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

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Plant 1 Ore Silos Removal Action Number 13 Work Plan

Fernald Environmental Management Project
Fernald, Ohio

January 1992
Revision No. 0

U. S. Department of Energy

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

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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 implement interim actions to mitigate the release of contaminants from the Plant 1 Silos until final remediation.

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 EPA.

The proposed action will remove all above surface structures and equipment down to the existing concrete base 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 supporting piers above the top of the slab.

The material removed will either be packaged for shipment to an appropriate disposal facility, placed into an on-site storage area, or decontaminated for unrestricted use.

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

The information used to prepare this work plan is included in the appendices for informational purposes only and is not subject to approval.

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SECTION 1

INTRODUCTION

This document provides a work plan describing a removal action for the Plant 1 Ore Silos. 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. 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 eight tile silos, six concrete 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 disposal of waste. All project activities will be completed in strict accordance with the requirements defined in applicable 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). While adhering to these standards, the work will be performed in an expeditious and prudent manner to remove the hazard posed 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. Fernald Environmental Management Project 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 preparing the silos for removal; (4) removal of the silos; (5) segregation, size reduction, and packaging

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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.

of wastes for disposal; (6) removal, size reduction, decontamination, and disposal of the structural steel; and (7) cleaning and decontaminating the area.

Installation of protective structures for nearby facilities will prevent the potential release of contaminated materials from these facilities in the event of an accident involving falling silo structures or debris. Removal of the silos will eliminate the hazard of accidental collapse of the silos and possible damage to adjacent facilities or release of contaminated materials. 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 equipment 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 with the process area situated on 136 acres located in southwestern Ohio. 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 and organic waste constituents.

Since July of 1989, uranium production has been 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 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.

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 was the receiving point for incoming ores and residues to be processed and for FEMP's own "waste" for further processing. As such, the facility was involved in the sampling of large amounts of uranium metal process residues and waste materials prior to 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 Plant 1, consisting of the eight glazed tile silos to the west and the six reinforced concrete silos to the east. 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. Plant 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 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 uranyl nitrate hydrate (UNH) tanks which presently contain approximately 100,000 gallons of ~ 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. 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.

