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PLANT 1 ORE SILOS REMOVAL ACTION NUMBER 13 WORK PLAN MARCH 1992 REVISION NO. 1

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Plant 1 Ore Silos Removal Action Number 13 Work Plan

Fernald Environmental Management Project
Fernald, Ohio

March 1992
Revision No. 1

U. S. Department of Energy

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PLANT 1 ORE SILOS
OF OPERABLE UNIT NUMBER 3
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WORK PLAN

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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
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
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PPE	Personal Protective Equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QAPjP	Draft Sitewide Quality Assurance Project 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
RTV	Room Temperature Vulcanizing
SE	Southeast
SMS	Site Media Sampling

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LIST OF ACRONYMS (Continued)

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])

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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.

The information in the appendices is included for informational purposes only and is not subject to approval.

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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 Project 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.

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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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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.

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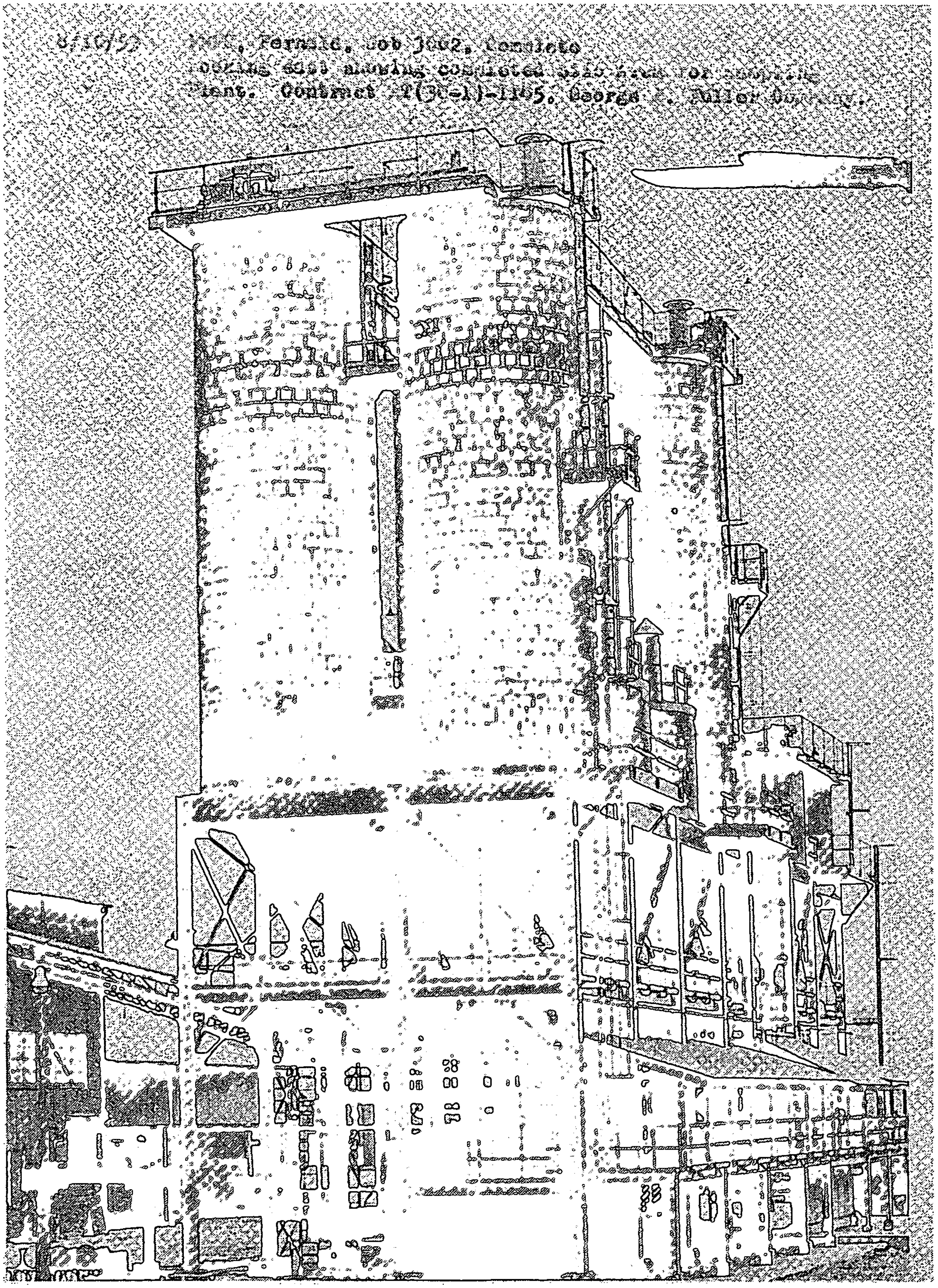

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Figure 3-1 - Overview of Plant 1 Silos Looking East

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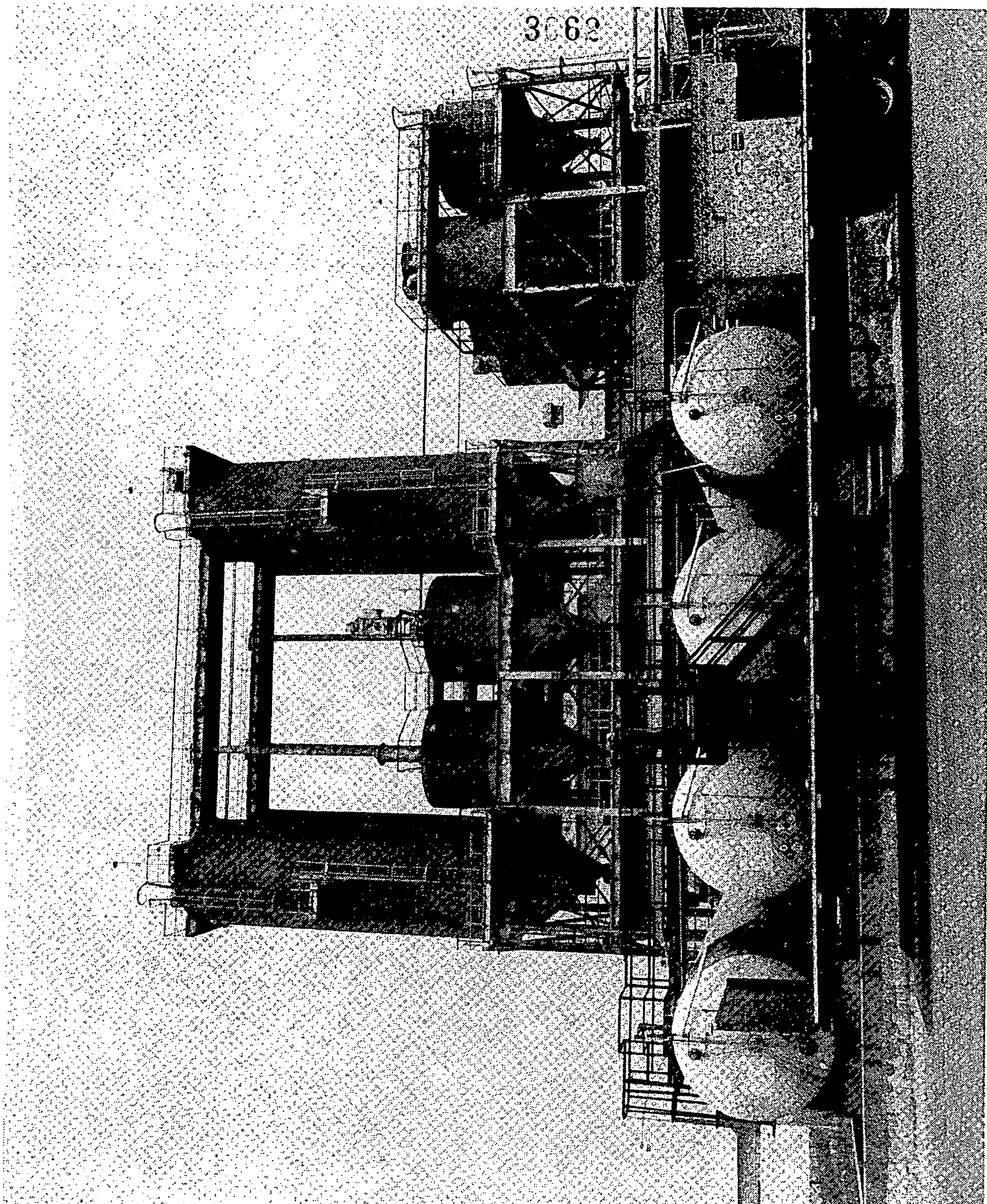

Figure 3-2 - Overview of Plant 1 Silos Looking North 14

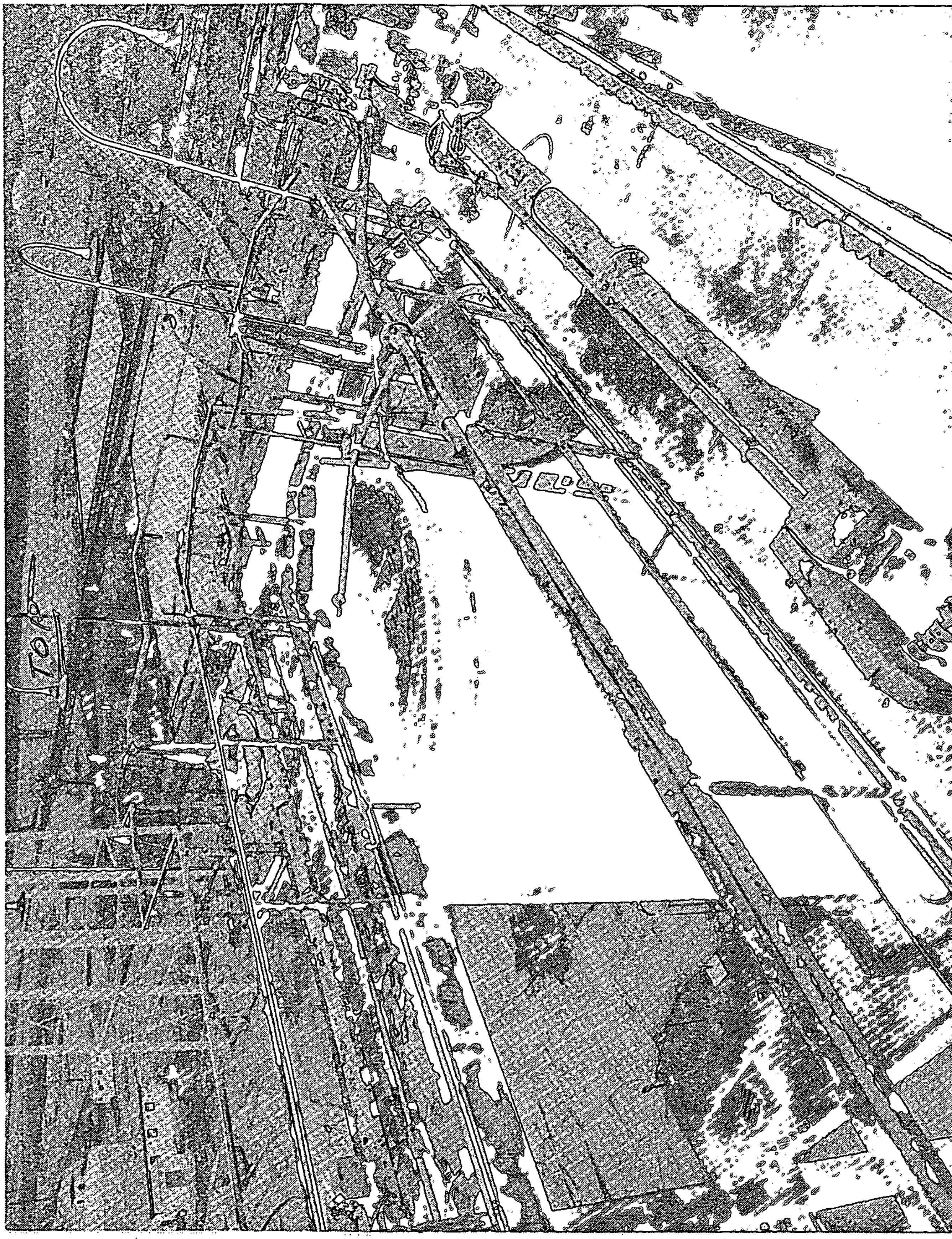

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Figure 3-3 - Aerial View at Top of Tile Silos

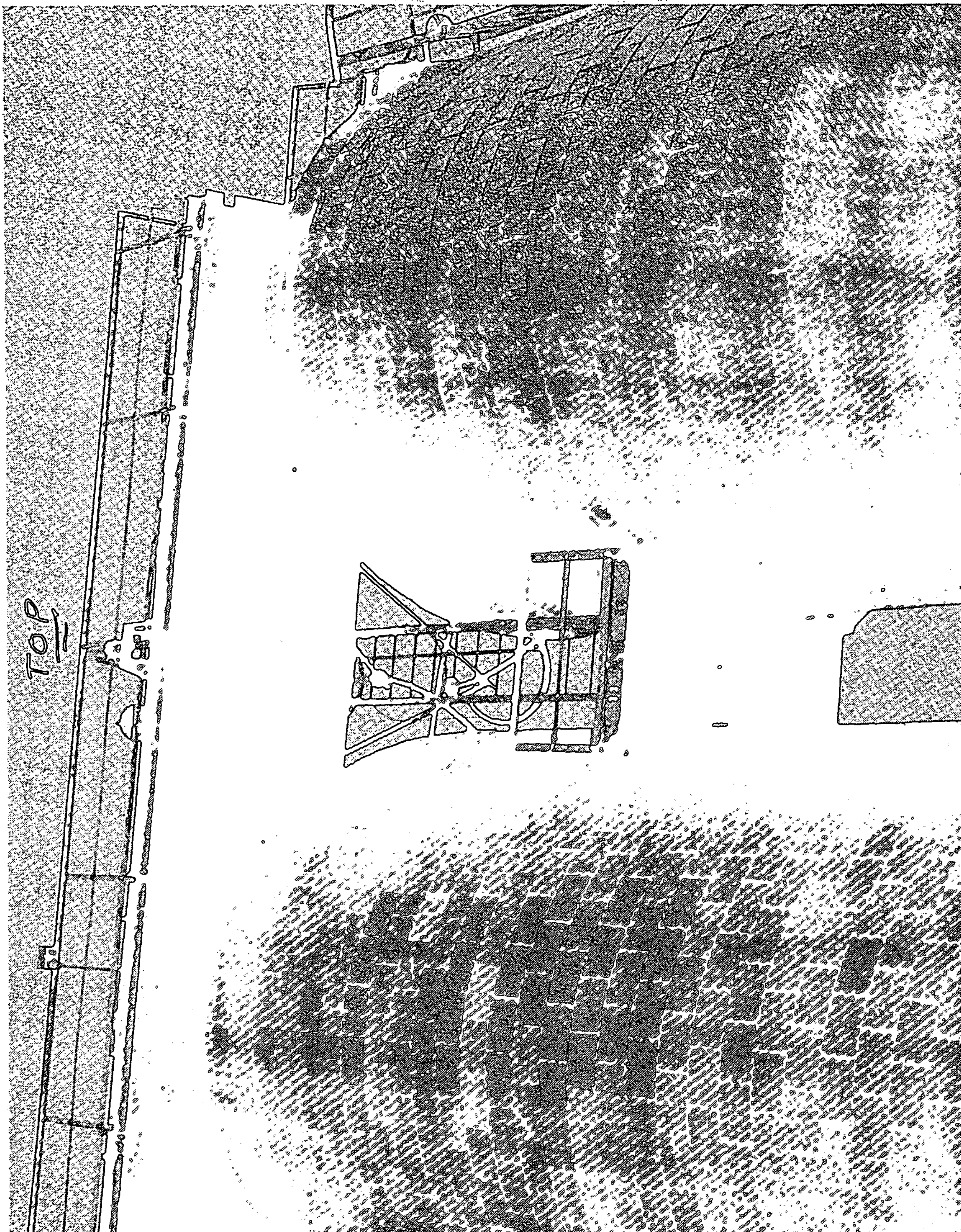

Figure 3-4 - View Showing the Two Westerly Tile Silos

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

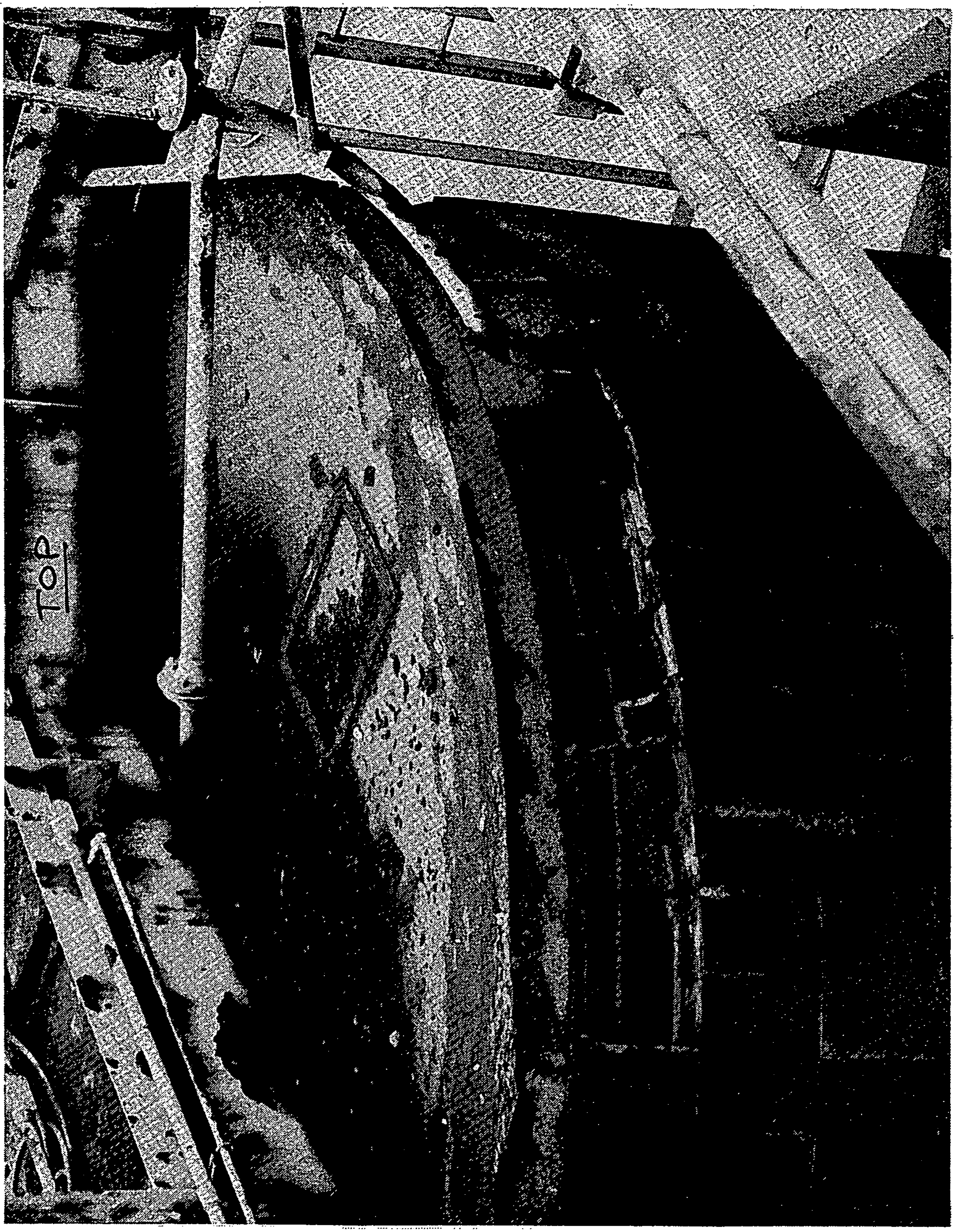

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Figure 3-6 - View of the Top of One of the Tile Silos

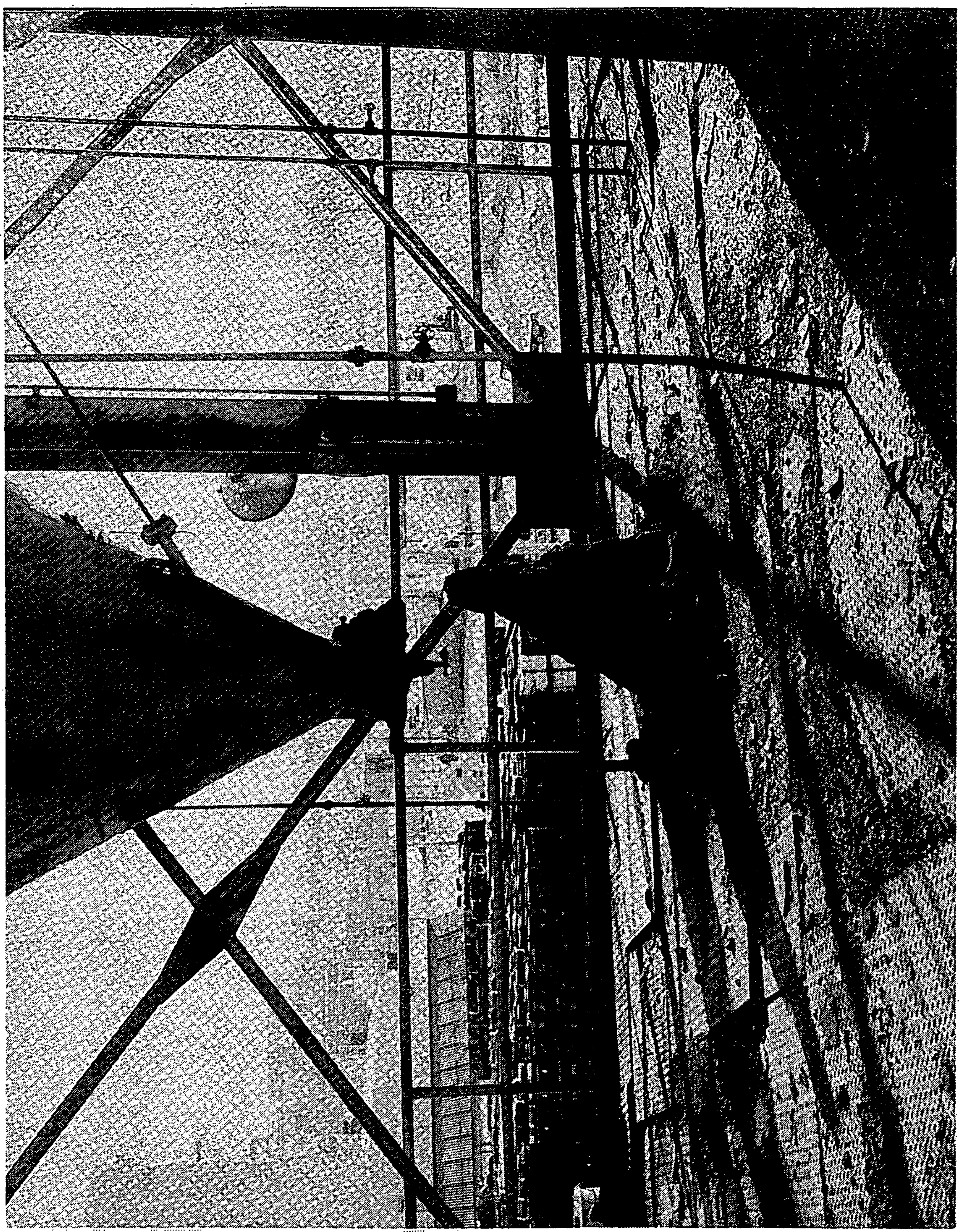

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Figure 3-7 - View Under One of the Tile Silos Showing Accumulated Debris on the Steel Deck

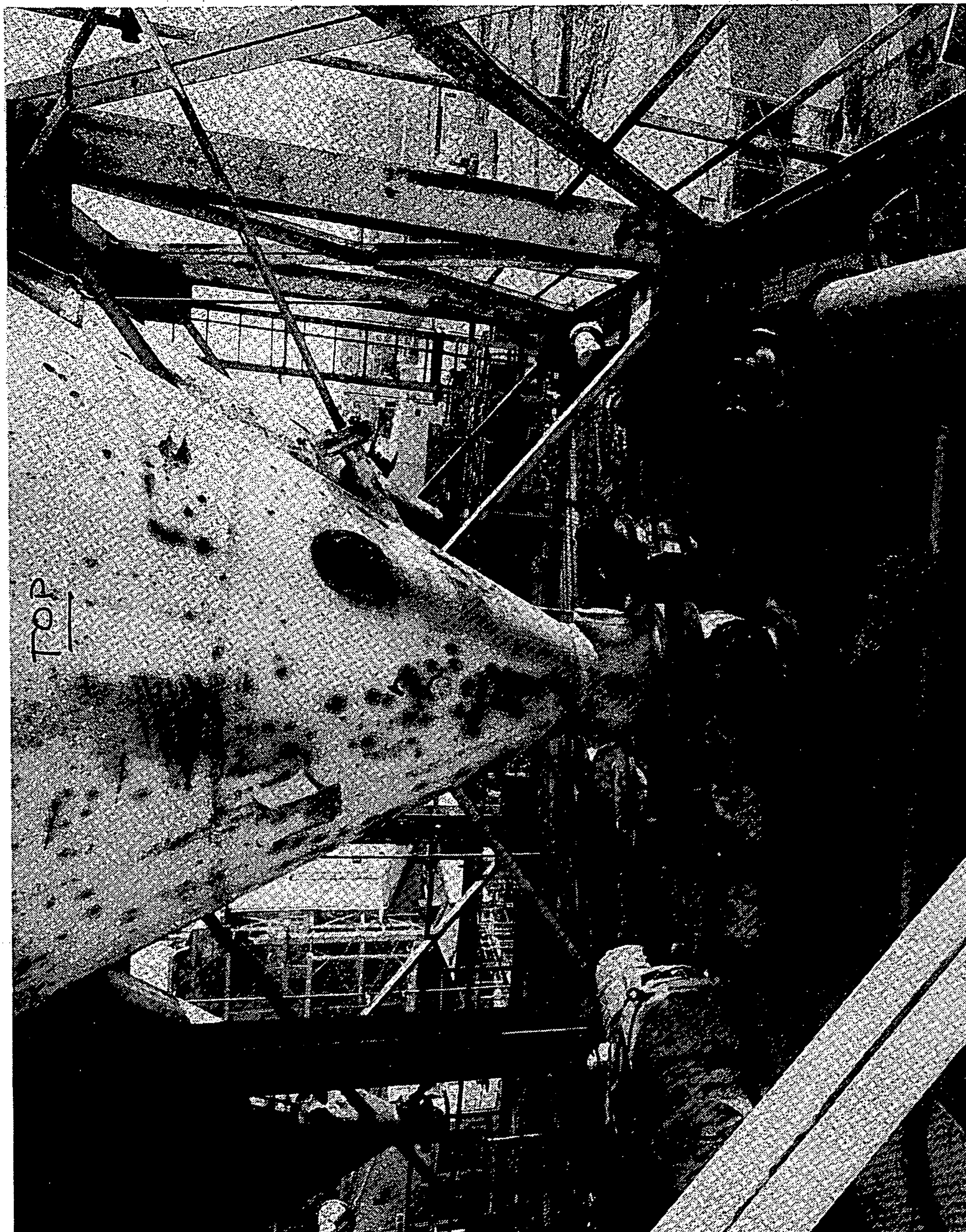

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Figure 3-8 - Another View Under One of the Tile Silos at the Tile Silo Cone Level

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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 from inside the tile silos.

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.

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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.

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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, activities associated with the characterization of the materials, 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.

