samples incidental to transport complies with existing requirements in applicable operating procedures and Nuclear Safety guidelines.

6.2.5 Contact Traffic Control if further guidance is needed when offering samples for on-site movement.

SITE-WIDE QUALITY ASSURANCE

6.2.6 Conduct periodic inspections of on-site shipping operations per applicable departmental procedures to verify compliance with applicable DOT/DOE/EPA regulations, WEMCO policies and procedures, and document inspections. Also conduct internal and independent audits of the on-site transportation of hazardous materials including hazardous substances, hazardous wastes, and nuclear and radioactive materials according to the appropriate DOE requirements.

6.2.7 Sign checksheet/release verifying that all Site-Wide Quality Assurance/Quality Certification functions have been performed and documented for on-site movement as required.

TRANSPORTATION SAFETY COMMITTEE

6.2.8 Evaluate policies for on-site transportation safety at the FEMP for compliance with applicable Federal, State and Local regulations.

6.0 PROCEDURE (cont.)

TRANSPORTATION SAFETY COMMITTEE

6.2.9 Ensure on-site transportation policies and practices are conducted in accordance with all FEMP and OSHA safety requirements.

SHIPMENT ORIGINATOR

6.2.10 Verify that the material is properly identified and quantified to determine on-site movement requirements.

6.2.11 Notify Facilities and Warehousing when the material is ready to be moved.

6.2.12 Attach appropriate transfer documents from Material Control and Accountability when required. Initiate appropriate transfer documents for on-site movement of material from one area to another.

6.2.13 Verify that the storage of materials incidental to transport complies with current requirements contained in the appropriate operating procedures and Nuclear Safety guidelines.

6.2.14 Contact the Traffic Control if further guidance is required when material is moved on-site.

6.2.15 When shipping nonradioactive hazardous materials, initiate form FMPC-OPR-3292, "Hazardous Material Transfer On-site Shipment."

6.2.16 Attach the completed form FMPC-OS&H-1993-1 to the Traffic Control copy of Form FMPC-OPR-3292.

6.2.17 Ensure a signed "Nonradioactive Hazardous Materials Shipment Approval Tag," form FMPC-OPR-2947 is attached to each package when shipping on radioactive hazardous materials on-site.

WASTE ORIGINATOR

6.2.18 Notify Facilities Services, Site-Wide Quality Assurance and MC&A when accumulated packaged waste must be transported to on-site storage facilities.

6.2.19 Request radiological surveys of wastes and packages as required.

6.2.20 Notify Facilities and Warehousing when packaged waste is ready to be transported to on-site storage facility.

6.0 PROCEDURE (cont.)

MAINTENANCE/GARAGE

6.2.21 Inspect, perform preventative maintenance, and repair all government vehicles used for on-site movement of material at FEMP.

6.2.22 Maintain records of services.

6.2.23 Notify government vehicle custodians of scheduled preventative maintenance and safety inspection services.

FACILITIES AND WAREHOUSING

6.2.24 Verify that on-site motor vehicle operators possess a valid state driver's license with the appropriate endorsements.

6.2.25 Verify that on-site motor vehicle operators have been properly trained and qualified according to the responsibilities to be performed.

6.2.26 Motor vehicle operator shall document the inspection results on the appropriate vehicle inspection form (Form OPR 2414), sign the inspection form and submit it to their supervision, and notify supervision of any defective or unsafe vehicle conditions.

NOTE: All defective or unsafe vehicle conditions must be corrected before the vehicle can be used.

6.2.27 Ensure that all packages are marked per applicable departmental procedures.

NOTE: If package markings are illegible or missing, notify supervision per applicable departmental procedure.

6.2.28 Ensure that all hazardous waste packages are labeled with the applicable DOT/EPA/OSHA labels and/or markings.

NOTE: If package labels are illegible or missing, notify supervision per applicable departmental procedure.

6.0 PROCEDURE (cont.)

FACILITIES AND WAREHOUSING

6.2.29 Load the material properly on the transport vehicle and ensure that the material is adequately distributed for weight distribution, stable and secured against shifting during transport.

NOTE: Hazardous materials shall be loaded onto a transport vehicle according to the guidelines provided in the DOT Hazardous Materials Segregation/Separation Chart and in compliance with all applicable Nuclear Safety guidelines.

6.2.30 Deliver the material to the designated delivery point by using the most direct and least congested route.

6.2.31 Prepare depleted, normal, or enriched uranium and other nuclear or radioactive material for on-site movement.

NOTE: Material Control and Accountability (MC&A) documentation must accompany the shipment from one area to the next area when necessary.

6.2.32 Request radiological surveys of materials and packages if not already available.

6.2.33 Review and verify radiological survey results for compliance with the appropriate regulatory requirements.

6.2.34 Assign personnel and equipment for on-site movement as requested.

6.2.35 Provide personnel and equipment for special emergency on-site movement as requested.

TRAFFIC CONTROL

6.2.36 Provide guidance for the required documents, packaging, marking, labeling, and the requirements for the placarding of hazardous materials for on-site movement.

6.2.37 Verify that the appropriate Federal and State Regulations and WEMCO Guidelines are followed for personnel and environmental safety.

6.0 PROCEDURE (cont.)

RADIOLOGICAL SAFETY

6.2.38 Conduct radiological surveys of materials, packages and vehicles on site.

6.2.39 Document the survey results on the appropriate forms according to departmental procedures.

6.2.40 Forward copies of the surveys to the Shipment Originator, Waste Originator, Traffic Control, and Site-Wide Quality Assurance as required.

MATERIAL CONTROL AND ACCOUNTABILITY (MC&A)

6.2.41 Prepare MC&A documentation for on-site movement of material as required.

NOTE: MC&A documents shall be used for verification of the materials and will serve as the shipping papers for on-site movement.

6.3 Off-Site Shipments

CENTRALIZED TRAINING

6.3.1 Approve departmental lesson plans for the personnel in each organization involved with the off-site loading, and transporting of hazardous materials, hazardous wastes, and radioactive materials.

6.3.2 Verify that the results of lesson plans are documented and that training qualification records are included in the employee's personnel record and entered into Centralized Training computer files.

ANALYTICAL SECTION (of Site Services)

6.3.3 Notify Material Control and Accountability and the Traffic Control when a sample containing nuclear radioactive material is to be shipped off-site.

6.3.4 Initiate Shipping Order for Nuclear Material Form, FEMP CONT-558, for samples that are to be shipped to off-site laboratories for analysis

6.0 PROCEDURE (cont.)

ANALYTICAL SECTION (of Site Services)

6.3.5 Forward the shipping order to Material Control and Accountability.

6.3.6 Initiate Shipping Order for Hazardous Material/ Hazardous Waste Non-Nuclear Form, FEMP CONT-3388, for samples that are to be shipped to off-site laboratories for analysis.

6.3.7 Forward the shipping order to Material Control and Accountability.

6.3.8 Verify that the waste samples are in proper packaging for off-site shipment according to departmental procedures.

6.3.9 Generate Form No. FMPC-OPR-2595, Off-Site Loading and Tie Down Inspection.

6.3.10 Maintain and verify the chain of custody transfer for off-site shipment according to applicable procedures.

6.3.11 Request that Radiological Safety monitor the samples and packages according to departmental procedures and provide the appropriate documentation to Traffic Control.

SITE-WIDE QUALITY ASSURANCE

6.3.12 Verify the identification of packaged uranium metals, oxides, and related products with the Shipping Order for Nuclear Material.

6.3.13 Conduct periodic inspections of the shipping operations per applicable departmental procedures to verify compliance with applicable DOT/DOE/EPA regulations and WEMCO policies and procedures and document inspections.

6.3.14 Review the Garage Section incoming vehicle inspection form for vehicle defects or deficiencies.

6.3.15 Attach the Quality Assurance Inspection Sheet, Form QAC-891010-1, Rev 1, to the support documentation for each vehicle loaded.

6.3.16 Verify that radiological surveys have been conducted for each carrier trailer and the materials for off-site shipment.

6.0 **PROCEDURE** (cont.)

RADIOLOGICAL SAFETY

6.2.38 Conduct radiological surveys of materials, packages and vehicles on site.

6.2.39 Document the survey results on the appropriate forms according to departmental procedures.

6.2.40 Forward copies of the surveys to the Shipment Originator, Waste Originator, Traffic Control, and Site-Wide Quality Assurance as required.

MATERIAL CONTROL AND ACCOUNTABILITY (MC&A)

6.2.41 Prepare MC&A documentation for on-site movement of material as required.

NOTE: MC&A documents shall be used for verification of the materials and will serve as the shipping papers for on-site movement.

6.3 Off-Site Shipments

CENTRALIZED TRAINING

6.3.1 Approve departmental lesson plans for the personnel in each organization involved with the off-site loading, and transporting of hazardous materials, hazardous wastes, and radioactive materials.

6.3.2 Verify that the results of lesson plans are documented and that training qualification records are included in the employee's personnel record and entered into Centralized Training computer files.

ANALYTICAL SECTION (of Site Services)

6.3.3 Notify Material Control and Accountability and the Traffic Control when a sample containing nuclear radioactive material is to be shipped off-site.

6.3.4 Initiate Shipping Order for Nuclear Material Form, FEMP CONT-558, for samples that are to be shipped to off-site laboratories for analysis

6.0 PROCEDURE (cont.)

RADIOLOGICAL SAFETY

6.3.26 Document the survey results on the appropriate forms according to departmental procedures.

6.3.27 Forward copies of the surveys to the Shipment Originator, Waste Originator, Traffic Control, and Site-Wide Quality Assurance as required.

SHIPMENT ORIGINATOR

6.3.28 Provide the Traffic Control with the required advance notification of off-site shipment.

6.3.29 Verify that material is properly identified and quantified.

6.3.30 Provide the Traffic Control with the information required to determine the appropriate DOT requirements for the shipment.

6.3.31 Notify Facilities and Warehousing when the material is prepared for loading or movement to the designated area for off-site shipment.

6.3.32 Provide Facilities and Warehousing with the documentation that designates the location on-site where the material for off-site shipment is to be picked up, location on-site where the material for off-site shipment is to be delivered, and the name and quantity of the material to be moved.

6.3.33 Provide any additional information required to the transporter to facilitate the safe loading and movement of material.

6.3.34 Verify that the temporary storage of materials incidental to off-site transport is in compliance with the existing requirements of the appropriate operating procedures and Nuclear Safety guidelines.

6.3.35 Prepares Product Order per FMPC-714 for proposed shipments of nuclear product material.

6.3.36 Initiate Shipping Order for Nuclear Material (Form FMPC Cont-558) for nuclear materials that are to be shipped off-site and forward shipping order to Material Control and Accountability.

6.0 PROCEDURE (cont.)

SHIPMENT ORIGINATOR

6.3.37 Initiate Shipping Order for hazardous Material/Hazardous Waste - non-nuclear (Form FMPC Cont-3388) for all hazardous non-nuclear material that is to be shipped off site and forward shipping order to Material Control and Accountability.

6.3.38 Initiates Miscellaneous Shipping Order (FMPC-ADMS-871) and obtains applicable approvals for all non-nuclear nonhazardous material shipments. Forwards approved Miscellaneous Shipping Order (MSO) to the Traffic Control.

6.3.39 Request radiological survey results of materials and packages to ensure compliance with applicable regulations and site procedures.

6.3.40 Notify and obtain approval of site-wide Quality Assurance/ Quality Certification for shipments of nuclear material.

6.3.41 Obtain Radiological Safety sign-off for nonradioactive material on a Miscellaneous Shipping Order.

6.3.42 Obtain Environmental Compliance sign-off for nonhazardous material on a Miscellaneous Shipping Order.

6.3.43 Provide Traffic Control with the information necessary to the applicable DOT requirements and prepare the bill of lading.

6.3.44 Contact the Traffic Control for further guidance when preparing material for off-site shipment.

FACILITIES AND WAREHOUSING

6.3.45 Verify that the transport vehicle is appropriate for the weight and center of gravity of the material to be loaded.

6.3.46 Inspect the transport vehicle and record the findings of the inspection.

6.3.47 Accept or reject equipment based on the vehicle inspection.

6.3.48 Position packages on the vehicle so that the weight is equally distributed over the width and length of the vehicle and as equally as possible among the vehicle's axles.

6.0 PROCEDURE (cont.)

FACILITIES AND WAREHOUSING

6.3.49 Ensure the load is placed on the vehicle in such a manner that it does not obscure the driver's view ahead or to the right or left sides, interfere with the free movement of his arms or legs, prevent his free and ready access to accessories required for emergencies, or prevent the free and ready exit of any person from the vehicle's cab or driver's compartment.

6.3.50 Ensure that all loading of hazardous materials, hazardous substances, hazardous wastes, and radioactive materials is conducted according to the guidelines provided in the DOT Hazardous Materials Segregated/Separation Chart in compliance with all applicable Nuclear Safety guidelines.

6.3.51 Block and brace all packages on or in the vehicle to prevent shifting or changing of position during normal transportation conditions, and in such a manner that the packages will remain stable after the restraints are removed prior to unloading the packages.

NOTE: Do not rely upon the ends, sides, or doors of the vehicle to prevent shifting of heavy loads unless they are specifically designed for this purpose.

6.3.52 Ensure that all sides, sideboards, rear endgates and endboards capable of preventing packages shifting are in their proper place and are strong enough and high enough to ensure that packages will not shift upon, or fall from the vehicle.

6.3.53 Use as many tiedown assemblies to secure all packages being transported on vehicles which are not equipped with sides or sideboards, and rear endgate or endboard as directed by applicable FEMP procedures.

6.3.54 Use only tiedown assemblies that conform to the rules of 49 CFR 393.102; plastic or fiber rope, any material with unknown strength or any damaged materials shall not be used as components of a tiedown system.

6.3.55 Tiedown assemblies will be installed to ensure the load will not move or shift during normal transport.

6.0 **PROCEDURE** (cont.)

FACILITIES AND WAREHOUSING

6.3.56 Ensure the principal tiedown forces are transmitted to the vehicle's frame rather than the wood or metal decking, and that the strength of the tiedown attachment points on the vehicle are equal to or greater than the strength of the tiedowns.

6.3.57 Ensure that flexible tiedowns (e.g., rope, strap, chain, etc.) are free from contact with any other stationary objects when they are taut to prevent chafing and damage during transport.

6.3.58 Visually check all packages before loading to ensure no defects are present.

6.3.59 Complete and submit the Off-Site Loading and Tie-Down Inspection Form to the Traffic Control when necessary.

6.3.60 Review and verify the radiological survey results for compliance with the appropriate regulatory requirements.

6.3.61 Submit appropriate paperwork to Traffic Control after loading.

6.3.62 Assign personnel and equipment for loading off-site shipments as required.

6.3.63 Assign personnel and equipment for spotting/loading of carrier trailers and freight containers used for off-site shipments.

PROCUREMENT/MATERIALS MANAGEMENT

6.3.64 Review and approve Miscellaneous Shipping Orders (MSO) and other documentation for off-site shipment of non-hazardous materials.

6.3.65 Forward approved copies of the Miscellaneous Shipping Order (MSO) to the Traffic Control.

6.3.66 Verify, using the appropriate shipping order, that the packages of material are identified as on the shipping order.

6.3.67 Attach the required markings, labels, and tally sheet to the packages of hazardous materials adhering to departmental procedures and direction by Traffic Control.

6.0 PROCEDURE (cont.)

MAINTENANCE/GARAGE

6.3.68 Inspect the inbound carrier vehicles that will be used for off-site shipments according to Federal Motor Carrier Safety Regulations and WEMCO procedures.