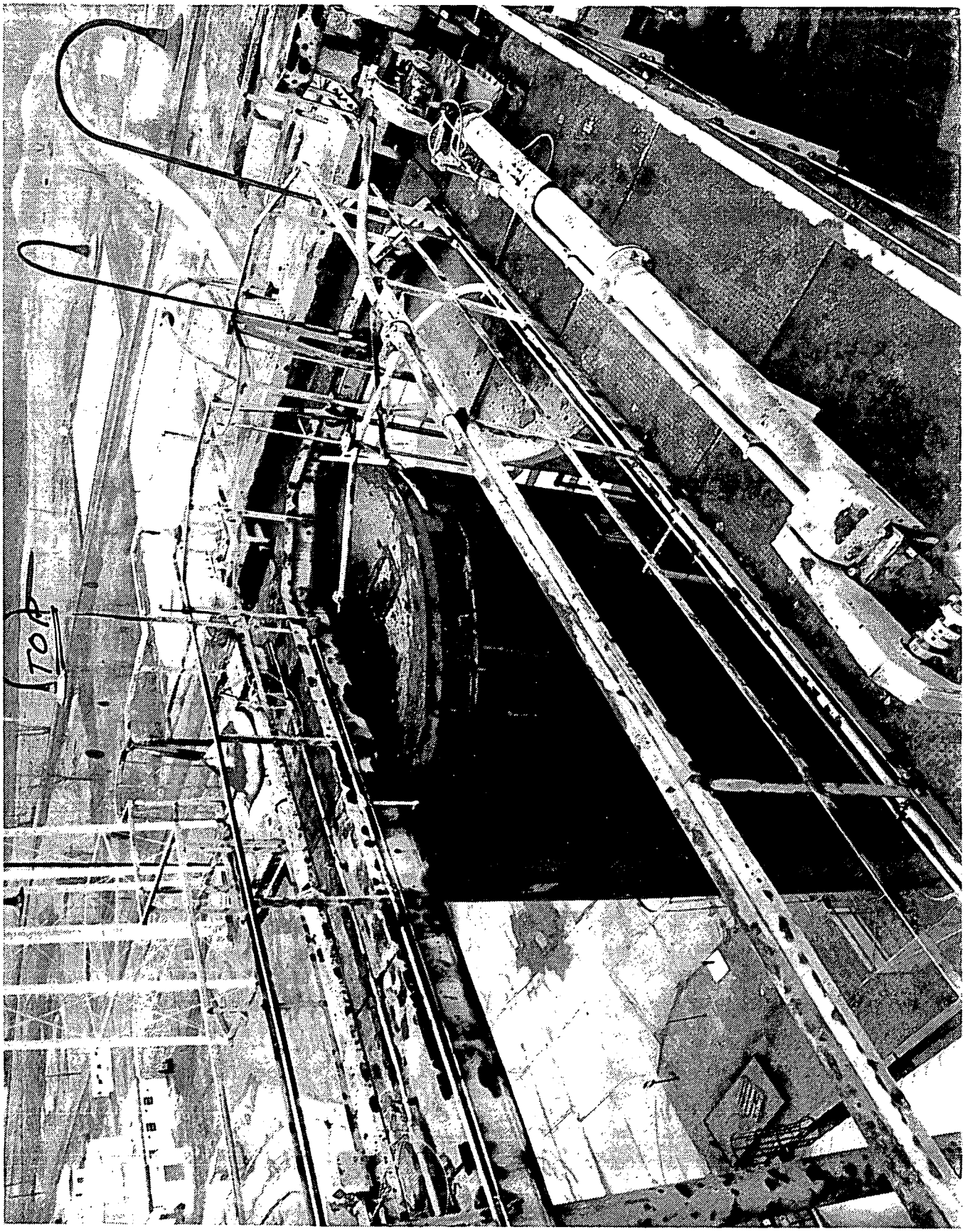

Figure 3-3 - Aerial View at Top of Tile Silos

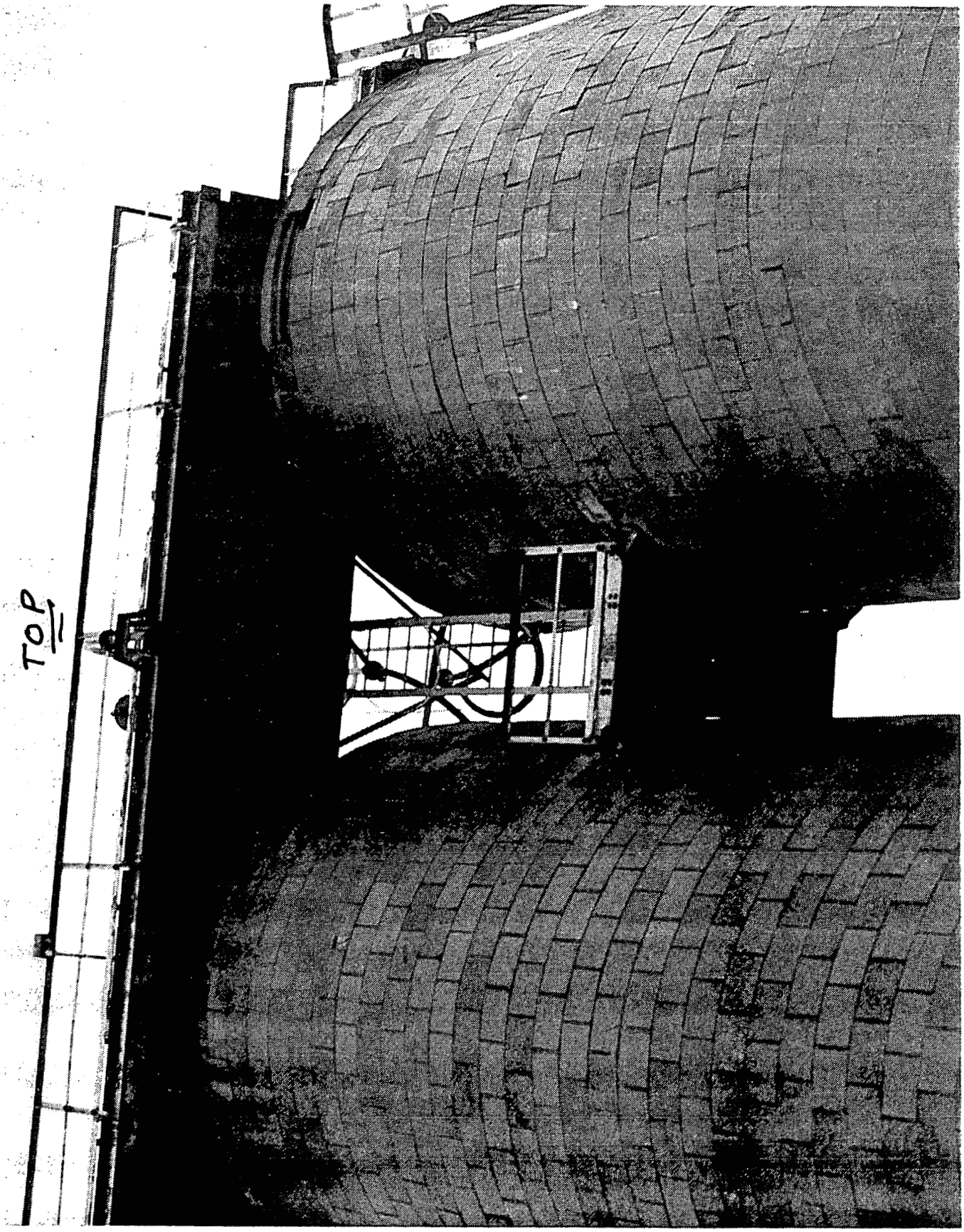

Figure 3-4 - View Showing the Two Westerly Tile Silos

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

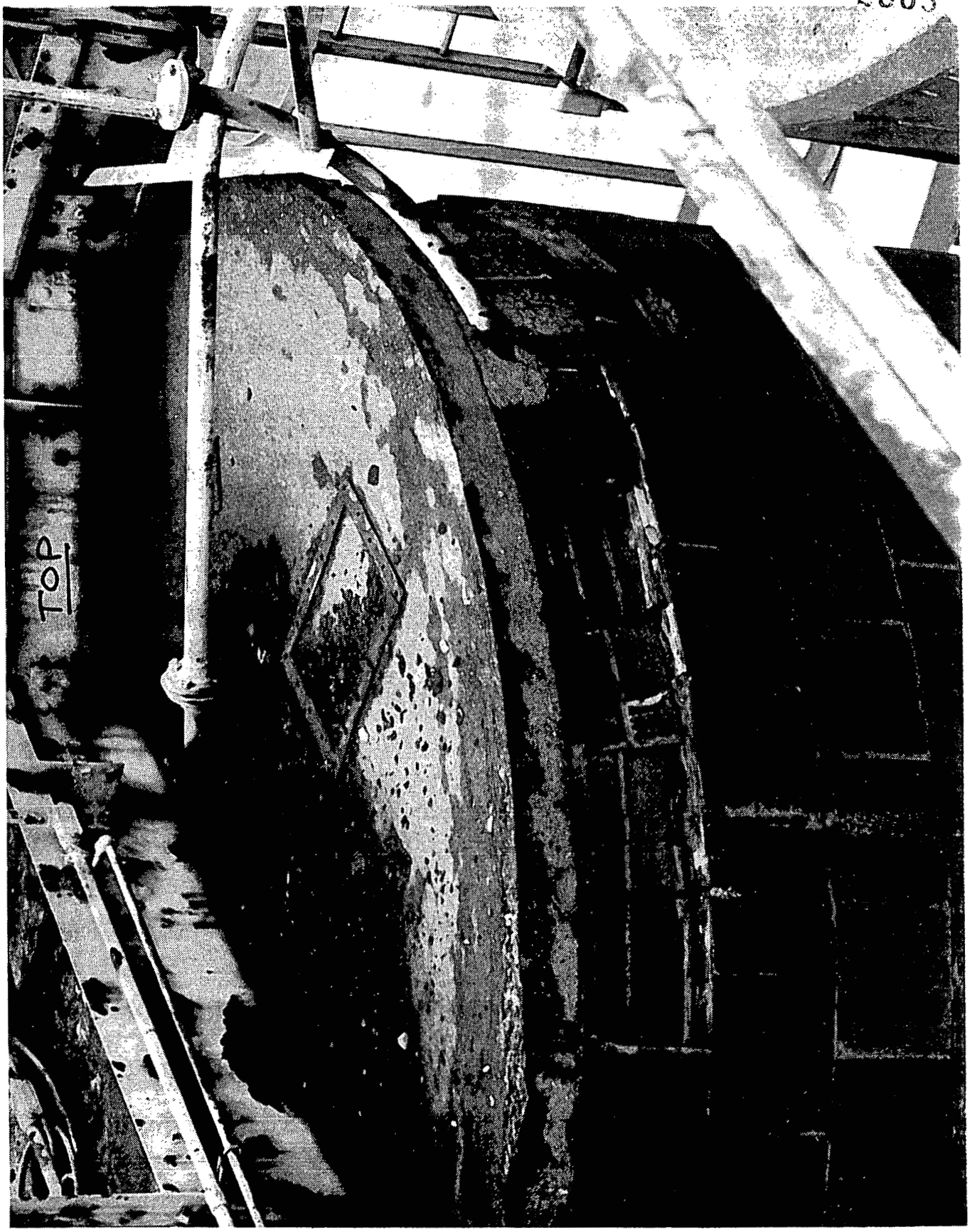

Figure 3-6 - View of the Top of One of the Tile Silos

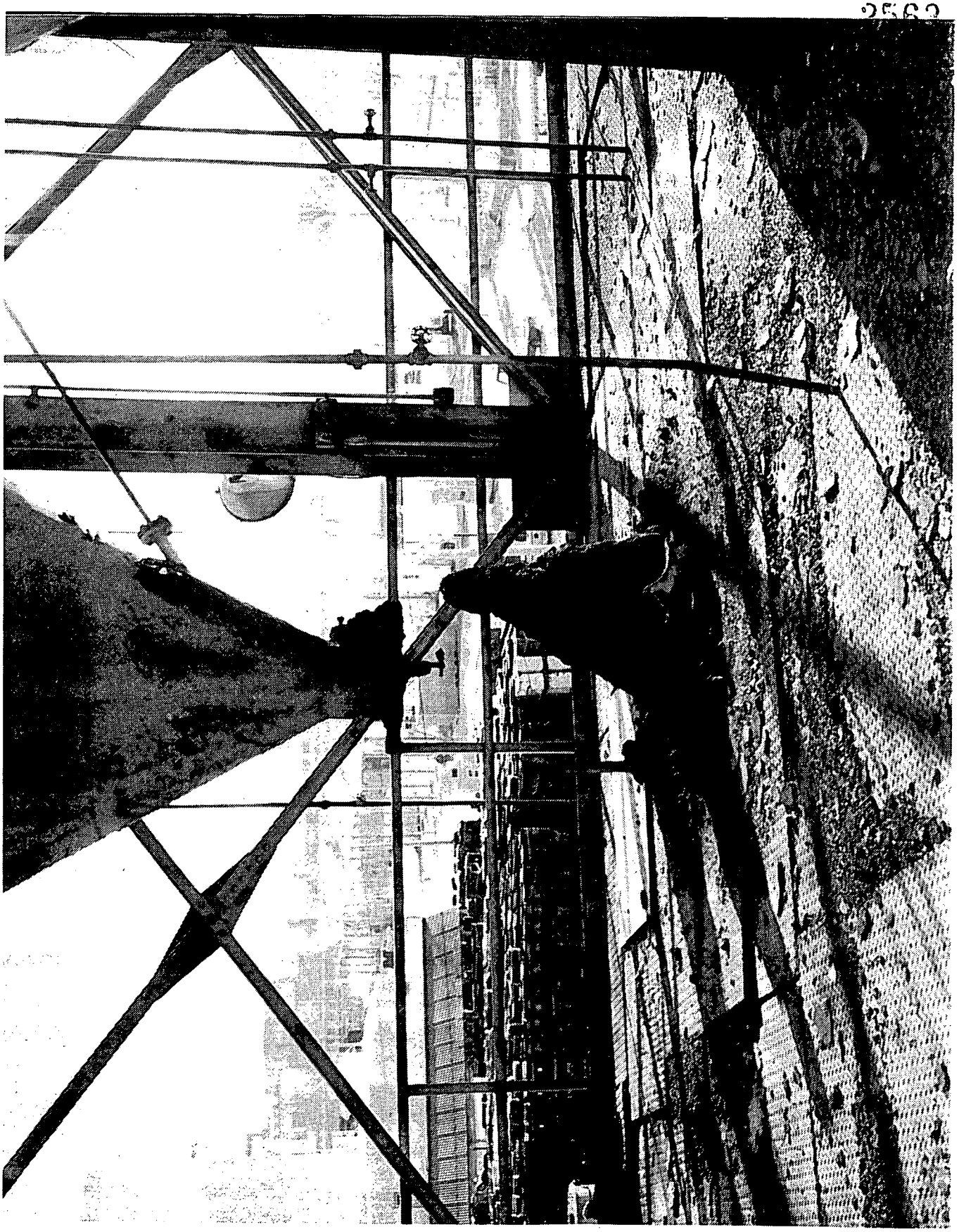

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Figure 3-7 - View Under One of the Tile Silos Showing Accumulated Debris on the Steel Deck

The accumulation of residue and debris on the steel deck under the silo cone can be seen. 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 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 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. 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.