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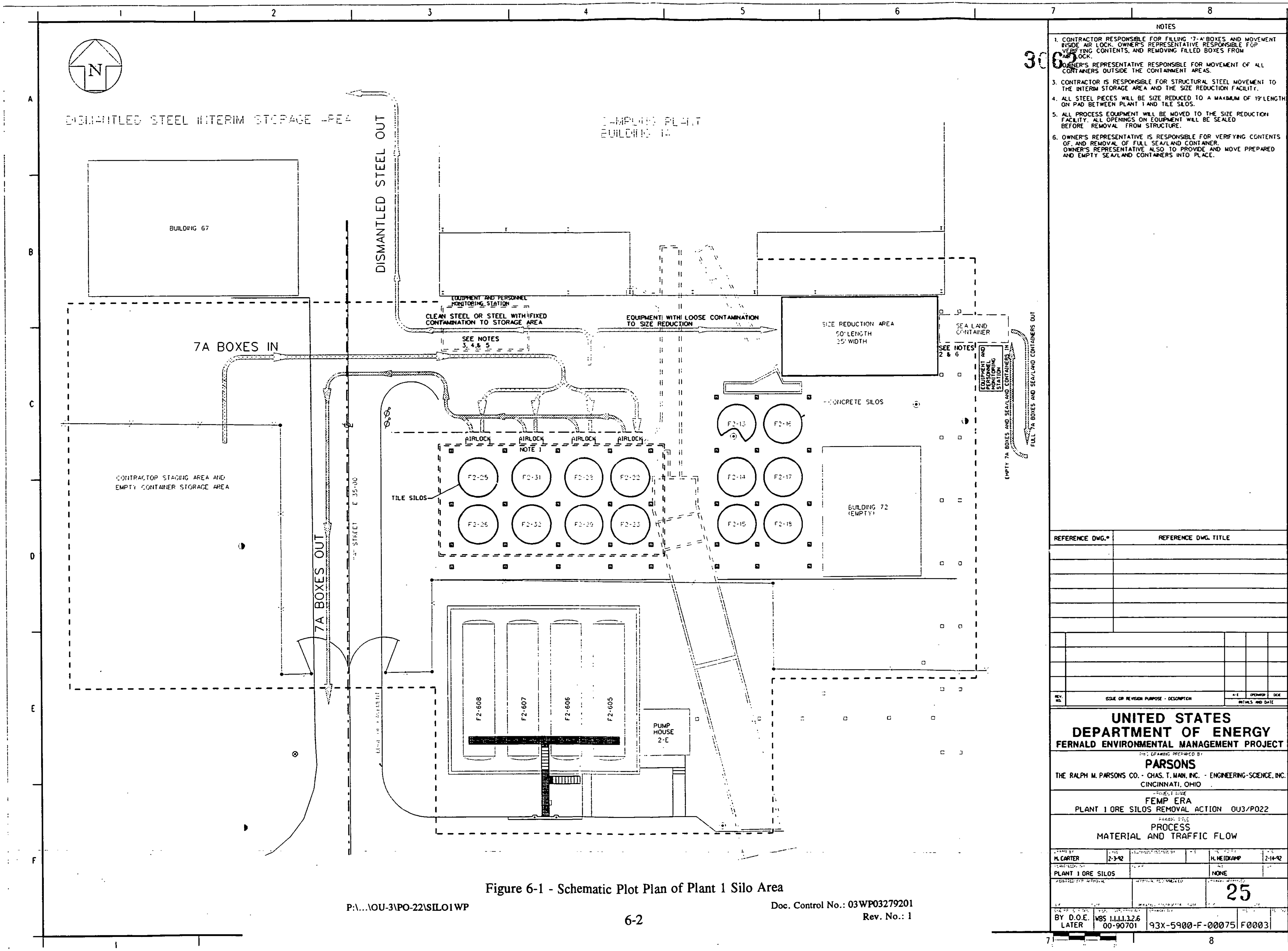

Figure 6-1 - Schematic Plot Plan of Plant 1 Silo Area

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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.

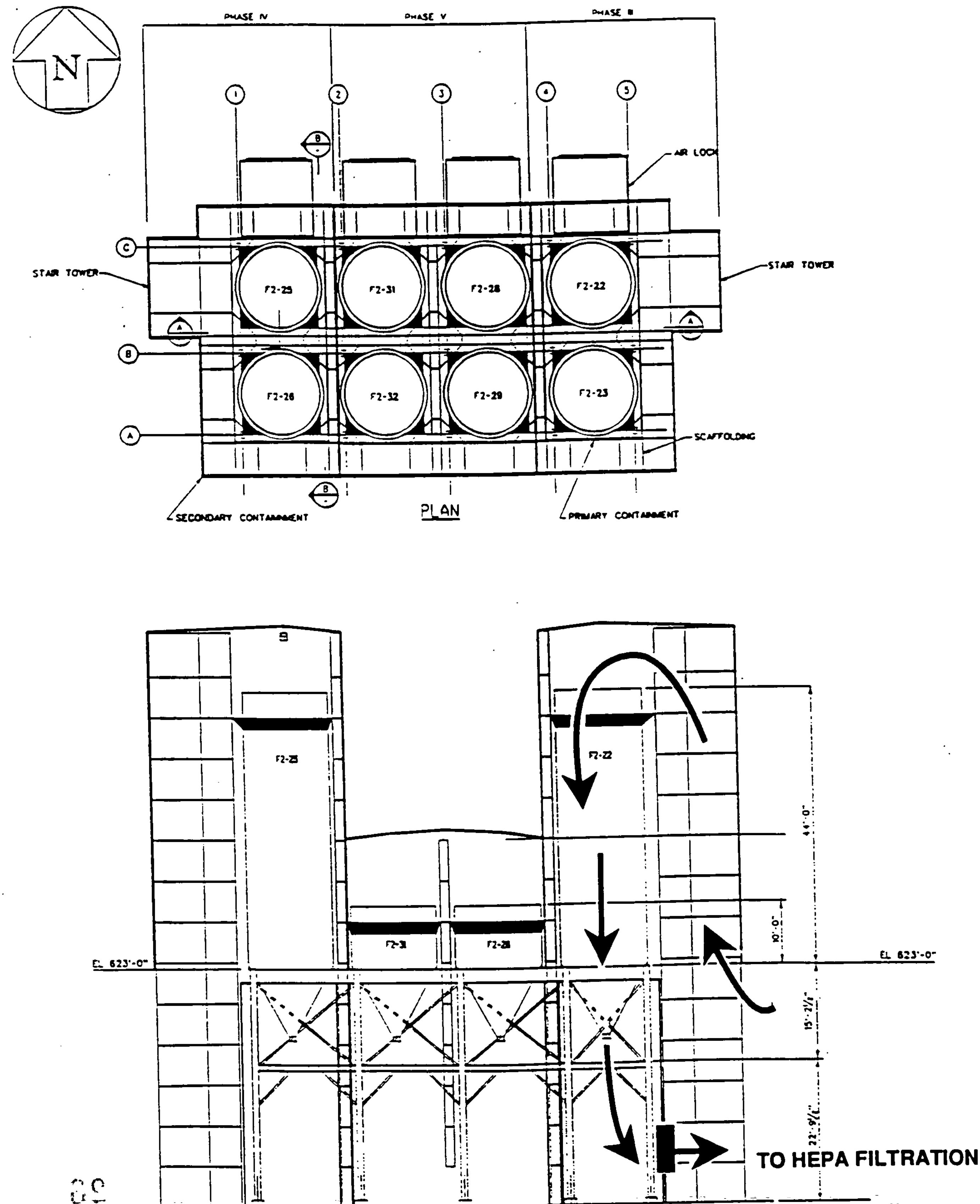

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Figure 6-2 - Schematic Drawing of Silo Containment Air Flow

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 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.

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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 as shown on contract drawings.

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.

29

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. Scaffolding shall be reassembled around the tile silo structure using additional scaffolding.

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

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.

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

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

33B) Install bracing as shown on contract drawings.

34A) Remove decking under appropriate tile silo to allow bottom cone to be lowered to grade level.

34B) 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 steel 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.

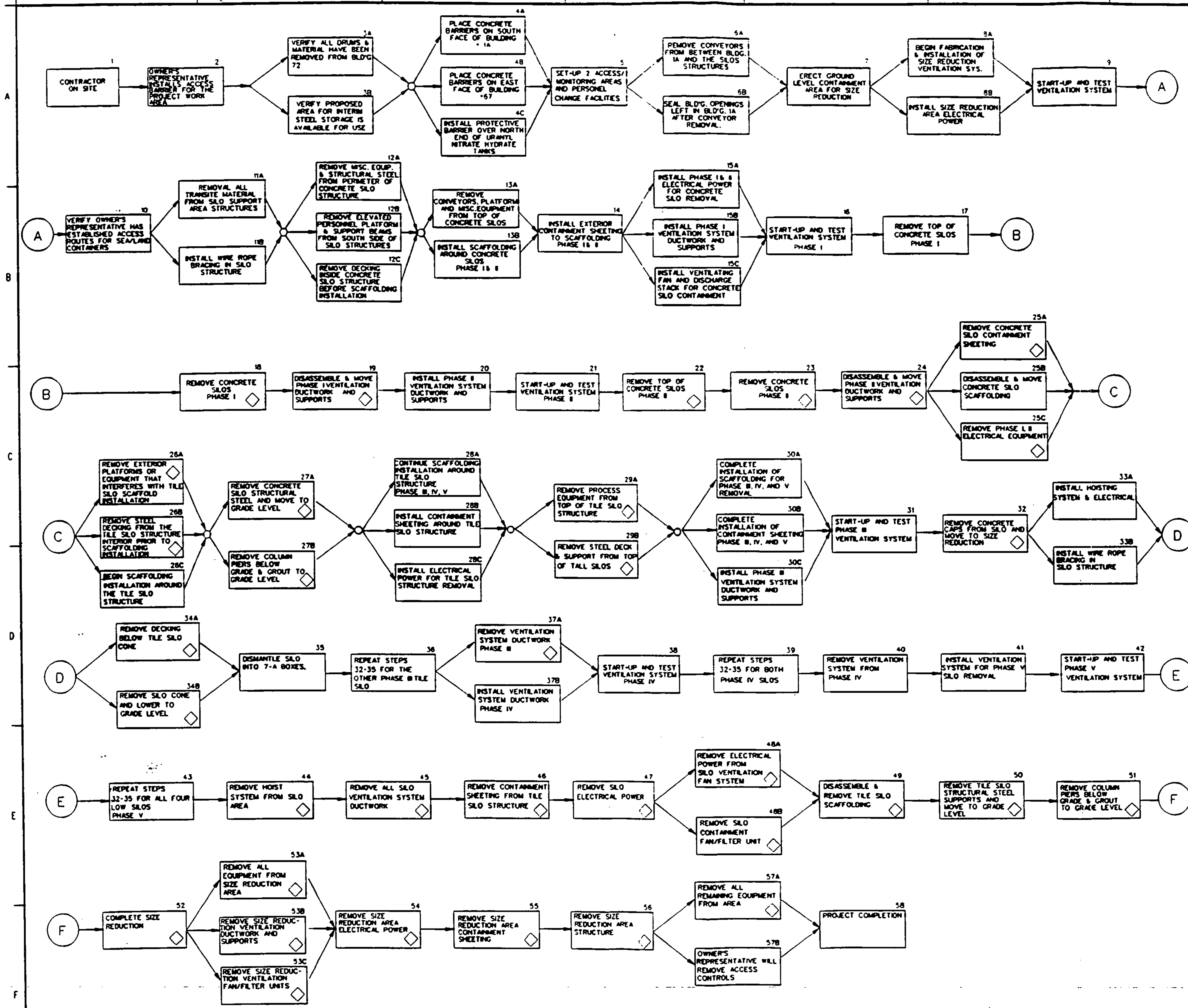
55) Remove the Size-Reduction area containment fabric. Monitor the fabric prior to disposition.

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.



NOTES

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/P022
PROCESS FLOW DIAGRAM SEQUENCE OF REMOVAL 32
H. CARTER 2/3/92 H. HEIDKAMP 2-14-92
PLANT 1 ORE SILOS NONE
BY D.O.E. LATER WBS 1.1.1.1.3.2.6 00-90701 93X-5900-F-00073 F0001

Figure 6-3 - Sequence of Removal

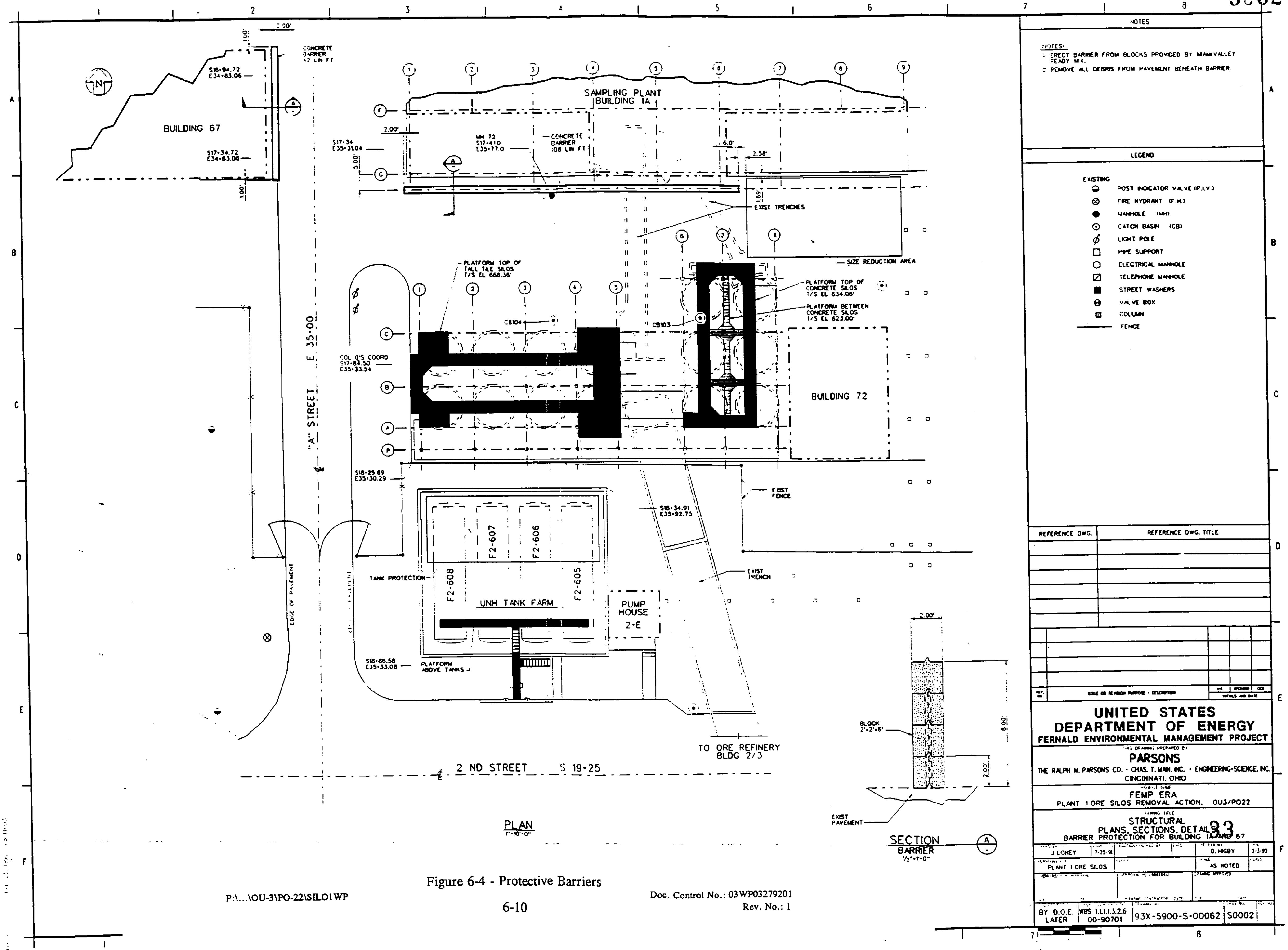


Figure 6-4 - Protective Barriers

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.
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 Material Disposition Plan

All materials will be removed from the silo area, size reduced, and placed in final disposition per the following plan. This Material Disposition plan is also shown in the form of a decision tree in Figure 6-5.

1) Process equipment (i.e., conveyors, hoppers, dust collectors including used HEPA filters) will be moved to the Size-Reduction building for disposition in sea/land containers.

2) Concrete pieces from the silos will be moved to the Size Reduction Area for size reduction and disposition in sea/land containers or 7A boxes.

3) Transite material will be removed with no size reduction and packaged in prepared boxes per FEMP site procedure IHS-IH-03.

4) Lubricating oils from conveyor gear boxes will be drained into 55-gallon drums inside the Size-Reduction area per Site Procedure FEMP-2089. Local spill containment measures will be taken during the draining operation.

5) Structural steel items will be moved to the pad area directly north of the tile silos where they will be monitored. All steel decking and pieces less than 1/4-inch thick will be packaged for shipment in sea/land containers. Prior to monitoring, loose surface contamination will be removed with portable HEPA equipped vacuum. All other steel will be moved to a storage area north of Building 67 for future decontamination and disposition.

6) Contractor's material and equipment will be radiologically monitored either before removal or at grade level to determine if any items can be released. If not, the items will be size reduced and packaged in sea/land containers.

7) All containment sheeting will be radiologically monitored at the conclusion of the project. If contaminated, it will be packaged in sea/land containers.

8) All scaffolding will be "wiped down" and radiologically monitored at the conclusion of the project. If contaminated, it will be packaged in sea/land containers. Low level contaminated steel will be stored on Plant 1 Pad and final disposition will be handled under Removal Action 17 of the Amended Consent Agreement, September 1991. Low level containerized waste will be shipped to Nevada Test Site (NTS) pending analysis results from pre-dismantling sampling. Potential storage locations for Resource Conservation and Recovery Act (RCRA) waste (if any exists) are Buildings 64, 68, 79, 80, 81, and the KC2 warehouse.

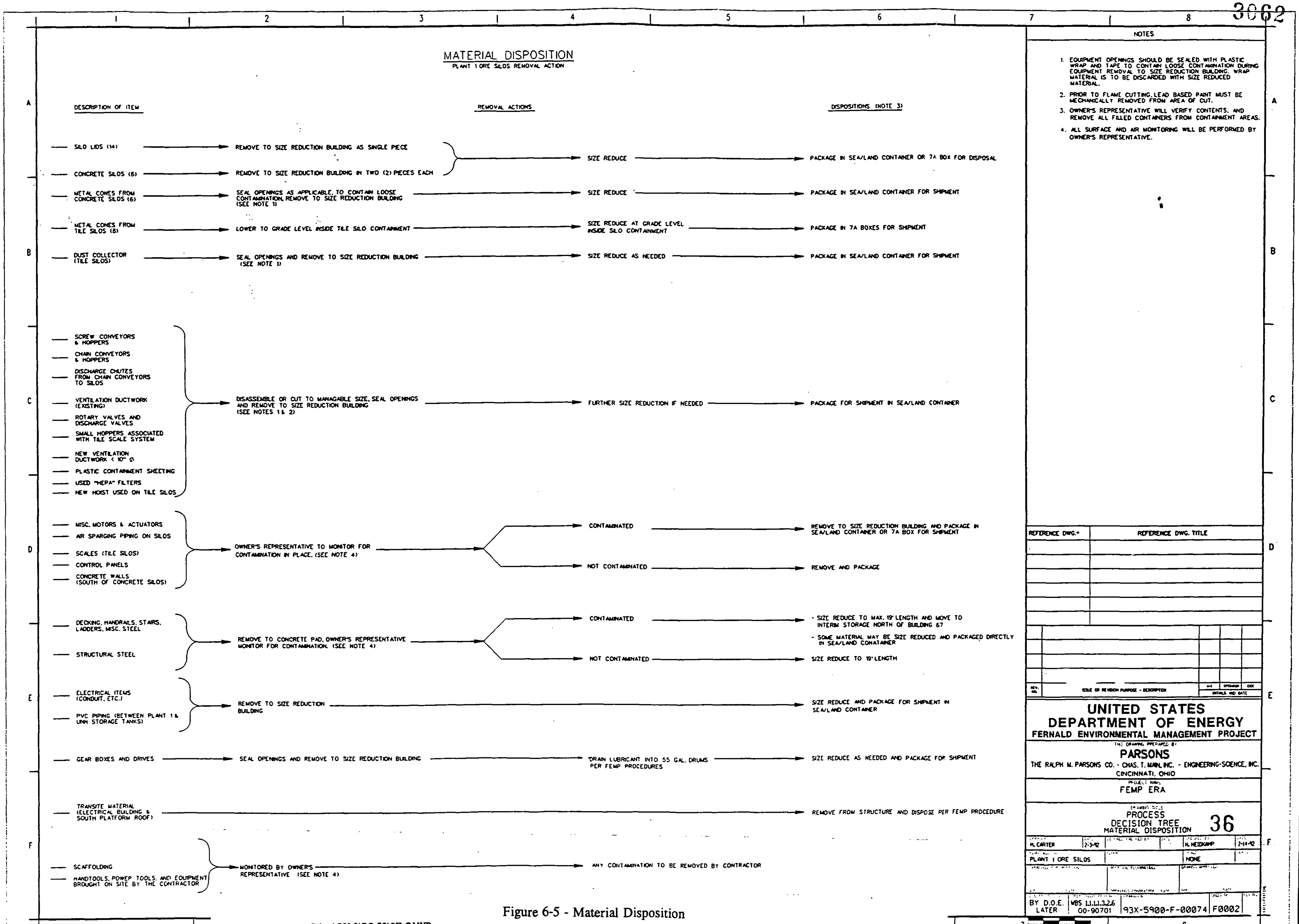


Figure 6-5 - Material Disposition

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 6-2. 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 6-2 - 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.

Table 6-2 - Plant 1 Silos Removal Action ARARs and TBCs (Continued)

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
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 6-3 and indicates that the predicted exposure is many orders of magnitude below the 10 mrem/yr standard.
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 39	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.

Table 6-2 - Plant 1 Silos Removal Action ARARs and TBCs (Continued)

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
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.
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.

Table 6-2 - Plant 1 Silos Removal Action ARARs and TBCs (Continued)

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
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.
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.

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Table 6-2 - Plant 1 Silos Removal Action ARARs and TBCs (Continued)

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
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.
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, treat[illegible] under the requirements of the NPD[illegible] 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.

Table 6-2 - Plant 1 Silos Removal Action ARARs and TBCs (Continued)

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
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.
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.

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Table 6-2 - Plant 1 Silos Removal Action ARARs and TBCs (Continued)

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
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 6-3 - 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.

FMPC ENVIRONMENTAL RESIDENTIAL CENSUS, 1989

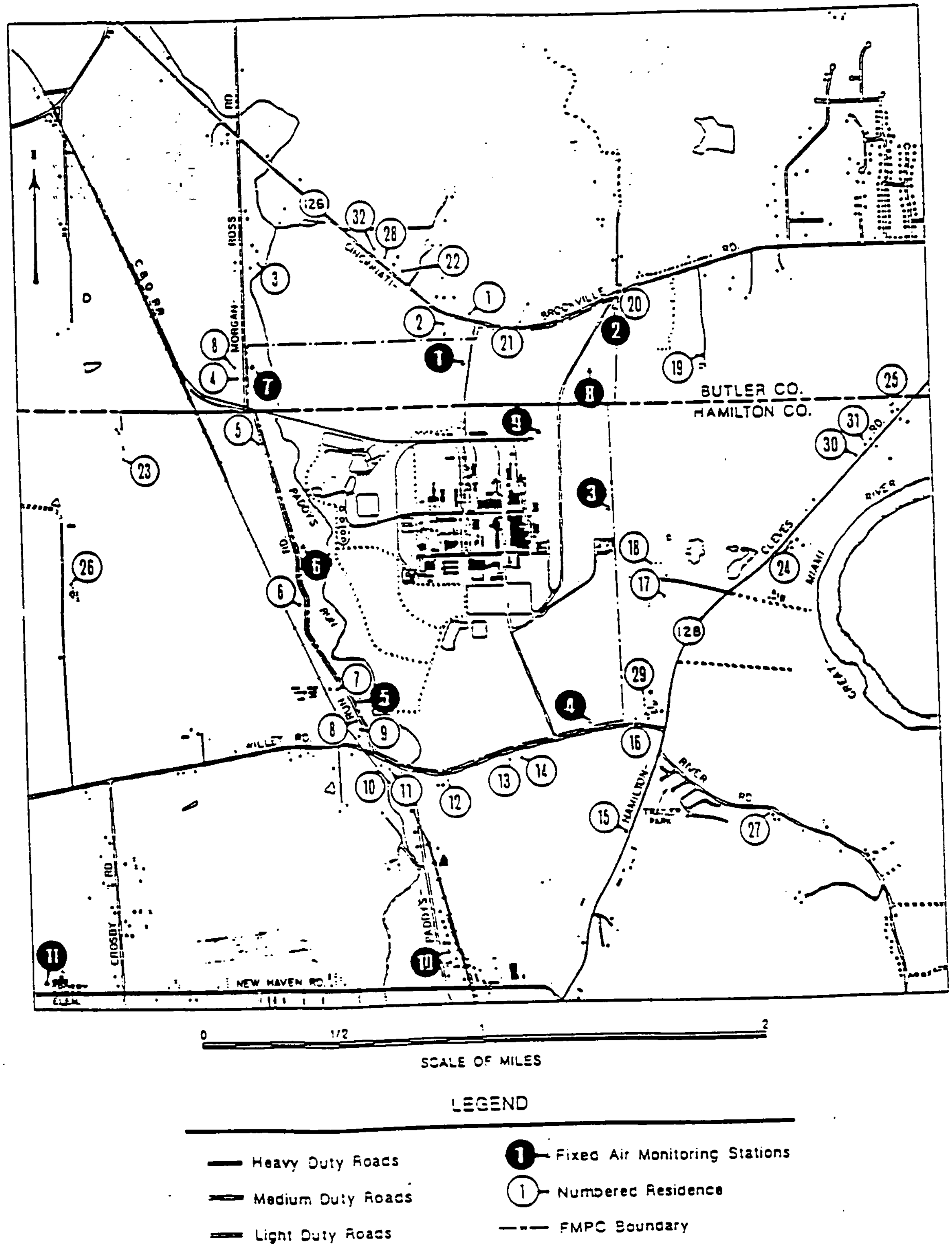

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Figure 6-6 - FMPC Environmental Residential Census, 1989

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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

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.

8

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 results of the analyses are presented in the Removal Site Evaluation (RSE), Appendix A. 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 the concentrations of radionuclides and Hazardous Substance List (HSL) constituents in the materials to be disposed of as part of the Plant 1 Ore Silos Removal Action.

3) Gain additional analytical information to perform a hazardous waste determination on the materials to be disposed of as part of the Plant 1 Ore Silos Removal Action.

8.2 Pre-Dismantling Sampling

Pre-construction sampling will be conducted to determine the presence of radiological, HSL, or hazardous waste constituents in the materials to be dispositioned as part of this removal action. The sampling locations have been selected within the Plant 1 Ore Silos Complex. This sampling will be performed in an established control zone, established by FEMP Radiological Safety (IRS&T Procedure SP-P-35-025).

During this sampling effort WEMCO Site Media Sampling (SMS) will extract representative samples of residual material internally encased in Process Feed and Withdrawal Flow Lines, Conveyor Systems, Valves, Pumps, Motors, Drumming Stations, and other miscellaneous systems. Approximately 36 access ports will need to be opened (unbolted or unflanged) to obtain enough hold-up material for four composite samples. The photographs following (Figures 8-1 through 8-6) show planned locations for this sampling. If the planned access cannot be achieved, an alternate sampling point will be chosen based on locating a similar material.

Three composite samples will be collected from the residual material in the silo cones and analyzed for full HSL and TCLP metals. The samples will have to be composited due to the limited amount of material remaining in each of the silos (see RSE, Appendix A for quantities). Based on existing data (see RSE, Appendix A), material from Silos 2, 5, and 7 will make up sample 1; material from Silos 3, 10, and 11 will make up sample 2; and material from Silos 4, 6, 12, 13, and 14 will make up sample 3. The compositing is based on similar lead concentrations. At the time of the actual removal of the material in the cones, the same grouping will be used when containerizing material.

SMS will also obtain three cores from the tile silos (tile material) and three cores from the concrete silos (concrete material), these sample locations will be determined based on accessibility, three separate samples must be obtained.

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. Personnel decontamination, if necessary, will be conducted inside the established control zone.

The seven composite samples will be analyzed for full radiological, full HSL and TCLP metals. Samples will be recoverable for possible future analysis based on the first round of analyses. The tile and concrete samples (cores) will be analyzed for RCRA constituents by the TCLP method to support the waste characterization phase.

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.

FEMP Operations Maintenance will operate the lift to allow access to the tops of the silos for sampling purposes, and they will be responsible for the removal and replacement of all nuts and bolts in areas where inspection or cover plates will be removed for access, or at process line flange connections where a visual inspection and possible sampling will occur.

FEMP Quality Control/Quality Assurance will periodically monitor and conduct surveillances at the project site to verify that all measures are implemented to ensure the quality of all samples collected. QC/QA will ensure that all samples are collected and analyzed in accordance with the Remedial Investigation/Feasibility Study (RI/FS) Quality Assurance Project Plan (QAPP). The U.S. EPA is in the process of reviewing a draft Sitewide Quality Assurance Project Plan (QAPjP) covering all sitewide sampling and analysis activities. Upon approval, this document will become the Sitewide QAPP. Remaining sampling and analysis activities will be conducted consistent with the Sitewide QAPP. The Sitewide QAPP outlines sampling procedures, analytical methods, sampling objectives, and sample handling and preservation.

8.3 Dismantling-Related Sampling and Monitoring

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 material/rubble samples will need to be taken during the dismantling/removal phase. If additional material is discovered, it will be sampled and analyzed for full radiological, full HSL and TCLP metals. New waste streams generated as a result of the construction activities will also be sampled to determine their final disposition.

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. Due to the institutional controls in-place throughout the duration of the removal action, sampling and monitoring are limited to air and surface water runoff. Other than the routine Environmental Monitoring Program, soil and groundwater samples will not be taken as part of this removal action.

To ensure that there are no fugitive air emissions, real-time constant air monitors (CAMs) and retrospective (for decay count) air samplers, as appropriate, will be placed in all occupied areas within the silo dismantling area and on the perimeter of the exclusion zone, to measure long-lived and short-lived airborne radioactivity concentrations. 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.