6.3.69 Document the inspection results on the FEMP Preliminary Visual Trailer Inspection Form with appropriate comments.

6.3.70 Forward copies of the maintenance and inspection documents to Site-Wide Quality Assurance and Facility Service and Support Sections.

6.3.71 Inspect, lubricate, perform the preventative maintenance for, and repair all government vehicles used for loading off-site shipments at FEMP.

6.3.72 Maintain records of services.

6.3.73 Notify the government vehicle custodians of scheduled preventative maintenance and safety inspection services.

TRAFFIC CONTROL

6.3.74 Provide guidance for the required documents and the requirements for the placarding of off-site shipments.

6.3.75 Verify compliance with appropriate Federal and State Regulations and WEMCO Guidelines.

6.3.76 Coordinate the scheduling of off-site shipment with the Shipment Originator, Site Services, and the carrier.

6.3.77 Coordinate the loading of off-site shipment with Site Services, Facilities and Warehousing, and the carrier.

6.3.78 Review shipping documents for completeness, proper authorization(s), and compliance with WEMCO policy, procedures, and accounting requirements.

6.3.79 Ensure that all off-site shipments are in compliance with legal restrictions on weight and dimension prior to release.

6.0 **PROCEDURE** (cont.)

TRAFFIC CONTROL

6.3.80 Prepare the Uniform Hazardous Waste Manifest according to the requirements of 40 CFR and the appropriate departmental procedures using documentation provided by the Shipping Originator and WEMCO support sections.

6.3.81 Prepare and sign the bill of lading according to the requirements of 49 CFR using documents provided by the Shipping Originator and WEMCO support sections.

6.3.82 Obtain the signature of the carrier's agent (driver) on all bills of lading and hazardous waste manifests to acknowledge receipt of the shipment by the carrier.

6.3.83 Use only ICC and PUCO approved commercial or contract carriers according to the appropriate DOE requirements.

NOTE: Commercial or contract carriers must have received an identification number from the Administrator of the USEPA. Additionally, State EPA identification numbers must be obtained from the Administrator of the State EPA Office when required.

6.3.84 Issue the appropriate shipment notifications to consignees.

6.3.85 Return the shipping order and notify Material Control and Accountability when a shipment of hazardous material, hazardous waste (non-nuclear), or nuclear material is shipped from FEMP.

TRANSPORTATION SAFETY COMMITTEE

6.3.86 Evaluate policies for off-site transportation safety at the FEMP for compliance with applicable Federal, State and Local regulations.

6.3.87 Ensure off-site transportation policies and practices are conducted in accordance with all FEMP and OSHA safety requirements. Conduct periodic inspections and evaluations of all activities associated with the handling and transporting of hazardous materials for off-site shipments.

6.0 PROCEDURE (cont.)

SAFEGUARDS AND SECURITY

6.3.88 Provide interpretation and advice concerning the security and safeguard measures required for off-site shipment of classified or strategic nuclear materials.

6.3.89 Coordinate with Traffic Control to spot incoming carrier vehicles for inspection by the Maintenance Garage and to have the radiological survey conducted.

6.3.90 Verify that vehicle doors are properly secured.

6.3.91 Verify that the seal number, when recognizable, matches the serial number on the bill of lading before the shipment leaves the FEMP site.

6.3.92 Verify that the bill of lading has been signed by the Traffic Control authorizing the shipment to be released.

6.3.93 Coordinate emergency response activities for off-site shipments with the Emergency Operations Center as required.

MATERIAL CONTROL AND ACCOUNTABILITY (MC&A)

6.3.94 Verify that the consignee is authorized to receive the specific nuclear materials before the materials are shipped.

6.3.95 Process, verify the type of material and lot numbers, and approve the Shipping Order for Nuclear Material Form, FEMP CONT-558, for off-site shipment of nuclear material.

6.3.96 Forward the shipping order to the Traffic Control.

6.3.97 Process, verify the type of material and lot numbers, and approve the Shipping Order for Hazardous Material/ Hazardous Waste Non-Nuclear Form, FEMP CONT-3388, for off-site shipment of material.

6.3.98 Forward the shipping order to the Traffic Control.

6.3.99 Receive shipping order from Traffic Control.

6.3.100 Notify the consignee that the preparation for off-site shipment has been completed.

6.0 PROCEDURE (cont.)

MATERIAL CONTROL AND ACCOUNTABILITY (MC&A)

6.3.101 Prepare and forward to the consignee, DOE/NRC Nuclear Materials Transaction Report, Form 741, for off-site shipments.

NOTE: These documents are used for verification of materials and shipping paper by Facility Site Services for material transport.

RADIOACTIVE SOURCE CONTROLLER

6.3.102 Notify the Traffic Control of the intent to ship radioactive source material off-site.

6.3.103 Provide copy of the purchase order to the Traffic Control.

6.3.104 Request Radiological Safety to conduct radiological 48-hour surveys of the radioactive source material and packaging.

6.3.105 Review the radiological survey results to verify compliance with applicable departmental procedures.

6.3.106 Initiate Shipping Order for Hazardous Material/Hazardous Waste Non-Nuclear Form, FEMP CONT-3388, after approval from EC&QA.

6.3.107 Notify the Traffic Control when the packaged material is ready to be shipped off-site.

6.3.108 Maintain constant surveillance of radioactive source material until it is loaded onto the transport vehicle for off-site shipment.

6.3.109 Remove the radioactive source material shipped from the inventory list.

WASTE OPERATIONS

6.3.110 Package hazardous waste and radioactive waste for off-site shipments.

6.3.111 Verify that hazardous waste for off-site shipment has been packaged according to EPA/DOT/DOE regulations and WEMCO Guidelines.

6.3.112 Request radiological surveys of packaged waste as required per applicable departmental procedures.

6.0 PROCEDURE (cont.)

WASTE SHIPPING COORDINATOR

6.3.113 Prepare and forward the Storage and Disposal Data Sheet, the Tally Sheet, and other documents as required to Site-Wide Quality Certification for review and approval.

6.3.114 Prepare additional shipping documentation according to consignee requirements.

NOTE: Consignee requirements must exceed the requirements of 49 CFR.

6.3.115 Receive the documentation associated with off-site shipment from the appropriate departments.

6.3.116 Forward the documentation to Site-Wide Quality Assurance for review.

WASTE SHIPPING

6.3.117 Prepare waste packaging for use by the Waste Originator according to departmental procedures.

6.3.118 Prepare packages of waste for off-site shipping according to departmental procedures and specific consignee requirements.

6.3.119 Request the radiological survey of waste containers as required.

SAFE SHUTDOWN

6.3.120 Prepares Nuclear Materials Disposition Order (NMDO) per PP-5031 for proposed shipments of nuclear materials.

6.3.121 Acts as liaison internally to facilitate shipment and externally to ensure customer satisfaction.

6.3.122 Tracks NMDO through completion, issues completion notice and maintains documentation on activity.

7.0 APPLICABLE DOCUMENTS

7.1 Drivers

7.1.1 DOE 1540.1, "Materials Transportation and Traffic Control Management"

7.0 **APPLICABLE DOCUMENTS** (cont.)

7.1.2 OR 1540.1B, "Materials Transportation and Traffic Control Management"

7.1.3 DOE 1540.2, "Hazardous Material Packaging for Transport - Administrative Procedures"

7.1.4 DOE 1540.3, "Base Technology for Radioactive Material Transportation Packaging Systems"

7.1.5 DOE 5000.3A, "Occurrence Reporting and Processing of Operations Information"

7.1.6 DOE 5480.3, "Safety Requirements for the Packaging and Transportation of Hazardous Materials"

7.1.7 DOE 5632.1, "Physical Protection of Classified Matter and Information"

7.1.8 DOE 5632.2A, "Physical Protection of Special Nuclear Material and Vital Equipment"

7.1.9 DOE 5700.6B, "Quality Assurance"

7.1.10 DOE/EV 06194-3, "Explosives Safety Manual"

7.1.11 DOE 5480.19 "Conduct of Operations"

7.1.12 10 CFR Part 71, "Packaging of Radioactive Material for Transport and Transportation of Radioactive Material Under Certain Conditions"

7.1.13 40 CFR Parts 116 -117, "Designation of Hazardous Substances and Their Reportable Quantities"

7.1.13 40 CFR Parts 260-265, "Standards Applicable to Hazardous Wastes"

7.1.14 49 CFR Parts 100-199, "Hazardous Material Regulations"

7.1.15 49 CFR Parts 383-397, "Federal Motor Carrier Safety Regulations"

7.1.16 International Atomic Energy Agency (IAEA) "Safety Series No. 6," 1985 Edition, as amended

7.0 APPLICABLE DOCUMENTS (cont.)

7.1.17 International Air Transport Association (IATA) "Dangerous Goods Regulations," 1991 Edition

7.1.18 International Civil Aviation Organization (ICAO) "Technical Instructions," 1985 Edition

7.1.19 American National Standards Institute (ANSI) N14 Series

7.1.20 Directory of DOE Certificates of Compliance for Radioactive Materials Packaging

7.2 Reference Documents

THIS SECTION WILL CONTAIN A LIST OF APPLICABLE WEMCO PROCEDURES.

8.0 APPLICABLE FORMS

THIS SECTION WILL CONTAIN A LIST OF APPLICABLE WEMCO FORMS AND FORM NUMBERS.

9.0 ATTACHMENTS

None

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		SITE POLICY AND PROCEDURE Page 29 of 29
Title: **PACKAGING, ON-SITE MOVEMENT AND OFF-SITE SHIPMENT OF MATERIAL**		DOCUMENT NO: PP-0314 REVISION NO. 0
Authorization: W. H. Britton, President	Supersedes: FMPC-314, Dated 12-31-90, Rev. 2	Issue Date: 12-20-91

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
12-20-91	0	Document describing how on-site and off-site materials are packaged and moved per Request No. P91-387, initiated by J. McGrogan.

APPENDIX F

CONTROL OF CONSTRUCTION WASTE

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		SITE STANDARD OPERATING PROCEDURE Page 1 of 29
Title: PACKAGING LOW LEVEL RADIOACTIVE WASTE (LLRW) FOR OFFSITE DISPOSAL		DOCUMENT NO: SSOP-0024 REVISION NO: 0
Authorization: (SOF) W. H. Britton, President	Supersedes: SOP 20-C-601, Dated 7-12-90, Rev. 1	Issue Date: 10-14-91

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1.0 PURPOSE

This document provides the procedure for packaging low level radioactive waste (LLRW) for offsite disposal.

2.0 APPLICABILITY

This procedure is applicable to the packaging methods required for shipping LLRW off site at packaging areas.

3.0 RESPONSIBILITIES

3.1 The waste generator/packager shall be responsible for complying with this procedure.

3.2 The supervisor of the waste generation area or packager shall be responsible for the following:

3.2.1 Specifying applicable scale check procedures and standard tare weight of packages.

3.2.2 Ensuring packaging materials are available for operators.

3.2.3 Ensuring that trained personnel package waste material.

3.2.4 Determining disposition of material identified in this procedure.

3.2.5 Ensuring that personnel package waste for shipment to meet applicable NTS, DOT, and EPA regulations.

3.2.6 Contacting Industrial Hygiene or Radiological Safety to determine the appropriate respiratory protection for the process being performed.

3.2.7 Providing operators with the required respiratory protection.

3.2.8 Ensuring the lid on an unfilled waste container is secured when no packaging is occurring to prevent additions of unknown materials.

3.2.9 Ensuring waste packages are weather-protected before, during, and after use to prevent moisture build-up.

3.2.10 Contacting Radiological Safety prior to opening any drum of radioactive or unknown material.

3.2.11 Contacting Industrial Hygiene prior to opening any container suspected of containing asbestos.

3.0 RESPONSIBILITIES (cont.)

3.3 Traffic shall be responsible for specifying the required waste container, transporting packaged waste to the applicable storage area, and weighing sea/land containers.

3.4 Materials Control and Accountability (MC&A) shall be responsible for completing a tally sheet for drums of non-RCRA wet and dried residues.

4.0 DEFINITIONS

4.1 Low Level Radioactive Waste (LLRW) - Waste the contains radioactivity and is not classified as high level waste, transuranic waste, or spent nuclear fuel or 11e(2) byproduct material as defined by DOE Order 5820.2A. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as low-level waste, provided the concentration of transuranic is less than 100 n Ci/g.

4.2 Waste Generator - Organization (point of generation) at which waste is originated.

4.3 Overpack - A container into which one or more smaller containers are placed.

4.4 Waste Container - A container which meets DOT requirements and NTS acceptance criteria.

4.5 RCRA (Resource Conservation and Recovery Act) - The Congressional Act which established safe and environmentally acceptable management practices for specific wastes. RCRA requires strict "cradle to grave" control and proper management of hazardous wastes.

4.6 Respirable Fines - Particulates and vapors capable of being inhaled.

5.0 GENERAL

5.1 The waste generator/packager shall package waste material in a container specified for disposal by Traffic.

5.2 Stencilling shall be 1-1/2 inch (minimum) legible block letters using waterproof ink/paint unless otherwise specified.

6.0 INDUSTRIAL HEALTH AND SAFETY REQUIREMENTS

6.1 A defined safety system is not involved.

6.2 Safety glasses with side shields shall be worn unless other eye protection is specified.

6.3 Respiratory protection provided by the supervisor shall be worn when required.

6.4 Leather-palm gloves shall be worn when handling drums/boxes/ containers, operating equipment, and when handling rough, sharp-edged, or contaminated material.

6.5 HEPA type filter vacuum cleaners or a vacuum system approved by IRS&T with a current DOP test label properly affixed to vacuum shall be used for cleaning.

6.6 Only trained personnel shall handle asbestos-containing materials.

6.7 Adequate ventilation must be provided when using silicone adhesive sealant.

6.8 Any circumstance which could have resulted in an intake of radioactive materials by inhalation, ingestion or absorption shall immediately be reported to a supervisor. The supervisor shall immediately report the circumstance or possible radioactive materials intake to IRS&T Radiological Safety Section for evaluation. The involved personnel shall report to the Urine Sampling Station at the end of their shift to complete an Incident Investigation Report (IIR) (Form FMPC-ES&H-1458), and submit a urine sample. The involved employees shall also report to the Urine Sampling Station at the start of their next shift to submit a followup urine sample. Employees are responsible for complying with additional requirements as specified by the Radiological Safety Section.

NOTE: WARNINGS, CAUTIONS, and NOTES precede the step/item to which they apply.

7.0 PROCEDURE

WARNING: A RADIOLOGICAL SAFETY TECHNICIAN SHALL BE PRESENT PRIOR TO OPENING ANY CONTAINER OF UNKNOWN RADIOACTIVE MATERIAL.

WARNING: AN INDUSTRIAL HYGIENE REPRESENTATIVE SHALL BE PRESENT PRIOR TO OPENING ANY DRUM SUSPECTED OF CONTAINING ASBESTOS.

CAUTION: PRIOR TO PERFORMING THE PACKAGING OPERATION, EACH CONTAINER SHALL BE INSPECTED BY THE WASTE GENERATOR/PACKAGER TO ENSURE THE CONTAINER IS EMPTY.

NOTE: Items 7.1 through 7.3 shall be performed prior to the packaging of any waste.

7.1 Prohibited Material Check

WASTE GENERATOR/PACKAGER

7.1.1 Check that a "Prohibited Materials List" (Figure 1) is displayed in the loading area or on the container.

7.1.1.1 If the list is not posted, notify the supervisor.

WASTE GENERATOR AND QUALITY ASSURANCE

7.1.2 Ensure the waste to be packaged is not on the "Prohibited Materials List".

7.1.2.1 If the waste is listed on the "Prohibited Materials List", do not package this waste. Notify the supervisor for disposition.