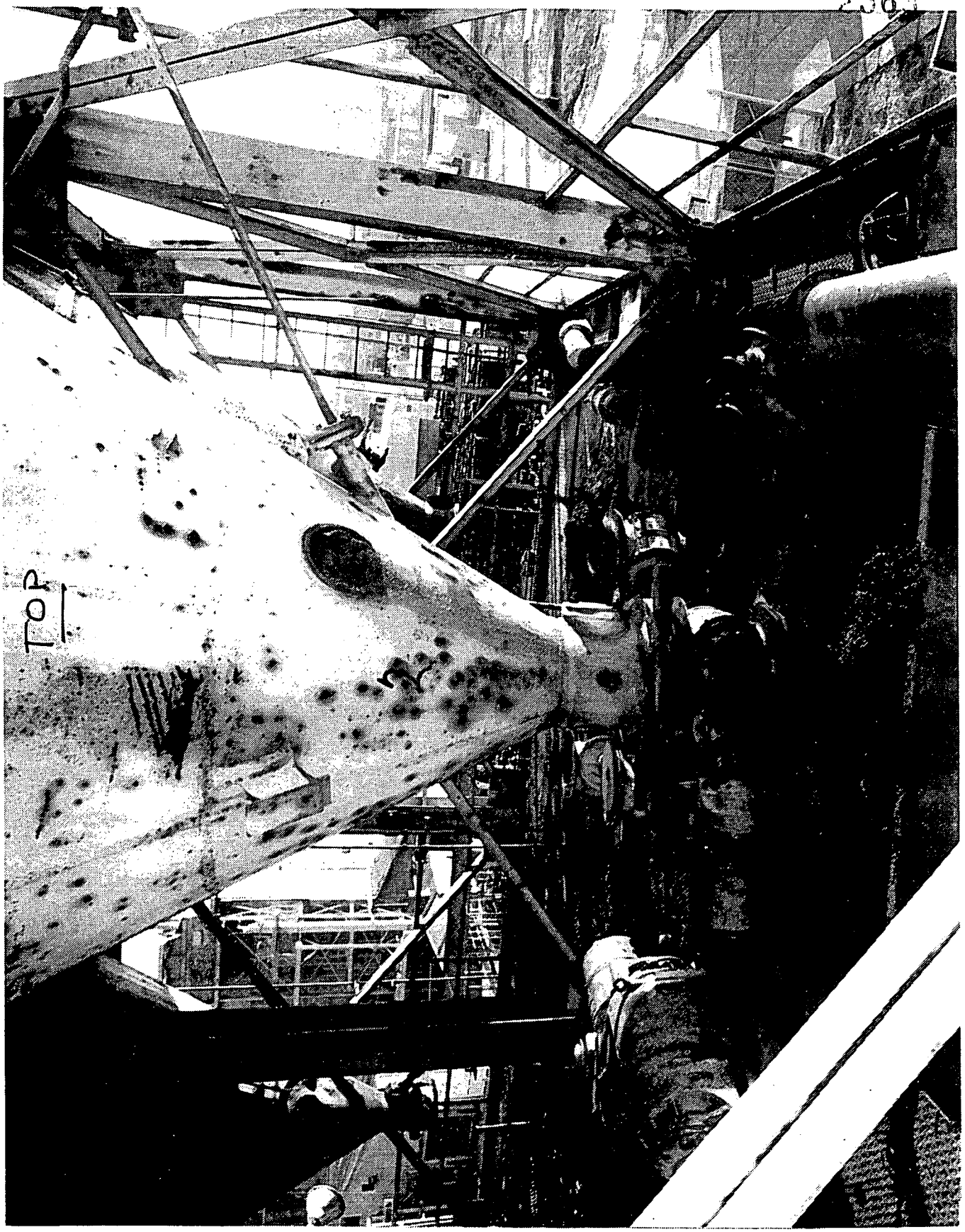


Figure 3-8 - Another View Under One of the Tile Silos at the Tile Silo Cone Level

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 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 small 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 the Removal Site Evaluation, Appendix A.1. These results indicate the presence of uranium and radionuclides of the uranium decay chain. Chemical analytical results are given in the Removal Site Evaluation, Appendix A.2. Few organic compounds were observed above detection limits. Results for Toxicity Characteristic Leaching Procedure (TCLP) tests are presently available from 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 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. 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. Further determinations are in progress and will be obtained to finalize the disposition of the waste containing these materials, as discussed in Section 8.

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 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 engenders the potential for exposure to radionuclides to plant population and the surrounding population from airborne or air conveyed releases from the ore silo facility due to weather conditions.

5) The potential for release also engenders the potential for weather condition caused 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.

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 accompanied by release of contents. This type of collapse could also damage and release radioactive materials from nearby facilities. The structural evaluation, Appendix B, concluded that the entire facility should be demolished or that the tall (44 feet) tile silos should be demolished and the remaining structure repaired.

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 environs. (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 an emergency and for inspection of the silo area.

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

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

SECTION 6

PROPOSED PLANT 1 ORE SILOS REMOVAL ACTION

6.1 Removal Action Approach

The objective of this removal action is to implement interim actions to mitigate 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 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. It 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 and will be addressed as part of the final remedial action for OU3 and/or OU5.

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 Operable Unit 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). The construction bid package will include drawings and specifications.

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

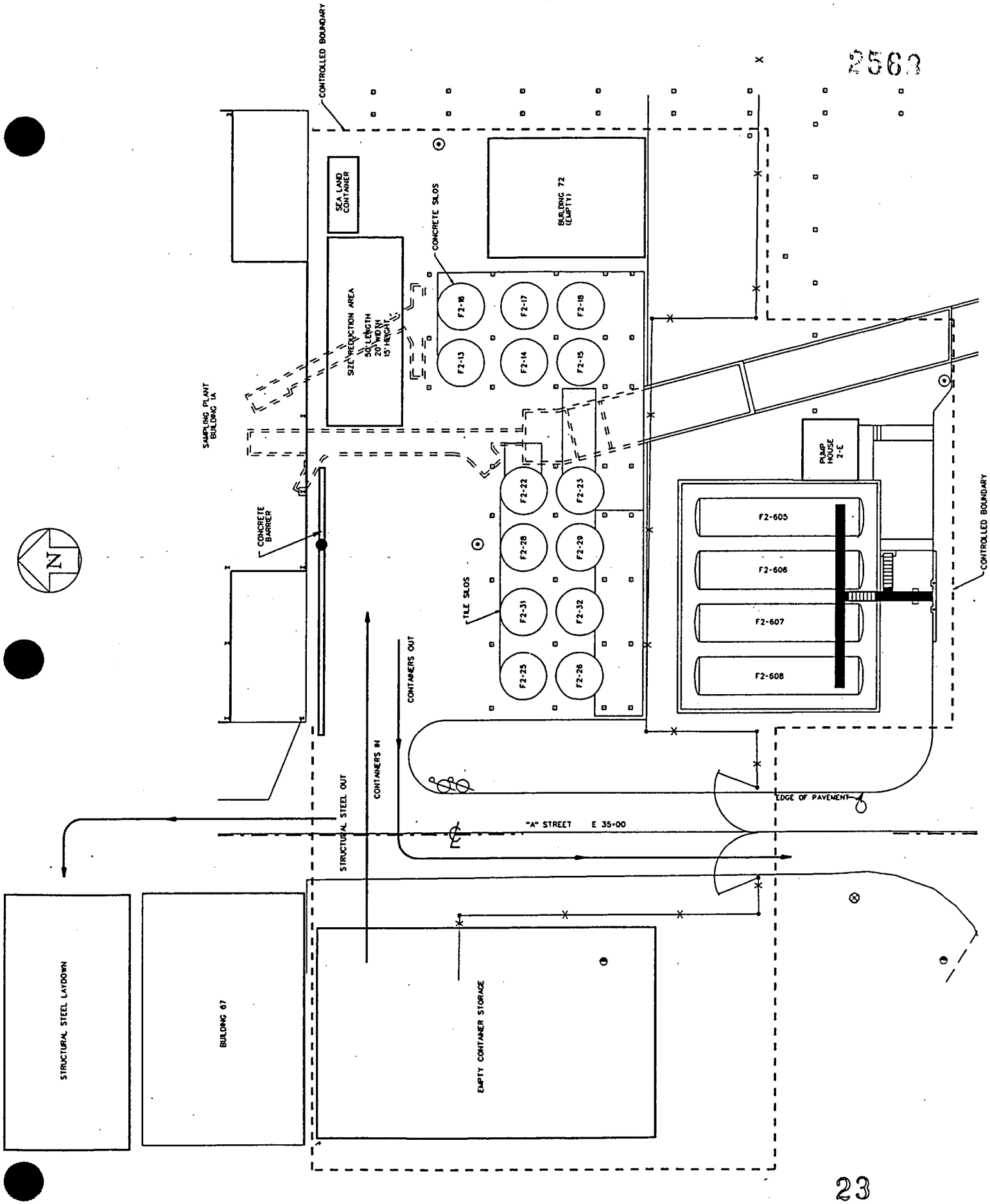


Figure 6-1 - Schematic Plot Plan of Plant 1 Silo Area

6.2 Control Measures

Contamination control basically will primarily be governed by (1) local containment at work stations and (2) provision of overall containment with directed air flow patterns from fresh air to progressively more contaminated areas. For tile and concrete silo removal, temporary structures will be erected to provide containment from weather conditions. Scaffolding will be erected around the silos to provide work stations for silo removal, and this scaffolding will be utilized to support temporary containment structures such as plywood and ventilation ducting. Local work stations will be arranged to contain removal debris such as mortar from the tile silos and concrete dust from the concrete silos. Egress from these work stations will be controlled by local radiation monitors and by periodic radiation surveys. The work stations will be routinely cleaned. Local containment structures will also be used to partially enclose conveyors, hoppers, and other process equipment during cutting and separation. Ventilation will be provided to containment and enclosures to assure directed air flow into contaminated work areas. Ventilation exhaust will be filtered through pre-filters and high efficiency particulate air filters. The filter exhaust will be monitored as will work areas and surrounding areas to assure compliance with airborne radionuclide concentration regulations.