During demolition, surface water samples will be collected at the entrance to the storm sewer system (CB 102,103,104) during significant storm events to ensure that the removal action does not significantly elevate contaminants in stormwater. All samples of the stormwater run-off will be analyzed for total uranium and total thorium. Based on process knowledge and historical data, uranium and thorium are the only two constituents detectable due to dilution from precipitation.

Materials that are intended to be released from the control zone for unrestricted use, are to be surveyed for removable and total (fixed plus removable) radioactive contamination in accordance with SP-P-35-010, "Unrestricted Release of Materials from FMPC."

8.3.1 Support Activities

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.

FEMP Quality Control/Quality Assurance will periodically monitor and conduct surveillances at the project site to verify that all measures are implemented to ensure the quality of all samples collected. QC/QA will ensure that all samples are collected and analyzed in accordance with the Remedial Investigation/Feasibility Study (RI/FS) Quality Assurance Project Plan (QAPP). The U.S. EPA is in the process of reviewing a draft Sitewide Quality Assurance Project Plan (QAPjP) covering all sitewide sampling and analysis activities. Upon approval, this document will become the Sitewide QAPP. Remaining sampling and analysis activities will be conducted consistent with the Sitewide QAPP. The Sitewide QAPP outlines sampling procedures, analytical methods, sampling objectives, and sample handling and preservation.

8.4 Post-Dismantling Environmental Monitoring

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

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 between 50 and 100 feet away from the Silos on the west, south, and east sides. The monitoring locations are screened between 15 and 20 feet below ground surface (BGS). The results from these monitoring wells for pre and post dismantling will be compared when data becomes available to assess any environmental impacts resulting from the Plant 1 Ore Silos Removal Action. 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.

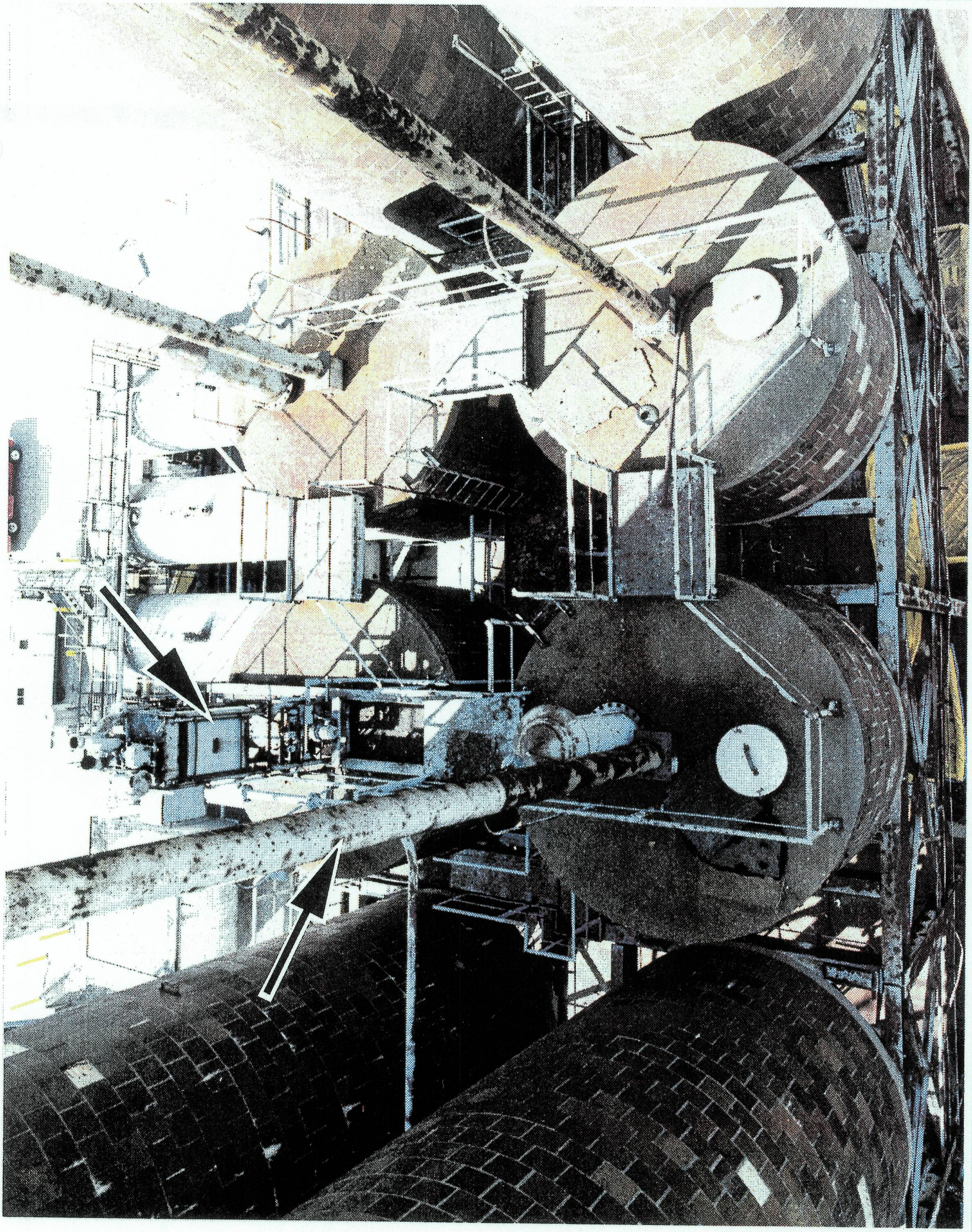

Figure 8-1 - Sampling Point 1

Figure 8-2 - Sampling Point 2

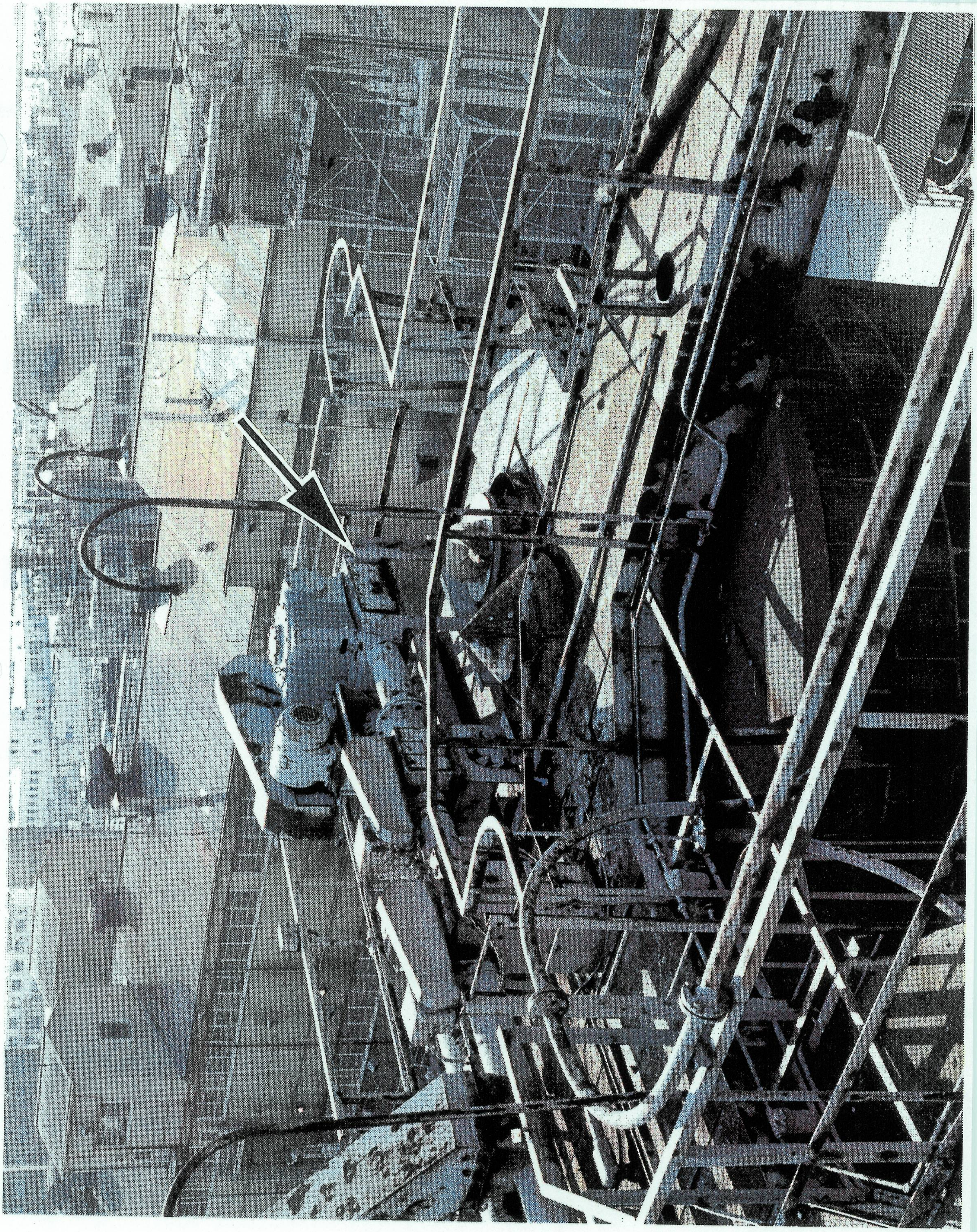

Figure 8-3 - Sampling Point 3

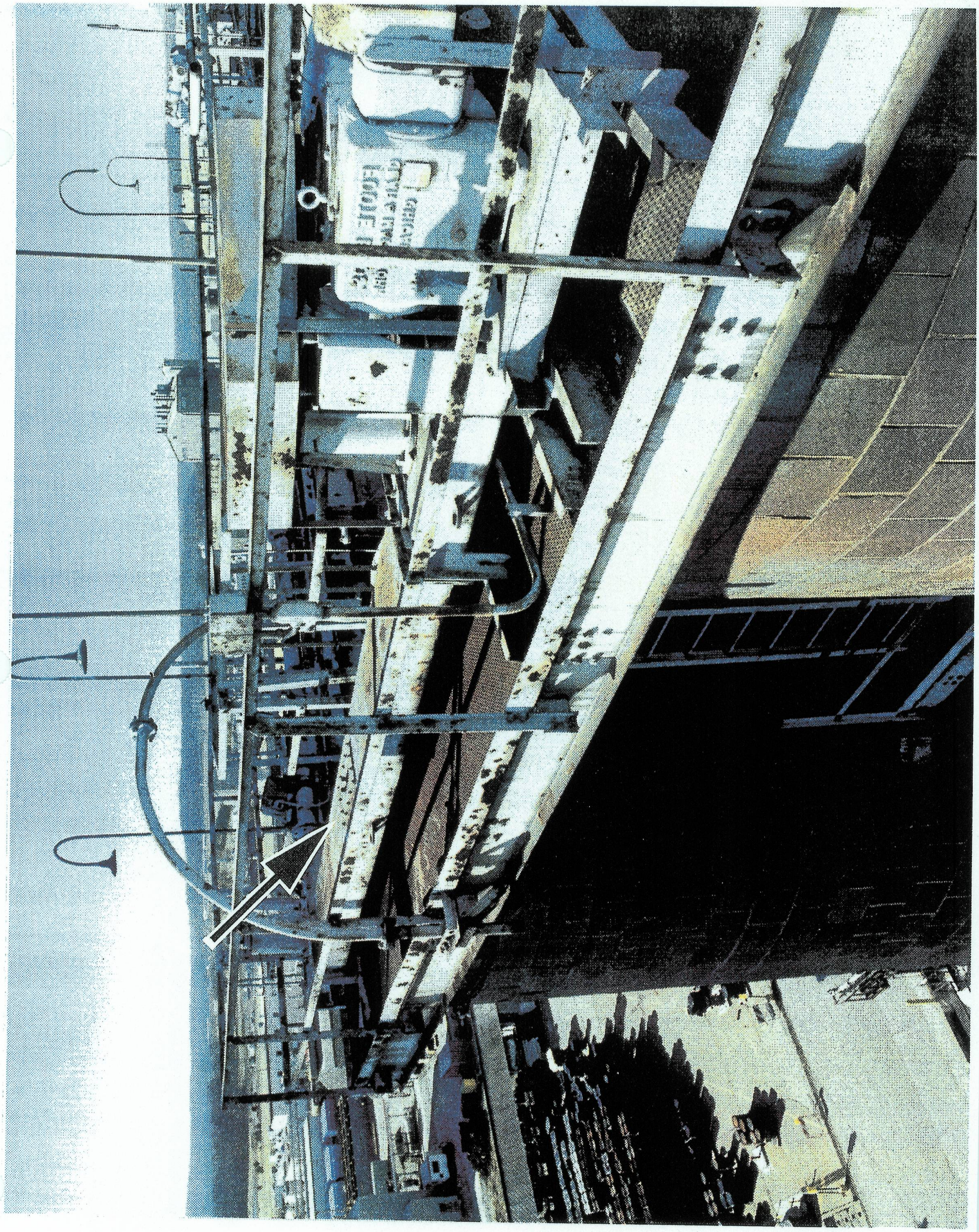

Figure 8-4 - Sampling Point 4

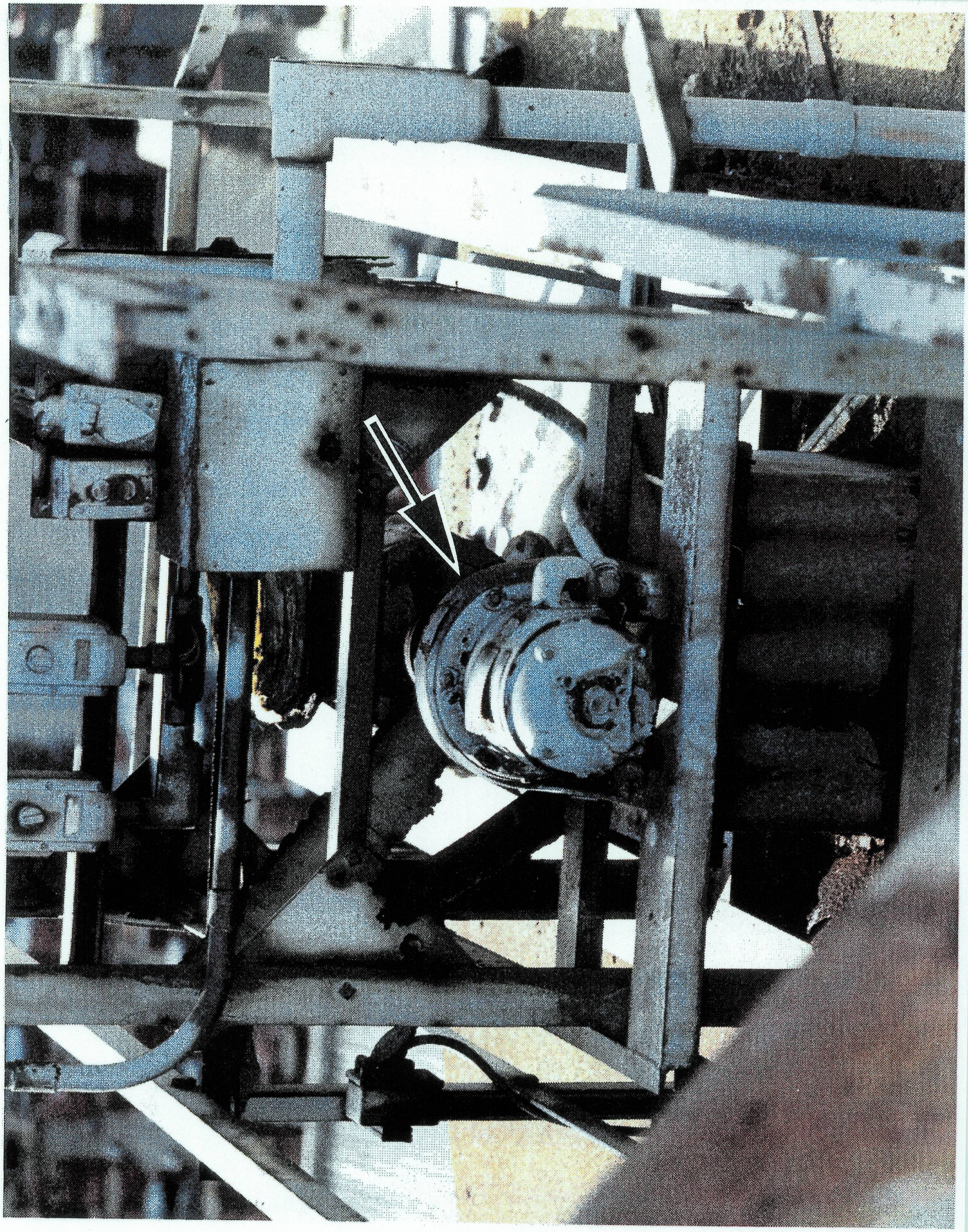

Figure 8-5 - Sampling Point 5

Figure 8-6 - Sampling Point 6

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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

This removal action will be conducted according to the overall quality assurance program at the FEMP as described in the site Quality Assurance Plan, PL-3014, attached in Appendix G. The Quality Assurance Plan is based on the criteria specified in American Society of Mechanical Engineers (ASME) NQA-1, US EPA Guideline AMQS-005/80 and DOE Orders 5700.6 and 5400.1. Detailed requirements are implemented by the WEMCO Site Policies and Procedures Manual, FMPC-2054; and WEMCO Departmental procedures and Topical Manuals. Specific quality assurance requirements will be incorporated into written and approved procedures and during personnel training. The site Quality Department will conduct periodic surveillances to verify compliance with the Quality Assurance Plan.

APPENDIX A

APPENDIX A

PLANT 1 ORE SILOS REMOVAL SITE EVALUATION

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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

TABLE OF CONTENTS

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

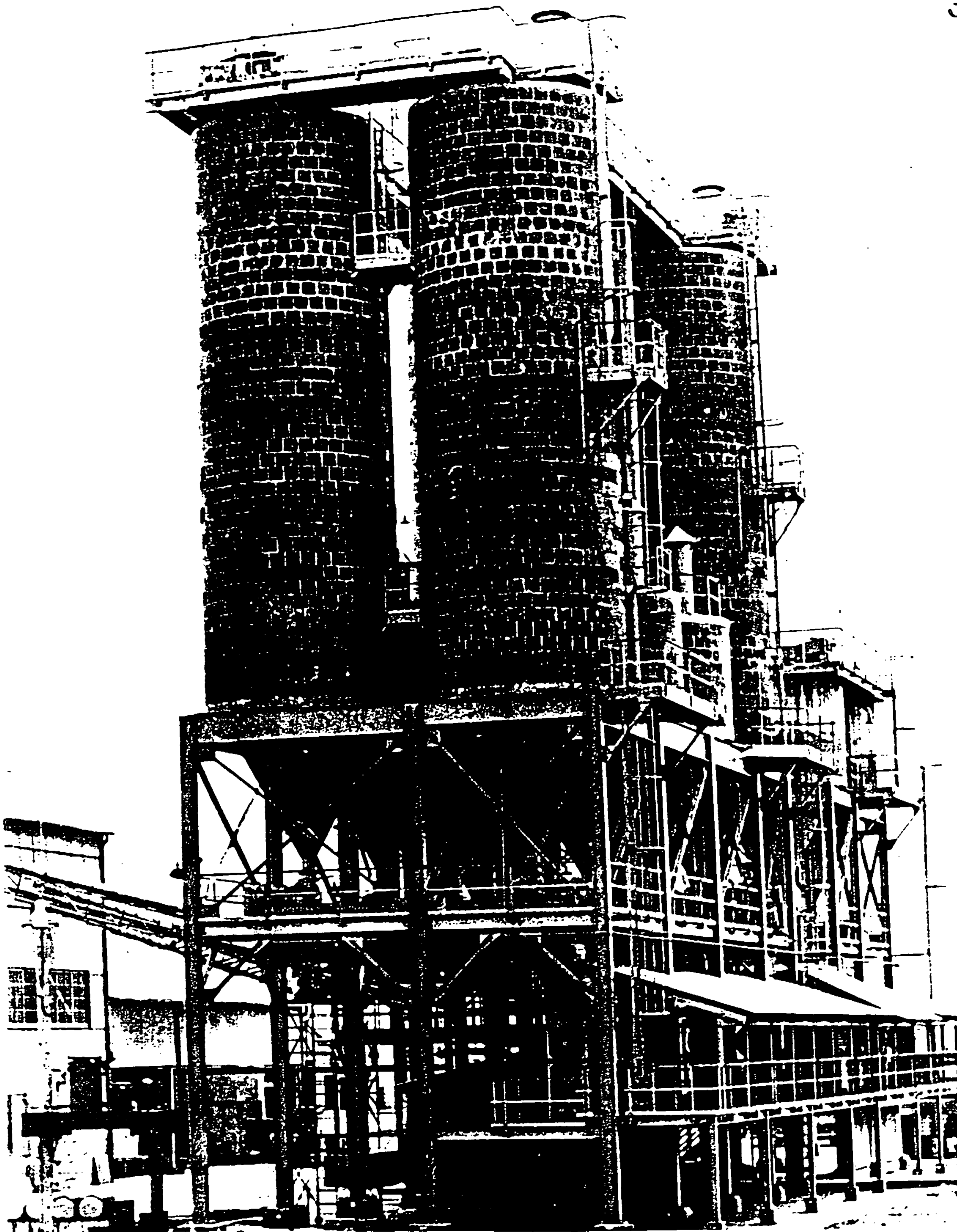
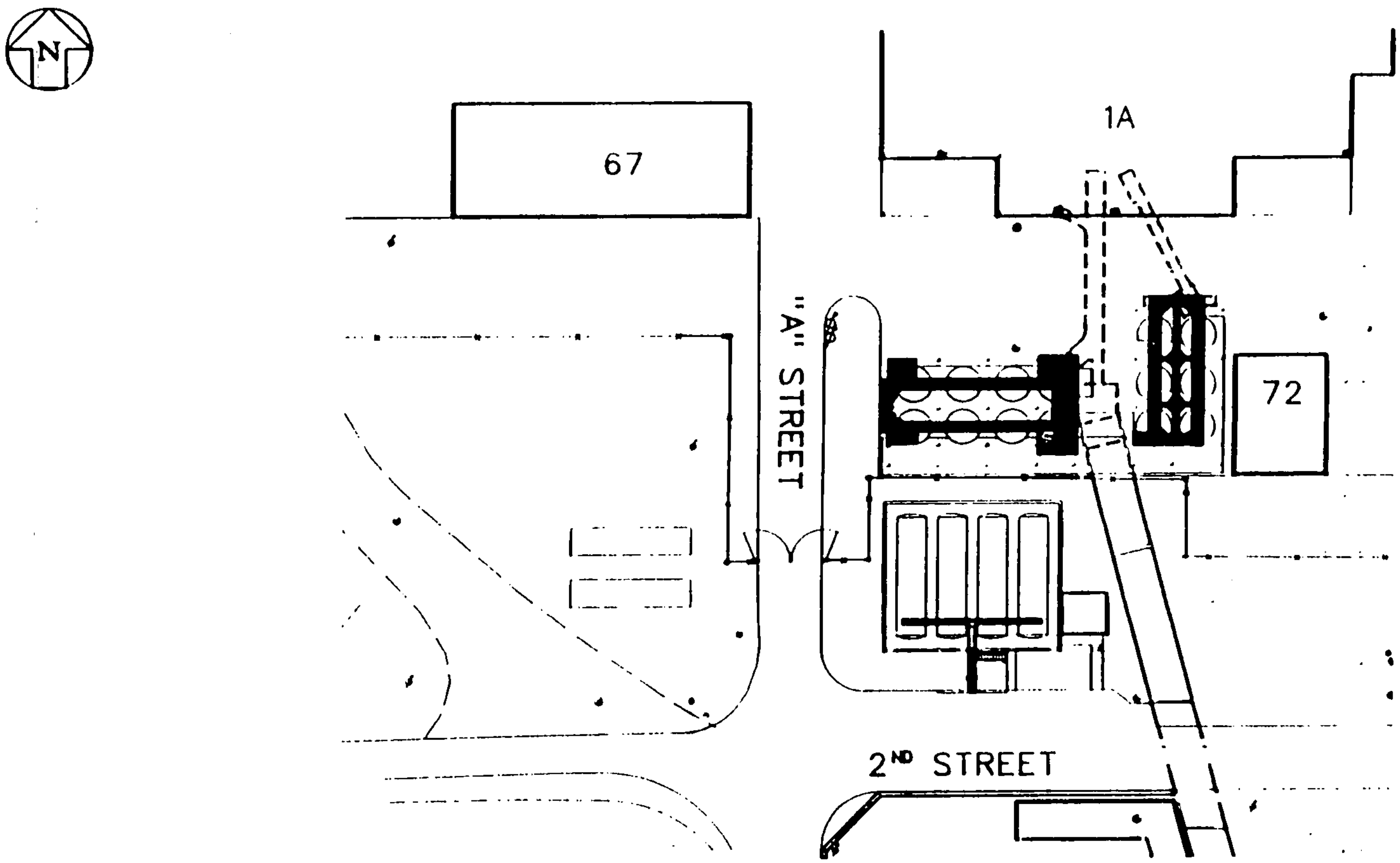


FIGURE 1

Overview of Plant 1 Silos Looking East



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

DATE 6-12-91
DRAWN WILLIAMS

047-3-0005

FERNALD PLANT 1 SILOS

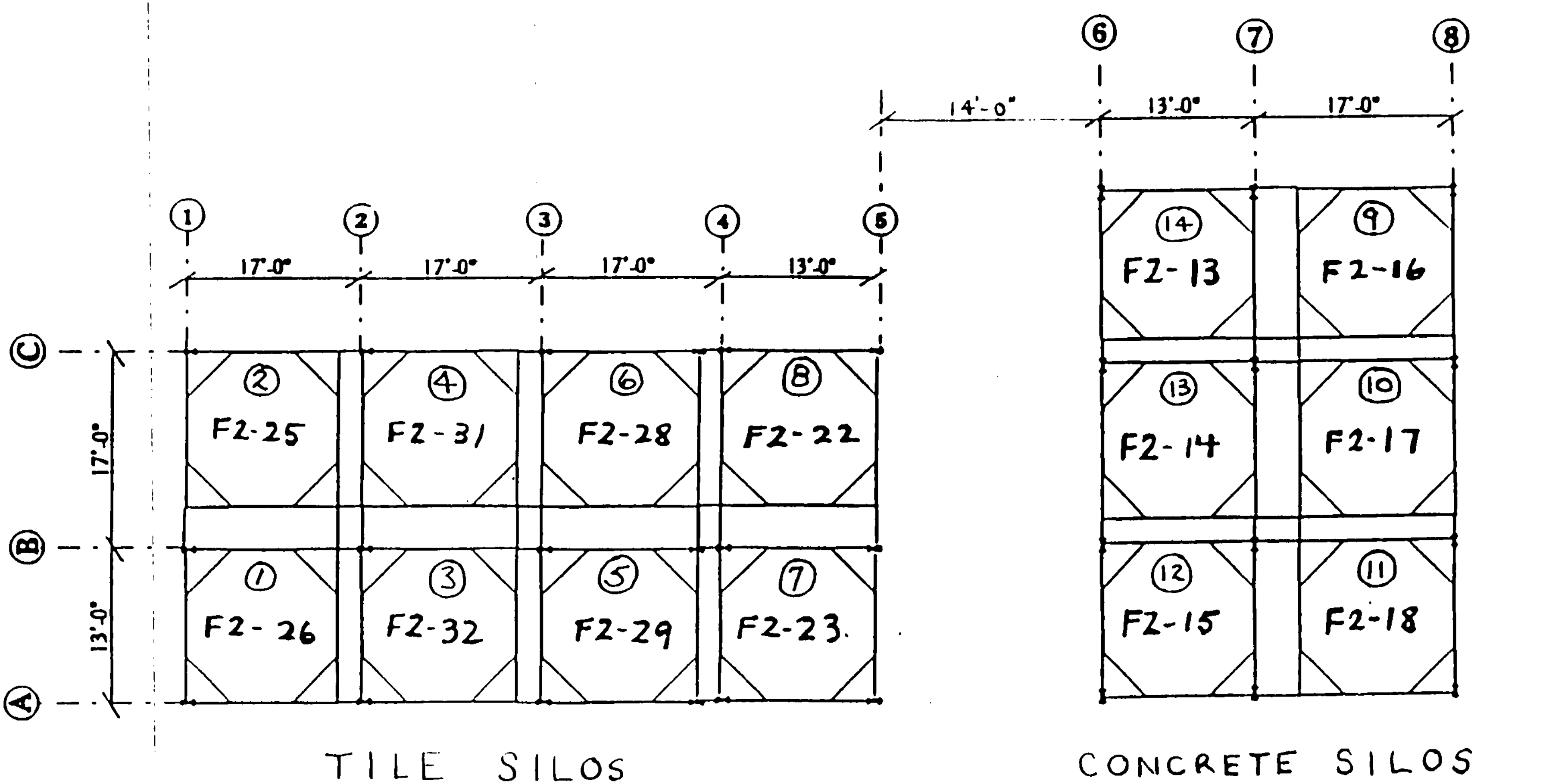

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FIGURE 3

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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.

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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)	TCLP Concentration (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.

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Table 5. Uranyl 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.