SUPERVISOR

7.1.2.2 Dispose of the waste on a case by case basis.

7.0 PROCEDURE (cont.)

7.2 Waste Characterization

WASTE GENERATOR/PACKAGER

7.2.1 Ensure a Material Evaluation Form (MEF), FMPC-OPR-3252 has been completed determining the material as RCRA/Non-RCRA and additional documentation from Environmental Compliance is provided specifying evaluation results for LLRW.

NOTE: A sample of the waste for TCLP may be required as requested by Operable Unit 3 (OU3) Compliance.

7.2.1.1 If an MEF has not been generated, obtain a numbered MEF from Waste Management Records and initiate a "Material Evaluation" per SSOP-0002.

NOTE: RCRA waste shall not be shipped.

7.2.1.2 If the waste is determined to be RCRA, notify the supervisor for disposition.

7.2.1.3 If the waste is determined to be non-RCRA, proceed to 7.2.2.

7.2.2 If notified by the supervisor a sample is required for major radionuclides and other suspected nuclides, obtain a sample of the waste per SOP 1-C-101.

7.3 Waste Inspection

WASTE GENERATOR/PACKAGER

7.3.1 Check waste for free liquid.

7.3.1.1 If free liquid is present which exceeds 0.5% of the material volume, notify supervisor.

7.3.1.2 If free liquid exists which does not exceed 0.5% of the material volume, proceed to the applicable packaging section of this SSOP.

7.3.2 When weather drops below 32°F, carefully inspect waste for ice.

7.3.2.1 If ice is present in waste, notify supervisor.

7.0 PROCEDURE (cont.)

7.4 Filling 55 and 85 Gallon Drums

WASTE GENERATOR/PACKAGER

7.4.1 Inspect the empty drum for damage, such as corrosion, dents, holes or other defects (Refer to Tables 1 and 2).

7.4.1.1 If damaged, mark the lids or side of the damaged drums with a red "X" and refer to Tables 1 and 2 for corrective action, as applicable.

7.4.2 Stencil on the drum the lot and drum number in accordance with the FEMP Lot Marking and Color-Coding System, RM-0005 or apply designated preprinted label (See Figure 2).

7.4.3 Weigh the empty drum per substeps 7.4.3.1 through 7.4.3.5.

SUPERVISOR

7.4.3.1 Specify the scale and the method of transporting the drum to the scale.

WASTE GENERATOR/PACKAGER

NOTE: The scale shall be inspected and operated in accordance with the SOP applicable to the area.

7.4.3.2 Inspect the scale to be used.

7.4.3.3 Move the drum on to the scale.

7.4.3.4 Obtain the tare weight.

7.4.3.5 Remove the drum from the scale and move to the loading area.

7.4.4 Stencil the tare weight on the drum (See Figure 2).

7.4.5 Record the data from the drum on to "Item Production/ Certification/Identification" XX Card, Form FMPC-CONT-1945-XX.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.4.6 Remove the drum lock ring and lid.

CAUTION: DO NOT FILL THE DRUM ABOVE THREE INCHES FROM THE TOP.

NOTE: Because density varies according to material type, the volume of material to be packed will vary.

7.4.7 By estimation, fill the 55 gallon drum to a maximum of 1,200 pounds (plus tare weight) and the 85 gallon drum to 1,000 pound maximum (plus tare weight).

7.4.8 Place a lid on the drum.

7.4.9 Secure the drum lid by installing a bolt-type lock ring and tighten the bolt.

7.4.10 Weigh drum per Item 7.5.

7.4.11 Mark the drum with the gross weight and net weight using two inch (minimum) letters.

WASTE GENERATOR/PACKAGER

7.4.12 Complete the "Item Production/Certification/Identification" XX Card, Form FMPC-CONT-1945-XX by entering the gross and net weights and transmit card to MC&A.

7.4.13 If the drum contains respirable fines, overpack per SOP 20-C-600.

7.4.14 Using the hoist/crane and barrel grab or equipment specified by supervisor, place the drum with bolt of lock ring facing outward on a pallet.

TRAFFIC

7.4.15 Strap the drum(s) and move the pallet(s) to the storage area designated by the supervisor.

WASTE GENERATOR/PACKAGER

7.4.16 When the operation is complete and all pallets are stored, notify the supervisor that the drums are ready to be moved to the designated waste staging area.

7.0 PROCEDURE (cont.)

7.5 Weighing Singlepack/Overpack Drums

SUPERVISOR

7.5.1 Specify the scale and the method of transporting the drum.

WASTE GENERATOR/PACKAGER

NOTE: The scale shall be inspected and operated in accordance with the SOP applicable to the area.

7.5.2 If not already completed, inspect the scale to be used as specified by the supervisor.

7.5.3 Notify supervisor the drum is ready to be moved to scale.

SUPERVISOR

7.5.4 As applicable, notify Traffic that a Motor Vehicle Operator (MVO) is required.

MVO/PACKAGER

7.5.5 Move the drum onto the scale.

WASTE GENERATOR/PACKAGER

7.5.6 Obtain the gross weight of the drum.

> WARNING: MAXIMUM WEIGHT OF DRUMS SHALL BE 700 POUNDS FOR A 30 GALLON OVERPACK AND 1,200 POUNDS FOR 55 GALLON OVERPACKS, 55 GALLON SINGLEPACKS, AND 85 GALLON OVERPACKS. MAXIMUM WEIGHT OF 85 GALLON SINGLEPACKS SHALL BE 1,000 POUNDS.

7.5.7 If the drum is over the specified weight limit, proceed as follows:

7.5.7.1 Remove lock ring(s) and lid(s) from the drums.

NOTE: The removed material may be included in an underweight drum of the same lot or packaged in another drum of the same lot.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.5.7.2 Remove material from the drum until the drum is within limit. Place the removed material in an approved container.

7.5.7.3 Place lid securely on the drum.

MVO/PACKAGER

7.5.8 Remove the drum from the scale.

WASTE GENERATOR/PACKAGER

7.5.9 If the drum contains respirable fines, install lever lock ring or bolt with a wire seal, record the seal number and date on Form FMPC-CONT-1945-XX, and overpack per SOP 20-C-600.

7.6 Filling Metal Boxes With Loose Material

WASTE GENERATOR/PACKAGER

7.6.1 Visually inspect boxes for rust, dents, or holes, including the bottom per Tables 1 and 2.

7.6.1.1 If damaged, mark side of box with a red "X" and complete corrective action per Tables 1 and 2.

7.6.2 If the bottom of the box has a drain plug, ensure plug is securely in place.

SUPERVISOR

7.6.3 Specify the scale and the method of transporting the box.

WASTE GENERATOR/PACKAGER

7.6.4 Move the empty metal box to the staging area.

7.6.5 Remove banding and cardboard packing material from the metal box and place in a designated container.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.6.6 Tare weigh each twentieth box to verify standard tare weight as follows:

NOTE: The scale shall be inspected and operated in accordance with the SOP applicable to the area.

7.6.6.1 If scale to be used as specified by the supervisor has not been checked, inspect scale.

7.6.6.2 Place box on the scale, obtain tare weight.

7.6.7 Record the weight on a "Box Tare Weight Check", Form FMPC-PRO-2867.

7.6.8 Remove box from the scale.

7.6.9 Remove lid and place in a designated location to prevent damage.

7.6.10 Add one fifty-pound bag of uncalcined diatomaceous earth spread evenly or sheets of wet-strength polypropylene pulp, super-absorbent fabric in the bottom of the box.

7.6.11 Place a clean, used skid over dicalite or fabric in the bottom of the box.

CAUTION: MATERIAL SHALL NOT BE LOADED IN BOX ABOVE THREE INCHES FROM THE TOP.

7.6.12 Load loose materials in box as tightly as possible.

7.6.13 When box is full, place lid on box and notify supervisor box is loaded.

SUPERVISOR

7.6.14 Specify the scale to be used and the method of transporting the box to the scale.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

NOTE: The scale shall be inspected and operated in accordance with the applicable scale procedure for the area of the packaging operation.

7.6.15 If not already completed, perform scale check according to the applicable SOP in the area of the packaging operation.

7.6.16 Move the box on to the scale.

7.6.17 Weigh the box including box pins and other hardware to ensure gross weight does not exceed 6000 lbs.

7.6.18 Remove the box from the scale.

7.6.19 Mark the side of the box with the gross weight and content description in 1-1/2 inch (minimum) block letters (See Figure 4).

7.6.20 Affix a Hazardous Waste Label (See Figure 3) on the box as shown in Figure 4.

7.6.21 Notify QA the box is ready for certification.

QUALITY ASSURANCE

7.6.22 Certify the box per applicable department procedures.

7.6.22.1 If the box does not meet certification requirements, complete a DCAR per SSOP-0023, tag the box for correction, and notify the generator.

WASTE GENERATOR/PACKAGER

7.6.23 Fill out an "Item Production/Certification/Identification card, Form FMPC-CONT-1945-XX, including standard tare weight specified by the supervisor, and the content description and transmit to MC&A.

7.6.24 Using fabric strapping or closure bolts, secure lid on the box for interplant shipment.

7.6.25 Notify the supervisor that boxes are ready to be moved to the Waste Management staging area.

7.0 PROCEDURE (cont.)

7.7 Loading Drums in Metal Boxes

WASTE GENERATOR/PACKAGER

7.7.1 Prior to completing Item 7.7, proceed to 7.10 or 7.11 (as applicable) for drum inspection.

7.7.2 Visually inspect boxes for corrosion, holes, or dents per Tables 1 and 2.

7.7.2.1 If damage is found, mark side of box with a red "X" and complete corrective action per Tables 1 and 2.

7.7.3 Place empty metal box in staging area.

7.7.4 Remove the banding and cardboard packing material from box and place in designated container.

7.7.5 Tare weigh each twentieth box per 7.6.6.1 through 7.6.6.2.

7.7.6 Record the weight on a "Box Tare Weight Check", Form FMPC-PRO-2867.

7.7.7 Remove lid from metal boxes.

7.7.8 Add a 50 lb bag of uncalcined diatomaceous earth or sheet(s) of wet-strength polypropylene pulp, super-absorbent fabric to the floor of the box.

7.7.9 Using a forklift, move box to a designated location to prevent damage.

7.7.10 Check drums to ensure that lever lock rings are closed.

7.7.10.1 If the drum contains respirable fines, install wire seal through lever lock ring.

7.7.11 Complete an "Item Production/Certification/Identification Card", Form FMPC-CONT-1945-XX per drum and insert the drum lot number and tare weight on the card and transmit to MC&A.

NOTE: Inspect and operate the hoist/crane in accordance with the applicable SOP for the area.

7.7.12 Ensure that the hoist/crane to be used has been inspected.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.7.13 Place barrel grab over drum.

7.7.14 Attach the lifting device specified by the supervisor on each side of the drum ring.

7.7.15 Position drum over the top of the box.

7.7.16 Lower drum into box and remove the lifting device.

CAUTION: DO NOT EXCEED A MAXIMUM GROSS WEIGHT OF 6,000 POUNDS.

7.7.17 Ensuring the weight does not exceed 6,000 pounds, repeat steps 7.7.1 through 7.7.16 until enough drums are loaded to fill a box.

7.7.18 When the box is filled, add a fifty-pound bag of uncalcined diatomaceous earth or sheets of wet-strength polypropylene pulp, super-absorbent fabric to the top of drums if condensation/frost is present or could develop on exterior of drums.

7.7.19 Place the lid on the box.

7.7.20 Obtain tabulated tare weight of box and contents. Record the tabulated tare box weight, contents, and gross weight on the FMPC-CONT-1945 card.

7.7.21 Stencil on the box the shipment log number, box identification, and gross weight (See Figure 4).

7.7.22 Affix a Hazardous Material Warning Label (See Figure 3) as shown in Figure 4.

7.7.23 Notify QA the box is ready for certification.

QUALITY ASSURANCE

7.7.24 Certify the box per the applicable department procedure.

7.7.24.1 If the box is not certified, complete a DCAR per SSOP-0023, tag the box for correction, and notify the generator.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.7.25 Using fabric strapping, secure lid on the box for interplant shipmen .

7.7.26 Notify the supervisor that boxes are ready to be moved to the Waste Management staging area.

7.8 Loading Asbestos in Boxes

WASTE GENERATOR/PACKAGER

> **WARNING:** ONLY CERTIFIED PERSONNEL SHALL HANDLE AND LOAD ASBESTOS-CONTAINING MATERIAL.

7.8.1 Visually inspect boxes for rust, holes, or dents.

7.8.1.1 If damage is found, mark the side of the box with a red "X".

7.8.1.2 Notify the supervisor of damaged box condition and request instructions.

7.8.1.3 Move damaged boxes to designated area.

7.8.2 Move the empty box to the staging area.

7.8.3 Remove banding and cardboard packing material and place in a designated container.

7.8.4 Tare weigh each twentieth box per 7.6.6.1 through 7.6.6.2.

7.8.5 Record the weight on a "Box Tare Weight Check", Form FMPC-PRO-2867.

7.8.6 Remove and place box lid in a designated location to prevent damage.

7.8.7 Stencil lot number per FEMP Lot Marking and Color Coding System or content description on the box (See Figure 4).

7.8.8 Affix a Hazardous Material Warning Label (See Figure 3) to box in location shown in Figure 4.

7.8.9 Add a minimum of one fifty-pound bag of uncalcined diatomaceous earth spread evenly in the bottom of the box.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.8.10 Adhere "Danger-Asbestos" stickers on two sides and lid of box.

7.8.11 Check to ensure that asbestos is double-bagged in labeled asbestos disposal bags.

7.8.12 Load asbestos in box ensuring not to exceed maximum gross weight.

CAUTION: DO NOT EXCEED MAXIMUM GROSS WEIGHT OF 6,000 POUNDS FOR METAL BOXES/5,000 POUNDS FOR WOODEN BOXES.

7.8.13 Place lid on the box.

7.8.14 Using fabric strapping, secure lid on the box for interplant shipment.

7.8.15 Perform scale check per the applicable SOP in the area of the packaging operation.

7.8.16 As directed by the supervisor, move box to scale.

7.8.17 Weigh the box.

7.8.18 Fill out an "Item Production/Certification/Identification" card, Form FMPC-CONT-1945-XX and transmit to MC&A.

7.8.19 Notify the supervisor that boxes are ready to be moved to the Waste Management staging area.

7.9 Packaging Material into Sea/Land Containers

WASTE GENERATOR/PACKAGER

NOTE: Do not place containers directly on ground.

7.9.1 Check the container for damage such as structurally affecting dents, stress cracks, flaking paint, rust, holes, and water leaks.

7.9.1.1 If container is damaged, mark a red "X" on the side of the container, notify supervisor of damage and request disposition of damaged container. Move unacceptable container to area designated by Waste Shipping.

7.9.1.2 If the container is free from damage, proceed to 7.9.2.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.9.2 Notify Waste Shipping that the container is ready for shipping preparation.

7.9.3 Attach a Prohibited Materials List (See Figure 1) to the container in a visible location.

WARNING: VAPOR FROM SILICONE ADHESIVE IS HAZARDOUS.

NOTE: Adhesive shall be applied to the farthest inside section first and outward from container to minimize inhalation of vapor.

NOTE: The bead of sealant shall be a minimum of 1/4 inch.

7.9.4 In a well ventilated area, apply a continuous bead of GE RTV SILICONE RUBBER ADHESIVE SEALANT, or equivalent, on all seams and corners of the container interior.