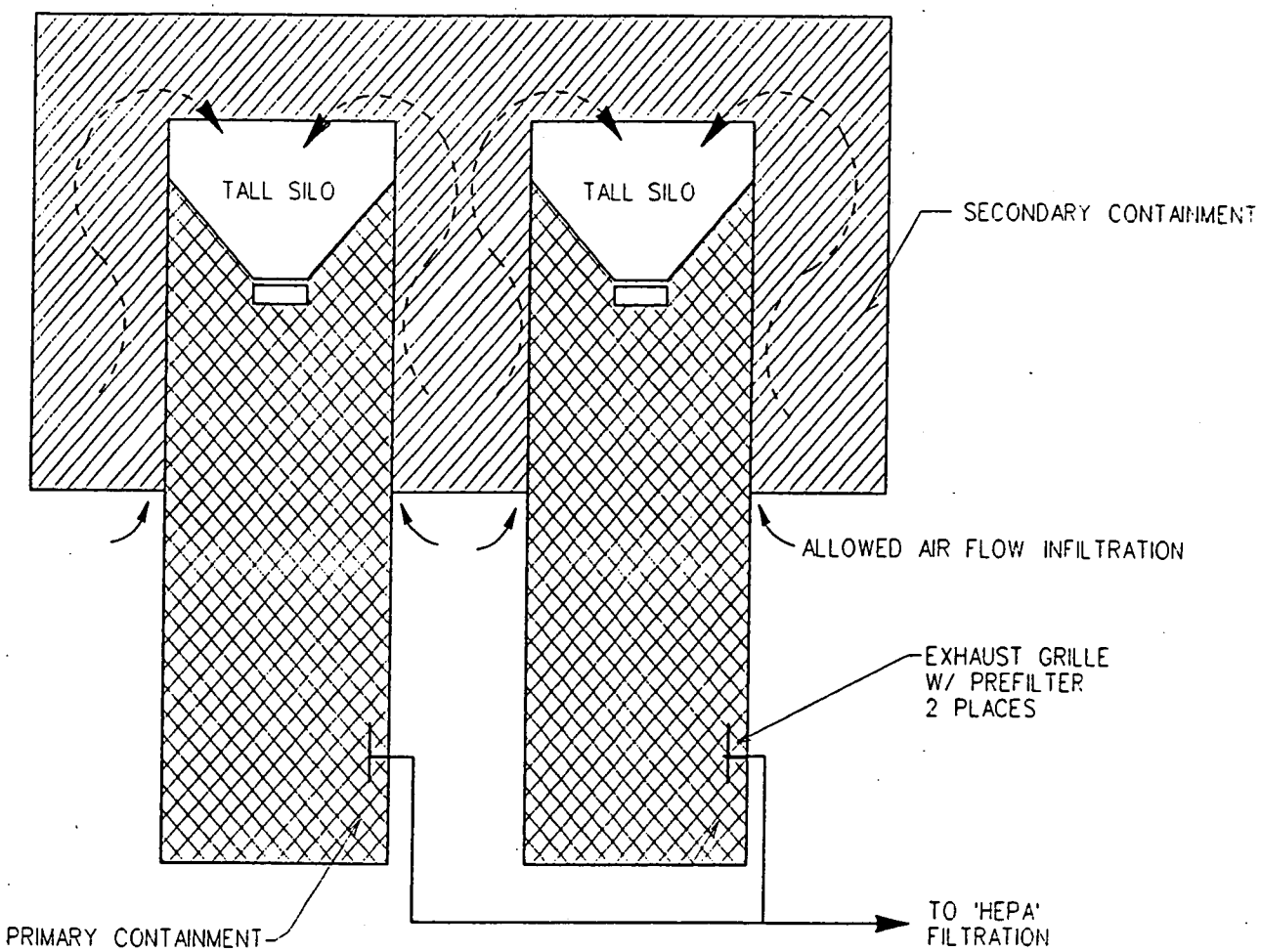
A schematic drawing of the silo containment air flow pattern is given in Figure 6-2. Temporary diking will be provided at the base of containment areas to assure that radionuclide contamination cannot escape during stormy weather. Also any decontamination fluids or materials will be collected for transfer and disposition through existing site facilities.

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.

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.

6.3 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.



CONTAINMENT SCHEMATIC

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

Only the scaffolding alternative would support the necessary requirements for safety, containment, and accessibility.

6.4 UNH Removal

Removal of uranyl nitrate hydrate from the storage tanks 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. In either case, 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 details will be completed during the detailed design phase of the activity.

6.5 Sequence of Removal

The sequence plan of removal is a key to reducing risks to workers and to controlling potential release to the environment at or below acceptable safety standards.

The sequence is based on a review of the complete removal action including both tile and concrete silos, associated equipment, and supporting structures. Key considerations include the following items:

1) 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.

2) 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 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.

3) 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).

Based on these considerations, the concept for removal sequence is as follows:

1) Control access to the dismantling area with appropriate signs and barriers. The proposed controlled area is given in Figure 6-1.

2) Remove radioactive materials from surrounding facilities and storage areas to the maximum extent practicable, including removal of enriched uranium storage drums from Building 72.

3) Install barriers to protect surrounding facilities and storage areas as necessary. This includes (1) placement of concrete barriers on the south face of Building 1A, (2) placement of concrete barriers on facing sides of Building 67, and (3) installation of a protective barrier at the north end of the uranyl nitrate hydrate. (Note: Enriched uranium shall be removed from Building 72, therefore protective barriers will not be required.)

4) Remove conveyors between Building 1A and the tile and concrete silos. Local containment will be provided for this work as necessary. Exposed process surfaces will be wrapped and sealed as necessary.

5) Erect ground level containment areas for size reduction and packaging and install ventilation filters and blowers.

6) Install scaffolding as needed for concrete silo removal. This will include installing scaffolding up to work levels for removal of non-load bearing structures. The scaffolding will be entirely self-supporting; that is, the existing structure will not be used for scaffolding support. Attach containment and ventilation as necessary for work areas.

7) Remove loose equipment and non-load bearing structures at ground level. This will include removal of transite structures.