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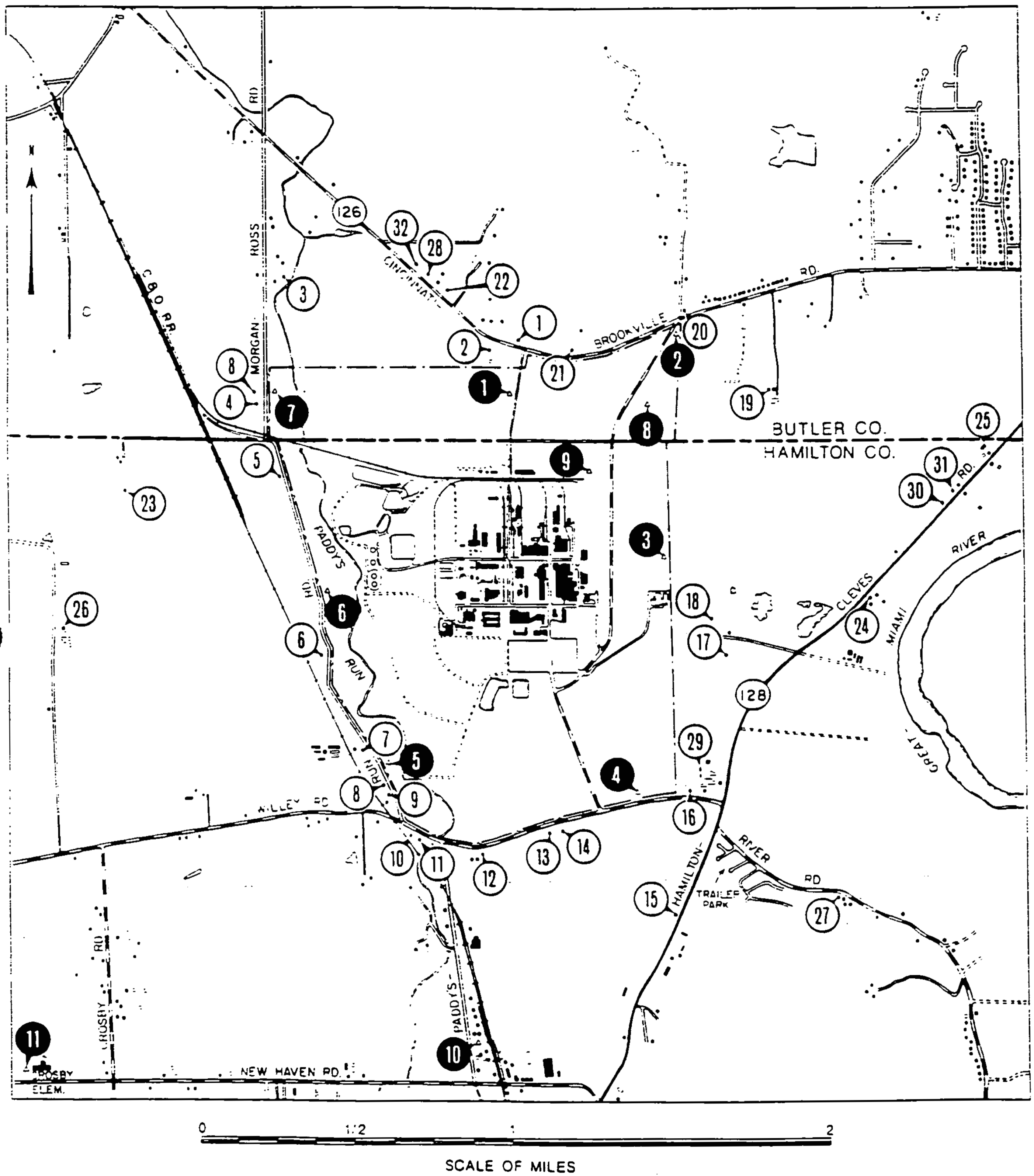

LEGEND

Heavy Duty Roads	Fixed Air Monitoring Stations
Medium Duty Roads	Numbered Residence
Light Duty Roads	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

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

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

[3] 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.

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

[5] 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]	31556 + 56538	516 + 577	377 + 858	31.6 + 38 6	189.3 + 440.1	183 + 318 9
High	[3]	160000(EM-2001)	1600(EM-2001)	2500(EM-2507)	130(EM-2001)	1600(EM-2504)	1100(EM-2507)
Low	[3]	630(EM-2510)	25(EM-2506)	7.4(EM-2575)	3.6(EM-2506)	5(EM-2574)	5.3(EM-2505)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	100000(EM-2504)	1200(EM-2509)	2300(EM-2504)	79(EM-2570)	660(EM-2507)	1100(EM-2507)
		140000(EM-2504)	1200(EM-2570)	2500(EM-2507)	83(EM-2571)	1600(EM-2504)	
		160000(EM-2507)	1400(EM-2571)		130(EM-2001)		
			1600(EM-2001)				

		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]	167.4 + 291 2	8 36 + 14 2	0.433 + 0.579	0 18 + 0 065	0 517 + 0.355	0.33 + 0.29
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)	3.1(EM-2571)
			5 2(EM-2506)	3.1(EM-2571)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	10(EM-2570)	43(EM-2571)	
		11(EM-2504)	55(EM-2572)	
		13(EM-2507)		

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

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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)								

* Units = ug/[illegible] + = Duplicate Sample

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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
\+ = Duplicate Sample

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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	684.3 + 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(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)	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	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-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

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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
(Note: N=?; to be determined)

PLANT 1 TILE SILOS RESIDUES
(micrograms per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	PARAMETER	DETECTION LIMIT	CONCENTRATION
6 F2-28	EM-2508 910318-081	Cyclohexanone	10.1	263
		2-Nitropropane	20.2	34
		Tetrachloroethene	5.1	64
		Barium	0.3	30.7
		Chromium	4.6	70.6
		Lead	9	386
7+ F2-23	EM-2509 910318-082	Toluene	5.1	19
		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+ F2-23	EM-2510 910318-083	Barium	0.3	15.9
		Chromium	4.6	43.9
		Lead	9	464
		Mercury	0.05	0.199
8 F2-22	(SILO CLOSED NO SAMPLE)			

+ = Duplicate Sample

PLANT 1 CONCRETE SILOS RESIDUES
(micrograms per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	PARAMETER	CONCENTRATION
10	EM-2570	Arsenic	43.8
F2-17	910501-040	Mercury	0.3
		Selenium	35
		Lead	1042.68
		Silver	16.03
		Barium	34.37
		Cadium	17.3
		Chromium	125.72
11+	EM-2575	Arsenic	79.9
F2-18	910430-111	Mercury	1.08
		Selenium	114
		Lead	895.69
		Silver	21.69
		Barium	15.35
		Cadmium	19.99
		Chromium	170.61
11+	EM-2571	Arsenic	95.2
F2-18	910430-112	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	Arsenic	<10	ug/L
	910501-044	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	Arsenic	<10	ug/L
	910501-045	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	

+ = Duplicate Sample

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

+ = Duplicate Sample

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 Lead	200 200	216 441	100,000 5,000
11+ F2-18	EM-2575 910430-111	Barium Lead	200 200	252 462	100,000 5,000
11+ F2-18	EM-2571 910501-112	Methyl Ethyl Ketone Selenium Mercury	50 420 0.2	83 738 0.2	200,000 1,000 200
12 F2-15	EM-2572 910501-041	Barium Lead	200 200	252 462	100,000 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

* Quantity Unknown. Assumed to be Equal to the Maximum Observed (Silo 7).

** Not S[illegible]led. Assumes Highest Concentrations Equal to the Silo 1 Reca[illegible]d Residue Sample (Silo 1 is empty).

100

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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.

(A) Concentrations are Average of Duplicate Sample.

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

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. 15 above the foundations. The upper silo support level is not raced 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 BREAKING 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

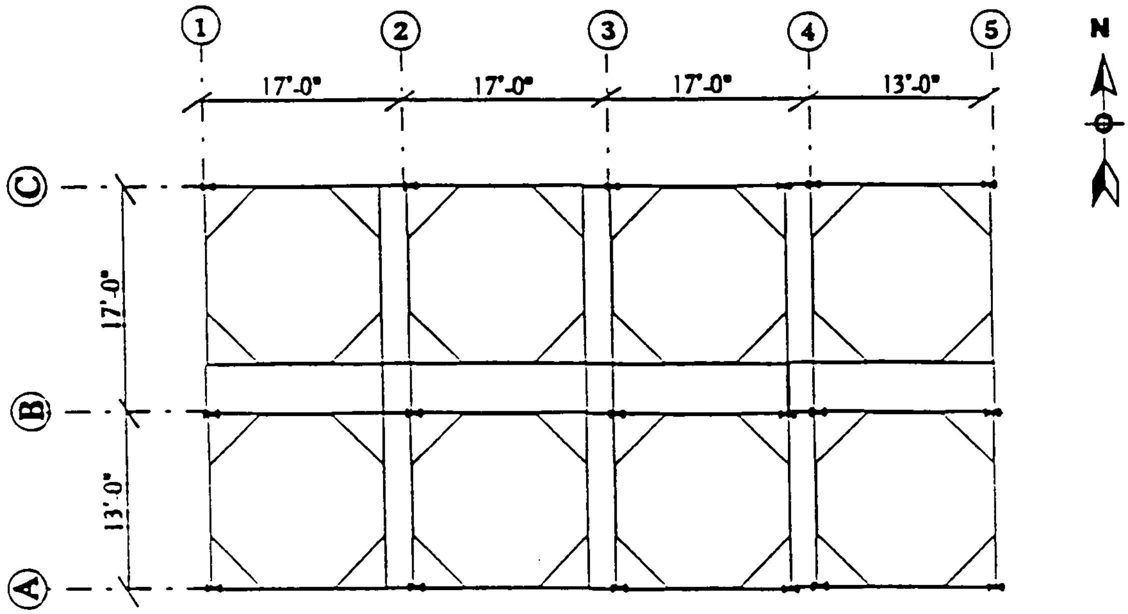
The tall (44 ft.) hollow clay tile silos on the west (eight-silo) structure are inadequate to resist 90 mph basic wind speed lateral loading. The transverse end frames on this structure would be severely overstressed under wind loading. The diaphragm capacity of the silo support beam framing, and the 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:

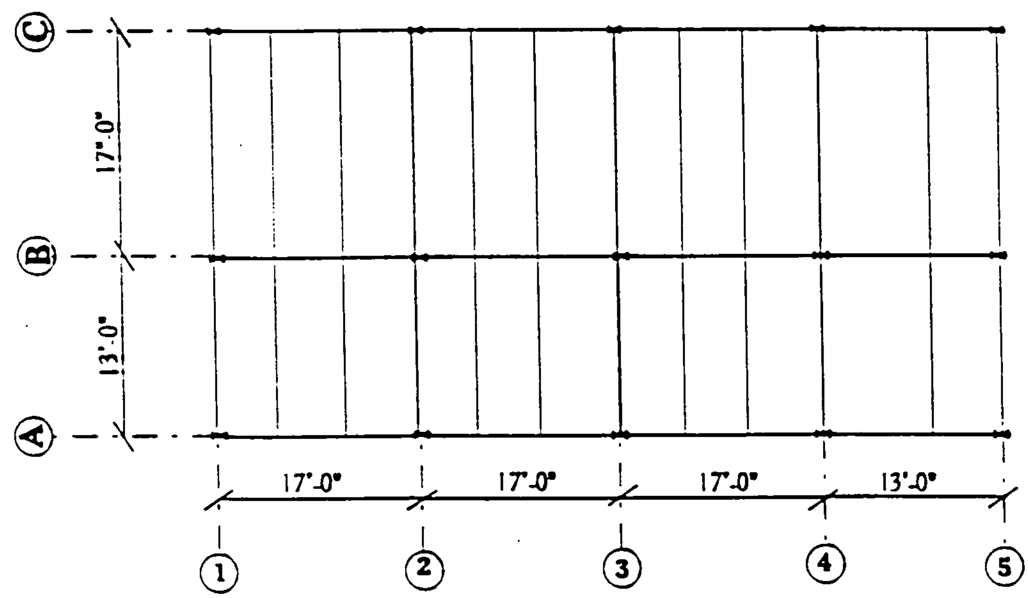
1. Demolish the entire facility.
2. Demolish the tall (44 ft.) tile silos. Inspect and repair as required the lower level platform decking plate connections and reinforce diagonal silo support beam connections, or add horizontal diaphragm bracing.
3. Demolish the tall (44 ft.) tile silos and add vertical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

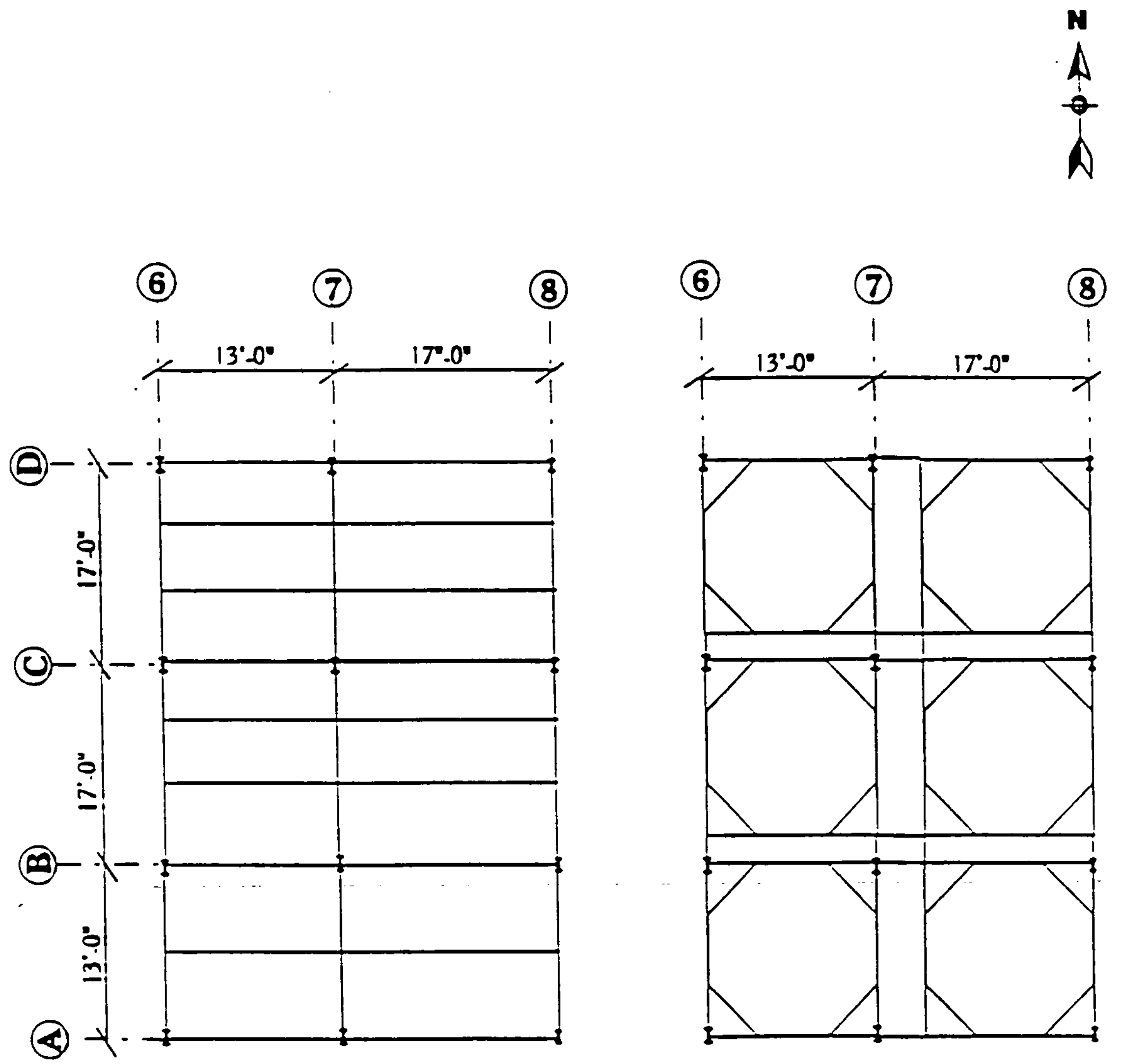
FERNALD PLANT 1 SILO INVESTIGATION





8 - SILO (WEST) STRUCTURE

FERNALD PLANT 1 SILO INVESTIGATION



6 - SILO (EAST) STRUCTURE

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

Location	Zone
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
Osceola 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	[illegible]
Providence	[illegible]
SOUTH CAROLINA	
Charleston	[illegible]
Fort Jackson	[illegible]
Parris Island	[illegible]
Shaw AFB	[illegible]
SOUTH DAKOTA	
Ellsworth AFB	[illegible]
Pierre	[illegible]
Sioux Falls	[illegible]
TENNESSEE	
Chattanooga	[illegible]
Holston AAP	[illegible]
Memphis	[illegible]
Milan AAP	[illegible]
Nashville	[illegible]
TEXAS	
Austin/Bergstrom AFB	[illegible]
Corpus Christi	[illegible]
Dallas	[illegible]
Dyess AFB	[illegible]
Ellington AFB	[illegible]
El Paso	[illegible]
Galveston	[illegible]
Fort Hood	[illegible]
Houston	[illegible]
Lone Star AAP	[illegible]
Reese AFB	[illegible]
San Antonio	[illegible]
Fort Worth	[illegible]
Wichita Falls	[illegible]
UTAH	
Dugway P.G.	[illegible]
Hill AFB	[illegible]
Salt Lake City	[illegible]
Tooele Army Depot	[illegible]
VERMONT	
All	[illegible]
VIRGINIA	
Fort Belvoir	1
Fort Eustis	1
Fort Meyer	1
Norfolk	1
Petersburg/Fort Lee	1
Quantico	1
Radford AAP	2
Richmond	1

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

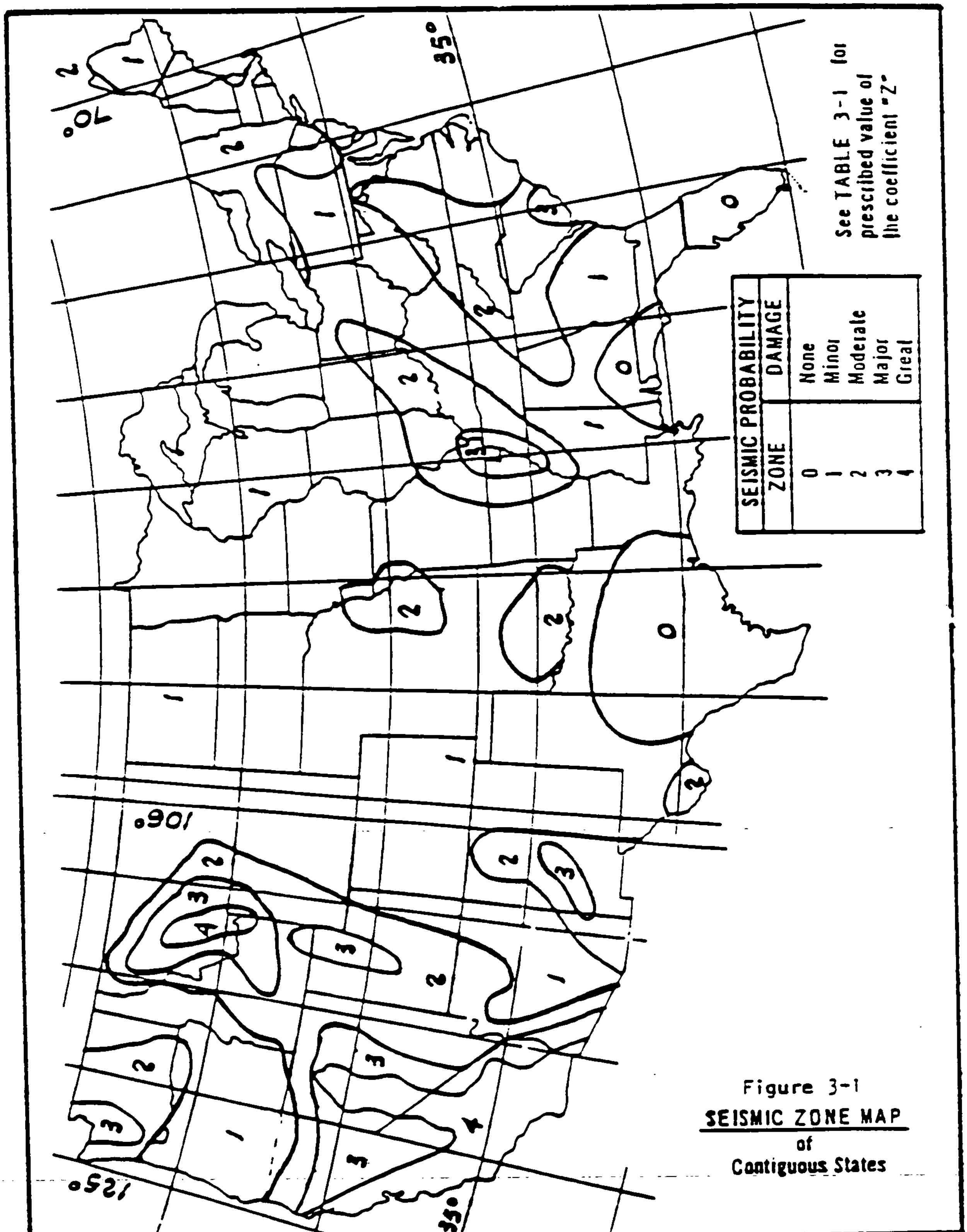


Figure 3-1
SEISMIC ZONE MAP
of
Contiguous States

APPENDIX C

APPENDIX C

IH&S-IH-03 WMCO INDUSTRIAL HYGIENE AND SAFETY MANUAL, CONTROL OF WORK INVOLVING ASBESTOS, 3-20-89, REV. 0

Note: Calculations supporting this evaluation are in the Administrative Record File of the project.

Control No.:

Westinghouse Materials Company of Ohio

	INDUSTRIAL HYGIENE AND SAFETY MANUAL			Industrial Hygiene
	CONTROL OF WORK INVOLVING ASBESTOS			
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).

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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.

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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.

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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. 119

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).

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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)

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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.

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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.

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) 133

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".

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

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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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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) Schedule:
Start Date: ____________
Completion Date: ____________

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

____

____

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

____

____

Removal Procedures (Wetting, Ventilation, 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 8672.

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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 supplied 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 supervision of proper disposal methods		

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

SECTION C - PRE-JOB REQUIREMENTS

SPECIFIED BY: IH 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 penetrations covered and sealed		
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. Personal air samples required (samples collected for entire shift when possible)		
2. No smoking, eating or drinking permitted in work area		
3. HEPA-Filtered vacuum required for clean-up		
4. HEPA vacuum required at point of cut/drilling		
5. Glove bag removal of pipe insulation required		
6. Transite panels shall be removed whole		
7. Asbestos material shall not be allowed to drop		
8. Disposable 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 coated with a sealant to encapsulate 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 departure 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: IH 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:

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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

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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).

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ATTACHMENT E

ASBESTOS WARNING SIGN

DANGER

ASBESTOS

CANCER & LUNG DISEASE
HAZARD

AUTHORIZED PERSONNEL ONLY

RESPIRATORS & PROTECTIVE CLOTHING

ARE REQUIRED IN THIS AREA

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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

APPENDIX D

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

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.

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

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.

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

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.

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

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 as necessary during the field work to minimize the potential for any new or existing contaminants to be carried into the adjacent soils.

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

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

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

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.

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

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*

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

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.

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

- 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.

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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 steel

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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.

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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~~ size reduction and packaging buildings 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

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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.

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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.

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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] + = Tolerance, plus or minus with 68% confidence
[3] Sample 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

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MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

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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MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

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

APPENDIX E

THE ON-SITE TRANSPORTATION OF RADIOACTIVE AND NONRADIOACTIVE HAZARDOUS MATERIALS

FMPC - 2089
TOPICAL MANUAL

THE ONSITE TRANSPORTATION OF RADIOACTIVE AND NONRADIOACTIVE HAZARDOUS MATERIALS

BY

C. E. BLOCK

FEBRUARY 29, 1988

PREPARED FOR THE U.S. DEPARTMENT OF ENERGY
OAK RIDGE OPERATIONS OFFICE

FEED MATERIALS PRODUCTION CENTER
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88-0008
FMPC-2089
Revision: 08/23/90
Topical Manual

The Onsite Transportation of Radioactive and Nonradioactive Hazardous Materials

by

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February 29, 1988

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Prepared for the
U.S. Department of Energy
Oak Ridge Operations Office
Contract DE-AC05-86OR21600

Approved: Ellery D. Savage
Manager
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Approved: W. H. Britton, President

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FMPC-2089
TOPICAL MANUAL

The Onsite Transportation of Radioactive and Nonradioactive Hazardous Materials

ADDITIONS AND REVISIONS

August 23, 1990

Additions:

(WMCO Course No. 2219000008801, "Transportation of Hazardous Materials.")
2.12 Training Requirements

Sample of a, "Nonradioactive Hazardous Materials Shipment Approval Tag."
3.8 Designating Control Persons

Any deviations from this requirement must have a written procedure approved by the Vice President of IRS&T.

For those cases where these pallets are stacked two or more high, the pallets will be positioned to ground level with a fork lift truck and the drums strapped prior to being transported and/or being loaded onto a transport conveyance. All personnel, except the motor vehicle operator, must stay back at least 20 feet from the operation during repositioning of pallets to ground level.
2.7 Tie-Down Requirements

Revisions:

Previously: Manager of Traffic
Revised: Manager, Transportation Regulatory Compliance
(Throughout Document)

Previously: Traffic Section
Revised: Manager, Transportation Regulatory Compliance
(Throughout Document)

Previously: ALL personnel

FMPC-2089
Revision: 08/23/90
Topical Manual

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ADDITIONS AND REVISIONS

August 23, 1990
(Continued)

Revised: NECESSARY personnel
2.12 Training Requirements
2nd line

Previously: In addition, each container...
Revised: In addition, each container (or is more than one (1)...)
3.1 Approved Containers
2nd paragraph
last sentence

Previously: ES&H
Revised: OS&H
(Throughout Document)

Chapter 1 - Introduction

All radioactive and hazardous materials used at the FMPC must be treated with the utmost care, especially when the materials are being transported over FMPC roadways. By following the proper procedures outlined in this manual, you can help protect the health and safety of all employees and the public, as well as minimize potential damage to the environment.

This manual contains guidelines that must be observed when transporting both radioactive materials and nonradioactive hazardous materials onsite. In addition, the manual provides instructions concerning onsite packaging, marking, labeling, and storing of radioactive and nonradioactive hazardous materials. It also lists the activities associated with transporting these materials, and indicates the responsible organization for each activity (see Appendix A).

1.1 WMCO Policy

It is the policy of the Westinghouse Materials Company of Ohio (WMCO) that all radioactive and nonradioactive hazardous materials shall be marked, labeled, handled, transported and/or stored using methods and procedures that comply with all applicable WMCO and government regulations and provide adequate protection to employees and the environment.

1.2 Purpose of the Manual

The Department of Energy (DOE) has issued a proposed amendment to DOE Order 5480.3, "Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances, and Hazardous Wastes." (The proposed amendment can be found in Appendix B.) At this time, DOE has not adopted or set an effective date for implementing this amendment.

In anticipation of this amendment, the Traffic Section of WMCO has prepared this manual to help WMCO employees understand the requirements for the safe and proper transporting of both radioactive materials and nonradioactive hazardous materials over the onsite roadways at the FMPC.

1.3 General Requirements

The Department of Transportation (DOT) regulates the transporting of hazardous materials, and publishes the requirements for compliance with these regulations (see Title 10 and Title 49 of the Code of Federal Regulations). The Environmental Protection Agency (EPA) regulates hazardous wastes, and the EPA regulations are published in Title 40 of the CFR. The EPA adopted (by reference) many of the regulations promulgated in Title 49 CFR. All personnel handling hazardous materials or hazardous wastes must comply with all applicable regulations.

1.4 Ensuring Package Integrity

All packages used for the onsite transportation of hazardous materials must meet 49 CFR 173.24 parts (a) and (b). In addition, packages for radioactive materials must meet 49 CFR 173.411, 173.421, 175.425, 173.441, 173.442, and 173.443. The WMCO Transportation Safety Committee must approve any exceptions to these regulations.

If you encounter a situation which requires an exception, you must submit a written request to the Manager, Transportation Regulatory Compliance. This request must include the procedure you with to follow for packaging and transporting a hazardous material, its specific form, and the type of container you wish to use. The WMCO Transportation Safety Committee and, if required, other appropriate disciplines, will review the request. The Manager, Transportation Regulatory Compliance will approve or reject the request in writing.

Chapter 2 - Transporting Radioactive Materials

Each day at the FMPC, radioactive materials are routinely moved from area to area. This chapter lists a series of general guidelines you must be aware of when transporting radioactive materials. These guidelines will help you ensure that these tasks remain routine and do not result in accidents that could have easily been avoided.

2.1 Listing Some Examples

The types of radioactive materials present onsite which are governed by these regulations include, but are not limited to, the following examples:

A. Enriched Uranium:
- Compounds such as UF_4 and UO_3 (uranium tetrafluoride and uranium trioxide, respectively)
- Manufactured forms of uranium metal products (N-reactor ingots)
- Scrap pieces of uranium metal products (N-reactor ingots)
- Magnesium fluoride from the Uranium Production Process.