7.9.5 Check to ensure all vents are closed and sealed.

7.9.6 Line the container floor with wet-strength polypropylene/pulp super-absorbent fabric, blotter paper, or uncalcined diatomaceous earth.

7.9.7 Cover the absorbent fabric, blotter paper or uncalcined diatomaceous earth with a 0.006 inch thick plastic sheet that extends at least 36 inches up each side of the container.

7.9.8 Place plywood on the container floor and up to approximately four feet in height on all sides.

7.9.9 Remove all container outside markings not related to load (See Figure 5).

CAUTION: THE GROSS WEIGHT OF THE CONTAINER SHALL NOT EXCEED 42,000 LBS.

CAUTION: AN UNSEALED CONTAINER SHALL BE LOCKED OR TEMPORARILY SEALED WHEN NOT ATTENDED.

7.9.10 Load the container. Use all the space in the container.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.9.11 After the container has been filled, clean the back ledge of the container.

7.9.12 Add a roll of wet-strength polypropylene/pulp super absorbent fabric extending width of container on base of lid/door.

7.9.12.1 If moisture is still present, add additional uncalcined diatomaceous earth or sheets of wet-strength polypropylene, super-absorbent fabric as needed.

7.9.13 Shut the container doors.

7.9.14 Complete applicable sections of the "Item Production/ Certification/Identification" card, Form FMPC-CONT-1945-XX and transmit to MC&A.

7.9.15 Notify the supervisor that sea/land containers are ready to be weighed.

WASTE GENERATOR SUPERVISOR

7.9.16 Notify Traffic to transport containers to Waste Management staging area.

TRAFFIC (HEAVY EQUIPMENT)

7.9.17 Move containers to Waste Management staging area per applicable department procedures.

7.9.18 Weigh the containers per applicable department procedure.

7.9.19 Deliver weigh ticket to Waste Shipping Coordinator.

7.10 Inspecting Drums Containing Non-RCRA Dried Residues

WASTE GENERATOR/PACKAGER

7.10.1 For a drum not in an overpack, proceed to step 7.10.3.

7.10.2 For an overpacked drum, complete the following:

7.10.2.1 Inspect the hoist/crane to be used if not previously completed.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

NOTE: The supervisor shall specify the hoist/crane to be used.

NOTE: Hoists/cranes shall be inspected and operated in accordance with the SOP applicable to the area.

7.10.2.2 Remove overpack lid.

7.10.2.3 Install a barrel grab over the drum in the overpack.

7.10.2.4 Attach the barrel grab to the hoist/crane, lift the drum from overpack, and lower on to the floor.

7.10.2.5 Remove barrel grab from the drum.

7.10.3 Notify MC&A the drum(s) are ready for inspection and re-packaging.

MC&A

7.10.4 Complete a MC&A tally sheet for the drum(s).

WASTE GENERATOR/PACKAGER

7.10.5 Remove lid from the drum and inspect drum interior for free-standing liquid.

7.10.5.1 If free-standing liquid is present at the top of the drum, pump liquid from the drum or drain the liquid from the drum using a drainage lid into the facilities sump system.

7.10.6 Replace lid on the drum.

7.10.7 Using a forklift, move drum to the scale specified by the supervisor.

7.10.7.1 If not already completed, perform scale check according to the applicable SOP in the area of the packaging operation.

NOTE: The scale shall be inspected and operated in accordance with the applicable scale procedure for the area of the packaging operation.

7.10.8 Weigh the drum and compare this weight to the weight stencilled on the drum.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.10.8.1 If the drum weighs more than the stencilled weight, remove drum lid and add one pound of Dicalite for every two pounds above the weight.

7.10.8.2 If the drum weighs less than the stenciled weight, proceed to 7.10.9.

7.10.9 Place lid on the drum and secure lever/lock rings onto the drum.

7.10.10 Using forklift, remove drum from scale and load drum into metal box per 7.7.

NOTE: A packager assigned to handle non-RCRA wet residues shall perform the procedural steps in the Plant 1 Mill Area.

7.11 Inspecting Drums Containing Non-RCRA Wet Residues

SUPERVISOR

7.11.1 Contact Traffic to transport drum(s) to Plant 1 Mill Area for inspection.

TRAFFIC

7.11.2 Deliver transport drum(s) to Plant 1 Mill Area per applicable department procedure.

PACKAGER

7.11.3 After delivery of drums to Plant 1 Mill Area, notify MC&A the drum(s) are ready for inspection and re-packaging.

MC&A

7.11.4 Complete a MC&A tally sheet for the drum(s).

PACKAGER

7.11.5 Remove the lid from drum and inspect for free-standing liquid.

7.11.5.1 If the drum contains oil, use a forklift and move drum to designated area. Notify supervisor for disposition of drum.

7.0 PROCEDURE (cont.)

PACKAGER

7.11.5.2 If the drum contains other free-standing liquids, complete steps 7.11.6 through 7.11.12.

7.11.5.3 If no free-standing liquid is present in the drum, proceed to 7.11.12.

7.11.6 Obtain a drainage lid and place on the drum.

7.11.7 Using forklift, rotate drum approximately at a 45 degree angle, drain liquid from drum into the Plant 1 Sump System until no liquid flows from drainage lid, and lower drum to floor.

7.11.8 Inspect and drain the remaining drums per steps 7.11.5 through 7.11.7.

7.11.9 After draining the drums, inspect each drum for damage.

7.11.9.1 If drum is damaged, complete 7.11.10 and then using a forklift, move damaged drum to holding area, as specified by supervisor, for disposal.

7.11.9.2 If drum is not damaged, proceed to 7.11.10.

7.11.10 Using a forklift, transfer the drained material into another drum of drained material filling the drum approximately six inches from the top.

NOTE: Steps 7.11.11 through 7.11.12 are applicable to filled and partially filled drums of drained material.

7.11.11 Add a minimum of one inch of dicalite to each drum.

7.11.12 Replace lid on the drum, close lever lock/bolt ring, and load the drum into a metal box per Item 7.8.

7.11.13 Using a forklift, move any empty drums to holding area for disposal.

8.0 REFERENCE DOCUMENTS

8.1 SSOP-0002, "Completing the Material Evaluation Form"

8.2 SSOP-0023, "Deviation and Corrective Action Reporting"

8.0 REFERENCE DOCUMENTS (cont.)

8.3 RM-0005, "FEMP Lot Marking and Color-Coding System"

8.4 20-C-600, "Overpacking Defective Containers"

9.0 APPLICABLE FORMS

9.1 FMPC-CONT-1945-XX, "Item Production/Certification/Identification"

9.2 FMPC-PRO-2867, "Box Tare Weight Check"

9.3 FMPC-OPR-3252, "Material Evaluation"

10.0 FIGURES

10.1 Figure 1, "Prohibited Materials List"

10.2 Figure 2, Diagram of LLRW Drum Labeling

10.3 Figure 3, Diagram of Hazardous Waste Label

10.4 Figure 4, Diagram of Metal Box Identification

10.5 Figure 5, Diagram of Sea/Land Identification

TABLE 1
CORROSION INSPECTION CATEGORIES

CATEGORY	CHARACTERISTIC	COULD CAUSE LOSS OF DRUM INTEGRITY		CORRECTIVE ACTION
		YES	NO	
A	Severe corrosion with deep pitting and/or metal flaking	X		1. Notify supervisor. **NOTE**: The drum requires disposition as directed by supervision within 24 hours.
B	Corrosion with shallow pitting and/or mild metal flaking		X	1. Proceed as directed by the supervisor. **NOTE**: Disposition shall be determined by the supervisor following review of completed inspection form.
C	Surface rust with no pitting and mild paint flaking which exposes bare metal		X	1. Proceed as directed by the supervisor. Repainting shall be scheduled by supervisor.

TABLE 2
LLRW CONTAINER INSPECTION

INSPECTION ITEM	INSPECTION CRITERIA	CORRECTIVE ACTION REQUIRED
Hole	An opening in the container including breach, gouge, puncture or leak.	Notify supervisor of condition and request disposition instructions.
Dent	A crease, depression of hollow made by blow or pressure; a concave distortion which jeopardizes the integrity of the container. A dent in the top or bottom rim.	Notify supervisor of condition and request disposition instructions.
Bulge	A swollen area, a convex distortion, an outward bend which jeopardizes the integrity of the container.	Notify supervisor of condition and request disposition instructions.

PACKAGING GUIDELINES FOR WASTE GENERATOR

PACKAGE HAS BEEN PROPERLY PREPARED FOR CLOSING:

- NO LIQUIDS OF ANY KIND HAVE BEEN PLACED IN CONTAINER
- HEAVY/BULKY ITEMS HAVE BEEN SECURED WITHIN CONTAINER
- ALL AVAILABLE SPACE HAS BEEN UTILIZED EFFICIENTLY
- PROHIBITED MATERIALS HAVE BEEN EXCLUDED (SEE BELOW)
- PACKAGING HAS NOT BEEN DAMAGED DURING LOADING
- LINER IS IN PLACE AND PROPERLY LAPPED AND SEALED

PROHIBITED MATERIALS

COMPRESSED GASES
(UNPUNCTURED AEROSOL CANS INCLUDED)

EXPLOSIVES

FREE LIQUIDS

FINE PARTICULATES (RESPIRABLE FINES)

HAZARDOUS WASTE
(SUSPECT RCRA MATERIALS INCLUDED)

CORROSIVE MATERIALS

ETIOLOGIC AGENTS

PROHIBITED MATERIALS LIST
Figure 1

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		SITE STANDARD OPERATING PROCEDURE Page 25 of 29
Title: PACKAGING LOW LEVEL RADIOACTIVE WASTE (LLRW) FOR OFFSITE DISPOSAL		DOCUMENT NO: SSOP-0024 REVISION NO. 0
Authorization: W. H. Britton, President	Supersedes: SOP 20-C-601, Dated 7-12-90, Rev. 1	Issue Date: 10-14-91