8) Remove structure and equipment from the top of concrete silos. This will include removal of platforms, catwalks, handrails, conveyors, hoppers, and motors. Containment will be provided for this work as necessary. Exposed process surfaces will be wrapped and sealed as necessary. Removal will be performed from the north side.

9) Remove concrete silos and supporting steel structure. These will be removed in sections as complete units and size reduced at ground level. These silos weigh approximately 25 tons each.

10) Install scaffolding as needed for tile silo removal. This will include installing scaffolding up to work levels for removal of non-load bearing structures. The scaffolding will be entirely self-supporting; that is, the existing structure will not be used for scaffolding support.

This activity will include removal of checker plate decking and decking support structure below the silo bottom cones and of the silo bottom cones. This removal is necessary to provide for passage of tile waste boxes. Reinforcing structure to compensate for this removal will be added as necessary. Containment will be provided for this work as necessary. 27

11) Remove overhead structures and equipment mounted on top of the tile silos. This will include the removal of piping, platforms, catwalks, handrails, conveyors, hoppers, and motors. Dismantling will be performed from the north side. Containment will be provided for exposing potentially contaminated material as discussed in Section 6.2. Exposed process surfaces will be wrapped and sealed.

12) Remove tile silo caps. The complete cap of each silo will be removed as a unit. Size reduction will performed at ground level. These caps weigh approximately 5 tons each. Exposed process surfaces will be wrapped and sealed.

13) Complete the installation of containment around tile silo removal work areas. Containment will be supported by the scaffolding. Ventilation will be connected. The silos will function essentially as downdraft chimneys for flow of ventilation air.

14) Remove tile silos. The tile silos will be removed essentially one tile at a time to minimize dust and airborne contamination. Tile will be loaded directly into waste boxes located inside the silos at the working level to minimize dust and airborne contamination. Air will flow into and down the silos away from workers. A box-lifting fixture and loading chute will be provided. Hoists for raising and lowering the lifting fixtures and loading chute will be supported by the scaffolding. The waste boxes will be loaded to a gross weight of three tons; and the scaffolding will be designed for the total weight including loaded box, lifting fixture, loading chute, and hoists.

    Shipping boxes will be removed at ground level with a dolly jack through an air lock. The air lock will double as a wipe down area.

    Silos removal will commence from the north side, away from the UNH storage tanks, with the tall silos being removed first then proceeding to the small silos.

15) Remove the remaining structural steel. Removal will be from the north side.

16) Remove concrete piers. The top few inches of the concrete pad may be disturbed during this portion of the removal. If the pad is disturbed, the surface will be refurbished so that the concrete surface is level.

17) Remove temporary dismantling structures, protective barriers, dismantling area barriers and clean up and decontaminate the entire area.

6.6 Waste Material Disposition

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

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

1) Low specific activity waste
2) Free release waste/materials
3) Cleaning and decontamination waste
4) Asbestos waste (in the form of transite panels)
5) Hazardous and/or mixed waste

In addition to the above waste streams, organic materials, such as gear box oil, transformer mineral oil will be separated and transferred to existing site facilities for eventual treatment or disposal. Lead in paint on steel structures is not leachable and paint will not be removed except in areas where burning procedures are used for structural steel size reduction. A waste handling and disposition description for each of the expected types of waste to be generated is provided below.

Low Specific Activity Waste

Table 6-1 shows the preliminary estimate of rubble to be generated as part of this removal action. The estimate shows the bulk of the rubble, about 547 tons, to be low specific activity (LSA) waste. This includes collected residue, tile and concrete rubble and contaminated steel and equipment. About 230 tons of the waste is estimated to be non-contaminated material.

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

Free Release Waste/Materials

The silos, equipment and residue will be monitored and the wastes will be characterized and segregated to minimize waste volume. In particular, the wastes will be sampled and/or tested to determine if removed material can be decontaminated for free release with a resultant reduction of low specific activity waste. The preliminary estimated waste weights given in Table 6-1 were based upon the presumption that structures and equipment in contact with process metal oxide cannot be decontaminated for free release. The opposite presumption was made for structures not in contact with process metal oxides.

Cleaning and Decontamination Waste

Decontamination techniques will be developed for removal execution. Simple wipe down techniques will be used at the removal site. The wipes and waste residues will be managed as a LSA waste. Decontamination will be done to contain radioactive material and to clean equipment items for release, including equipment used in the removal process. The base pad will also be decontaminated, to the extent practicable, as a part of this action. If structural members need to be decontaminated to allow for free release, they will be staged for future decontamination.

Decontamination methods may include vacuum grit blasting or carbon dioxide blasting, because these methods minimize waste generation. A steam cleaner or high-pressure water spray may be used to clean the base slab.

The wastewater that may be generated as a result of cleaning and decontamination operations will be collected and transferred to the Plant 8 sump. This wastewater will be combined with other plant

wastewaters for treatment prior to discharge to the Great Miami River via the existing NPDES permitted outfall. As such, the treatment and discharge of this decontamination wastewater and the monitoring of the effluent discharge will be in accordance with the existing PTI/PTO and NPDES permits issued to the FEMP by the Ohio EPA. In consideration of the anticipated contaminants and the expected volume of wastewater to be generated, the existing wastewater treatment facilities are deemed to be adequate.

Asbestos Waste

Asbestos material such as the transite structures will be packaged and disposed according to existing site procedure, namely Industrial Hygiene and Safety Manual IH&S-IH-03, Control of Work Involving Asbestos, 3-20-89, Revision 0, attached in Appendix C.

Hazardous and/or Mixed Waste

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

Table 6-1 - Preliminary Estimated Weights Construction Waste

	Weight[1]	Material Activity[2]	Container Type[3]	Number of Containers
Collected Silo and Equipment Residue	12 Ton	LSA	Drums	25
Tile Silo Rubble	290 Ton	LSA	Box	100
Concrete Silo Rubble	160 Ton	LSA	Box	50
Structural Steel and Equipment (Contaminated)	70 Ton	LSA	Sea Land	10
Structural Steel (Decontaminated)	230 Ton	Free Release	---	---
Construction Wastes	15 Ton	LSA	Box	5

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1) Weights are preliminary estimates based on information from existing drawings, photographs, and field surveys.

2) LSA or Low Specific Activity as defined in DOT regulations, 49CFR 173.403 (n) (1).

3) Containers will comply with DOT Specifications 7A (49CFR178.350) Type A. Box material and compliance criteria comply with Specification 7A-542. Box dimensions are approximately 6 feet by 4 feet by 3 feet. Sea-Land container dimensions are approximately 8 feet by 8 feet by 20 feet.

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 shall 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).

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

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
29 CFR 1926	Safety and health standards for general construction.	Applicable	This removal action will be conducted in accordance with applicable general construction standards of the OSHA. The specific requirements are identified in the task-specific health and safety plan.
40 CFR 61, Subpart H	Emissions of radionuclides to the ambient air from DOE facilities 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.	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.