B. Depleted or Normal Uranium
- Compounds (same examples as above)
- Manufactured forms of uranium metal products including derbies, ingots, and flats
- Scrap pieces of uranium metal products such as Mark 31 materials, flat materials, and top crops.

C. Low-level Waste - Radioactive Materials:
- Production process residues from which it is not economical to recover the uranium (depleted magnesium fluoride)
- Uranium materials that do not meet required specifications for production, and can not be blended, recycled, or used for producing manufactured products (depleted UF_4 slag).

D. Low-level Waste - Radioactive Materials:
- Nonradioactive articles that are contaminated with radioactive materials are covered by the regulations (soil, concrete, metal scrap, wooden products).

E. Pyrophoric materials:

- Uranium chips, turnings and sludge.

2.2 Approved Containers

The Manager, Transportation Regulatory Compliance is responsible for ensuring that all containers meet regulations or guidelines set forth in DOE Order 5480.3

The majority of radioactive materials transported onsite are contained in 55-gallon drums. When these materials are transported onsite only, the lids of these drums must be securely fastened with a lever-lock device or bolt type rings.

Pyrophoric materials are packaged in 30-gallon drums only. Chips and turnings are shipped in the same manner as required for storage. Sludges are limited to 100 pounds per drum and one drum per pallet, with plastic drum covers to prevent any liquid from splashing out of the drum during transport.

Proper covers or enclosures of containers for onsite transportation of ingots, billets derbies and scrap material are not currently available and must be designed and fabricated. Currently, these containers of material must be suitable covered and/or enclosed in plastic to maintain their integrity. Once this is accomplished, the Manger, Transportation Regulatory Compliance will oversee the development of the necessary Standard Operating Procedures (SOPs) for transporting these materials.

Examples of containers approved for the onsite transportation of radioactive materials include banded wooden boxes, 55 or 30 gallon drums, 5- or 10- gallon cans, ingot and derby skids.

2.3 Reporting Fires During Transport

If you notice fire or smoke coming from materials you are transporting over the FMPC roadways, follow these steps:

- If your tow-tractor is equipped with a radio, notify the dispatch immediately. If possible, disconnect the tractor from the trailers. Of course, if the fire is close to the tractor, do not attempt to disconnect the trailers. Move at least approximately 50 feet upwind from the trailers.
- If your tow-tractor does not have a radio, disconnect the tractor from the trailers then drive to the nearest fire alarm pull box. Again, if the fire is close to the tractor, do not attempt to disconnect the trailers. Go to the nearest fire alarm pull box.

2.4 Handling Enriched Uranium

In order to meet the special requirements for criticality control and safety, you must follow SOPs 20-C-101 and 20-C-102 when packaging, storing and moving enriched uranium. Enriched uranium may be transported onsite in the packages they were received in since those packages are approved for offsite transport. (Packages for offsite shipments must meet requirements that are more strict than those for onsite shipments.)

Authorized certified personnel (normally the shipping supervisor) at the packaging plants must verify that the FMPC complies with all packaging requirements.

2.5 Contamination Control

The responsible personnel in the packaging plants must ensure that all packages, skids or pallets are free of any loose radioactive material prior to loading them onto a transport conveyance. (A conveyance is any type of vehicle, motorized or hand-powered, used to move materials at the FMPC.)

Transportation personnel will not move the material until personnel in the Environmental and Radiological Monitoring Subsection of ES&H survey each shipment and sign the completed MC&A transfer document signifying that the packages, skids, pallets, and/or four-wheel trailers are free of any loose radioactive material that may damage the environment during transport.

2.6 Available Transportation Vehicles

The primary vehicle used to move radioactive materials onsite is the six-ton capacity four-wheel trailer pulled by a tow-tractor. Depending on the material being transported and the urgency of the request, Transportation may use other types of vehicles.

2.7 Tie-Down Requirements

The responsible personnel in the packaging plants will secure drums or cans together with nylon straps when two or more drums or cans are loaded onto a pallet prior to loading onto a transport conveyance. Any deviations from this requirement must have a written procedure approved by the Vice President of IRS&T.

For those cases where these pallets are stacked two or more high, the pallets will be positioned to ground level with a fork lift truck and the drums strapped prior to being transported and/or being loaded onto a transport conveyance. All personnel, except the motor vehicle operator, must stay back at least 20 feet from the operation during repositioning of pallets to ground level.

In addition, these personnel supervise the safe loading of skids, pallets or other types of containers onto the transport conveyance by assigned Transportation personnel. For example, pallets must be square on conveyance and, if double stacked, must be straight and stable.

Before moving any load, transportation operators must check each load to make sure it's stable and there is no loose radioactive material. The appropriate transfer document (for exampke place, must complete the training course(s) in order to be certified. The training must include information and requirements which are imposed by Public Law 93-633, "The Transportation Safety Act of 1974," the "Resource Conservation and Recovery Act of 1974," and WMCO's ES&H Requirements.

The Hazardous Materials Training course will include instructions in the use of Title 49 CFR, documenting, packaging, labeling, or handling hazardous waste, and an introduction to nuclear safety. WMCO's Training Section will maintain a computerized listing of all personnel who have successfully completed these training courses. Training is required every two years.

In addition, to comply with training requirements, training courses provided by Westinghouse Corporate, WMCO, or DOE would compliment the Hazardous Materials Training Course.

2.13 Conducting Surveillances and Audits/Appraisals

Quality Assurance, along with the Traffic Section, WMCO's Transportation Safety Committee, and ES&H will periodically conduct surveillances and audits/appraisals.

These surveillances and audits/appraisals will cover all aspects of packaging, handling, storing, and transporting hazardous materials. Reports shall be documented, reported to, and reviewed by responsible management. Reports by the issuing group will verify that all corrective actions have been taken.

2.14 Reporting Incidents

In addition to the reporting requirements of WMCO Site Procedures Manual, Numbers FMPC-703 and FMPC-704, spills, leaks, or damage to containers of radioactive or other hazardous materials while they are being transported onsite must be reported immediately to the Assistant Emergency Duty Officer, the Fire and Safety Inspector, and the Manager, Transportation Regulatory Compliance (extension 6469). A copy of Minor Event Report and/or Unusual Occurrence Report must be sent to the Manager, Transportation Regulatory Compliance for review and/or remedial action.

Chapter 3 - Transporting Nonradioactive Hazardous Materials

Nonradioactive hazardous materials used at the FMPC include flammables, combustibles, flammable solids, oxidizers, corrosive materials, compressed gases, magnesium metal granules, and other regulated materials.

The guidelines for transporting nonradioactive hazardous materials are similar to those listed in the previous chapter for radioactive materials. However, there are unique guidelines for these materials, especially in regard to labeling, marking, and the Material Safety Data Sheets (MSDS). These are described in greater detail in the following sections.

3.1 Approved Containers

Refer to Title 49 of the Code of Federal Regulations 172.101, Hazardous Materials Table, for the requirements and exceptions for packaging of hazardous materials. Purchase orders issued for hazardous materials must contain a provision requiring compliance with appropriate packaging, marking and labeling requirements. The FMPC's various suppliers must ship nonradioactive hazardous materials in approved containers that are marked and labeled in accordance with 49 CFR regulations. This includes the appropriate MSDS for each hazardous material.

Generally, the manufacturers' packages for hazardous materials are adequate for onsite transportation. A shipment of hazardous materials divided into two or more containers must meet the standards of the original container. In addition, each container (or if more than one (1) container of same material going to one person or location) must be accompanied by the appropriate MSDS.

3.2 Working Quantities

Working quantities of hazardous materials that can be carried to the job site (for example, the quantity needed for one day's work) are exempt from the packaging, labeling and marking requirements. For exceptions see Topical Manual FMPC-2086, "Hazardous Communications Standard Written Program."

3.3 Marking the Shipping Name

Each package should be marked with the proper DOT shipping name of the contents as shown in 49 CFR 172.101. The Manager, Transportation Regulatory Compliance has a copy of these regulations, and will answer any questions you may have regarding their applicability to particular situations.

3.4 Labeling Requirements

Each package containing a nonradioactive hazardous material will be identified for onsite shipment with the DOT hazard class by applying the proper DOT diamond-shaped label. These labels are 4"x4".

3.5 Placarding Requirements

Vehicles carrying hazardous materials onsite do not require placarding. One exception is the LPG cylinder trailers which require placards and are spotted at various locations throughout the plant site. Placards are similar in appearance to labels, but are 12"x12".

3.6 Taking Precautions While Loading and Unloading Hazardous Materials

Smoking is NOT permitted while unloading any flammable liquid, flammable solid, oxidizing materials, or flammable compressed gas. Keep fire away and do not allow anyone in the vicinity to smoke, light matches, or carry any flame. When loading in completed, drivers must ensure that loads are secured to withstand incidents of normal transport on the plant site.

3.7 Segregation and Separation Chart of Nonradioactive Hazardous Materials

Nonradioactive hazardous materials must be loaded and transported in accordance with the information provided in the following table:

HAZARDOUS MATERIALS					
Flammable liquids or flammable gases; flammable liquid of flammable gas label					MUST NOT BE LOADED OR STORED TOGETHER
Flammable solids; flammable solid label Oxidizer; oxidizer label Organic peroxide; organic peroxide label					
Corrosive liquids; corrosive label			2X		
Nonflammable gases; N.F.G. label					
Poisonous gases or liquids in tank car tanks, cylinders; poison gas labels		X	X	X	

The letter X at an intersection indicates that these materials must not be loaded or stored together.

Corrosive liquids must not be loaded above or adjacent to flammable solids or oxidizing materials. An exception is that shippers loading truckload shipments of corrosive liquids and flammable solids or oxidizing materials' packages, and who have obtained prior approval from DOT, may load such materials together when it is known that the mixture of contents would not cause a dangerous evolution of heat or gas.

3.8 Designating Control Persons

Each facility owner, even those in the nonproduction areas, will appoint one or more control persons. Persons so designated will be trained in the requirements of this manual and appropriate sections of 49 CFR. In turn, they will inspect and approve each shipment of nonradioactive hazardous material prior to transport. Their approval is signified by their signature on the nonradioactive hazardous material transport approval tag and affixing it to the package(s). See sample below:

Nonradioactive
Hazardous Materials
Shipment Approval

This shipment
has been inspected
and approved for
shipment.

Name: ____________________

Date: ____________________

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3.9 Conducting Surveillances and Audits/Appraisals

Quality Assurance, along with the Manager, Transportation Regulatory Compliance, WMCO's Transportation Safety Committee, and ES&H will periodically conduct surveillances and audits/appraisals. These surveillances and audits/appraisals will cover all aspects of packaging, handling, storing, and transporting hazardous materials. Reports shall be documented, reported to, and reviewed by responsible management. Reports by the issuing group will verify that all corrective actions have been taken.

3.10 Conclusion

This manual provides guidelines for transporting radioactive and nonradioactive hazardous chemicals over the roadways of the FMPC. Be sure to contact the Manager, Transportation Regulatory Compliance at extension 6469 if you have any questions about this manual or the proper procedures to follow.

Appendix A

Listing of Activities and Responsibilities
Associated with Transporting Radioactive and
Nonradioactive Hazardous Materials

This appendix lists all activities associated with the transportation of radioactive and nonradioactive hazardous materials. The first column lists the activity, and the third column lists the proper procedures to follow and where they can be found.

Activity	Responsible Organization	Departmental Procedures
Intraplant shipments	All organizations	Topical Manual 2086 Topical Manual 2089
Design and test containers and prepare necessary SARP's	Engineering OS&H Traffic	Title 49 CFR Title 10 CFR
Verify container qualification	Traffic	Title 49 CFR DOE/DP00053-H1
Container Approval - Onsite	Onsite Transportation Safety Committee	Topical Manual 2089
Container Approval - Offsite	Traffic	Title 49 CFR
Prepare requisitions for procurement of container	Traffic	FMPC 302 Site Procedure
Review requisitions for inclusion of quality requirements	Quality Assurance	FMPC 302 Site Procedure
Procure containers, components, material	Procurement & Contracts	FMPC 302 Site Procedure
Prepare inspection plan and inspect	Quality Assurance	Quality Assurance Dept. Procedures

Activity	Responsible Organization	Departmental Procedures
Plan material shipment; prepare shipment papers; obtain approvals; notify authorities; coordinate incoming shipments; review and determine hazardous materials classification; certify shipment to carrier	Traffic MC&A	Transp. Manual SOP-TRF-46-C-110 FMPC 517 Site Procedure
Verify container condition as suitable for use.	Applicable organization packaging the material for shipment	Production, Waste Management and Quality Assurance Procedures
A. Package	All organizations	Pkg. facilities SOPs
B. Label & mark the product	All organizations	Pkg. facilities SOPs
Determine nuclear materials safety limits	Nuclear & Systems Safety	SOPs 20-C-101 and 20-C-102
Review request for shipment of nonradioactive, hazardous materials as required	Traffic	Title 40 and 49 CFR
Review request for shipment of radioactive and hazardous materials as required	Traffic	Title 40 and 49 CFR
Prepare packaging procedures and check list	Production	Pkg. facility SOPs

Activity	Responsible Organization	Departmental Procedures
Approve packaging procedures	Production	Pkg. facility SOPs
Hold in storage for shipment or distribution onsite as appropriate	Production	Pkg. facility SOPs
Monitor shipments prior to transfer between buildings	OS&H	FMPC 2084 Radiation Control Manual
Transfer nuclear materials accountability	MC&A	FMPC-517 Site Procedure
Load or unload material for shipment	Transportation	Transp. Manual SOP TRF-46-C-110
Transport material onsite	Transportation	Transp. Manual
Perform surveillances and audits/appraisals of the activities of transportation system	Quality Assurance Traffic Transp. Safety Committee OS&H	Topical Manual 2089 SOP TRF-46-C-110
Maintain onsite transportation plan in a current state	Traffic	Transp. Manual
Vendor deliveries of bulk hazardous materials to the FMPC	Receiving	IC&W Manual
Compliance with WMCO Hazardous Materials Manual	All organizations	Topical Manual 2089

Activity	Responsible Organization	Departmental Procedures
Training for compliance with Public Law #93-633	Traffic Training Section	Transportation Hazardous Materials Training Program

Appendix B

Proposed DOE Order for Onsite Packaging and Transportation of Hazardous Materials, Hazardous Substances, and Hazardous Wastes

Onsite Shipment

Shipment of hazardous materials, hazardous substances, and hazardous wastes made wholly within the site boundaries of DOE-owned reservations or facilities from which the shipment originates.

Onsite shipping requirements apply to shipments conducted over all roadways, rail lines, and other modes of transportation located within site boundaries of DOE-controlled/owned reservations or facilities.

Requirements

A. Onsite shipments shall comply with regulations of the Department of Transportation (DOT) to the fullest extent practicable. Exceptions to these regulations are allowed provided that a level of safety equivalent to that by DOT can be demonstrated.

B. Explosive materials shall be shipped onsite in accordance with the DOE Explosives Safety Manual (ESM).

C. Onsite shipments, which are exempt from 49 CFR; e.g., de minimus quantities and those shipments defined as movements; i.e., limited quantities of hazardous materials or substances transported by workers and ordinarily consumed or otherwise used in the performance of their duties, are exempt from the requirements of this section, but may be subject to other Federal regulations such as OSHA and RCRA.

D. A documented Safety Analysis shall be developed for onsite shipment of high hazard hazardous materials, substances or wastes immediately harmful to human health, safety and/or the environment (e.g., radioactive materials, fissile materials, hydrogen cyanide, PCBs, etc.) for which exceptions to DOT regulations are considered necessary. These Safety Analyses may address generic types of shipment routinely made onsite or single unique shipments, as applicable. However, each shipment made under a Safety Analysis should be so identified in the internal administrative documentation ordinarily prepared. Onsite shipment of nonreuseable (single-trip) packaging that are made on a routine or periodic basis can be supported by Safety Analysis addressing the overall operation in place of developing a Safety Analysis for each individual shipment.

1. The Safety Analysis shall include supporting technical information which clearly demonstrates a degree of safety for onsite shipment equivalent to that required by DOT regulations.
2. Exceptions to DOT regulations shall be clearly identified and justified in the Safety Analysis.
3. The following considerations shall, as a minimum, be also addressed in the Safety Analysis:
    a. Projected uses of packaging
    b. Package design and materials of construction
    c. Type and quantity of hazardous materials
    d. Criticality Safety Analysis (if applicable)
    e. Potential credible accident scenarios and associated probabilities
    f. Quality Assurance Program

4. Design and administrative controls may provide equivalent safety and shall be described in the Safety Analysis. Administrative controls include, but are no limited to, escorts, traffic control, speed and public access restrictions, and advance notifications to emergency response resources.

5. A Safety Analysis developed for Type B or greater quantities of radioactive materials, and Type A or greater quantities of fissile materials shall be approved by the DOE Field Office prior to conducting shipping operations. For shipments involving quantities less than these, the review and authorization levels by hazard classification, as suggested by DOE Order 5481.1A, should be used.

APPENDIX F

APPENDIX F

CONTROL OF CONSTRUCTION WASTE

CONTROL NO. 3062

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

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.

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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.

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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.

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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.

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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.

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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.

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7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.7.25 Using fabric strapping, secure lid on the box for interplant shipment.

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 <u>PROCEDURE</u> (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.

> **<u>WARNING</u>: VAPOR FROM SILICONE ADHESIVE IS HAZARDOUS.**

<u>NOTE</u>: Adhesive shall be applied to the farthest inside section first and outward from container to minimize inhalation of vapor.

<u>NOTE</u>: 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).

<u>CAUTION</u>: THE GROSS WEIGHT OF THE CONTAINER SHALL NOT EXCEED 42,000 LBS.

<u>CAUTION</u>: 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.

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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.

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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"

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Authorization: W. H. Britton, President	Supersedes: SOP 20-C-601, Dated 7-12-90, Rev. 1	Issue Date: 10-14-91

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

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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.

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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.

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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

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NON-RCRA, RADIOACTIVE, OR ASBESTOS DRUM

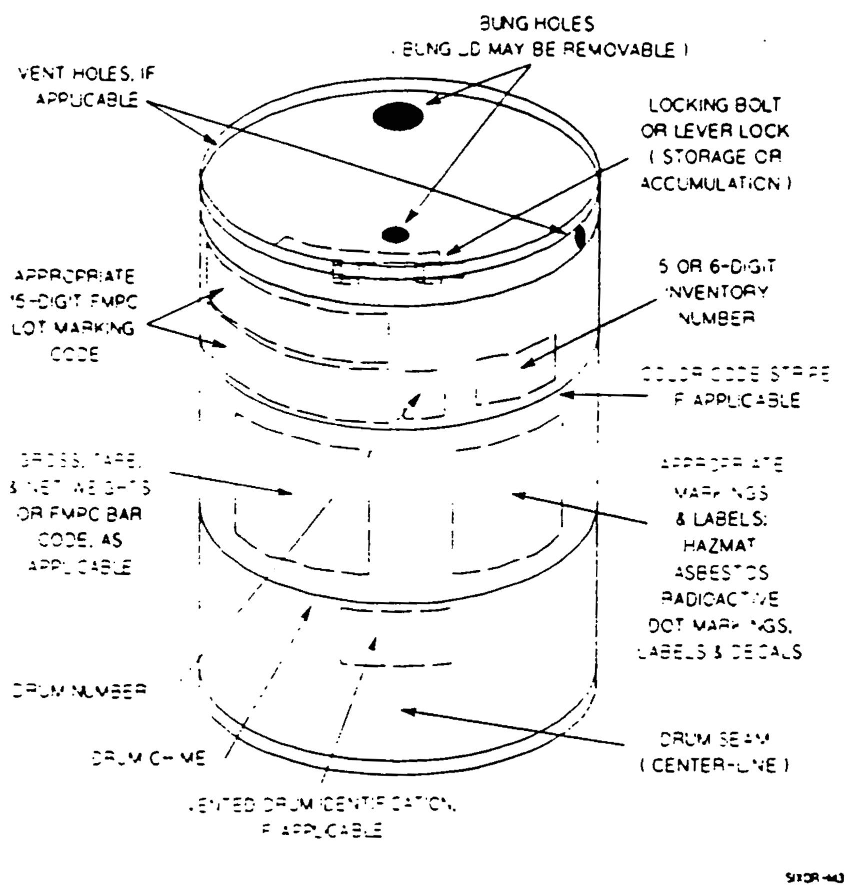

DIAGRAM OF LLRW DRUM LABELING
Figure 2

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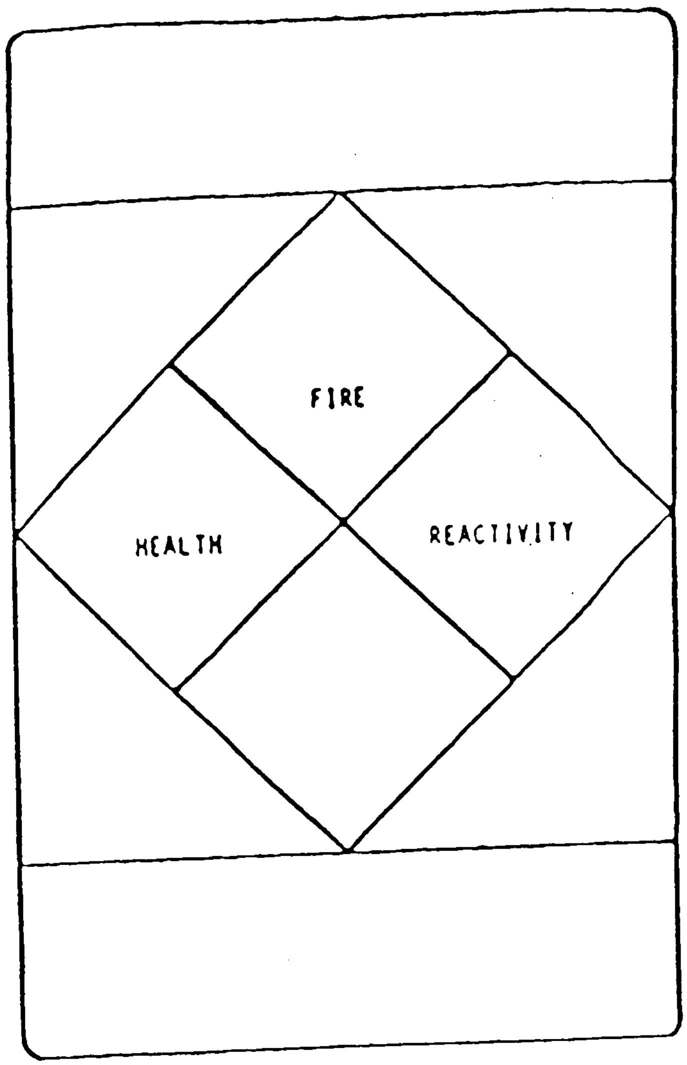

DIAGRAM OF HAZARDOUS WASTE LABEL
Figure 3

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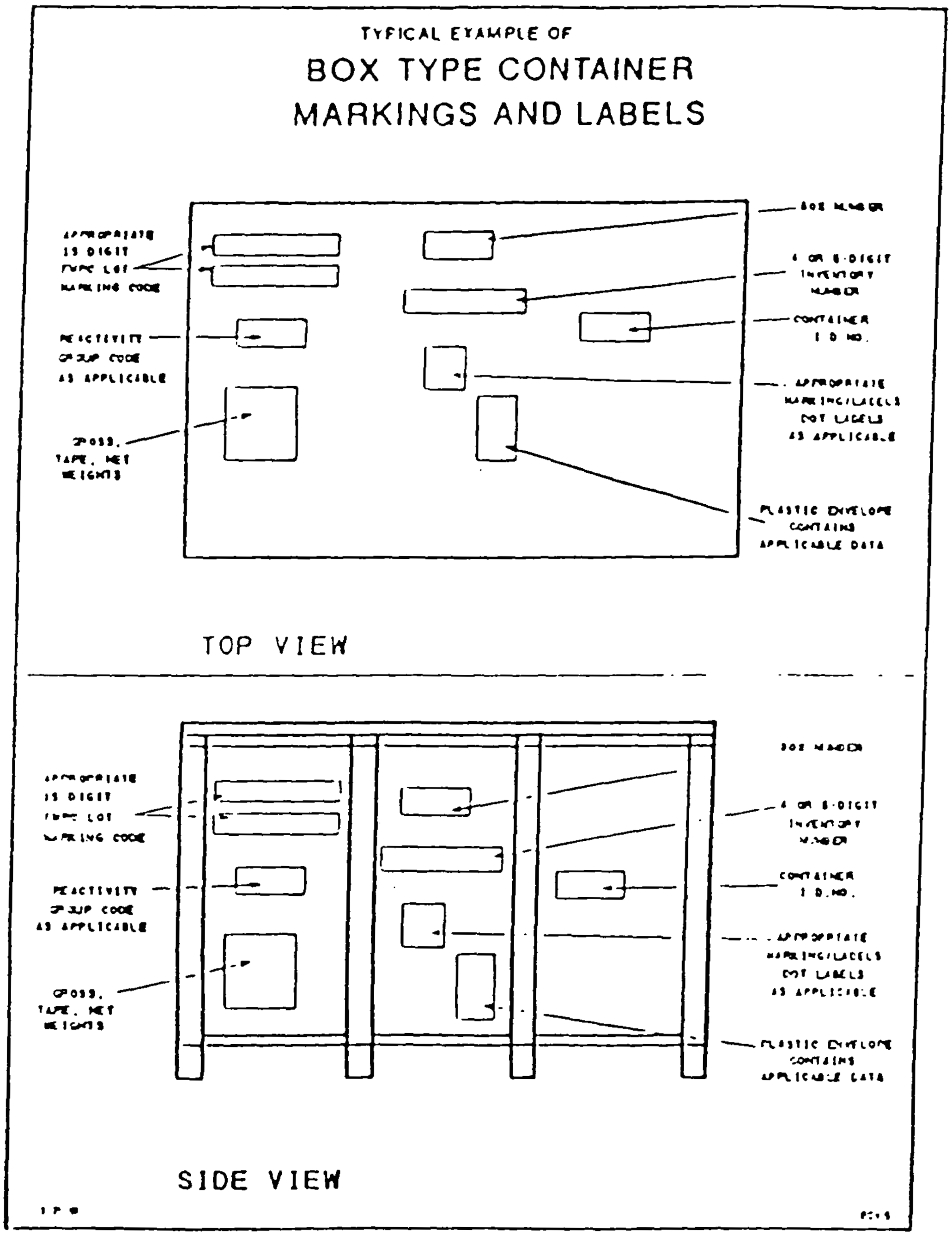

DIAGRAM OF METAL BOX IDENTIFICATION
Figure 4

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SEA/LAND CONTAINER
MARKINGS AND LABELS

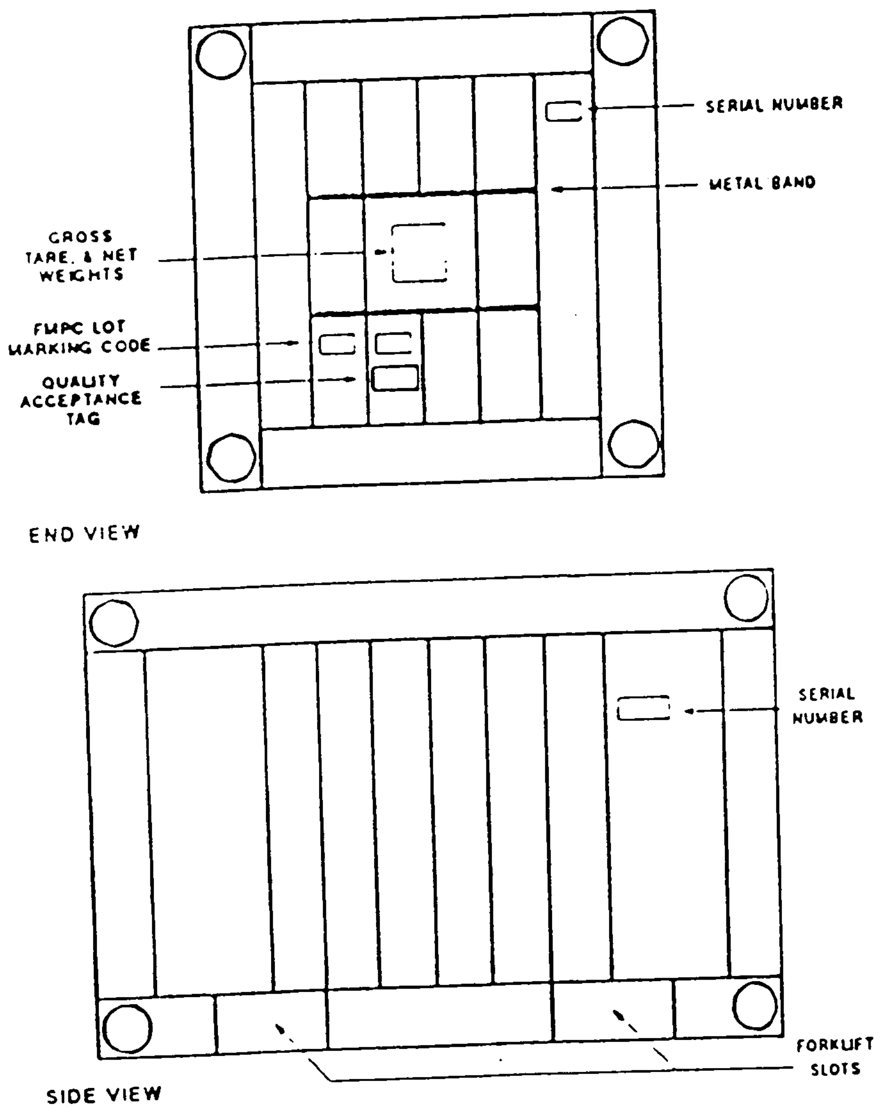

DIAGRAM OF SEA/LAND IDENTIFICATION
Figure 5

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		SITE STANDARD OPERATING PROCEDURE Page 29 of 29
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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.