NON-RCRA, RADIOACTIVE, OR ASBESTOS DRUM

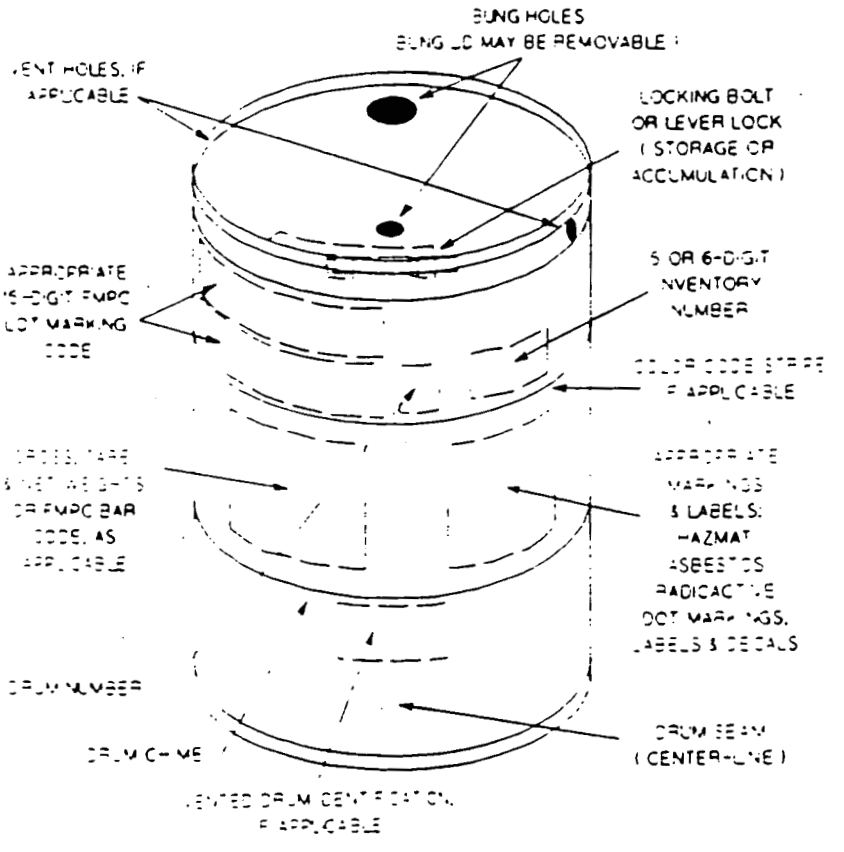

DIAGRAM OF LLRW DRUM LABELING
Figure 2

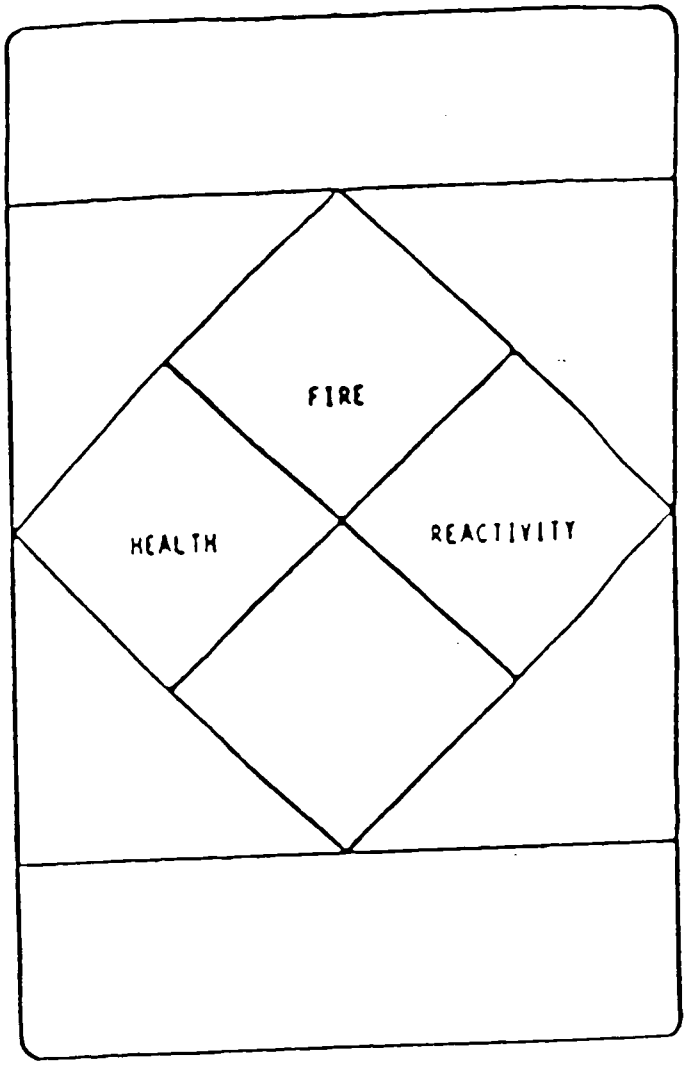

DIAGRAM OF HAZARDOUS WASTE LABEL
Figure 3

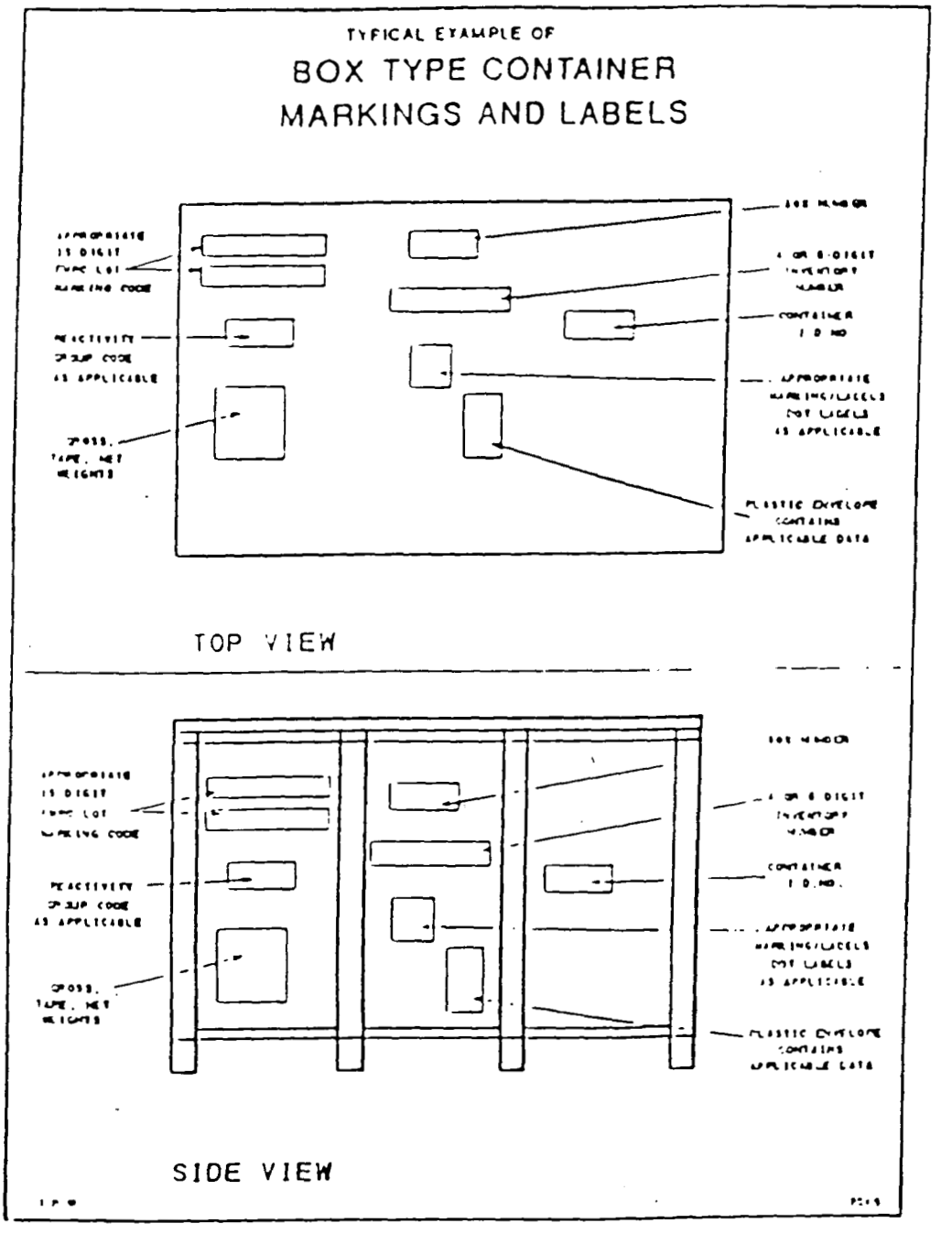

DIAGRAM OF METAL BOX IDENTIFICATION
Figure 4

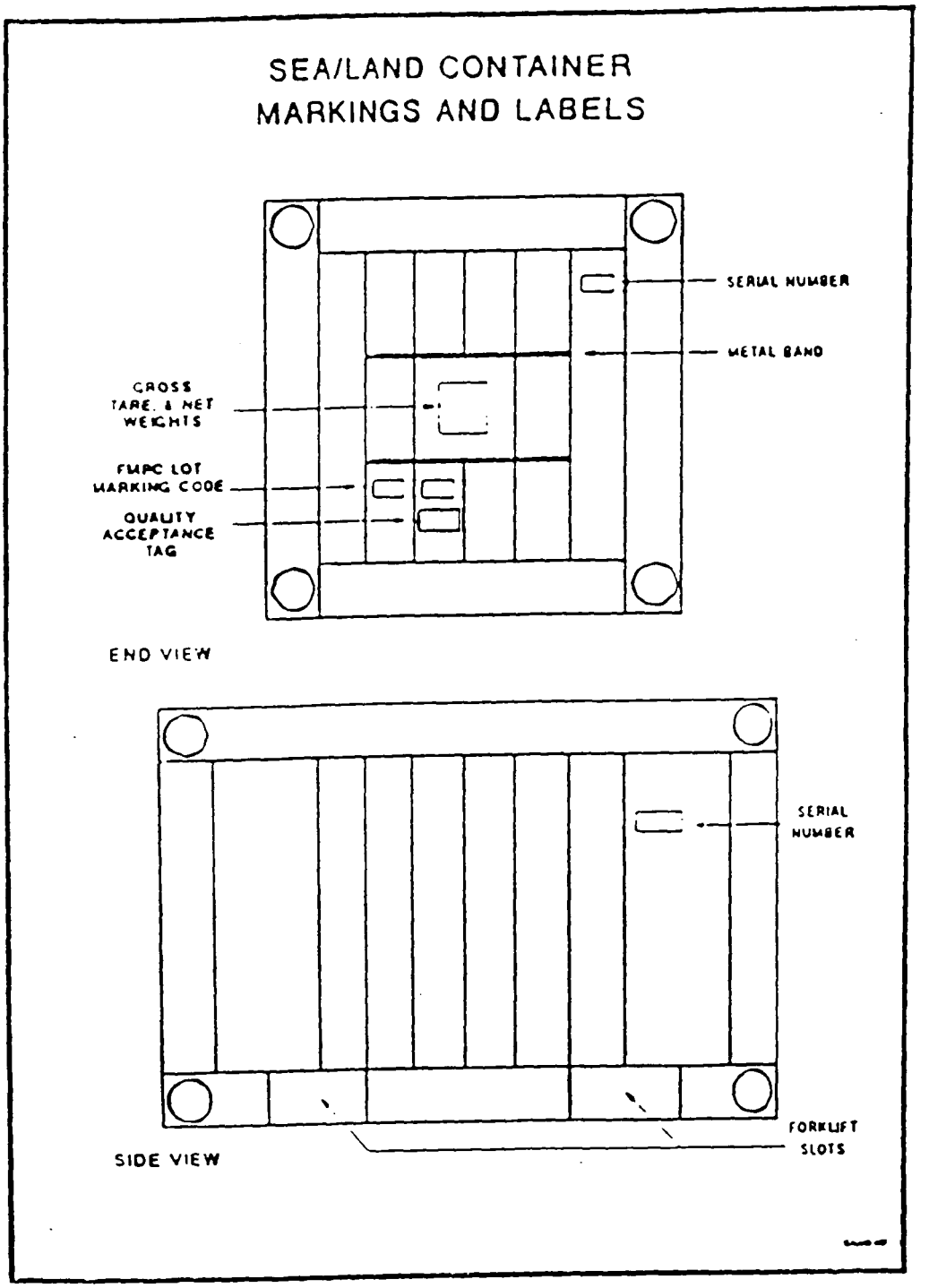

DIAGRAM OF SEA/LAND IDENTIFICATION
Figure 5

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		SITE STANDARD OPERATING PROCEDURE Page 29 of 29
Title: PACKAGING LOW LEVEL RADIOACTIVE WASTE (LLRW) FOR OFFSITE DISPOSAL		DOCUMENT NO: SSOP-0024 REVISION NO. 0
Authorization: W. H. Britton, President	Supersedes: SOP 20-C-601, Dated 7-12-90, Rev. 1	Issue Date: 10-14-91

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
10-14-91	0	New site procedure required to replace SOP 20-C-601 per Request No. P91-196, initiated by S. Brown.

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		INTERIM Page 1 of 13
Title: **PREPARING AND EVALUATING WASTE STREAMS DESIGNATED AS LOW LEVEL RADIOACTIVE WASTE (LLRW)**		DOCUMENT NO: IN-6028 SITE STANDARD OPERATING PROCEDURE
Authorization: for W. H. Britton, President	Supersedes: None	Issue Date: 10-30-91 Expiration Date: 12-30-91

1.0 PURPOSE

The purpose of this document is to provide the procedure for waste generators to prepare waste streams designated as Low Level Radioactive Waste (LLRW) for packaging and evaluate the waste streams to ensure the material is non-RCRA prior to packaging for offsite disposal. A Material Evaluation Form (MEF) will not be required unless the waste material does not meet the criteria established by this procedure.

2.0 APPLICABILITY

This document is applicable to waste streams requiring offsite disposal (excluding construction-generated waste and wastes associated with a Hazardous Waste Management Unit).

3.0 RESPONSIBILITIES

3.1 **Supervisors** shall be responsible for the following:

3.1.1 Ensuring that only trained personnel perform this procedure.

3.1.2 Contacting Industrial Hygiene or Radiological Safety to determine the appropriate respiratory protection.

3.1.3 Providing waste generator with the required respiratory protection.

3.2 **Waste generators** shall be responsible for complying with this procedure.

3.3 The **Vehicle Garage** section of Site Services shall be responsible for draining Freon from light-duty vehicles upon request.

3.4 Traffic shall be responsible for transporting material to packaging area upon request.

4.0 DEFINITIONS

4.1 Low Level Radioactive Waste - Waste that contains radioactivity and is not classified as high level waste, transuranic waste, or spent nuclear fuel or ile byproduct material as defined by DOE Order 5820.2A. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as low-level radioactive waste, provided the concentration of transuranic is less than 100 n Ci/g.

4.0 **DEFINITIONS** (cont.)

4.2 Waste Generator - Organization (point of generation) at which waste is originated.

4.3 RCRA (Resource Conservation Recovery Act) - The congressional act which established safe and environmentally acceptable management practices for specific wastes. RCRA requires strict "cradle to grave" control and proper management of hazardous wastes.

4.4 Large Waste Generator - Generator which accumulates material within a two week period to fill a sea/land container.

4.5 Small Waste Generator - Generator which cannot fill a sea/land container with material within a two week period.

4.6 Entrapped Liquids - Collected fluids that have accumulated by expos to elements.

4.7 Internal Fluids - Liquid within equipment which functioned as a working component of the equipment.

4.8 Waste Streams - For the purpose of this procedure, this term is defined as wood, metal, or light duty vehicles designated as LLRW scrap materials.

5.0 **GENERAL**

None

6.0 **INDUSTRIAL, HEALTH, AND SAFETY REQUIREMENTS**

6.1 Safety glasses with side shields shall be worn unless other eye protection is specified by IRS&T.

6.2 Respiratory protection provided by the supervisor shall be worn when required by IRS&T.

6.3 Leather-palmed gloves shall be worn to protect hands from rough material and contamination.

6.4 HEPA type filter vacuum cleaners or an IRS&T approved vacuum shall be used for cleaning.

6.0 INDUSTRIAL, HEALTH, AND SAFETY REQUIREMENTS (cont.)

6.5 Any circumstance which could have resulted in an intake of radioactive materials by inhalation, ingestion or absorption shall immediately be reported to a supervisor. The supervisor shall immediately report the circumstance of possible radioactive materials intake to IRS&T Radiological Safety Section for evaluation. The involved personnel shall report to the Urine Sampling Station at the end of their shift to complete a Incident Investigation Report (IIR) (Form FMPC-ES&H-1458), and submit an incident urine sample. The involved personnel shall also report to the Urine Sampling Station at the start of their next shift to submit a followup urine sample. Employees are responsible for complying with additional requirements as specified by the Radiological Safety Section.

7.0 PROCEDURE

7.1 General

7.1.1 Warning, Cautions, and Notes shall precede the step to which they apply.

7.1.2 Large generators shall inspect/prepare material per item 7.2 and evaluate material per item 7.3.

7.1.3 Small generators shall inspect/prepare material per item 7.2 and evaluate material per item 7.4.

7.2 Inspecting/Preparing Waste Streams

LARGE GENERATOR/SMALL GENERATOR

7.2.1 Visually inspect wood material for residues.

7.2.1.1 If residues are present, remove by scraping with paint scraper or wiping with a rag until no visible residue.

7.2.1.2 Dispose of rag in established Satellite Accumulation Area (SAA) per SOP 20-C-605.

7.2.2 Inspect metal material per Table 1 and perform corrective action as required.

7.0 **PROCEDURE** (cont.)

GENERATOR

NOTE: Only light/medium duty vehicles and forklifts are to be inspected and prepared per this procedure. This document is not applicable to heavy equipment.

7.2.3 Prepare light-duty vehicles per 7.2.4 through 7.2.10.

7.2.4 Fuel Tank Removal

7.2.4.1 Remove fuel tank from the vehicle.

7.2.4.2 Drain gasoline from tank per applicable draining method (refer to Table 2).

7.2.4.3 Steam clean the fuel tank per instructions provided supervisor.

7.2.4.4 Place tank inside the vehicle.

7.2.5 Propane Tank Removal

7.2.5.1 If a propane tank is present, remove and dispose of tank in accordance with supervisor instructions.

7.2.6 Tire Preparation

7.2.6.1 Deflate tires and remove valve stems.

7.2.7 Oil Filter Removal

7.2.7.1 Remove oil filters from vehicle as instructed by supervisor.

7.2.7.2 Check filter for internal fluids and drain per 7.2.10 as applicable.

7.2.7.3 Return filter to original position in vehicle.

7.0 **PROCEDURE** (cont.)

GENERATOR

7.2.8 Hydraulic Unit Removal

7.2.8.1 If any hydraulic units are on the vehicle, remove per instructions provided by supervisor or drain internal fluid from unit per 7.2.10 and place unit inside the vehicle.

7.2.9 Battery Removal

7.2.9.1 Remove and dispose of batteries in manner designated by the supervisor.

7.2.10 Draining Internal Fluids

7.2.10.1 Drain internal fluid per applicable draining method (refer to Table 2).

7.2.10.2 If Freon is present, notify Vehicle Garage.

VEHICLE GARAGE

7.2.10.3 Pump and recycle Freon per instructions provided by supervisor.

7.2.11 Inspect light-duty vehicle per Table 3 and perform corrective action as required.

7.3 Evaluating Waste Streams

LARGE GENERATOR

7.3.1 Check for a completed Material Evaluation Form (MEF).

7.3.1.1 If a MEF has been completed designating material as non-RCRA, proceed with packaging of material per SSOP-0024.

7.3.1.2 If a MEF has been completed designating material as RCRA, contact supervisor for disposition instructions.

7.3.1.3 If a MEF has not been completed, proceed to 7.3.2.

7.0 **PROCEDURE** (cont.)

LARGE GENERATOR

7.3.2 Evaluate material by completing Section I of the applicable evaluation form (refer to 9.1 through 9.3).

7.3.3 For an evaluation form with all responses indicated as yes or non-applicable, complete the following:

7.3.3.1 Complete Section II of the evaluation form.

7.3.3.2 Package material per SSOP-0024.

7.3.3.3 Submit evaluation form to supervisor for review and signature.

SUPERVISOR

7.3.3.4 Review evaluation form.

7.3.3.5 Sign form for approval of material meeting the evaluation requirements as non-RCRA and approval of container identification.

7.3.3.6 Distribute form.

LARGE GENERATOR

7.3.4 For an evaluation form with a negative response, complete the following:

7.3.4.1 Initiate a MEF per SSOP-0002.

7.3.4.2 Hold material at generation area.

7.3.4.3 After receipt of the completed MEF, complete the applicable action per Step 7.3.5 or 7.3.6 according to material designation as RCRA or non-RCRA.

7.3.5 For material designated as non-RCRA, package material per SSOP-0024.

7.3.6 For material designated as RCRA, notify supervisor to determi disposition requirements.

7.0 **PROCEDURE** (cont.)