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

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
49 CFR 171-179	Any waste shipped off site must be packaged, marked, and labelled in accordance with these DOT shipping requirements.	Applicable	All of the waste to be shipped off site will contain radionuclides and will be classified as a low specific activity waste. These waste materials will be packaged in accordance with applicable DOT regulations for off-site shipment to the Nevada Test Site. The waste containers will be marked and labelled as required by these DOT regulations.
OAC 3745-15-07	The emission or escape into open air from any source whatsoever in such a manner or in such amounts as to endanger the health, safety, or welfare of the public or to cause unreasonable injury or damage to property shall be declared a public nuisance and is prohibited.	Applicable	The potential for emissions will be controlled by providing local containment and a ventilation system with HEPA filtered exhaust for potentially contaminated work areas.

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

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

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

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

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

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
DOE Order 5400.5, Chapter II, Section 1.a	The exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall 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 shall 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) shall not exceed 4 mrem in a year from drinking water.	To Be Considered	Contaminated debris will be contained to prevent runoff from becoming contaminated from removal activity. Waste liquid generated will be contained and, as appropriate, treated under the requirements of the NPDES permit in the FEMP Waste Water Treatment Unit.
DOE Order 5400.5, Chapter IV	The management and free release of wastes, residues, structures, equipment, and other property shall adhere to the radiological protection requirements and guidelines described in DOE Order 5400.5. The requirements of this section shall apply for surface contamination of existing structures and equipment (Figure IV-1).	To Be Considered	Radiation surveys will be performed prior to releasing any potentially contaminated materials off-site to demonstrate compliance with the specified standards.
DOE Order 5480.11	Radiation doses, levels, and concentrations for restricted and unrestricted areas shall not exceed specified limits.	To Be Considered	Work crews will be required to dress appropriately as outlined in the site-specific Health and Safety Plan. Work areas will be surveyed for radiation level and dosimeters will be worn, as required, to monitor work exposure.

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

REGULATORY CITATION	REQUIREMENT	ARAR/TBC	COMPLIANCE STRATEGY
DOE Order 5820.2A, Chapter III.3.c	Technical and administrative controls shall be used to reduce the quantity and/or radioactivity of the waste generated. Uncontaminated waste shall 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 shall 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) shall comply with DOE Order 1540.1. The number and volume of containers shall 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.

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 6.3).

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 5480.11 are for radiation workers at DOE facilities or for a dose equivalent of 5,000 mrem at 2,000 hours exposure. The dose equivalents given in this table are adjusted to 10 mrem equivalent at 8,760 hours exposure. This is conservative because removal actions are not expected to be on a 24-hour basis.)

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

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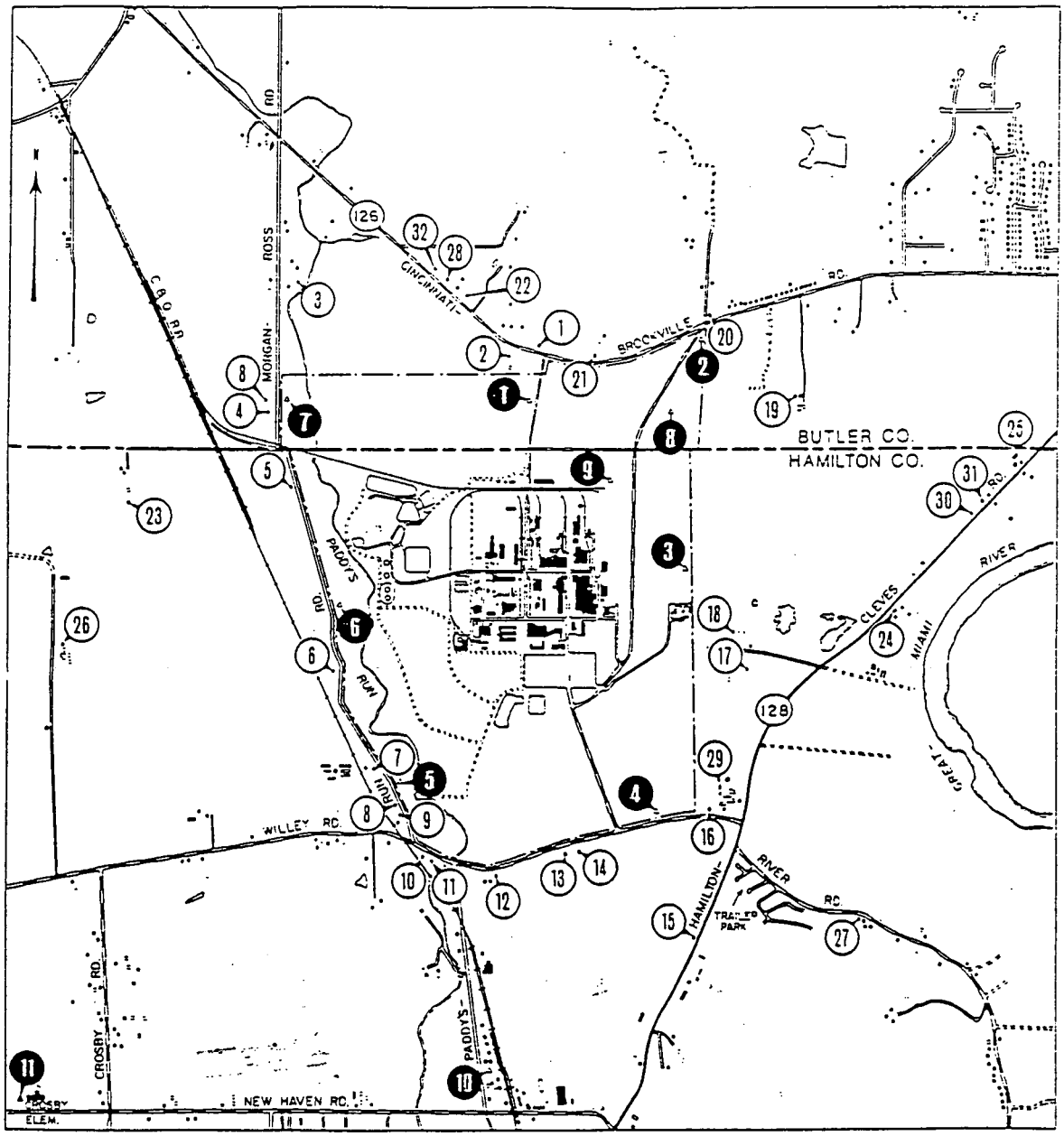

LEGEND

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

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Figure 6-3 - FMPC Environmental Residential Census, 1989

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 WEMCO personnel.

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

7) The subcontractor shall 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.