CONTROL NO. 88-0008

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: HF 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 11e 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 exposure 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 by 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.

<table>
<tr><td colspan="2">WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO
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<tr><td colspan="2">Title: PREPARING AND EVALUATING WASTE STREAMS DESIGNATED AS LOW LEVEL RADIOACTIVE WASTE (LLRW)</td><td>DOCUMENT NO: IN-6028
SITE STANDARD OPERATING PROCEDURE</td></tr>
<tr><td>Authorization:
W. H. Britton, President</td><td>Supersedes: None</td><td>Issue Date: 10-30-91</td></tr>
</table>

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 determine 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

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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 20-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.

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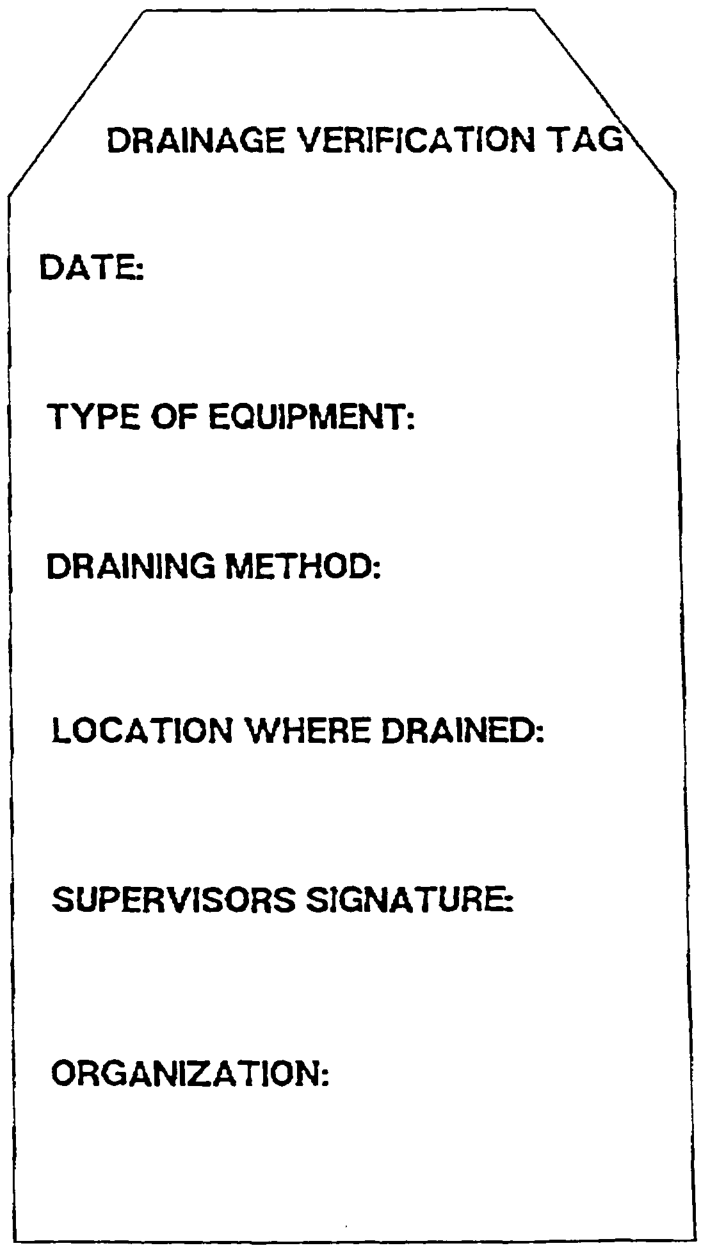

DIAGRAM OF DRAINAGE VERIFICATION TAG
Figure 1

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Authorization: W. H. Britton, President	Supersedes: None	Issue Date: 10-30-91

RECORD OF ISSUE/REVISIONS

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.

CONTROL NO. 88-0008

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.

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Title: DISPOSITION REQUIREMENTS FOR RADIOLOGICALLY CONTAMINATED AND UNCONTAMINATED CONSTRUCTION/ MAINTENANCE WASTE		DOCUMENT NO: IN-6031 SITE OPERATING REQUIREMENT
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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.

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Authorization: W. H. Britton, President	Supersedes: IN-6015, Dated: 09-27-91	Issue Date: 11-27-91

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 <u>REQUIREMENTS</u> (cont.)

6.2 <u>RUBBLE</u> (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 <u>METAL</u>

<u>NOTE</u>: 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.

<u>NOTE</u>: 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 <u>REQUIREMENTS</u> (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 <u>PROCESS EQUIPMENT</u>

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 <u>WOOD</u>

<u>NOTE</u>: 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.

<u>NOTE</u>: Based on RST findings, the wood shall be processed as LLW or certified clean and free released.

6.6 <u>ASBESTOS</u>

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

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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.

3062
CONTROL NO. 88-OCCE

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Title: **CONTROL OF CONSTRUCTION/MAINTENANCE WASTE**		DOCUMENT NO: IN-6032 SITE POLICY AND PROCEDURE
Authorization: [signature] 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"

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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.

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Authorization: W. H. Britton 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.

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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 <u>RESPONSIBILITIES</u>

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 is 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.

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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.

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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.

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5.0 <u>GENERAL</u> (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.

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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.

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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.

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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 specifying 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.

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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.

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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.

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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"

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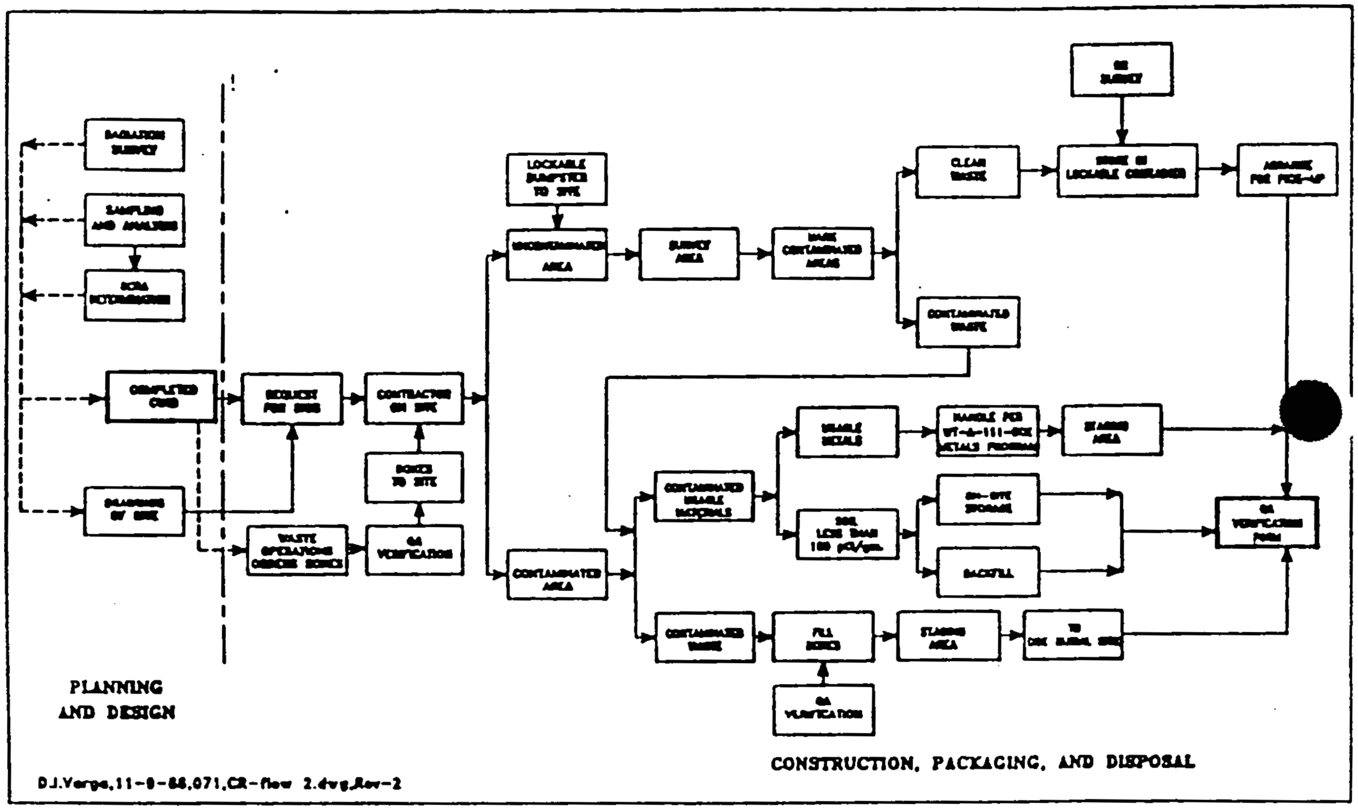

CONSTRUCTION, PACKAGING, AND DISPOSAL DIAGRAM
Figure 1

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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.

APPENDIX G

APPENDIX G

QUALITY ASSURANCE PLAN

PL-3014
Supersedes IN-6013
Dated 9/27/91

WEMCO QUALITY ASSURANCE PROGRAM PLAN

Issue Date: 11-27-91

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT
COMPANY OF OHIO

P.O. BOX 398704
CINCINNATI, OHIO 45239-8704

PL-3014
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Revision No. 0

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RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
11-27-91	0	Plan required for WEMCO Quality Assurance Program incorporating requirements of the Restoration Quality Assurance Program Plan and Quality Assurance Program requirements per 40 CFR Part 61. Includes key terminology, organization and requirements update per Request No. P91-596, initiated by K. A. Merriman.

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STATEMENT OF WEMCO QUALITY ASSURANCE POLICY AND AUTHORITY

WEMCO QUALITY POLICY

The policy of Westinghouse Environmental Management Company of Ohio is to provide products and services which meet the customer's need and perform their required function reliably and safely while improving the environment. We will continuously improve the quality of our products and services by doing the right things right the first time.

This Quality Assurance Program Plan incorporates the Westinghouse Environmental Management Company of Ohio (WEMCO) policies for achieving or exceeding the required quality levels for WEMCO activities at the Fernald Environmental Management Project (FEMP). The Quality Assurance program is described in the plan and meets the requirements of the quality assurance standard ANSI/ASME NQA-1, "Quality Program Requirements for Nuclear Facilities." The program also meets the requirements of DOE 5700.6C and U.S. Environmental Protection Agency (EPA) Guideline QAMS-005/80. The achievement of quality at the FEMP shall not be sacrificed because of cost or schedule.

I retain the responsibility for the overall WEMCO Quality Assurance (QA) Program. The authority for establishing, administering, and evaluating the effectiveness of the QA Program is delegated to the Manager of Environmental Compliance & Quality Assurance (EC&QA). Members of my staff are responsible for implementing the program in their organizations. All levels of management are responsible for the achievement of quality and taking a leadership role in ensuring that this QA Program Plan is understood by all employees and implemented. Each employee is responsible for compliance with the requirements of the Program as it applies to his/her work assignments.

I encourage each of you to fully support implementation of this plan which will assure us of a sustained leadership position in the quality of our products and services.

W. H. Britton, President
Westinghouse Environmental Management Company of Ohio

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WEMCO QUALITY ASSURANCE PROGRAM PLAN

INTRODUCTION

1. Background

A Quality Assurance Program defines the way an organization does business. From 1953 to 1989, the Fernald Environmental Management Project (FEMP), formerly the Feed Materials Production Center (FMPC), was a production facility that supplied DOE with uranium metal products for the nation's defense programs in a consistently safe and economical way. Uranium metal production was suspended in July 1989 to focus on environmental restoration of the site. Later that same year the site was added to the Environmental Protection Agency's (EPA) National Priority List of federal facilities in need of remediation. Since then no uranium metal products have been produced. The current mission at the FEMP is environmental restoration and compliance with federal and state laws, regulatory requirements and legal agreements. An integral part of successfully pursuing this mission is to assure that the required level of quality in all site activities is achievable, while also taking the necessary measures to assure health and safety of both site personnel and the public and to safeguard the environment. The success of the FEMP depends on the required level of quality being achieved in every functional area including design and analysis, procurement, fabrication, installation, construction, testing, handling, storing, shipping, operating, maintenance, repair, modification, sampling, monitoring, measurement, data analysis, inspection, and documentation.

2. Program Standard

To provide adequate assurance that required levels of quality are being achieved, this program is based on the criteria specified in ANSI/ASME NQA-1, Federal EPA Guidelines QAMS-005/80, Department of Energy (DOE) Orders 5700.6C and 5400.1, and other DOE Orders specifying quality assurance-related requirements.

3. Plan Content

The purpose of the WEMCO QA Program Plan (hereafter also referred to as "Plan") is to describe the overall QA Program (hereafter also referred to as "Program") for the WEMCO activities performed in the operation of the FEMP. Included in the 18 sections of the Plan are the requirements of DOE Order 5700.6C, the requirements derived from the eighteen criteria of NQA-1, and the essential elements of a QA plan for environmentally related measurement projects as specified in QAMS-005/80 and DOE Order 5400.1.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

3. Plan Content (cont.)

Each section of the Plan identifies responsibilities for functions covered in NQA-1 and outlines the procedural approach that will be followed. To organize the program to the FEMP operations the 18 sections can be grouped as follows:

A. Group 1 - Management of the WEMCO QA Program. (Sections 1.0, 2.0, 3.0, 4.0, 6.0, 9.0, 15.0, 16.0, and 17.0)

Group 1 provides for establishing the responsibility and authority of the functional units of WEMCO relative to assuring quality of processes and products involved in the operation of the FEMP. It describes the role of the QA organization in establishing and maintaining the Program. It defines required quality levels for our work and provides for training of personnel and the interfacing between organizations to assure the varied expertise of the organization is brought to bear. It establishes a system for the prevention, early detection, correction, and reporting of deficiencies, including any breakdown in the management systems to assure quality and improvement. It describes the document control system and the system for the compilation of the records which document our management of the program.

B. Group 2 - Performance of Work. (Sections 3.0, 5.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, and 14.0)

Group 2 provides for controlling activities associated with establishing and maintaining the technical requirements for our work. Included are design and procurement specifications and requirements for testing. It provides for the control of approved instructions, procedures, drawings and other appropriate documents. It provides for the control of processes used in site restoration, environmentally-related measurements, handling wastes and in the construction and maintenance of facilities. Measuring and test equipment used in these processes are calibrated to maintain accuracy. Items received or manufactured by WEMCO are identified and controlled to verify they are made and conform to established requirements. Provisions are included for handling, storage, and shipping of materials to protect against loss of containment integrity and physical damage. Provisions are included for using approved suppliers of purchased material, equipment and services which satisfy company requirements. Provisions are included for items (i.e., hazardous waste, environmental media, and product) to be monitored, measured and tested. Associated processes are monitored and observed during construction, operations (including environmental monitoring), and site restoration activities to determine conformance to procedural and technical requirements and to ensure continuous improvement in the quality of all products and services. The acceptance status of items subject to inspection and test is known throughout these operations.

3. Plan Content (cont.)

   C. Group 3 - Assessment of the WEMCO Quality Assurance Program. (Sections 1.0, 2.0, and 18.0)

      Group 3 provides for periodic assessment of the Program to determine effectiveness and to promote improvement. It describes the organizational freedom and authority of the QA organization and its role in conducting audits and assessments. Provisions are included for qualification of persons conducting assessments. It provides for the auditing of operations and systematic handling of nonconforming conditions and learning through corrective actions.

4. Implementing the Plan

This Plan, submitted to the Contracting Officers' Representative (COR) for approval, is the WEMCO Quality Assurance Program Plan. It is not necessary for each department to develop a separate QA plan covering their operation. Implementing the Plan requires the use of site procedures and supplemental Department Procedures which satisfy the provisions of this Plan. This Plan does provide for the use of special QA Plans for programs or projects when additional controls are needed or special emphasis is needed. For example, the Analytical Laboratories organization maintains an approved QA plan which assures that the data generated to support the environmental monitoring program are of known quality.

Approved Quality Assurance Project Plans (QAPjPs) are required by the Amended Consent Agreement for the establishment of QA plans in accordance with EPA requirements to address data generation activities. QAPjPs shall describe the procedures used to determine the precision, accuracy, representativeness, comparability, and completeness of environmental measurements. A QAPjP for radionuclide emission measurements is specifically required per 40 CFR Part 61, "National Emission Standards for Hazardous Air Pollutants; Regulation of Radionuclides." Guidance for the preparation of QAPjPs is provided in implementing site procedures (see Appendix B).

Approved QA plans, where required, shall be in place prior to initiation of project/program activities.

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WEMCO QUALITY ASSURANCE PROGRAM PLAN

SECTION 1.0 - ORGANIZATION

1.1 General

The responsibility of the functional units of the WEMCO organization relative to assuring quality of FEMP processes, restoration activities, and products are described in this section. The role and authority of the QA organization in establishing and maintaining the QA Program is also described.

1.2 Requirements

1.2.1 The assignment of major functions within the WEMCO organization, are defined in Appendix A of this plan.

1.2.2 The manager of the Environmental Compliance & Quality Assurance (EC&QA) Department reports directly to the WEMCO President. This provides the QA portion of the organization freedom and authority to:

1.2.2.1 Identify problems, initiate corrective actions and verify that problems have been resolved.

1.2.2.2 Access work areas to conduct audits and assessments to verify that FEMP activities conform to the Quality Assurance Program.

1.2.2.3 Stop work or to control further operations where significant conditions adverse to quality are identified and immediate corrective actions are required.

1.3 Responsibilities

1.3.1 The President of WEMCO retains the authority and responsibility for the overall QA Program of WEMCO. This authority extends to the review and approval of this Plan, as well as the issue and maintenance of the WEMCO Total Quality Plan.

1.3.2 The Manager of EC&QA is responsible for developing the QA Program, monitoring its implementation and effectiveness and coordinating the WEMCO organizations' QA functions.

1.3.3 The QA organization includes a quality assurance group responsible for routinely monitoring and assessing analytical processes for precision and accuracy to support the FEMP site restoration program.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

1.3 Responsibilities (cont.)

1.3.4 Managers of functional departments and lower tier organizations are responsible for achieving quality in the products, processes, restoration activities and functions assigned to their organizations. They are responsible for conducting the operations of their organizations in compliance with the applicable requirements of this Plan.

1.3.5 Responsibilities for interfaces are designated in Site Documents (i.e, Department Charters, Site Policies and Procedures, Site Standard Operating Procedures) and Department Procedures assigned to the departments for development and maintenance.

1.4 Procedure

1.4.1 The organizational structure of WEMCO for implementing and monitoring the Program are shown in Appendix A.

1.4.2 Charters are prepared for each functional organization and issued in the Site Documents Manual.

1.4.3 Methods and practices followed by the functional organization in discharging assigned responsibilities are documented in Site Documents, and supplemented in Department Procedures.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

SECTION 2.0 - QUALITY ASSURANCE PROGRAM

2.1 General

The WEMCO QA Program Plan describes the system of controls which make up the QA Program. This section shows the relationship of the manuals and procedures which are used to document and implement the policies and provisions of the QA Program. It presents basic policy on training and qualification of WEMCO personnel and describes methods used for periodic assessment of the QA Program.

2.2 Requirements

2.2.1 The Basic Requirements and Supplements of NQA-1 and the requirements of DOE Order 5700.6C apply to the QA Program for FEMP activities. This involves establishing graded levels of QA based on the importance to safety and reliability as determined by risk assessment and analysis.

2.2.2 The requirements of QAMS-005/80 and DOE Order 5400.1 apply to all environmental sampling and measurement efforts mandated by the EPA. Approved QAPjPs are required by the Amended Consent Agreement for the establishment of QA Plans in accordance with EPA requirements to address data generation activities.

2.2.3 Control over activities which contribute to the achievement or verification of quality are described in written procedures which are used by functional organizations in conducting the activities.

2.2.4 Personnel performing quality achieving or verifying activities are indoctrinated and trained in accordance with formally planned, executed and documented training activities.

2.2.5 The QA Program is reviewed regularly and the results reported to the WEMCO President.

2.3 Responsibilities

2.3.1 Every level of organization involved in achieving quality is responsible for:

2.3.1.1 Evaluation of structures, equipment, systems, components and processes relative to their importance to safety, reliability and to other quality functions.

2.3.1.2 Preparing, implementing and maintaining site and department procedures, to comply with applicable requirements of this Plan.

2.3.1.3 Performing tasks in accordance with approved procedures consistent with this Plan.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

2.3 Responsibilities (cont.)

2.3.1.4 Assuring that its personnel receive the necessary orientation and training to assure compliance with existing, new or revised implementing procedures.

2.3.1.5 Evaluating the effectiveness of implementing the QA measures of the company.

2.3.2 In addition the QA organization is responsible for:

2.3.2.1 Establishing and maintaining the WEMCO QA Program Plan.

2.3.2.2 Review and approval of quality related procedures or documents prepared and submitted to the QA organization by other organizations to assure that specified quality requirements are incorporated.

2.4 Procedure

2.4.1 This Plan describes the QA Program which provides for a planned and disciplined approach to achieving quality, safety and reliability of WEMCO processes, restoration activities, and products.

2.4.2 Activities are conducted in accordance with the following types of controlled documents:

2.4.2.1 Site Documents Manual - contains the top level documents for implementing the QA Program: Charters, Site Policies, Site Procedures, and Site Standard Operating Procedures. The Document Control organization coordinates the writing and review of the procedures by affected disciplines and controls the issuance. A matrix which identifies the site implementing procedures for each element of the Program is included as Appendix B to this Plan.

2.4.2.2 Site Operating and Interfacing Documents - include Information Documents, Requirements Documents, and Site Operating Documents. Also included are plans, such as work plans, which may be required by DOE Orders as well as Regulatory agencies and legal agreements. These documents provide detailed requirements/instructions to more than one department in a particular area of concern.

2.4 Procedure (cont.)

2.4.2.3 Department Documents - include department procedures, plans and manuals. These documents provide detailed information to department personnel on the performance of their work. They are prepared and issued by department management.

2.4.2.4 Technical procedures - provide information (i.e., operational, maintenance, test) for use in facility and process system activities.

2.4.3 The Program uses "graded" levels of quality assurance related to the importance to safety or intended function. The amount and type of verification applied to WEMCO activities varies based on the quality level classifications determined for the component, system, structure, process, computer program, or data use. Quality level determination is based on performing a risk assessment for the new or modified facility or process in accordance with the applicable site document. Data Quality Objective analytical levels are based upon use of data generated and the analyte of concern in accordance with applicable QAPjP's and site documents.

2.4.4 Special action plans are developed for use on programs or projects where additional guidelines or controls are needed to prevent failures or mitigate the consequences of accepted risks. The QA organization reviews and approves these special action plans.

2.4.5 Training and indoctrination programs include such subjects as:

- QA Program/Quality related and special work related activities to achieve understanding and commitment to the requirements of the QA Program
- Industrial and Radiological Safety/Operations/Maintenance activities
- Nondestructive examination (NDE) and inspection methods and techniques
- Inspection, test and audit personnel certification

2.4.6 The QA Program is reviewed at least once per year. The review is a management assessment of the effectiveness of the program and is accomplished by one or more of the following:

2.4 Procedure (cont.)

2.4.6.1 An assessment by QA Management, including such things as reviews of quality problems and their underlying causes, analysis of trends to deliberately and continually seek out potentially significant conditions adverse to quality, and reviews of other program assessment actions such as audits (internal and customer) and corrective action status. This assessment, which shall include, as a minimum, the problems encountered and their resolution or planned resolution, shall be reported to the Fernald Office (FO) Office of Assistant Manager for Environment, Safety, and Quality (AMESQ) and the Contracting Officers' Representative (COR).

2.4.6.2 Internal audits or management assessments which may be directed by the WEMCO President's staff to assess particular aspects of the program's effectiveness.

2.4.6.3 Audits or assessments by other qualified Westinghouse groups.

2.4.7 The QA organization periodically reports to management on the performance of measurement systems and data quality. These reports include assessments of data accuracy, precision and completeness.

2.4.8 Problem prevention encompasses a broad variety of activities, at the FEMP. These include: assessments, audits, design control, procurement document control, control of purchased items, occurrence reports, corrective action reports and employee incentives. Together these activities form a system which continually improves quality and prevents problems.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

SECTION 3.0 - DESIGN CONTROL

3.1 General

Control measures are used to assure that design requirements, including quality standards, are defined and verified as applicable, and are accurately represented in drawings, specifications and procedures.

3.2 Requirements

3.2.1 Design Input - The comprehensive set of functional and operational requirements, design criteria, computer programs, regulatory requirements, codes and standards on which the design is based are clearly identified, documented and approved. Changes from the approved design bases, including the reason for the changes are identified, documented and approved.

3.2.2 Design Process - The final approved drawings, specifications and procedures are traceable to the design basis using documents prepared in sufficient detail to permit independent verification of design procedure and calculation accuracy.

Design analyses are documented in sufficient detail to permit independent verification.

Applicable quality standards are identified, documented, and receive approval by the QA organization.

3.2.3 Design Verification - Designs are independently verified using one or a combination of design reviews, alternate independent calculations and qualification testing, depending on the safety aspects of the item, the complexity of the design, the similarity of the design with previously proven designs and current technology. Verification of computer programs shall include appropriate testing. The method and results of design verification shall be clearly documented with the identification of the verifier clearly indicated. Design verification shall be performed by any competent individual(s) or group(s) other than those who performed the original design but who may be from the same organization. Verification shall be completed prior to relying upon the component, system, structure, process, computer program, or data to perform its function.

3.2.3.1 Design Reviews - Planned design reviews are conducted as part of the design process. The results of the reviews are reported to the responsible design manager and include planned actions to resolve any deficiencies noted. Resolution of deficiencies is documented by the responsible organization.

3.2 Requirements (cont.)

3.2.3.2 Calculations - Design calculations are verified for accuracy by personnel other than those involved in the original design work, or by the use of alternate calculation methods of proven validity. Results of the reviews are documented.

3.2.3.3 Qualification Testing - Designs are verified by testing conducted under either simulated or actual environmental conditions consistent with design basis requirements in accordance with approved procedures which incorporate test requirements and acceptance criteria. Results are documented in test reports and serve as a basis for review and confirmation of design accuracy.

3.2.3.4 Interface Control - Procedures provide for the coordination and control of design interfaces where responsibility for design activities are assigned and requirements for design document review and approval are identified.

3.2.3.5 Documentation and Records - Final design documents (drawings/specifications and supporting documents, which may include computer programs or corresponding mathematical models) are collected and maintained in accordance with documented procedures.

3.2.3.6 Extent of Design Verification - The extent of the design verification required is determined by the Project Manager and is a function of the importance to safety of the item under consideration, the complexity of the design, the degree of standardization, the state of the art, and the similarity with previously proven designs.

3.2.4 Change Control - Changes to final designs, including field changes, shall be justified and subjected to design control measures commensurate with those applied to the original design. Where a significant design change is necessary because of an incorrect design, the design process and verification procedure shall be reviewed and modified as necessary.

3.3 Responsibilities

3.3.1 Organizations performing quality affected design functions are responsible for establishing design control procedures which comply with the requirements of this Plan.

3.3 Responsibilities (cont.)

3.3.2 Design engineers are responsible for incorporating quality-affecting design requirements in design documents, such as drawings, specifications, and test procedures.

3.3.3 The QA organization is responsible for reviewing design documents to ensure that quality attributes are specified and can be inspected and that design control procedures have been followed.

3.4 Procedure

3.4.1 A control system which controls and documents design activities is defined in procedures.

3.4.2 The design basis is developed to include applicable regulatory requirements.

3.4.3 Design activities, including a risk analysis for the facility/equipment design, are conducted and coordinated with the Industrial, Radiological Safety & Training (IRS&T) Department, the QA organization, and technical support organizations to maintain design interfaces.

3.4.4 Specifications, drawings and procedures are prepared and changes controlled to assure configuration control.

3.4.5 The designs described in final design documents (e.g., drawings) are verified using methods authorized in this Plan.

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WEMCO QUALITY ASSURANCE PROGRAM PLAN

SECTION 4.0 - PROCUREMENT DOCUMENT CONTROL

4.1 General

Procurement documents are generated and controlled in accordance with established procedures which ensure the incorporation of applicable technical and quality requirements. Procurement documents receive independent reviews to determine that applicable technical interfacing and quality program requirements are applied and necessary verification measures are imposed.