7.4 Evaluating Waste Streams

SMALL GENERATOR

7.4.1 Check for a completed MEF.

7.4.1.1 If a MEF has been completed, perform Step 7.4.2 or 7.4.3, as applicable.

7.4.1.2 If a MEF has not been completed, proceed to 7.4.4.

7.4.2 For material designated as non-RCRA per the MEF, proceed as follows:

SMALL GENERATOR

7.4.2.1 Notify supervisor the material is non-RCRA.

SUPERVISOR

7.4.2.2 Contact Traffic and request transfer of material to the appropriate packaging area.

TRAFFIC

7.4.2.3 Move material to packaging area.

SMALL GENERATOR

7.4.3 For material designated as RCRA per the MEF, notify supervisor for disposition instructions.

NOTE: The applicable evaluation form (refer to 9.1 through 9.3) shall be used for information in determining the material is non-RCRA or requires a MEF. The evaluation form shall be filled out at the packaging area by the packager of the material.

7.4.4 Using the evaluation form, evaluate the material per Section I of the form.

SMALL GENERATOR/SUPERVISOR/TRAFFIC (AS APPLICABLE)

7.4.5 For material meeting all the evaluation criteria of Section I, complete steps 7.4.2.1 through 7.4.2.3.

7.0 **PROCEDURE** (cont.)

SMALL GENERATOR

7.4.6 For material which does not meet one or more of the evaluation items, complete the following:

7.4.6.1 Initiate a MEF per SSOP-0002.

7.4.6.2 Hold material at generating area.

7.4.6.3 After receipt of the completed MEF, dispose of material per 7.4.2 or 7.4.3, as applicable.

8.0 **APPLICABLE DOCUMENTS**

8.1 Drivers

8.1.1 DOE 5820.2A, "Radioactive Waste Treatment"

8.2 Reference Documents

8.2.1 SSOP-0002, "Completing the Material Evaluation Form"

8.2.2 SSOP-0024, "Packaging Low Level Radioactive Waste (LLRW) for Offsite Disposal"

9.0 **APPLICABLE FORMS**

9.1 FS-F-3465, "LLRW Wood Materials Evaluation"

9.2 FS-F-3464, "LLRW Metal Materials Evaluation"

9.3 FS-F-3472, "LLRW Light-Duty Vehicle Evaluation"

10.0 **FIGURES**

10.1 Figure 1, Diagram of Drainage Verification Tag

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		**INTERIM** Page 9 of 13
Title: **PREPARING AND EVALUATING WASTE STREAMS DESIGNATED AS LOW LEVEL RADIOACTIVE WASTE (LLRW)**		DOCUMENT NO: IN-6028 SITE STANDARD OPERATING PROCEDURE
Authorization: W. H. Britton, President	Supersedes: None	Issue Date: 10-30-91

TABLE 1
METAL PREPACKAGING INSPECTION

METHOD	CHECK FOR	CORRECTIVE ACTION
Visual	Residues	1) Remove residues by scraping with paint scraper or wiping with a rag. 2) Dispose of rags in established SAA per SOP 10-C-605.
Visual	Internal Fluids	1) Complete one of following, as applicable: 1.1 Unplug drain cap from metal material and drain. 1.2 Perforate casing and drain per instructions provided by supervisor. 1.3 Mechanically pump/suck fluid from metal material per instructions by supervisor. 2) After draining is considered complete, allow metal to remain in draining position until a period of five minutes has elapsed without any fluid flowing from material. 3) Replace drain cap, and/or seal perforations with caulking, as applicable. 4) Complete a "Drainage Verification Tag". 5) Attach tag to metal material.
Visual	Entrapped Liquids (usually in crevices of material)	1) Drain liquid from material by rotating until empty into a 55 gal drum. 2) After draining is considered complete, allow material to remain in draining position until a period of five minutes has elapsed without a drop of fluid flowing from material.
Visual	Electrical Equipment	1) Remove any electrical equipment (i.e. ballasts, dielectric fluids, starter caps, mercury switches) as directed by supervisor.

TABLE 2
DRAINING METHODS FOR LIGHT-DUTY VEHICLES

TYPE OF FLUID	METHOD
Internal Fluids -Anti-freeze -Brake fluid -Gasoline -Transmission Fluid -Engine Oil -Power Steering Fluid -Differential Fluid (rear end)	1) Perform one of following steps as applicable: 1.1 Unplug drain cap from metal material and drain fluid into a 55 gallon drum at a SAA. 1.2 Perforate casing by drilling per instructions provided by supervisor and drain fluid into a 55 gallon drum at SAA. 1.3 Mechanically pump/suck fluid from metal material into a 55 gallon drum at a SAA per instructions by supervisor. 2) After draining is considered complete, allow metal to remain in draining position until a period of five minutes has elapsed without any fluid flowing from material. 3) Replace drain cap, and/or seal perforations with caulking, as applicable. 4) Complete a "Drainage Verification Tag". 5) Attach tag to metal material.

TABLE 3
LIGHT-DUTY VEHICLE PREPACKAGING INSPECTION

METHOD	CHECK FOR	CORRECTIVE ACTION
Visual	Entrapped Liquids (usually in crevices of material)	1) Drain liquid from material by rotating until empty into a 55 gal drum. 2) After draining is considered complete, allow material to remain in draining position until a period of five minutes has elapsed without a drop of fluid flowing from material.

DRAINAGE VERIFICATION TAG

DATE:

TYPE OF EQUIPMENT:

DRAINING METHOD:

LOCATION WHERE DRAINED:

SUPERVISORS SIGNATURE:

ORGANIZATION:

DIAGRAM OF DRAINAGE VERIFICATION TAG
Figure 1

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Title: **PREPARING AND EVALUATING WASTE STREAMS DESIGNATED AS LOW LEVEL RADIOACTIVE WASTE (LLRW)**		DOCUMENT NO: IN-6028 SITE STANDARD OPERATING PROCEDURE
Authorization: W. H. Britton, President	Supersedes: None	Issue Date: 10-30-91

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DATE	REV. NO	DESCRIPTION AND AUTHORITY
10-30-91	INTERIM	Interim required for preparing and evaluating LLRW per Request P91-585, initiated by S. Brown.

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		INTERIM Page 1 of 7
Title: **DISPOSITION REQUIREMENTS FOR RADIOLOGICALLY CONTAMINATED AND UNCONTAMINATED CONSTRUCTION/ MAINTENANCE WASTE**		DOCUMENT NO: IN-6031 SITE OPERATING REQUIREMENT
Authorization: W. H. Britton, President	Supersedes: IN-6015, Dated: 09-27-91	Issue Date: 11-27-91 Expiration Date: 01-27-92

1.0 PURPOSE

The purpose of this document is to establish the requirements for determining how waste will be handled when the waste is removed from construction and maintenance sites.

2.0 APPLICABILITY

These requirements are applicable to all construction and maintenance activities at the Fernald Environmental Management Project (FEMP) that generate waste.

3.0 DEFINITIONS

3.1 Construction Waste - Unusable material or equipment (such as soil, rubble, wood, metal, RCRA, and hazardous waste) generated during the execution of a construction, demolition, or maintenance project.

NOTE: Waste generated by planned, non-emergency, non-custodial maintenance activities shall be handled as construction waste.

3.2 Future Use Material - Reusable material held for anticipated use in the plant and/or projects.

3.3 Metal Refuse - Metal not suitable for reclamation due to a hard-to-remove non-metallic wrapping, mixed metal composition, heavily rusted, less than 1/4 inch thick, or internal non-decontaminable surface.

3.4 Radioactive Contaminated Waste - Discardable construction material containing radionuclides that exceed the specified limits.

3.5 Rubble - Non-metallic material (such as tiles, gravel, concrete, asphalt, masonry) greater than two inches in diameter that cannot be reused.

3.6 Soil - Particles of dirt and gravel with a maximum dimension of two inches.

3.7 Uncontaminated Waste - Construction waste that contains radioactive concentrations below limits specified in this document.

3.8 Usable Metals - Uncontaminated metals that are suitable for reuse as part of the DOE Metals Program.

4.0 RESPONSIBILITIES

4.1 **Project Management and Acquisition (PM&A) and Site Services** shall be responsible for the following:

4.1.1 Ensuring that the requirements of this document are implemented.

4.1.2 Coordinating with Environmental Engineering to determine waste type.

4.1.3 Coordinating planning and handling of construction waste during removal, packaging, and disposition.

4.1.4 Developing the waste sampling plan.

4.2 **Industrial Radiological Safety and Training (IRS&T)** shall be responsible for the following:

4.2.1 Performing surveys of proposed construction sites to obtain data used to support the waste sampling plan, determine surface contamination, and specify protective equipment required.

4.2.2 Sampling suspect asbestos material and arranging for analysis to determine asbestos content.

4.3 **Environmental Management (EM)** shall be responsible for conducting sampling in accordance with the waste sampling plan.

4.4 **Environmental Compliance and Quality Assurance (EC&QA)** shall be responsible for the following:

4.4.1 Designating a storage area for PCB contaminated material.

4.4.2 Making a RCRA determination/radiological characterization (RDRC) based on process knowledge and/or analytical data.

5.0 GENERAL

5.1 Construction waste may consist of soil, rubble, wood, general refuse, PCBs, metal, asbestos, or equipment and can be liquid or solid.

6.0 REQUIREMENTS

6.1 Soil

6.1.1 Soils within the Category 1 limits (Refer to Table 1) may be used as backfill in controlled and uncontrolled areas or stockpiled in designated areas.

6.1.2 Soils exceeding the Category 1 limits but within Category 2 limits may be stockpiled in designated areas or used as backfill in controlled areas.

6.1.3 Soils that exceed Category 1 limits shall not be built over without DOE approval nor used as backfill in uncontrolled areas.

6.1.4 Soils exceeding Category 2 limits shall be packaged for disposal as low level waste (LLW).

6.1.5 Site certification samples shall be obtained and analyzed after excavation is complete to verify that build over requirements were met.

TABLE 1
SOIL/RUBBLE CONTAMINATION LIMITS

MATERIAL	MAXIMUM CONCENTRATION[1]	
	Category 1	Category 2
Depleted uranium	35	100
Enriched uranium	30	100
Thorium	10	50

[1] In Picocuries per gram (pCi/gm).

6.0 **REQUIREMENTS** (cont.)

6.2 RUBBLE (includes concrete, block, stone, asphalt)

6.2.1 Rubble within the Category 1 limits (Refer to Table 1) is classified as uncontaminated. Category 1 rubble may be stockpiled in designated areas.

6.2.2 Rubble exceeding the limits of Category 1 is considered contaminated material that can not be decontaminated to less than Category 1 limits shall be packaged as low level waste (LLW) and staged for disposal.

6.3 METAL

NOTE: Metal waste is categorized as reusable or refuse. Reusable metal consists of ferrous (carbon steel material such as structural shapes & pipe) and non-ferrous (stainless steel, copper, aluminum, lead, brass, monel inconel, or nickel) material. Metal refuse consists of oxidized sheet metal and mixed metals.

6.3.1 Metal is considered uncontaminated if 100 cm^2 smears from the surface of the material shows removable contamination levels less than 100 disintegrations per minute (dpm) beta/gamma and less than 20 dpm alpha, the average fixed plus removable contamination level shall be less than 1000 dpm/100 cm^2, and the maximum fixed plus removable contamination level at any point of the surface shall be less than 3000 dpm/100 cm^2.

NOTE: All uncontaminated metals can be released for unrestricted use or disposal.

6.3.2 Contaminated metal that is decontaminated to meet free release limits shall be released for burial at a sanitary landfill or sold as scrap.

6.3.3 Metal that cannot be decontaminated to meet free release limits shall be segregated into one of the following categories: ferrous, non-ferrous, and metal refuse.

6.3.4 Metal refuse shall be packaged into approved waste containers for eventual shipment to a designated DOE burial site.

6.3.5 Usable ferrous and non-ferrous metals shall be stored on-site to support the excess metal sales program.

6.0 REQUIREMENTS (cont.)

6.3.6 The requirements for handling metallic waste shall conform with the excess metal sales program and the WEMCO Radiation Control Manual.

6.4 PROCESS EQUIPMENT

6.4.1 Reusable equipment, such as machine tools, valves, and instruments, shall be classified as future-use material.

6.4.2 Equipment that is not re-usable shall be classified by waste type and disposed of in the same manner as other waste.

6.5 WOOD

NOTE: Pressure treated wood shall be segregated pending RCRA determination.

6.5.1 Wood scrap (such as pallets, crates, form lumber, sheeting, and similar material) generated by construction activities shall be surveyed. If the surface contamination is 100 ccpm or greater, the wood shall be treated as LLW.

6.5.2 Wood removed during the demolition phase of construction shall be reviewed by the Radiological Safety Lead Technician, on a case by case basis.

6.5.3 The Radiological Safety Technician (RST) shall determine if the wood has been exposed to radioactive materials and if the material is surveyable.

NOTE: Based on RST findings, the wood shall be processed as LLW or certified clean and free released.

6.6 ASBESTOS

6.6.1 Materials that contain asbestos or that are suspected to be asbestos, shall be handled as asbestos.

6.6.2 All asbestos material shall be handled according to applicable IRS&T Department Procedures.

6.0 **REQUIREMENTS** (cont.)

6.7 POLYCHLORINATED BIPHENOLS (PCBs)

6.7.1 PCB material consists of transformers, capacitors, fluorescent light bulbs, and similar electrical equipment containing PCBs and material (gloves, rags, spill absorbents) which have been used in the removal from service of PCB containing equipment or for clean-up of spills of PCB containing materials.

6.7.2 PCBs shall be packaged and stored at a location specified by Environmental Compliance.

6.8 OTHER

6.8.1 Construction waste (liquid or solid) not specifically categorized on the Construction Waste Identification and Disposition (CWID) Form posted in the area shall be handled on a case-by-case basis by Environmental Engineering.

7.0 **APPLICABLE DOCUMENTS**

7.1 Drivers

7.1.1 40 CFR 260, 261 and 300

7.1.2 IN-6032, Control of Construction/Maintenance Waste

7.2 References

None

8.0 **FIGURES**

None

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		INTERIM Page 7 of 7
Title: **DISPOSITION REQUIREMENTS FOR RADIOLOGICALLY CONTAMINATED AND UNCONTAMINATED CONSTRUCTION/ MAINTENANCE WASTE**		DOCUMENT NO: IN-6031 SITE OPERATING REQUIREMENT
Authorization: W. H. Britton, President	Supersedes: IN-6015, Dated: 09-27-91	Issue Date: 11-27-91

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
11-27-91	INTERIM	Document establishing requirements for disposing of construction and maintenance waste required per Request No. P91-686, initiated by S. Lund.

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		INTERIM Page 1 of 4
Title: **CONTROL OF CONSTRUCTION/MAINTENANCE WASTE**		DOCUMENT NO: IN-6032 SITE POLICY AND PROCEDURE
Authorization: W. H. Britton, President	Supersedes: IN-6016, Dated 09-27-91	Issue Date: 11-27-91 Expiration Date: 01-27-92

1.0 POLICY

The Westinghouse Environmental Management Company of Ohio (WEMCO) shall manage and control the generation and processing of construction and maintenance waste generated at the Fernald Environmental Management Project (FEMP) to protect the environment and ensure worker safety.

2.0 SCOPE

This document establishes the WEMCO policy for controlling all phases of handling construction and maintenance waste in order to minimize waste and comply with applicable DOE orders and federal, state, local regulations, and site policies and procedures.

3.0 DEFINITIONS

3.1 Administrative Record File - An organized collection of documents opened to public review that form the basis for the selection of a removal or remedial response action pursuant to requirements set forth by the Comprehensive Environmental Response, Compensation, and Liability Act.

3.2 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) - The law that mandates the development of an organizational structure and procedures to respond to releases, or threats of releases, of hazardous substances or pollutants/contaminants.

3.3 Construction Waste - Unusable material or equipment (such as soil, rubble, wood, metal, or hazardous waste) generated during the execution of a construction, demolition, excavation, or maintenance project.

NOTE: Waste generated as a result of planned maintenance activities shall be handled as construction waste.

3.4 Removal Site Evaluation (RSE) - The documented results of an inspection (if necessary) and assessment of a release or threat of release of a hazardous substance, pollutant, or contaminant to determine if a CERCLA response is required. The RSE is submitted to the Department of Energy (DOE) for review/approval and is also maintained as a part of the Administrative Record File.

3.5 Resource Conservation and Recovery Act (RCRA) - The regulatory statute that mandates "cradle-to-grave" control of specified hazardous waste by imposing management requirements on generators, transporters, and owners/operators of treatment, storage, and disposal (TSD) facilities.

3.0 DEFINITIONS (cont.)

3.6 Resource Conservation Recovery Act (RCRA) Waste - Hazardous waste identified as meeting the criteria defined by, or specifically listed in,the Resource Conservation and Recovery Act.

3.7 Waste Sampling Plan - Document prepared by Environmental Engineering to provide the number, type, location, and laboratory analyses required on samples to allow a comprehensive characterization or project waste.

4.0 RESPONSIBILITIES

4.1 Project Management and Acquisition (PM&A) and Site Services shall be responsible for acting as the construction coordinator/planner/estimator to monitor compliance with "Construction Waste Identification/Disposition" (CWID) requirements (when a CWID is used), and for ensuring the proper handling and packaging of construction waste. The PM/PE also coordinates construction waste planning and handling, including the determination of reusable or waste material. Coordinates with representatives from other departments to provide project support and documentation. PM&A shall also be responsible for ensuring waste minimization by developing a waste sampling plan, reviewing the CWID with the PM/PE and responding to special waste handling problems on a case-by-case basis.

4.2 Industrial, Radiological Safety and Training (IRS&T) shall be responsible for surveying waste generated during construction prior to release as waste, and verifying that construction wastes meet disposition location criteria specified in the CWID. Also, monitoring radiological safety of the construction site.

4.3 Environmental Management (EM) shall be responsible for the following:

4.3.1 Performing field sampling of waste in accordance with the project waste sampling plan.

4.3.2 Providing CERCLA integration guidance and maintaining the Administrative Record.

4.4 Environmental Compliance and Quality Assurance (EC&QA) shall be responsible for participating in project waste sampling planning and issuing a RCRA Determination/Radiological Characterization (RD/RC) Letter.

5.0 GENERAL

5.1 Conceptual designs and drawings shall be completed, if required.

5.2 Clean packing and shipping materials shall be segregated from contaminated waste.

5.3 An RSE shall be completed for all planned excavation/demolition activities which involve hazardous substances and the removal of one cubic yard of material or more.

NOTE: Exceptions may be made for emergency and maintenance activities which have approved standard operating procedures containing control measures to be used.

5.4 Plans for the safe handling and disposal of wastes shall be developed and implemented to ensure the safety of site workers and the protection of the environment.

6.0 PROCEDURE

6.1 Detailed procedures for managing and controlling construction and maintenance wastes are found in IN-6033, "Controlling the Generation of Construction/Maintenance Waste."

6.2 Requirements for construction waste handling and construction excavation are contained in IN-6031, "Disposition Requirements for Radiologically Contaminated and Uncontaminated Construction and Maintenance Waste."

7.0 APPLICABLE DOCUMENTS

7.1 Drivers

7.1.1 40 CFR 260 & 300

7.2 References

7.2.1 IN-6033, "Controlling the Generation of Construction/ Maintenance Waste"

7.2.2 IN-6031, "Disposition Requirements for Radiologically Contaminated and Uncontaminated Construction and Maintenance Waste"

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		INTERIM Page 4 of 4
Title: **CONTROL OF CONSTRUCTION/MAINTENANCE WASTE**		DOCUMENT NO: IN-6032 SITE POLICY AND PROCEDURE
Authorization: W. H. Britton, President	Supersedes: IN-6016, Dated 09-27-91	Issue Date: 11-27-91

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
11-27-91	INTERIM	Policy statement for the control and minimization of waste material generated by construction and maintenance projects required per Request No. P91-687, initiated by S. Lund.

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM	INTERIM Page 1 of 19
Title: CONTROLLING THE GENERATION OF CONSTRUCTION/ MAINTENANCE WASTE	DOCUMENT NO: IN-6033 SITE STANDARD OPERATING PROCEDURE
Authorization: W. H. Britton, President / Supersedes: IN-6017, Dated: 09-27-91	Issue Date: 11-27-91 Expiration Date: 01-27-92

1.0 PURPOSE

To provide the procedure for controlling and minimizing construction and maintenance waste while maintaining worker safety standards and environmental protection requirements.

2.0 SCOPE

This procedure describes the requirements and responsibilities for minimizing the generation of construction/maintenance waste, separating and segregating waste materials, determining the contamination level of waste, establishing handling and packaging requirements, and determining disposition. Also controls the release of hazardous substances to the environment during construction, maintenance excavation, and demolition projects (See Figure 1).

3.0 DEFINITIONS

3.1 Administrative Record File - An organized collection of documents open to public review, that form the basis for the selection of a removal or remedial response action pursuant to requirements set forth by the Comprehensive Environmental Response, Compensation, and Liability Act.

3.2 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - The law that mandates the development of an organizational structure and procedures to respond to releases, or threats of releases, of hazardous substances or pollutants/contaminants.

3.3 Characterization/Certification Sampling - Sampling waste material from pre and post excavation areas to determine excavation area and depth, quantity of waste generation, type of contamination, Site Safety and Health Plan (SSHP) worker protection requirements, and build over certification.

3.4 Construction Excavation/Penetration Permit - A document than lists known hidden hazards or obstructions in an area where excavation or penetration activities will take place.

3.5 Construction Waste - Unusable material or equipment (such as soil, rubble, wood, metal, RCRA, and hazardous waste) generated during the execution of a construction, demolition, or maintenance project.

NOTE: Waste generated by planned, non-emergency, non-custodial maintenance activities shall be handled as construction waste.

3.0 DEFINITIONS (cont.)

3.6 Construction Waste Packaging Area - A site adjacent to the construction site where empty waste containers are filled with construction waste.

NOTE: The packaging area background radiation level shall not exceed limits established by IRS&T if waste will be transferred to a dedicated clean storage area or transported from the site.

3.7 Disposition Location - Area designated by Environmental Engineering and the CERCLA Group for the storage of construction waste.

3.8 Fixed Contamination - Residual contamination remaining after decontamination.

3.9 Future Use Material - Reusable material held for anticipated use in the plant and/or in projects.

3.10 Hazardous Substance - A substance designated for special consideration under the Clean Air Act, Clean Water Act, or TSCA, any hazardous waste that is designated as RCRA, and any material that the EPA lists as presenting a substantial danger to health and the environment.

3.11 Hazardous Waste - Discardable material containing or exhibiting hazardous or toxic waste characteristics as defined in Title 40 of the Federal Regulations, Part 261 (RCRA).

3.12 Metal Refuse - Metal not suitable for reclamation due to a hard-to-remove non-metallic wrapping, mixed metal composition, heavily rusted, less than 1/4 inch thick, or internal non-decontaminatable surfaces.

3.13 Pollutant/Contaminant - A substance, not listed as hazardous, that may cause an adverse affect in organisms and/or the offspring of organisms if inhaled, absorbed, or ingested.

3.14 Project Sampling Plan - A plan developed by Environmental Monitoring that specifies sampling to be conducted for a specific operation.

3.15 Radioactive Contaminated Waste - Construction waste that contains radionuclides that exceed limits specified in IN-6015.

3.16 RCRA Project File - A file that consist of a scope of work, "Construction Waste Identification/Disposition (CWID), NEPA documents, activity drawings, process knowledge, sampling plan, and analytical results.

3.0 DEFINITIONS (cont.)

3.17 Removable Contamination - Surface contamination that can be removed using standard decontamination practices.

3.18 Removal Site Evaluation (RSE) - The documented results of an inspection (if necessary) and assessment of a release or threat of release of a hazardous substance, pollutant, or contaminant to determine if a CERCLA response is required. The RSE is submitted to the Department of Energy (DOE) for review and is also maintained as a part of the Administrative Record File.

3.19 Resource Conservation and Recovery Act (RCRA) - The regulatory statute that mandates "cradle-to-grave" control of specified hazardous waste by imposing management requirements on generators, transporters, and owners/operators of treatment, storage, and disposal (TSD) facilities.

3.20 Rubble - Non-metallic material (such as tiles, gravel, concrete, asphalt, masonry) greater than two inches in diameter, that cannot be reused.

3.21 Soil - Particles of dirt and gravel with maximum dimension of two inches.

3.22 Toxic Substance Control Act (TSCA) - The law that enables the Environmental Protection Agency (EPA) to control chemicals and substances, such as PCBs, dioxins, and asbestos, by requiring the testing of all materials, old and new, entering the environment and regulating the release of chemicals and substances when necessary.

3.23 Uncontaminated Waste - Construction waste that contains radioactive concentrations below limits specified in IN-6015.

3.24 Usable Metals - Uncontaminated metals that are suitable for reuse as part of the DOE Metals Program.

3.25 Waste Sampling Plan - Requirements established by Environmental Engineering (per a sample request form) on sample number, type, location, and lab analysis to characterize project waste.

4.0 RESPONSIBILITIES

4.1 **Project Management and Acquisition (PM&A)** shall be responsible for the following:

4.1.1 Coordinating with representatives of other departments to plan construction waste handling, determine if material is reusable or waste, discuss waste minimization options, and provide project support and documentation.

4.1.2 Initiating a request for RCRA Determination/Radiological Characteristion (RDRC) for a construction project.

4.1.3 Coordinating delivery of empty waste containers to the construction packaging site.

4.1.4 Monitoring subcontractor and FEMP employee compliance with the "Construction Environmental Safety and Health Work Survey" (CESHWS) and CWID to ensure contaminated construction waste handled and packaged in accordance with Standard Operating Procedures.

4.1.5 Maintaining the "Property Disposal Log" and coordinating the sale or disposal of surplus material.

4.1.6 Developing a RCRA project file for each construction/maintenance project.

4.1.7 Ensuring that an adequate waste sampling plan is developed.

4.1.8 Ensuring that waste minimization is accomplished.

4.1.9 Coordinating with the PM/PE to review the CWID form.

4.1.10 Responding to waste handling problems on a case-by-case basis.

4.2 **Industrial, Radiological Safety and Training (IRS&T)** shall be responsible for the following:

4.2.1 Performing radiological surveys of the construction site to verify that the area is safe for workers.

4.2.2 Performing preliminary surveys to assist in identifying contaminated locations and the quantity of contaminated construction waste that will be generated.

4.0 RESPONSIBILITIES (cont.)

4.2.3 Surveying waste for surface contamination prior to release for disposition to ensure that the material is within release limits.

4.2.4 Sampling material suspected to be, or contain, asbestos.

4.2.5 Arranging for laboratory analysis to determine the presence of asbestos in samples.

4.2.6 Notifying the Project Engineer of asbestos sample analysis results.

4.2.7 Specifying protective equipment required for personnel handling asbestos, RCRA, and/or mixed waste material.

4.3 Environmental Management (EM) shall be responsible for the following:

4.3.1 Developing the Project Sampling Plan.

4.3.2 Taking field samples of waste in accordance with SW-846 and the Project Waste Sampling Plan.

4.3.3 Providing CERCLA integration guidance.

4.3.4 Maintaining the "Administration Record"

4.3.5 Providing information pertaining to radiological and/or RCRA contamination at the construction area.

4.3.6 Reviewing RSE documents prior to submittal to DOE.

4.3.7 Providing concurrence with the waste sampling plan developed by Environmental Engineering.

4.4 Environmental Compliance and Quality Assurance (EC&QA) shall be responsible for the following:

4.4.1 Inspecting waste containers to verify container integrity.

4.4.2 Observing containers being filled with waste to verify adherence to applicable SOPs and the CWID.

4.0 RESPONSIBILITIES (cont.)

4.4.3 Completing material identification documentation, obtaining the supervisors signature on the documents, and delivering the documentation to Materials Control and Accountability (MC&A).

4.4.4 Issuing Deviation and Corrective Action Reports (DCARs) when waste is not handled in accordance with procedures, the CWID, or CESHWS.

4.4.5 Preparing and issuing a "Quality Operations Assessment Checklist".

4.4.6 Participating in the development of the Waste Sampling Plan.

4.4.7 Issuing an RD/RC Letter based on process historical knowledge and/or sample results.

4.5 The Controller shall be responsible for the following:

4.5.1 Maintaining an inventory of filled waste containers.

4.5.2 Generating documentation for moving filled containers to storage.

4.6 Site Services shall be responsible for the following:

4.6.1 For maintenance projects, the Site Services Department Maintenance Planner/Estimator shall perform the PM/PE responsibilities as follows:

4.6.1.1 Coordinating with representatives of other involved Departments to plan waste handling methods, determine material disposition (reusable or waste), discuss waste minimization options, and provide project support and documentation.

4.6.1.2 Initiating RD/RC requests for maintenance projects.

4.6.1.3 Coordinating delivery of empty containers to the packaging site.

4.6.1.4 Monitoring FEMP and subcontractor personnel to ensure that contaminated waste is handled in accordance with applicable SOPs.

4.6.2 Preparing a designated location for receiving contaminated materials for storage prior to shipment.

4.0 RESPONSIBILITIES (cont.)

4.6.3 Obtaining approved on-site disposition locations for RCRA construction waste.

4.6.4 Notifying MC&A of the container inventory and/or serial number.

4.6.5 Making the required preparation for ISO container loading.

4.6.6 Providing final closure for ISO containers.

4.6.7 Providing material movement services (including weighing filled waste containers and delivering containers to and from the site).

5.0 GENERAL

5.1 A "Property Disposal Request", Form FMPC-CONT-563 shall be prepared before equipment (tagged or untagged) is removed.

5.2 Project subcontractors shall be instructed to segregate clean packing and shipping materials to prevent contact with contaminated waste.

5.3 Packing materials shall be removed before entering a controlled area.

5.4 The "Contaminated Waste Packaging Guidelines" (Refer to Table 1) shall be followed for each type of contaminated construction waste shipped to a DOE burial site.

TABLE 1
CONTAMINATED WASTE PACKAGING REQUIREMENTS

MATERIALS[1]	METAL CONTAINERS	DRUMS	INTERNATIONAL SHIPPING ORGANIZATION (ISO)	CONTAMINATED DUMPSTERS
Metal refuse	Yes	N/A	Yes[2]	N/A
Scrap wood/pallets	Yes	N/A	Yes	Yes
Concrete	Yes	N/A	N/A	N/A
Soil	Yes	N/A	N/A	N/A
Asbestos	Yes	N/A	Yes	N/A
Misc. trash	N/A	N/A	N/A	Yes[2]
Floor sweepings/dust collector residues	N/A	Yes[2]	N/A	N/A

(1) RCRA material shall be handled on a case-by-case basis.

(2) Refer to SOP 20-C-601 for specific packaging guidelines.