4.2 Requirements

4.2.1 The preparation and control of procurement documents are performed in accordance with Site Documents.

4.2.2 Technical Requirements - Applicable design basis and regulatory requirements are included in the purchasing documents and accompanying drawings and specifications.

4.2.3 Quality Assurance Program Requirements - A Quality Level is assigned to procurement documents which defines requirements for the supplier quality assurance program to be applied to items or services procured.

4.2.4 Right of Access - Procurement documents include provisions for imposing applicable requirements to lower tier subcontractors and suppliers including WEMCO access to plant facilities and records for source inspection and audit as determined necessary.

4.2.5 Documentation Requirements - The quality assurance records to be prepared and maintained by the supplier, along with storage, disposition and retention time requirements, are defined in the purchase order/subcontract.

4.2.6 Nonconformances - Suppliers report nonconformances to procurement requirements to WEMCO for disposition as stipulated in the purchase order.

4.2.7 Spare and Replacement Parts - The purchase order/subcontract requires the supplier to furnish technical and quality assurance requirements which would be imposed in ordering the spare and replacement parts identified by the supplier.

4.2.8 Procurement Document Review - Independent reviews of procurement documents are performed prior to release to the supplier to determine that applicable technical and quality assurance program requirements are included and are verifiable.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

4.2 Requirements (cont.)

4.2.9 Procurement Document Changes - Whenever technical or quality assurance requirements change as a result of such activities as design change, review comments, and nonconformance disposition, procurement documents are changed and processed through the same reviews as the original document.

4.3 Responsibilities

4.3.1 Preparation of purchasing documents and obtaining the independent reviews are the responsibility of the requisitioner. Technical review and disposition of supplier submittals is the responsibility of the requisitioner.

4.3.2 Organizations providing technical interfacing activities with the requisitioning group will perform independent reviews of procurement documents and supplier submittals as required.

4.3.3 The QA organization is responsible for reviewing the quality assurance program requirements incorporated in procurement documents and for reviewing supplier submittals for proper disposition action.

4.4 Procedure

4.4.1 The technical and quality assurance requirements are incorporated in the purchase requisition document through reference to applicable drawings and specifications and entering the Quality Level classification which applies.

4.4.2 The need for independent technical reviews is determined based on requirements of the Site Policies and Procedures (SP&P) and Site Standard Operating Procedures (SSOP). Comments resulting from the reviews and requisitioner disposition are documented.

4.4.3 Changes to technical or quality assurance program requirements, which result from the bid/proposal evaluation process or subsequent contract implementation, are formally documented and submitted to the independent review organizations for approval.

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SECTION 5.0 - INSTRUCTIONS, PROCEDURES AND DRAWINGS

5.1 General

Written instructions, procedures and drawings are used to prescribe and control activities affecting quality of FEMP processes, data, and products. These documents incorporate the criteria which are used to judge the acceptability of the activities.

5.2 Requirements

5.2.1 Written instructions, procedures and drawings are developed and approved for the performance of activities which achieve or verify the quality of processes or products.

5.2.2 Written instructions, procedures and drawings provide directions for activities to be performed under controlled conditions and in proper sequence. They provide for independent verification for acceptability based on acceptance criteria which are incorporated in the document.

5.3 Responsibilities

5.3.1 Each member of management is responsible for assuring that activities affecting quality under their cognizance are prescribed and controlled by instructions, procedures or drawings.

5.3.2 Organizations who prepare instructions, procedures and drawings will ensure that these documents adequately describe activities affecting quality and otherwise satisfy the WEMCO procedures for preparation, maintenance and control of such documents.

5.3.3 In addition, the QA organization reviews these documents to assure the requirements of this section of this Plan and supporting procedures are adhered to.

5.4 Procedure

5.4.1 SP&Ps and SSOPs are developed and maintained to provide direction on the preparation of instructions, procedures and drawings used to control activities affecting quality.

5.4 Procedure (cont.)

5.4.2 Responsible managers prepare the documents used to perform and control activities affecting quality: included are Site Policies and Procedures, Site Standard Operating Procedures, Department Procedures, Test Procedures, Engineering Drawings, Inspection Procedures, Calibration Procedures, and Work Orders/Packages.

5.4.3 The controls over preparation, review, approval, change, issue and distribution of documents are covered in Section 6.0.

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SECTION 6.0 - DOCUMENT CONTROL

6.1 General

Activities which affect quality are governed by controlled documents such as technical specifications, drawings, permits, instructions and procedures. Documents such as computer graphics and maps are also subject to document control. Departments responsible for the preparation of these documents obtain review and approval by other departments in accordance with established site policies and procedures. Comments are resolved prior to approval and implementation of the documents. Document revisions are reviewed and approved by the same organizations which performed the original review and approval. The document issue and distribution methods provide for availability of correct and applicable documents at locations where they are used.

6.2 Requirements

6.2.1 Documents which specify quality requirements or prescribe activities affecting quality are reviewed for adequacy, approved for release by authorized personnel and controlled to assure that correct documents are being employed at work locations.

6.2.2 Changes to documents are reviewed for adequacy and approved for release by the same organizations as the original document, except for minor changes. The authority to classify changes as minor is documented. Minor changes are limited to those which are inconsequential editorial corrections such as spelling, grammar, or punctuation corrections.

6.2.3 The document control system provides for identification and methods for control of the documents.

6.3 Responsibilities

6.3.1 Each department is responsible for preparing their procedures, obtaining the required reviews and approvals prior to issue, and issuing them as controlled procedures.

6.3.2 The manager of the issuing organization is responsible to route the document to other interfacing organizations for review and to ensure that the review and comment resolution process is completed.

6.3.3 Organizations involved in document control are responsible for establishing and implementing procedures describing their control system.

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6.3 Responsibilities (cont.)

6.3.4 Controlled document holders maintain the latest revision of documents until superseded. Superseded documents are then disposed of to avoid use in subsequent work activity.

6.3.5 The manager of the issuing organization must assure that historical copies of superseded documents are maintained.

6.3.6 Work activity managers and supervisors assure that the correct revision of documents are used at work locations.

6.4 Procedure

6.4.1 The Site Documents Manual and Department Procedure Manuals contain procedures describing review, approval, distribution, and revision of the procedures contained therein. Documents are serialized and assigned to specific individuals or groups. The control of department procedures and instructions is provided by master lists maintained under the responsibility of the department manager.

6.4.2 Technical procedures, which include test procedures, standard operating and maintenance procedures, sampling procedures, calibration procedures, and construction/installation procedures, are issued and controlled by the responsible department in accordance with SP&P.

6.4.3 Controlled documents are reviewed and approved by authorized department personnel. The review encompasses comparison to applicable contract, standard, and regulatory requirements, and explicit review for acceptance criteria, inspectability, and definition of inspection witness points.

6.4.4 Document approvals are indicated and documented after review comments are resolved, in accordance with the approved document control procedures.

6.4.5 Approved documents are issued to designated recipients in accordance with authorized distribution lists which are developed and maintained by the issuing organization.

6.4.6 When it is determined that drawings and specifications no longer have applicability at active work sites, copies are removed from work-place areas and destroyed.

6.4.7 Historical copies of superseded documents shall be identified as such and stored in such a manner to avoid inadvertent use.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

SECTION 7.0 - CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES

7.1 General

Selected suppliers provide acceptable material, equipment, and services which are produced under quality systems that satisfy the requirements of the purchase order/subcontract and the pertinent FEMP Site Policies and Procedures (SP&Ps).

7.2 Requirements

7.2.1 Procurement Planning - Procurement is performed in accordance with documented procedures which describe the sequence of activities for evaluating and selecting the supplier, monitoring supplier performance at the source and examination of items on delivery.

7.2.2 Supplier Selection - The suppliers used have demonstrated or have been evaluated as having the ability to provide acceptable items and services based on prior experience, current documented evidence or direct evaluation of capabilities.

7.2.3 Bid/Proposal Evaluation - Supplier bids/proposals are evaluated for conformance to the technical and quality requirements of the solicitation. Unacceptable conditions disclosed by the evaluation are resolved prior to contract award and start of work.

7.2.4 Supplier Performance Evaluation - Planned surveillance of suppliers is performed during material processing to assure the supplier satisfactorily performs the fabrication, inspection, testing, and shipping according to purchase order requirements. Surveillance activities including supplier discrepancies and audit results are documented.

7.2.5 Control of Supplier Generated Documents - Supplier documents are submitted in accordance with purchase order/subcontract requirements and are reviewed for conformance to the technical and quality requirements of the order. WEMCO procedures describe the requirements for interfacing with the supplier when documenting review results and resolving discrepancies.

7.2.6 Control of Changes in Items or Services - Changes to requirements in the course of procurement are documented in a formal change to the purchase order/subcontract. Supplier-proposed changes, once approved by WEMCO, are also implemented through formal changes to the purchase order/subcontract.

7.2 Requirements (cont.)

7.2.7 Acceptance of Items or Services - The supplier inspects, tests, and otherwise controls his product to allow meaningful product certifications. Supplier surveillance by WEMCO, and receipt inspection or functional testing of delivered product are used as the basis of acceptability of items or services.

7.2.8 Control of Supplier Nonconformance - The supplier controls nonconforming items, notifies Procurement who notifies affected WEMCO organizations and implements approved disposition action as required in the purchase order/subcontract.

7.2.9 Commercial Grade Items - Commercial grade items are used in applications where specified in design documents. Acceptance for use is based on assuring the item is identified by manufacturer's catalog number and conforms to the manufacturer's published requirements.

7.3 Responsibilities

7.3.1 Requisitioning organizations perform technical evaluation of suppliers' bids/proposals and document submittals and disposition nonconformances reported by the supplier.

7.3.2 Procurement evaluates and selects suppliers, issues purchase orders/subcontracts and administers processing of supplier submittals and nonconformance reports.

7.3.3 The QA organization evaluates suppliers' performance and acceptability of procured items and evaluates suppliers for support of bid/proposal evaluation and selection.

7.4 Procedure

7.4.1 The purchase requisition identifies the Quality Level to be applied to the procurement. For major procurements involving bids and subcontract awards, a milestone schedule for completion of procurement action is used by the Procurement organization to control activities.

7.4.2 The selection of suppliers is based on assessment of supplier performance and capabilities. This supplier performance information along with technical considerations including quality assurance requirements and technical exceptions are the principal criteria applied in evaluating bids/proposals.

7.4 Procedure (cont.)

7.4.3 Surveillance of suppliers is performed during fabrication, inspection, testing and shipment of material and equipment based on the importance and complexity of the item and is imposed as a purchase order/subcontract requirement. Also during the course of the procurement the documents generated by the supplier are developed and submitted for approval by WEMCO.

7.4.4 Procured items are accepted based on inspection and formal release at the suppliers facility or based on inspection and/or functional testing performed upon receipt. Supplier certification, test and inspection reports and other supporting evidence are used to determine item acceptability.

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SECTION 8.0 - IDENTIFICATION AND CONTROL OF ITEMS

8.1 General

Identification and control measures are applied to items received or manufactured by WEMCO and to samples obtained to verify they conform to applicable drawings, specifications or other technical requirements.

8.2 Requirements

8.2.1 Identification Methods - Identification of material, parts and components is maintained by serial number, heat, batch, lot numbers, or other designations to provide clear and legible marking which does not affect function or service life of the item. Identification markings are assigned to all samples per approved procedure and located on items to preclude obliteration during processing.

8.2.2 Specific Requirements - Items received or manufactured by WEMCO are marked with identifications required by applicable specification or purchase order requirements and are traceable to item data records. Stored items are monitored and protected to control shelf-life expiration and marking deterioration due to environmental exposure.

8.2.3 Sample Requirements - Samples processed for environmental monitoring are required to be identified and tracked from acquisition to storage to analysis in accordance with written procedures.

8.3 Responsibilities

8.3.1 The cognizant engineer specifies identification for acquired or manufactured items.

8.3.2 Site Services applies identification to manufactured items in accordance with operating procedure requirements.

8.3.3 The QA organization reviews work and procurement documents for item identification provisions and includes identification in verification and certification activities.

8.3.4 The organizations responsible for sampling activities specify methods for identifying environmental samples and assign custody authority.

8.4 Procedure

8.4.1 Identification numbering and marking methods are included in purchase orders for procured items and in Site and Department Standard Operating Procedures for product manufactured by WEMCO.

8.4.2 Items requiring identification are inspected for proper marking as a condition for release for use or for shipment of product or waste to customer locations.

8.4.3 Methods for handling, locating, and monitoring items in storage, in order to maintain identification and observe shelf-life restrictions, are described in and department procedures.

8.4.4 Environmental samples are identified by pre-prepared sample labels, standardized field tracking reporting forms and laboratory sample custody logs.

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SECTION 9.0 - CONTROL OF PROCESSES

9.1 General

Processes used in site restoration, waste management, the manufacture and monitoring of product and in the construction, maintenance and monitoring of facilities are controlled by procedures where process parameters and associated environmental conditions are maintained within specified limits.

9.2 Requirements

9.2.1 Process Control - Normal chemical, metal, and waste handling processes and associated parameter and environmental condition controls are described in operating and chemical analysis procedures. Trained personnel use approved procedures which incorporate proven practices and in-process monitoring to assure product and data quality.

9.2.2 Special Processes - Processes such as welding, heat treating, nondestructive examination (NDE), when applied to construction or operation activities, are performed using qualified procedures, equipment and personnel, as specified in applicable codes and standards.

9.2.3 Qualification Requirements - Measures for establishing and maintaining special process procedure, equipment and personnel qualifications are described in site policies and procedures. Requirements for applying these qualifications to work activities are included in such documents as procedures, instructions, and work orders, which describe and authorize the work.

9.2.4 Qualification Records - The status of qualification of process procedures, equipment and personnel are documented, maintained, and used in controlling processes.

9.2.5 Data Control - For each major environmentally-related measurement parameter involved in environmental monitoring, written procedures are used to assess the precision, accuracy, and completeness of the measurement data. These procedures include the equations to calculate precision, accuracy and completeness, and the methods used to gather data for the precision and accuracy calculations.

9.3 Responsibilities

9.3.1 Cognizant engineers are responsible for including in procedures, instructions and other work control documents, requirements for process controls, including formal qualifications.

9.3 Responsibilities (cont.)

9.3.2 The Site Services and QA (for NDE activities) organizations responsible for performing special processes prepare the procedures, perform the qualification and maintain records and status of qualification data.

9.3.3 The QA organization verifies process qualification activities.

9.4 Procedure

9.4.1 Procedure documents for the control of processes prescribe methods to be followed in planning, conducting, and maintaining procedure, equipment and personnel qualifications. The operating procedure for the process includes acceptance criteria for the process parameters or environmental conditions being controlled. These procedures receive the QA organization's review and approval.

9.4.2 Approved process procedures are used in construction, operations, waste management and site restoration work and as appropriate, include verification steps performed by the QA organization. Currently qualified process procedures, equipment and personnel are used as specified in work control documents.

9.4.3 Records of qualification are maintained and periodic status reports issued and used to determine personnel, procedure and equipment assigned to work.

9.4.4 Statistical methods applicable to environmentally-related measurement projects include: central tendencies and dispersions, data quality assessment, significance tests, confidence limits and testing for outliers. Laboratory and field items used for quality control checks include: replicates, spiked samples, split samples, control charts, blanks, internal standards, zero and span gases, quality control samples, surrogate samples, calibration standards and devices, and reagent checks.

9.4.5 Written procedures are used for routinely assessing environmental monitoring and measurement data. Routine assessments assure that the quality assurance objectives for measurement data in terms of precision, accuracy, completeness, representative and comparability are being met. These documents outline the data flow or report scheme from collection of raw data through storage.

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SECTION 10.0 - INSPECTION

10.1 General

Product, hazardous by-product and environmental samples are examined, measured, and tested and associated processes are monitored and observed during construction and site restoration to determine conformance to requirements specified in drawings, specifications, and procedures. Inspection and analysis activities are planned and performed by qualified personnel who are independent of the work group, using approved procedures. Inspection and analysis results are based on documented acceptance criteria or data quality objectives for analysis activities and are documented and approved by authorized personnel.

10.2 Requirements

10.2.1 Personnel - Inspection and analysis activities performed for the purpose of accepting product, determining product or waste compositions, environmental monitoring, authorizing releases to the environment or verifying body burdens of radioactive or toxic materials is done by qualified personnel who are independent of the producing organizations.

10.2.2 Inspection Planning - Inspections are performed at designated steps in the process sequence as documented in operating procedures, inspection instructions or work control documents. Inspection steps are mandatory hold points unless waivers are authorized prior to proceeding. Sampling for inspection is based on recognized standards or approved alternates.

10.2.3 In-process Inspection - Inspection of items in process or under construction is performed to verify that specifications are met. To supplement item inspections, processing methods, equipment and personnel are monitored at the work location to verify that process control elements are being applied.

10.2.4 Final Inspection - As verification that the inspection program has been effectively applied, a final check of the item and associated records is performed to assure completeness and proper authorization of acceptance of the work, including required rework to resolve nonconformances.

10.2.5 In-service Inspection - Scheduled testing and surveillance of operating equipment is performed using procedures which verify safety system performance, instrument calibration and proper maintenance of equipment.

10.2 Requirements (cont.)

10.2.6 Analysis - To assure analytical results are representative of the environmental media and conditions being measured, controls are imposed on sampling methods and sample custody, analytical procedures used and data reduction, validation and reporting.

10.3 Responsibilities

10.3.1 Managers of laboratories performing analytical tests are responsible for establishing chemical analysis controls for the test and examination services provided to support site restoration, environmental monitoring, and health programs.

10.3.2 The QA organization is responsible for planning and performing the item and in-process inspection applied to construction, restoration, waste handling, and site supporting activities.

10.3.3 The Site Services and Environmental Management Departments are responsible for establishing in-service inspection programs to cover operation of equipment and facilities involved in operations, site restoration, environment, and health programs.

10.3.4 The Site Services and Environmental Management Departments are responsible for the collection of valid measurement data and the routine assessment of measurement systems for precision and accuracy in support of environmental monitoring. Periodic reports of data appraisals will be prepared and submitted to management.

10.4 Procedure

10.4.1 Inspection hold points, witness points, acceptance criteria, and provisions for recording inspection results are included by the cognizant engineer in standard operating procedures, construction work documents, or in procurement documents for purchased items.

10.4.2 Personnel performing inspection activities meet the qualification requirements specified in department procedures. They respond to notifications that hold or witness points have been reached in the work sequence and perform the specified inspection activity and record results.

10.4.3 Surveillance of work activities is conducted to complement the hold point inspection plan. The checklists used provide for sufficient coverage of work controls to verify conformance to work procedures.

10.4 Procedure (cont.)

10.4.4 The completed inspection documents receive a final review as a basis for authorizing the work as complete and acceptable. These documents are maintained as QA records.

10.4.5 In-service inspections or surveillances are planned, performed, and documented by the organization responsible for the operations. Included is the preparation of the procedures and the evaluation of results to determine adequate performance of equipment.

10.4.6 All activities which could directly or indirectly influence data quality on environmental monitoring are controlled by procedures. Procedures prescribe sample equipment, sampling methods, test procedures and analytical methods. Documentation of samples, sample custody, transportation, handling and storage are covered.

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SECTION 11.0 - TEST CONTROL

11.1 General

Testing used to verify conformance of an item or a process to specified requirements is performed according to written procedures which contain the test requirements and acceptance limits. The test results are evaluated and conclusions regarding item or process qualification or acceptability are documented and maintained along with other pertinent testing data as test records.

11.2 Requirements

11.2.1 Test Requirements - Testing requirements and acceptance criteria are incorporated in design specifications, drawings, and purchasing documents by the item or process designer.

11.2.2 Test Procedures - Testing is conducted by trained personnel using documented and approved test procedures. Test procedures provide for meeting prerequisites, using calibrated test instruments, and performing the test under suitable environmental conditions where test data are recorded and test operations monitored for compliance to test requirements.

11.2.3 Test Results - Test data are recorded and traceable to the item or process under test. These test results are evaluated by the designer and, for formal items or process qualification testing, may receive an independent review.

11.2.4 Test Records - Testing information covering planning, performance and evaluation is compiled and maintained as the test record. Included are the actions taken to resolve any deviations observed.

11.3 Responsibilities

11.3.1 The designer is responsible for preparing test procedures, monitoring test performance, and evaluating test results.

11.3.2 The test equipment/facility operator is responsible for training test operating personnel and for performing the test, recording data, and implementing corrective action for nonconforming conditions.

11.3.3 The QA organization reviews and approves the test procedures, provides independent verification of compliance to test requirements, and assures deviations are resolved.

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11.4 Procedure

11.4.1 Testing to qualify equipment or processes for site restoration or new application, or for acceptance of vendor supplied or WEMCO fabricated items is covered by written procedures which have been reviewed and approved by the QA organization. Testing of a developmental nature is not subject to these testing controls.

11.4.2 Tests are performed by trained personnel using the approved procedures. Test operations may be monitored by the cognizant design organization to assure test requirements are satisfied or provisions incorporated in the test procedures for the QA organization to perform independent verification of procedure compliance.

11.4.3 Test data are recorded according to requirements of the test procedure. The data are evaluated by the test sponsor and the results documented. Testing deviations are documented, evaluated, and resolved by the test sponsor and resolution concurred in by the QA organization as a condition for certification of test completeness.

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SECTION 12.0 - CONTROL OF MEASURING AND TEST EQUIPMENT

12.1 General

Tools, gages, instruments, and other devices used to measure controlled characteristics of an item or process during construction, operations, site restoration, and supporting activities are calibrated and adjusted at specified intervals to maintain accuracy.

12.2 Requirements

12.2.1 Selection - Measuring and test equipment used for documented product, process or environmental media characterization or used to protect health and safety of personnel and the environment, to safeguard equipment or facilities, or to account for nuclear materials are selected for proper type, range and accuracy and are calibrated and controlled to maintain accuracy.

12.2.2 Calibration - Calibration is performed at prescribed intervals based on purpose, stability, and wear. Calibration is traceable to nationally recognized standards and documented according to written procedures which specify conditions such as equipment identification, calibration frequency and method, and records to be maintained including the basis for calibration if other than national standards are used.

12.2.3 Control - Calibration devices which show evidence of damage or malfunctions, are tagged, segregated or removed from service and repaired or replaced. Important preventive maintenance tasks are scheduled and performed and critical spare parts are maintained to minimize downtime. Where measuring and test equipment is found to be out of control or out of tolerance, items which have been measured or tested since the last known calibration are considered suspect and placed under nonconformance controls until resolved. Where standards commercial devices such as rulers, tape measures, and levels provide adequate accuracy of measurement, no calibration and control measures are applied.

12.2.4 Handling and Storage - Calibrated devices are placed in designated storage areas to protect them against inadvertent damage when not in use.

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12.2 Requirements (cont.)

12.2.5 Records - Each device is covered by a calibration record which is traceable to a unique identification of the device and is maintained for the life of the device. Calibration status for each device is maintained and monitored to administer a recall/re-calibration system. The dates of the last and next calibrations, along with the "as-found" and "as calibrated" condition are documented in the calibration record.

12.3 Responsibilities

12.3.1 The cognizant engineer is responsible for identifying devices included in construction, operations and site restoration process system and facility designs which require calibration.

12.3.2 Each department, or approved vendor, which performs calibration activities is responsible for establishing systems to calibrate such devices.

12.3.3 Custodians of calibrated equipment are responsible for establishing the system to control the use of such devices.

12.3.4 Users of calibrated devices are responsible for proper selection and handling and for returning devices for re-calibration in accordance with applicable procedures.

12.4 Procedure

12.4.1 Custodians maintain lists of devices included in the calibration system, based on determinations made by the cognizant engineer. The procedures used to calibrate and the records of calibration data for each device are maintained by the custodians, or approved vendors where applicable.

12.4.2 Calibration is performed by trained personnel, or approved vendors, using approved procedures and applied to devices listed in the calibration system.

12.4.3 Identification numbers are assigned and affixed to the device and entered into supporting calibration records by the custodian.

12.4.4 Devices are submitted by the user for re-calibration in response to the recall system notification or returned prior to notification based on evidence of malfunction. When product or processes are suspected of nonconforming because of use of an out-of-calibration device, the QA organization is notified. Based on the evaluation performed, the extent of any nonconforming situation is reported to the cognizant engineer who may specify remeasurement or retest as the disposition action.

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SECTION 13.0 - HANDLING, STORAGE AND SHIPPING

13.1 General

Materials procured for the uranium product and radioactive and hazardous waste materials which were historically produced by WEMCO are protected against loss of containment integrity and physical damage during handling, storage, and shipping using procedures which specifically address these activities.

13.2 Requirements

13.2.1 Instructions - Materials and radioactive and hazardous wastes are prepared for handling, storage, and shipment by proper packaging, preserving and marking. This preparation and the actual handling, storage and shipment is performed in accordance with written instructions.

13.2.2 Special Packaging - Where special protective equipment or environments are specified for packaging material for storage or shipment, special procedures are used which provide for monitoring and verification that specified conditions are established and maintained.

13.2.3 Material Handling - Handling and lifting devices used in manufacturing, storage, and shipping activities are subject to periodic load test and inspection in accordance with a documented control system. Operators of this equipment are trained and experienced.

13.2.4 Environmental Samples - Special procedures for the samples obtained in environmental measurements shall specify requirements for containers, preservation, transport and storage of the samples.

13.3 Responsibilities

13.3.1 The cognizant engineer is responsible for including handling, shipping, and storage requirements in equipment specifications, drawings, and procurement documents, as applicable.

13.3.2 Measures for controlling the handling, storage, shipment, and disposal of radioactive and hazardous waste material are contained in procedures established by the responsible engineering organization.

13.3.3 Chain-of-custody measures for controlling the handling, storage, shipping and disposal of environmental samples are contained in procedures developed by those organizations responsible for sampling activities.

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13.3 Responsibilities (cont.)

13.3.4 Standard Operating Procedures are prepared by the responsible operations activity and followed in controlling lifting equipment and the handling and storing of incoming materials, stored uranium products, and radioactive and hazardous wastes.

13.3.5 The QA organization is responsible for planning and performing verification activities, including the verification of compliance to site-wide requirements for interim storage of hazardous wastes.

13.3.6 The QA organization is responsible for verifying the acceptability, marking and content of each waste package. The QA organization is also responsible for the examination of highway transport vehicles for off-site hazardous waste shipments.

13.4 Procedure

13.4.1 Handling, storage, and shipping requirements are included in drawings and specifications and are implemented through procedures prepared by responsible transportation, operations, and technical support groups and reviewed and approved by the QA organization.

13.4.2 Lifting equipment is periodically load tested and inspected in accordance with schedules and instructions administered through the preventive maintenance program. Operators are assigned on the basis of experience and training where the status information is maintained and reports issued.

13.4.3 Radioactive and hazardous waste materials are packaged and shipped in accordance with approved procedures which satisfy the requirements of applicable transportation regulations.

13.4.4 The procedures for environmental samples outline their preparation and preservation and include the special containers, specific procedures and reagents used. Sample shipping and storage times are considered along with sample custody.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

SECTION 14.0 - INSPECTION, TEST AND OPERATING STATUS

14.1 General

The acceptance status of items subject to inspection and test is known throughout construction and operations by tagging or marking items or documents traceable to the item. The operating status of systems and components is shown by warning tags affixed to equipment to prevent inadvertent operation.

14.2 Requirements

14.2.1 Inspection and Test Activity - The status of inspection and test activities is identified on the item or in documents traceable to the item.

14.2.2 Status Indicators - Control aids, such as tags and labels, are attached to the item to show status until the item is installed or shipped. The authority to apply and remove such control is specified in site procedures.

14.2.3 Operating Status - Status indicators such as tags and labels, are used to identify the operating status of items or systems whose use is to be prevented or restricted.

14.3 Responsibilities

14.3.1 Managers of activities who perform inspections or test are responsible for establishing procedures covering the use of status indicators such as tags and labels.

14.3.2 Managers who operate systems and facilities are responsible for establishing procedures covering the use of controls (i.e., tagged valves, tagged switches, and lockouts) to indicate operating status to preclude inadvertent operations.

14.3.3 Department managers are responsible to assure status indicators are used and followed as required by procedures.

14.4 Procedure

14.4.1 The use of status indicators is incorporated in the procedures and instructions used to administer and operate the FEMP. These procedures establish who is authorized to apply and remove these indicators and the restrictions on use of the item signified by the tag or label attached.

14.4.2 The performance of work activities includes observing conditions imposed by the presence of tagged items and the application of these indicators to aid in controlling in-process work.

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WEMCO QUALITY ASSURANCE PROGRAM PLAN

SECTION 15.0 - CONTROL OF NONCONFORMING ITEMS

15.1 General

Nonconforming products, processes, waste packages, or support materials are identified and segregated, where practicable, to prevent inadvertent use. The nonconforming condition is documented and the condition evaluated by cognizant technical personnel who then specify disposition of the nonconformance. Once disposition action is completed, physical controls are released, disposition action is documented, and entries made for use in trend evaluations.

15.2 Requirements

15.2.1 Nonconforming items are tagged for identification and physically segregated to preclude inadvertent use.

15.2.2 The nonconforming condition is documented on a Deviation Report form and responsible supervision notified.

15.2.3 The nonconforming condition is evaluated by cognizant personnel and disposition specified, performed, and verified as complete as a basis for formal closeout of the nonconformance.