5.0 GENERAL (cont.)

5.5 Waste containers shall be prepared in accordance with applicable procedures.

5.6 Filled containers that exceed the specified capacity shall be returned to the job site for removal of contents to bring the container within limits.

5.7 Packaging the following materials in box type containers is prohibited:
(A) Resource Conservation and Recovery Act (RCRA) hazardous wastes.
(B) Pressurized vessels
(C) Explosives
(D) Radioactive gases
(E) Pyrophoric materials
(F) Toxic or poisonous substances (except asbestos containing materials)
(G) Reactive material
(H) Liquid metals
(I) Flammable substances
(J) Alkaline metals
(K) Liquid organic waste
(L) Waste containing free liquid, dry powder, or respirable fines that have not been immobilized per NVO-325.
(M) PCBs
(N) Etiologic agents

5.8 Packaging of materials listed in Item 5.7 shall be on a case-by-case basis by Environmental Engineering.

5.9 Asbestos shall be packaged in accordance with applicable procedures.

5.10 The appropriate CERCLA Programs Operable Unit Manger shall review completed RSE documents to ensure that all CERCLA requirements are met and then forward the RSE to DOE for review and approval.

6.0 PROCEDURE

6.1 Pre-construction Planning/Estimating

NOTE: A pre-construction meeting (usually during Title I design) attended by groups involved in the Project shall be held. Project interface requirements shall be addressed/agreed to by all service organizations. The meeting shall identify interfaces with service organizations. The meeting may incorporate the project site walkdown to review the project scope for sampling and waste characterization.

PM&A AND SITE SERVICES

6.1.1 Prepare a draft "Construction Waste Identification/Disposition" (CWID) sheet, Form FMPC-CONT-2716.

NOTE: Accuracy and detail are required in preparing the CWID since the CWID and supporting documentation may be used by the planner/estimator or the subcontractor to estimate the costs associated with handling construction wastes and by OU3 Compliance for completion of RD/RC. The CWID is also used to report and quantify the estimated waste versus the actual waste generated at the completion of the project and to quantify the amounts and waste types for use on the CESHWS form.

6.1.2 Provide preliminary project information to Environmental Engineering.

NOTE: Process knowledge provided to Environmental Engineering will expedite RCRA Determination/Radiological Characterization (RDRC).

6.1.3 Initiate a RCRA Project File for each construction project.

6.1.4 Set project priorities and issue priorities list and status information.

6.0 PROCEDURE (cont.)

PM&A

6.1.5 Coordinate with the applicable departments and conduct a Project Site Walkdown.

NOTE: The following groups should be represented: Facility Owner, PM/PE, Radiological Safety, Solid Waste Compliance, Environmental Characterization and Surveillance, CERCLA Program Group, and groups required due to the nature of the project.

6.1.6 Submit a request for Radiological Safety to survey the project site.

NOTE: The result of this survey, along with historical and process knowledge, shall be used in the preparation of a Waste Sampling Plan.

6.1.7 Document the walkdown, using process and historical knowledge, on a "Rubble Characterization Information Checklist", Form FMPC-EM-3306.

6.1.8 Complete an "Environmental Media Sampling Request", Form FMPC-EM-3307.

6.1.9 Obtain OU3 Compliance, the CERCLA Program Group, and Radiological Safety concurrence with the Waste Sampling Plan.

6.1.10 Submit the Waste Sampling Plan (per a sample request form) to EM.

6.1.11 Prepare and obtain approval of a "Construction Excavation/ Penetration Permit", Form FMPC-T-2711 for field sampling.

6.1.12 Forward the permit to EM.

EM

6.1.13 Using the sample request form, develop the Project Sampling Plan.

6.1.14 Take samples in accordance with the sampling plan.

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6.0 PROCEDURE (cont.)

EM

6.1.15 Submit samples to the analytical lab for analysis.

NOTE: Sampling and analysis shall be in accordance with EPA SW-846.

6.1.16 Notify Environmental Engineering that sampling is complete and samples were sent to the lab.

PM&A

6.1.17 Track and expedite lab analysis.

6.1.18 Update information to construction coordination for projects on the RCRA priority list.

SITE SERVICES

6.1.19 Perform analysis of samples in accordance with SW-846 (when applicable).

NOTE: Samples may be submitted to an offsite laboratory.

6.1.20 Forward analysis results to Environmental Engineering and EM.

PM&A

6.1.21 Review the analysis results from the lab and complete the RCRA Project File.

6.1.22 Transmit the RCRA Project File to OU3 Compliance and the analytical data to PM&A for drafting.

6.1.23 Using analysis results, draft an update of the FEMP Site Sampling Data Base.

EC&QA

6.1.24 Using process historical knowledge and/or sample analysis results, prepare and issue RCRA Determination/Radiological Characterization (RD/RC) letter.

PM&A

6.1.25 Using the analytical data, revise the CWID.

6.0 PROCEDURE (cont.)

6.1.26 Coordinate with Environmental Engineering and review the CWID form to identify and document the disposition location for each waste.

NOTE: A consideration of waste minimization possibilities shall be included.

6.1.27 Obtain required approvals of the completed CWID.

NOTE: The waste planning phase of a construction project is complete when the CWID is approved and issued.

6.1.28 Contact the Environmental Engineering to determine the type of waste containers for packaging contaminated and hazardous waste.

6.1.29 Develop a set of excavation and demolition drawings specify contamination levels for soil and equipment and listing construction wastes, weights, and volumes.

6.1.30 If excavation involves hazardous substances or the removal of greater than one cubic yard of soil, draft an RSE.

6.1.31 Transmit the RSE to the appropriate CERCLA Program Operable Unit (OU) Manager for review.

EM

6.1.32 Review the draft RSE to determine the need for CERCLA removal action.

6.1.33 Submit the RSE for approval.

6.1.34 Submit the RSE to DOE.

NOTE: DOE will determine if a specific CERCLA removal action is required.

PM&A

6.1.35 Complete a "Construction Environmental Safety and Health Work Survey", (CESHWS) Form FMPC-REST-2717.

6.0 PROCEDURE (cont.)

6.1.36 Post the CESHWS and supporting documentation in the work area.

6.1.37 Post a "Prohibited Materials List" on the waste containers.

6.2 Controlling and Disposing of Uncontaminated Construction Waste

NOTE: After construction starts, wastes shall be handled in accordance with the CESHWS posted in the work area. The CESHWS shall have the completed CWID and all supporting documentation required for waste identification and compliance attached.

NOTE: If changes are required, except for minor modifications in quantities, the CWID and CESHWS shall be revised and reissued with all approvals.

6.2.1 Uncontaminated Concrete and Soil

NOTE: Concrete and soil construction waste shall be surveyed by Radiological Safety to ensure that the material does not exceed limits specified in IN-6015.

PM&A

6.2.1.1 Contact Radiological Safety and request a radiation survey be conducted.

IRS&T

6.2.1.2 Survey the truck that is to be loaded to ensure that radiation contamination is below 1,000 disintegrations per minute (dpm) and 100 cm^2 beta/gamma.

6.2.1.3 Survey the concrete/soil waste to verify that the material to be loaded has no detectable contamination above the background count.

6.2.1.4 Complete a Radiological Survey Report.

6.2.1.5 After the truck is full, survey the material to ensure that no concrete or construction waste exceeding the contamination limit was loaded on the truck.

6.0 PROCEDURE (cont.)

6.2.1.6 Release loaded truck to the designated and marked location.

NOTE: Concrete or soil construction waste shall be unloaded in the designated controlled area within one hour. No loads, full or partial, shall sit overnight.

6.2.1.7 Deliver a copy of the Radiological Survey Report(s) to PM&A.

NOTE: A survey report is required for each load.

6.2.2 Uncontaminated Waste Other Than Concrete or Soil

PM&A

6.2.2.1 Contact Radiological Safety and request a survey be conducted.

IRS&T

6.2.2.2 Survey the construction project area to identify contaminated spots.

6.2.2.3 Notify the PM/PE of survey results.

PM&A

6.2.2.4 Coordinate with the subcontractor to remove and package contaminated waste that may be present in accordance with the CWID or CESHWS.

IRS&T

6.2.2.5 Survey the construction site and establish a staging area to prevent contamination of materials.

PM&A

6.2.2.6 Contact Site Services and arrange for delivery of a lockable dumpster.

6.2.2.7 Locate the lockable dumpster in the staging area specified by Radiological Safety.

6.0 PROCEDURE (cont.)

6.2.2.8 As waste is generated, ensure that material is moved to the staging area and placed outside the dumpster until the waste is monitored by Radiological Safety.

NOTE: Waste shall not remain outside the dumpster overnight.

IRS&T

6.2.2.9 Survey collected waste to ensure that no contaminated waste enters the dumpster.

PM&A

6.2.2.10 Have the subcontractor place the verified clean waste in the dumpster.

NOTE: The dumpster shall be picked up after project completion or when the dumpster is full.

6.3 Controlling and Disposing of Contaminated Construction Waste

NOTE: Loose or removable contamination shall be removed (as practicable) prior to demolition or removal of contaminated or hazardous construction waste.

NOTE: Contaminated waste removal shall be coordinated with Waste Operations High Level Cleaners and Site Maintenance.

NOTE: Excavation/demolition activities involving contaminated materials shall be accomplished in accordance with the Site Specific Safety and Health Plan (SSHP). The SSHP addresses abatement processes required to protect human health and the environment.

PM&A

6.3.1 Contact Inventory Control and obtain containers specified on the CWID.

6.3.2 Contact Sitewide Quality and request that waste containers be inspected during preparation and loading.

NOTE: Sitewide Quality shall be notified at least one hour in advance.

6.0 PROCEDURE (cont.)

EC&QA

6.3.3 Ensure that the container is loaded and secured in accordance with applicable SOPs.

6.3.4 Coordinate with the subcontractor to segregate and package construction waste (Refer to CWID OR CESHWS).

NOTE: Packaging shall be in accordance with the SSHP.

NOTE: Material too large for the designated container shall be reduced in size by the subcontractor.

NOTE: Material designated for future use shall be handled as specified on the CWID.

NOTE: Containers shall be weighed at the job site to ensure weight requirements are met.

6.3.5 Install a non-tamperable seal on the container.

EM

6.3.6 Take certification samples for analysis (if required) to verify that buildover limits have been met.

PM&A

6.3.7 When the container is secure, sign the W-65 card as "generator".

6.3.8 Coordinate with MC&A to transport waste to the disposition location.

SITE SERVICES

6.3.9 Transport waste containers from the job site to the scale to be used for weighing.

6.3.10 Weigh the material in accordance with the applicable SOP.

6.3.11 Record the weight on the W-65 card.

6.3.12 Transport the containers to designated storage location.

6.0 PROCEDURE (cont.)

6.3.13 Contact MC&A and EC&QA when a box has been emptied.

PM&A

6.3.14 Prepare a final CWID when construction is complete.

7.0 APPLICABLE DOCUMENTS

7.1 Drivers

7.1.1 Title 40 CFR, Parts 260, 261, and 300

7.1.2 IN-6032, Control of Construction/Maintenance Waste

7.2 References

7.2.1 Toxic Substance Control Act of 1975

7.2.2 Resource Conservation and Recovery Act

7.2.3 SW-846, "Test Methods for Evaluating Toxic Waste"

8.0 APPLICABLE FIGURES

8.1 "Construction Waste Flow Diagram"

9.0 APPLICABLE FORMS

9.1 FMPC-CONT-563, "Property Disposal Request"

9.2 FMPC-PM&A-2716, "Construction Waste Identification and Disposition"

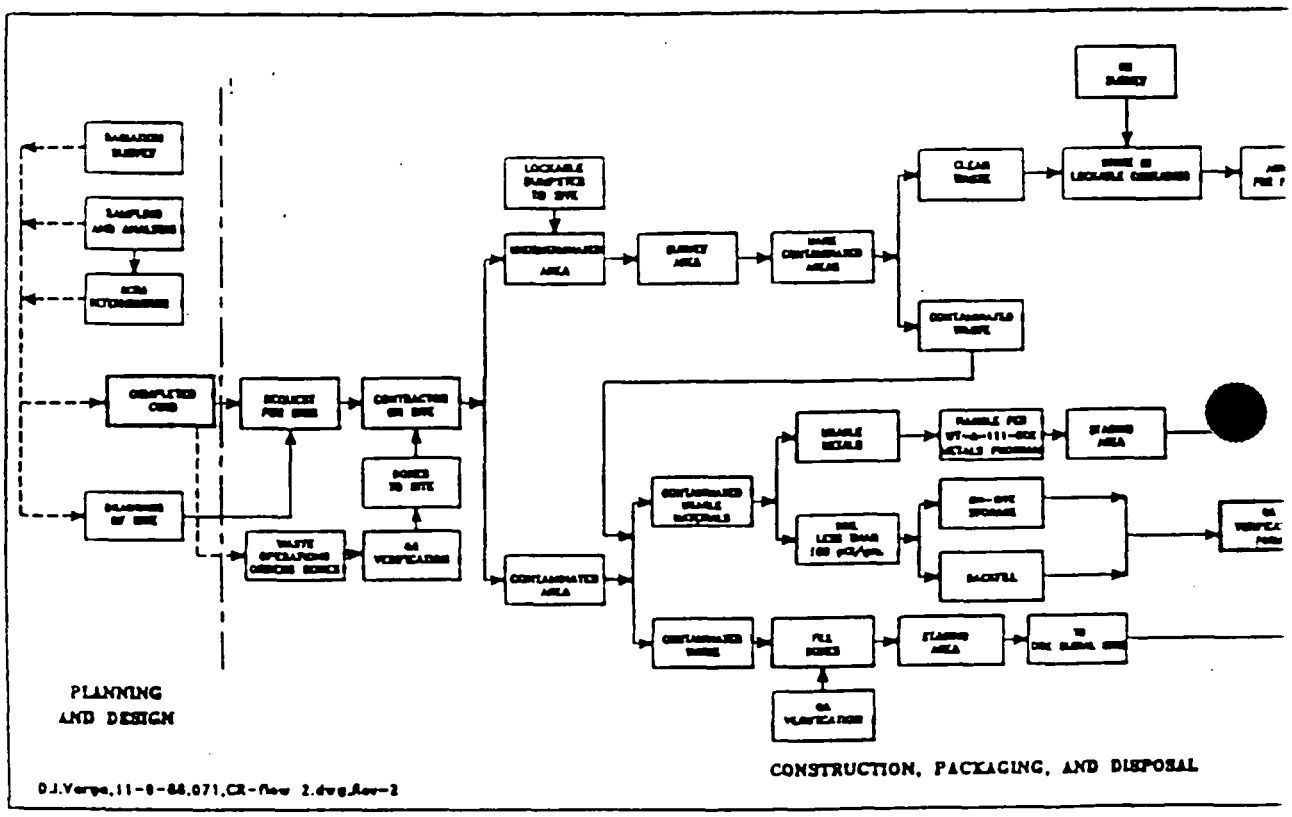
9.3 FMPC-EM-3306, "Rubble Characterization Information Checklist"

9.4 FMPC-EM-3307, "Environmental Media Sampling Request"

9.5 FMPC-T-2711, "Construction Excavation/Penetration Permit"

9.6 FMPC-Q-2717, "Construction Environmental Safety and Health Work Survey"

9.7 FMPC-CONT-1945-XX, "Item Production/Certification/Identification"



CONSTRUCTION, PACKAGING, AND DISPOSAL DIAGRAM
Figure 1

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RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
11-27-91	INTERIM	Procedure for controlling and minimizing waste produced by construction and/or maintenance projects required per Request No. P91-688, initiated by S. Lund.