15.2.4 Control of nonconforming items is accomplished in accordance with written site procedures.

15.3 Responsibilities

15.3.1 The QA organization is responsible to ensure the tagging, segregating, and reporting of nonconforming items, and for reviewing and approving and verifying completeness of specified disposition actions.

15.3.2 The Performance Assessment organization periodically analyzes nonconformance documents for the identification of adverse quality trends and reports any trends detected.

15.3.3 Cognizant engineers are responsible for determining and specifying disposition of the nonconforming condition and obtaining the QA organization's concurrence of disposition action.

15.3.4 Procurement/Materials Management is responsible for ensuring that supplier caused nonconformances are processed and dispositioned and affected organizations provided copies of dispositioned documents.

15.3.5 Every WEMCO employee is responsible for notifying the responsible management and the QA organization of nonconforming items or potential nonconforming items.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

15.4 <u>Procedure</u>

15.4.1 Upon identification of a nonconformance, the QA organization initiates a Deviation Report, notifies the responsible supervisor, tags the nonconforming items and arranges for segregating these items, where practicable.

15.4.2 The technical organization responsible for the product, process, waste package, or support material evaluates the condition and specifies disposition on the Deviation Report form. Where "use-as-is" or "repair" is specified, as built records are updated to reflect changes.

15.4.3 After obtaining customer approval, if required, and the QA organization approval, disposition action is completed and acceptance verified by QA.

15.4.4 The QA organization removes tags, makes closeout entries in control logs, obtains QA Management approval to closeout the Deviation Report and files the report as a permanent QA record.

15.4.5 Deviation Reports are used by the Performance Assessment organization for trending and analysis to provide input for upgrading management systems.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

SECTION 16.0 - CORRECTIVE ACTION

16.1 General

In addition to the immediate action required to correct nonconformances as covered in Section 15.0, permanent corrective actions to preclude recurrence of significant problems are required. This system shall be implemented to continually seek out potentially significant conditions adverse to quality to detect them before they have major impact. The QA or Performance Assessment (for trend analyses) organizations identify to appropriate levels of management areas requiring corrective action based on evaluation of problems identified from such sources as nonconformances, failures, malfunctions, and other deviations from requirements discovered through audit, inspection, surveillance, assessment, and data review activities. Corrective action emphasizes determining and correcting the underlying causes of the problem, especially for any recurring conditions.

16.2 Requirements

16.2.1 Conditions which could have an impact on safety and reliability, violate regulatory requirements, or represent significant or repetitive noncompliance with QA Program requirements are identified in writing to responsible management for corrective action. Corrective actions are pursued when the predetermined limits for environmental data acceptability have been exceeded.

16.2.2 Reported conditions are evaluated for underlying root causes, potential generic implications and corrective action determined and implemented to preclude recurrence. Any deficiencies in the Program or its implementation that allowed the condition adverse to quality to occur shall be corrected. In this regard, the Program will be considered inadequate unless the investigation demonstrates otherwise.

16.2.3 Corrective actions are verified as complete and periodically evaluated for effectiveness. This information is a source of input for assessment of trends and tracking status of corrective action.

16.2.4 The corrective action process is described in site procedures.

16.3 Responsibilities

16.3.1 The QA or Performance Assessment (for trend analyses) organization is responsible for documenting on the Corrective Action Report form the significant condition adverse to quality, reviewing the record of evaluation and specified corrective action, and performing verification of completion of corrective action.

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16.3 Responsibilities (cont.)

16.3.2 Management responsible for the activity in which the nonconforming condition occurred investigates the cause of the condition, determines corrective action, and documents cause and corrective action on the Corrective Action Report. The management responsible for implementing corrective action obtains the QA organization verification of work as acceptable, and completes associated documentation required on the Corrective Action Report.

16.4 Procedure

16.4.1 The QA or Performance Assessment (for trend analyses) organization describes continuing or recurring conditions adverse to quality on the Corrective Action Report and issues the report to the responsible manager.

16.4.2 The responsible manager identifies the underlying cause of the condition and the corrective action to preclude recurrence and determines a schedule for implementation.

16.4.3 The QA or Performance Assessment organization evaluates the corrective action specified for completeness and appropriateness to the condition specified.

16.4.4 The responsible manager takes corrective action and ensures satisfactory completion.

16.4.5 The QA or Performance Assessment organization verifies completion of the corrective action and documents this on the Corrective Action Report.

16.4.6 The Performance Assessment organization maintains logs and files for use in trend analysis in upgrading management systems.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

SECTION 17.0 - QUALITY ASSURANCE RECORDS

17.1 General

Required QA records are generated, compiled, and maintained in accordance with written procedures which ensure that the documented evidence of quality is identified, retrievable, and safeguarded during handling and storage. These records, which demonstrate the acceptability of items or services, include the result of inspections, tests, audits, surveillance, material and environmental sample analyses, design reviews and qualifications, as appropriate, for activities involving design, procurement, manufacture, construction/installation, test, operation, maintenance, and site restoration.

17.2 Requirements

17.2.1 Record requirements are included in the specifications, procurement documents, and instructions or procedures generated to control work.

17.2.2 Generated records are legible and accurate, bear evidence of validation and are handled, distributed, and controlled to provide protection from damage and loss during the time they are being compiled.

17.2.3 Records are maintained in filing systems in storage facilities where access is controlled and provisions made to prevent damage or loss while in storage.

17.2.4 QA records are maintained in accordance with site and department procedures.

17.3 Responsibilities

17.3.1 Department/section managers are responsible for developing and maintaining procedures or instructions for identifying and controlling records within their department.

17.3.2 The Communication Services organization operates a Record Vault where a second set of quality records is stored as backup. The originating department for the record retains a copy in their storage location in support of this dual storage system.

17.3.3 The QA organization is responsible for the review and approval of department procedures dealing with quality assurance records control.

17.3 Responsibilities (cont.)

17.3.4 Individuals involved in the collection, validation, storage, transfer, and reduction of data are responsible for: clearly documenting their work; maintaining accurate records, describing the methodology used, and providing justifications for the assumptions/determinations.

17.4 Procedure

17.4.1 Preparation - Work and procurement documents specify quality assurance records requirements for the job. During work performance, records are prepared and distributed to records filing/storage locations in accordance with records control procedures.

17.4.2 Identification - Records distributed to the Record Vault are marked according to retention requirements. The classifications of records as lifetime or non-permanent is performed by the cognizant engineering activity according to applicable code or standard requirement and provided to the Record Vault.

17.4.3 Collection/Filing - Departments generating records have provisions for collecting, indexing, and filing to assure accountability, irretrievability, and safekeeping until reproduced and a second copy provided to the Record Vault for permanent storage.

17.4.4 Permanent Storage - Records placed into Record Vault storage are examined to confirm content, archival quality, and prescribed coding. The procedure for operation and maintenance of permanent storage facilities provides for the control of personnel access, records removal, film storage, and environmental conditions to prevent damage or deterioration of records.

17.4.5 Retrieval/Disposition - Record Vault operations provides for timely retrieval of records and for disposition of records when retention periods have elapsed.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

SECTION 18.0 - ASSESSMENTS

18.1 General

A formal system is maintained for the assessment of activities covered by the WEMCO QA Program. System components include: identification of activities to be assessed; written procedures for conducting assessments; formal reporting of findings; written responses which include corrective actions to correct deficiencies; and documented follow-up and close-out. Two types of assessments are conducted: Management Self-Assessments and Independent Assessments.

18.2 Requirements

18.2.1 Management Self-Assessments

18.2.1.1 Management Self-Assessments are planned and identify activities to be covered, reporting schedules, and the degree of follow-up required.

18.2.1.2 Each assessment shall include an evaluation of WEMCO's effectiveness in correcting the deficiencies identified in previous assessment reports.

18.2.1.3 Management Self-Assessment reports identify strengths and weaknesses and contain planned improvement actions for weak areas.

18.2.1.4 Assessments are conducted by personnel who have received formal training in assessment standards and practices.

18.2.1.5 Assessments are scheduled to avoid multiple reviews of an activity within a short period of time.

18.2.1.6 All environmental, safety and health functional areas are covered in the Management Self-Assessment Program.

18.2.1.7 Departments will develop Department Procedures which describe the methods by which data will be collected. The procedures will also cover reporting, corrective action development, follow-up and close-out.

18.2.1.8 All supervisory levels are involved in Management Self-Assessment.

18.2.2 Independent Assessments

18.2.2.1 Independent Assessments are planned and identify activities to be covered, reporting schedules, and the degree of follow-up required.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

18.2 Requirements (cont.)

18.2.2.2 Each assessment shall include an evaluation of WEMCO's effectiveness in correcting the deficiencies identified in previous assessment reports.

18.2.2.3 Assessments are conducted by personnel who have received formal training in assessment standards and practices.

18.2.2.4 Assessments are scheduled to avoid multiple reviews of an activity within a short period of time.

18.2.2.5 Departments that conduct Independent Assessments develop procedures for conducting the assessments. Procedures cover the assessment topics, schedules, pre-assessment preparation, report preparation, follow-up, and close-out.

18.3 Responsibilities

18.3.1 Management Self-Assessments

18.3.1.1 The Performance Assessment organization of the Performance Assessment & Communications (PA&C) Department is responsible for administering the Management Self-Assessment Program.

18.3.1.2 Staff Managers participate directly in the assessment and provide input to the assessment report. All supervisory levels are involved in the self-evaluation and continuous improvement and provide input to the assessment process.

18.3.1.3 Staff Managers are responsible for the preparation of Management Self-Assessment reports. Reports are addressed to the WEMCO President and copies are provided to the managers of the Performance Assessment and Reporting & Document Control organizations of PA&C.

18.3.1.4 Staff Managers develop assessment procedures for their own departments.

18.1.3.5 The Reporting & Document Control organization reviews Self-Assessment reports and enters planned actions into the WEMCO Centralized Commitment Control System.

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18.3 Responsibilities (cont.)

18.3.2 Independent Assessments

18.3.2.1 The QA organization is responsible for maintaining a record of the types of independent assessments conducted, the departments responsible for conducting the assessments, and the assessment schedules.

18.3.2.2 The assessment team leader is responsible for planning the assessment, conducting the assessment, and issuing the assessment report.

18.3.2.3 Managers to whom assessment reports are addressed are responsible for responding to the report. Responses shall include planned corrective actions and anticipated completion dates.

18.3.2.4 The assessment team leader verifies that planned corrective actions have been completed.

18.4 Procedure

18.4.1 Management Self-Assessments

18.4.1.1 Performance Assessment develops and publishes a schedule for Management Self-Assessments by department.

18.4.1.2 Department personnel conduct the assessment, obtaining input from all supervisory levels, and prepare and assessment report which identifies strengths and weaknesses and contains planned actions to correct the weaknesses.

18.4.1.3 Each Self-Assessment report contains a section which reviews how well the department completed planned actions listed in the report for the previous reporting period.

18.4.1.4 Responsible management determines the root cause of each identified weakness. The resulting conclusions are considered in the development of planned corrective actions.

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18.4 Procedure (cont.)

18.4.2 Independent Assessments

18.4.2.1 Assessment team leaders select team members and plan the assessment.

18.4.2.2 The assessment is conducted in accordance with the controlling procedure and required reports are issued.

18.4.2.3 Responsible management determines the root cause of each identified weakness. The resulting conclusions are considered in the development of planned corrective actions.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

APPENDIX A

WEMCO AFFECTED ORGANIZATIONS & FUNCTIONS

PRESIDENT	• Sets QA Policy • Authorizes Implementing Procedures
Performance Assessment & Communications	• Trend Analysis • Performance Assessment • Total Quality Program • Site Policies & Procedures Control • Public Information & Employee Communications • Community Relations • Records Management • Financial Auditing
Project Management & Acquisition	• Construction Planning & Coordination • Project Management • Engineering/Design Control/Risk Assessment • Procurement/Materials
Site Services	• Maintenance • Waste Treatment/Utilities Operation • Manufacturing • Transportation • Analytical Laboratories • Process/Plant Engineering/Design Control/ Risk Assessment • Receiving/Warehousing
Environmental Management	• Waste Handling/Storage/Shipping • Waste Engineering/Design Control/Risk Assessment • Restoration Project Engineering/Design Control/Risk Assessment • Environmental Monitoring/Control • Environmental/Regulatory Compliance • RMI Extrusion Plant Subcontract Technical Control
Industrial, Radiological Safety & Training	• Radiological/Nuclear/Industrial Safety Engineering & Control • Training • Certification/Qualification • Safeguards & Security • Emergency Preparedness
Quality	• Quality Assurance Engineering • Construction/Product/Receiving Inspection • Product/Waste Certification • Certification/Qualification • Independent Audits
Controller	• Financial Planning & Accounting • Information Systems • Materials Control and Accountability

WEMCO QUALITY ASSURANCE PROGRAM PLAN

APPENDIX B

IMPLEMENTING SITE POLICIES & PROCEDURES, SITE STANDARD OPERATING PROCEDURES, AND CHARTERS

NQA-1 ELEMENT		SITE DOCUMENT
1. Organization		
	CH-0221	Human Resources Charter
	CH-0226	Environmental Compliance and Quality Assurance (EC&QA) Department Charter
	CH-0235	Operational Excellence Board Charter
	CH-FMPC-204	Joint Westinghouse Materials Company of Ohio-Department of Energy Change Control Board Charter
	CH-FMPC-209	Independent Safety Review Committee Charter
	CH-FMPC-215	Site Services Department Charter
	CH-FMPC-220	Controller Charter
	CH-FMPC-222	Office of Counsel Charter
	CH-FMPC-230	Industrial, Radiological Safety and Training Department Charter
	CH-FMPC-2001	Technical Review Board Charter
	CH-FMPC-2004	Project Management and Acquisition Department Charter
	FMPC-101	WMCO Management Philosophy
	FMPC-201	Public Affairs and Communications Department Charter
	FMPC-202	Strategic Management Board Charter
	FMPC-208	Subcontract Review Committee Charter
	FMPC-210	Best Management Practices Committee Charter
	FMPC-212	Environmental Council Charter
	FMPC-217	Technical Director Charter
	FMPC-223	Site Remediation Department Charter
	FMPC-225	Administration Department Charter
	FMPC-228	Performance Assessment Department Charter
	FMPC-232	WMCO Total Quality Council Charter
	FMPC-234	Readiness Review Board Charter
2. Quality Assurance Program		
	FMPC-102	Training
	FMPC-412	Management Control System Policy
	FMPC-711	Quality Levels
	IN-6034	Risk Assessment and Management (RAM) System
	PL-3014	WEMCO Quality Assurance Program Plan
	PP-0710	Quality Assurance Plans
	SSOP-0036	Quality Assurance Project Plans
3. Design Control		
	FMPC-508	Safety Analysis Documentation Program
	FMPC-512	Configuration Control of Safety Systems, Design Features for Safety, and OSR - Affected Procedures
	FMPC-609	Records Management
	FMPC-702	Development and Control of Design
	FMPC-705	Operational Readiness Process
	IN-6034	Risk Assessment and Management (RAM) System
	PP-0722	Engineering Services
	XXX-XXX	Data Quality Objectives
4. Procurement Document Control		
	FMPC-302	Request for Purchase
	FMPC-315	Control of Purchased Supplies and Services
	FMPC-316	8(A) Vendor Program
	FMPC-317	Technical Evaluation of a Proposal

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5. Instructions, Procedures, and Drawings

FMPC-512	Configuration Control of Safety Systems, Design Features for Safety, and OSR - Affected Procedures
FMPC-715	FMPC Work Request System
PP-0103	Site Document System
PP-0722	Requesting Engineering Services
PP-5031	Nuclear Materials Disposition Order Management System
SSOP-0034	Nuclear Materials Disposition Order Management

6. Document Control

FMPC-302	Request for Purchase
FMPC-605	DOE Directives Administration
FMPC-609	Records Management
FMPC-702	Development and Control of Design
FMPC-715	FMPC Work Request System
PP-0103	Site Document System
PP-0502	Commitment Control
PP-0722	Requesting Engineering Services

7. Control of Purchased Material, Equipment, and Services

FMPC-306	Contract Administration
FMPC-315	Control of Purchased Supplies and Services
FMPC-317	Technical Evaluation of a Proposal
PP-0310	Personal Computers Procurements
PP-FMPC-5013	Acquisition of Automated Data Processing Equipment, Software and Services

8. Identification and Control of Items

FMPC-307	Control and Accountability of Nuclear Materials
RM-0005	FEMP Lot Marking and Color Coding System

9. Control of Processes

FMPC-705	Operational Readiness Process
FMPC-708	Personnel Certification
FMPC-716	Control of Processes
XXX-XXX	Software Management Plan
XXX-XXX	Data Quality Objectives

10. Inspection

FMPC-708	Personnel Certification
FMPC-717	Inspection
AnL-SP-1001	Analytical Laboratory QA Plan
XXX-XXX	Data Quality Objectives

11. Test Control

FMPC-721	Plant Test Authorization

12. Control of Measuring and Test Equipment

FMPC-718	Measuring and Test Equipment Calibration and Control

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13. Handling, Storage and Shipping

FMPC-304	Handling of Controlled Substances and Selected Chemicals
FMPC-314	Packaging, On-site Movement and Off-site Shipment of Material
FMPC-319	Material Compatibility Practices
FMPC-519	Management of Hazardous Waste
IN-6032	Control of Construction Waste/Maintenance Waste
PP-FMPC-312	Disposal of Non-contaminated Waste from Non-process Areas

14. Inspection, Test and Operating Status

FMPC-717	Inspection
PP-FMPC-706	Deviation and Corrective Action Reporting Program
PP-FMPC-719	Energy Control (Lockout and Tagout)
SSOP-0023	Deviation and Corrective Action Reporting

15. Control of Nonconforming Items

PP-FMPC-706	Deviation and Corrective Action Reporting Program
SSOP-0023	Deviation and Corrective Action Reporting

16. Corrective Action

FMPC-704	Minor Event Reporting System
FMPC-707	Audit Program
FMPC-709	Conduct of Quality Assurance Surveillance Activity
PP-FMPC-706	Deviation and Corrective Action Reporting Program
PR-FMPC-4006	Occurrence Reports
SSOP-0023	Deviation and Corrective Action Reporting

17. Quality Assurance Records

FMPC-609	Records Management

18. Quality Assurance Audits

FMPC-707	Audit Program
FMPC-708	Personnel Certification
FMPC-709	Conduct of Quality Assurance Surveillance Activity

XXX-XXX - To Be Developed

WEMCO QUALITY ASSURANCE PROGRAM PLAN

APPENDIX C

ABBREVIATIONS, ACRONYMS, AND DEFINITIONS

Accuracy - A qualitative concept in the statistical treatment of measurement data used to describe the agreement between the central tendency of a set of numbers and their correct value (or the accepted reference value). Accuracy is a measure of bias in a system. The accuracy of measurement systems is based on the results of frequent checks of the calibration curve by running calibration check standards.

ad hoc - For a specific case, situation, or purpose.

Amended Consent Agreement - The modified Consent Agreement signed in September 1991, which includes the renegotiated framework and schedules for developing, implementing, and monitoring appropriate response actions at the FEMP and to facilitate cooperation, exchange of information and participation of the U.S. EPA and the U.S. DOE in such actions.

AMESQ - Oak Ridge Operations Office of Assistant Manager for Environment, Safety, and Quality.

ANSI - American National Standards Institute

ASME - American Society of Mechanical Engineers

Assessment - The act of reviewing, inspecting, testing, checking, conducting surveillances, auditing, or otherwise determining and documenting whether items, processes, or services meet specified requirements. Assessments are performed by or for senior management.

Audit - A planned and documented activity systematically performed to determine by investigation, examination, or evaluation of objective evidence the quality of operation of some function or activity. Audits may be of two basic types: (1) performance audits in which quantitative data are independently obtained for comparison with routinely obtained data in a measurement system, or (2) system audits of a qualitative nature that consists of an on-site review of the quality assurance system and physical facilities for sampling, calibration, and measurement.

CFR - Code of Federal Register

Chain-of-Custody Procedure - A procedural sequence of events which tracks sample custody or possession. A sample is considered in custody if it is in an authorized person's possession; locked so that no one can tamper with it; after having been in physical custody; and/or in a secured area, restricted to authorized personnel.

Charter - A document approved by the WEMCO President defining the work scope and responsibilities of a particular department or committee.

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Cognizant Engineer/Project Manager - Individual responsible for the required regulatory documentation during preliminary engineering phase of any project which requires regulatory compliance and for any such revision during the course of the project as required. The individual is also responsible for assuring an accurate technical content of regulatory documents associated with the project and for assuring an accurate description and analyses of project activities.

Comparability - A measure which expresses the confidence with which one data set can be compared to another. Comparability for a program is achieved by ensuring that all sampling and analysis use specified uniform procedures.

Completeness - A measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions.

Compliance - Adherence to mandatory regulatory orders and directives.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) - An act enabling the EPA to investigate and clean-up abandoned or uncontrolled hazardous waste sites.

Computer Program - A sequence of instructions suitable for processing by a computer. Processing may include the use of an assembler, a compiler, an interpreter, or a translator to prepare the program for execution as well as to execute it. Computer programs impacted by the WEMCO QA Program Plan are those used for design analysis; process or operations control; or data base or document control registers when used as the controlled source of quality information.

Consent Agreement (CA) - The agreement between the U.S. EPA and the U.S. DOE for the cleanup of the FMPC under the authorities of Section 106 and 120 of Superfund Amendments and Reauthorization Act of 1986 (SARA). The Consent Agreement signed in April 1990, amends the July 1986 Federal Facility Compliance Agreement (FFCA). (1) To ensure the environmental impacts associated with the past and present activities at FMPC are thoroughly investigated and appropriate response actions(s) taken are necessary to protect the public health, welfare, and the environment. (2) To establish a procedural framework and schedule for developing, implementing and monitoring appropriate response action at FMPC in accordance with CERCLA, and the National Contingency Plan, EPA Superfund guidance and policy and (3) To facilitate cooperation, exchange of information and participation between the parties involved. (See "Amended Consent Agreement")

Controlled Document - Any document for which distribution and status are to be kept current by the issuer in order to assure that authorized holders or users of the document have available the most up-to-date version for accomplishment of work action.

COR - Contracting Officers' Representative

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Corrective Action - Measures taken to rectify significant conditions adverse to quality and, where necessary, to preclude repetition.

Data Quality - The totality of features and characteristics of data that bears on its ability to satisfy a given purpose. The characteristics of major importance are accuracy, precision, completeness, representativeness, comparability, traceability, and authenticity.

Deviation - A departure from specified requirements.

DOE - U.S. Department of Energy

DOE 5400.1 - DOE Order entitled "General Environmental Protection Program"

DOE 5700.6C - DOE Order entitled "Quality Assurance"

Environmental Compliance - Adherence to those requirements established by DOE Orders and Federal and State Regulatory Agencies that address environmental protection of the FEMP and environs.

Environmentally-Related Measurements - A term used to describe essentially all field and laboratory measurement of chemical, physical, or biological parameters in the environment; determining the presence or absence of priority pollutants in waste streams; health and ecological effect studies; clinical and epidemiological investigations; engineering and process evaluations; studies involving laboratory simulation of environmental events; and studies or measurements of pollutant transport, including diffusion models.

EPA - U.S. Environmental Protection Agency

External Audit - An audit of the Quality Assurance Program activities of suppliers of materials and services to the FEMP. Included within this definition are the on site construction contractor of the FEMP, the contractor(s) performing remediation and/or restoration services, and the contractor(s) performing architect/engineer services.

Federal Facilities Compliance Agreement (FFCA) - An agreement between the EPA and the DOE pertaining to the FEMP to: (1) Ensure compliance by DOE, Oak Ridge Operations, Oak Ridge, Tennessee (DOE-ORO), with existing environmental statutes, and implementing regulations to include the Clean Air Act, RCRA, and CERCLA at the FMPC. (2) To ensure environmental impacts associated with past and present activities at the FMPC are thoroughly investigated, and appropriate remedial response action taken as contemplated by CERCLA.

FEMP - Fernald Environmental Management Project

FMPC - Feed Materials Production Center; The name of the FEMP prior to August, 1991.

Internal Audit - An audit of a WEMCO organization's activities by representatives of another WEMCO organization to determine the status and assess the adequacy and effectiveness of the implementation of WEMCO procedures and requirements.

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Item - An all-inclusive term used in place of any of the following: appurtenance, facility, sample, assembly, component, equipment, material, module, part, structure, subassembly, subsystem, system, unit, documented concepts or data.

Lifetime Records - Quality Assurance Records that meet one or more of the following criteria: a) those which would be of significant value in demonstrating capability for safe operation; b) those which would be of significant value in maintaining, reworking, repairing, replacing, or modifying an item; c) those which would be of significant value in determining the cause of an accident or malfunction of an item; or d) those which provide required baseline data for in-service inspections. Lifetime records are required to be maintained for the life of the particular item.

Nonconforming Condition - A condition which does not conform to specified requirements in one or more characteristics.

Nonpermanent Records - Quality Assurance Records that are required to show evidence that an activity was performed in accordance with the applicable requirements but need not be retained for the life of the item because they do not meet the criteria for lifetime records.

NQA-1 - Quality Assurance Program Requirements for Nuclear Facilities; An American National Standard sponsored and published by the American Society of Mechanical Engineers.

OR 5700.6B - Oak Ridge Order entitled "Quality Assurance"

ORO - Oak Ridge Operations

Performance Audit - A planned independent procedural check of the operation of a measurement system or component parts thereof to obtain a quantitative measure of the quality of the data generated or work performed.

Precision - A measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision is best expressed in terms of the standard deviation. Various measures of precision exist depending upon the "prescribed similar conditions". The precision of an analytical method is determined from the results of duplicate samples.

Preventive Maintenance - Maintenance performed for precautionary reasons to protect against malfunction or failure.

Procedure - A document that specifies or describes how an activity is to be performed.

Process - A series of actions that achieves an end or result.

Product - The end result of a process; this includes waste generated, stored, and/or shipped and computer programs.

QAMS - Quality Assurance Management Staff; An EPA organization.

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Quality - Fitness for intended use, which includes conformance to requirements.

Quality Assurance (QA) - All those planned and systematic actions necessary to provide adequate confidence that an item will perform satisfactorily and safely in service.

Quality Assurance Program - The overall program established by WEMCO to implement the quality assurance requirements imposed on the FEMP by its customers. The Program assigns responsibilities and authorities, defines policies and requirements, and provides for the performance and assessment of work.

Quality Assurance Program Plan - The formal, approved, and controlled text that describes the WEMCO QA Program which ensures adherence to WEMCO policies for achieving required quality levels in the operation of the FEMP.

Quality Assurance Project Plan (QAPjP) - An orderly assembly of detailed and specific procedures by which an agency delineates how it produces quality data for a specific project or measurement method. A given agency would have only one quality assurance program plan, but would have a quality assurance plan for each of its projects or programs (group of projects using the same measurement methods; for example, a laboratory service group might develop a plan by analytical instrument since the service is provided to a number of projects).

Quality Record - A completed document that furnishes evidence of the quality of items and/or activities effecting quality.

Resource Conservation and Recovery Act (RCRA) - An act which enabled the EPA to issue regulations for a national hazardous waste management program. The regulations govern hazardous waste from the time it is created to the time of its disposal. Any waste that is transported off the site for treatment, storage, or disposal must be accompanied by a manifest that: (1) Identifies who generated the waste (2) Provides a full description of the contents and quantity of the waste, and (3) Designates the facility to which it must be shipped.

Representativeness - Expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, process condition, or an environmental condition. Data representativeness is a function of sampling strategy; therefore, the sampling scheme should be designed to maximize representativeness.

Restoration - The environmental rejuvenation of the site and its surrounding to a former state or condition which (1) does not present a threat or hazard to the public health and welfare and the environment or (2) which effectively mitigates and minimizes the threat or hazard to the public health and welfare and the environment.

Risk Analysis - A quantitative description of potential accident scenarios and the likelihood of releases of materials to the environment and the resulting impact.

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Standard Operating Procedure (SOP) - An operation, analysis, or action whose mechanics are thoroughly prescribed and documented and which is commonly accepted as the usual or normal method for performing certain routine or repetitive tasks.

Surveillance - The act of monitoring or observing to verify whether an item or activity conforms to specified requirements.

Valid - Founded on truth or fact.

Validation - The process of evaluating a product at the end of the entire development process to ensure compliance with requirements.

Verification - The act of reviewing, inspecting, testing, checking, conducting surveillances, auditing, or otherwise determining and documenting whether items, processes, or services meet specified requirements. Verifications are performed by the line organization.

WEMCO - Westinghouse Environmental Management Company of Ohio

WEMCO Site Document Manual - A manual of policies, charters, and procedures approved by the WEMCO President, containing instructions which direct the actions of more than one department or a significant number of employees.

WMCO - Westinghouse Materials Company of Ohio; The name of WEMCO from January, 1986 through August 23, 1991.

Work - Process of performing a defined task or activity; for example, research and development, operations, maintenance and repair, administration, software development and use, inspection, safeguards and security, data collection, and analysis.