SECTION 8

SAMPLING AND ANALYSIS PLAN

8.1 Sampling Objectives

As identified in Section 4.0, some sampling has been previously conducted in the vicinity of the Plant 1 Ore Silos. Additional sampling is proposed to be conducted to support the Plant 1 Ore Silo Removal Action to achieve the following objectives:

1) Characterize the concentrations of Hazardous Substance List (HSL) constituents in the materials to be disposed in the Plant 1 Ore Silo Removal Action.

2) Complete a hazardous waste determination of the materials in the Plant 1 Ore Silo project.

3) Complete a hazardous waste determination on containerized waste materials generated incidental to completing the construction activities associated with the Removal Action.

4) Ensure defined soil contamination concentrations are identified during the Removal Action.

5) Ensure continued protection of human health and the environment through long-term monitoring of the Removal Action system during the period until final remediation under Operable Unit 3.

To achieve the sampling objective, samples are proposed to be collected prior to and during the construction phase of the Removal Action, and as a part of a long-term monitoring program.

8.2 Pre-construction Sampling

To determine the possible presence of HSL constituents in the materials proposed to be dismantled, additional sampling locations have been selected within the area and process equipment of the Plant 1 Ore Silos. Additional radioisotopic analytical data will also be acquired in the pre-construction sampling phase to complete a full radiological characterization of the Ore Silos. Sample locations and procedural methodology are given in Appendix I, "Work Plan, Site Media Sampling, SMS-REQ-104".

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The waste stream to be encountered will be sampled and analyzed for specific radionuclides of concern and for full metals (including TCLP). Samples will be analyzed for organic compounds if photoionization detector (PID) measurements performed by Environmental Monitoring Technicians are positive. If no PID measurements are positive, then random samples will be analyzed for organic

compounds. Fractions will be saved for possible analysis based upon the results of the first round of analyses.

If the analytical results show any HSL analyte is present in concentrations greater than background, the data will be statistically assessed. Excess concentrations for naturally occurring HSL's are those above background[3,4]. If the mean plus two standard deviations is less than the regulatory threshold, no further analyses are required. These values will be presented in the final project report. Additional sample locations will be designated in relation to those showing excess concentrations.

Following completion of all analyses, the concentrations of any positive analytes will be summarized, with the mean and 95% confidence level, and presented in the final project report.

8.3 Construction-Related Sampling

Instrument Measurements During Demolition

During demolition portable instrument measurements will be taken for organic vapors by Environmental Monitoring Technicians with PID instruments. Radiological Safety Technicians will monitor the Ore Silo area for radioactive contamination using a combination of alpha scintillation (ZnS) and beta-gamma Geiger Mueller (GM) field portable instruments (fixed plus removable contamination), and a alpha/beta-gamma low background proportional counter to analyze swipe samples (removable contamination). Any measurable or detectable organic vapor concentrations and/or alpha scintillation probe and beta-gamma GM probe count rate in excess of 300 DPM/100 cm^2 total alpha (fixed plus removable), and 1000 DPM/100 cm^2 total beta-gamma (fixed plus removable) will be cause for associated materials to be decontaminated, or containerized and managed consistent with pertinent ARARs. All collected residues within conveyor systems, process flow lines, valves, hoppers and pumps are expected to be classified as LSA (Low Specific Activity) radioactive waste, and will be shipped in accordance with 49 CFR. Other materials will continue to be dismantled and containerized until there is no indication of organic compounds, or radiation measurements are indicative of less than 300 DPM/100 cm^2 total alpha (fixed plus removable), and 1000 DPM/100 cm^2 total beta-gamma (fixed plus removable).

Materials that are not required to be containerized by the above field survey methods, and are intended to be released from the Ore Silos removal area for unrestricted use, are to surveyed for removable and

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[3] Shacklette, H.T., and Boerngen, J.A., "Elemental Concentrations in Soils and Other Surficial Materials of the Conterminous United States", U.S. Geological Survey Professional Paper 1270, 1984.

[4] Logan, T.J., and Miller, R.H., "Background Levels of Heavy Metals in Ohio Farm Soils", Research Circular 275, Ohio State University, February, 1983.

total (fixed plus removable) radioactive contamination in accordance with SP-P-35-010, "Unrestricted Release of Materials from FMPC." This does not apply to bulk materials such as soil, concrete, liquids, or wet materials, which will require sample analysis.

Construction Rubble Sampling

In preparation for disposal of dismantled materials exhibiting an in situ activity concentration between 35 and 100 pCi/g of total uranium, the containers will be documented with the contents as characterized as described in Pre-construction Sampling.

Representative samples will be collected from the containers of materials which have not been characterized through pre-construction sampling for purposes of determining the radiological properties of the materials and to complete a hazardous waste determination. Samples shall be collected and analyzed in a manner consistent with the protocols defined in the RI/FS Quality Assurance Program Plan (QAPP) and as supplemented by Part III of SW-846, 3rd Edition, Test Methods for Evaluating Solid Waste pertaining to the sampling of containerized materials.

Collected samples shall be analyzed for full TCLP, HSL constituents and full radiological parameters at the RI/FS QAPP laboratory unless there is prior concurrence for an alternate laboratory by US EPA and Ohio EPA.

8.4 Environmental Monitoring

To ensure the continued protection of human health and the environment, a long term environmental monitoring program will continue in the vicinity of the Plant 1 Ore Silos demolition area, until its completion and release from the exclusion zone status. The program will be specific for the Ore Silos area and will essentially have three key components, air, surface water and groundwater monitoring.

Monitoring for Fugitive Dust Emissions

Effluent monitoring will be performed on the exhausts of HEPA (High Efficiency Particulate Air) filtered ventilation systems servicing containment areas, as required by WEMCO Environmental Compliance. Real-time constant air monitors (CAMs) and retrospective (for decay count) air samplers, as appropriate, will be placed at all occupied areas within the Silos demolition area and on the perimeter of the demolition exclusion zone, to measure long-lived and short-lived airborne radioactivity concentrations. Air samples will be collected daily and analyzed for gross alpha and gross beta concentrations by Radiological Safety. Engineering controls and additional health and safety measures will be instituted if elevated concentrations are detected.

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Surface Water Monitoring Program

During construction, water samples will be collected by Environmental Monitoring, and taken of the stormwater run-off at the entrance to the storm sewer system (CB 102, 103, 104) on a monthly basis[5].

Following construction activities, and during operations on the pad, the following water samples will be taken of the stormwater run-off on an approximately monthly basis depending on precipitation events until sample results indicate that quarterly sampling is sufficient.

1) At the inlet to the storm sewer system (CB 102, 103, 104) at the storm sewer MH 11

2) All samples of the stormwater run-off will be analyzed at the FEMP laboratory for total uranium and total thorium. Samples will be collected in a manner consistent with the RI/FS QAPP. Collected samples will be transferred to the FEMP Laboratory for analysis in accordance with the Analytical Laboratories Quality Assurance Plan, October 1987.

Groundwater Sampling and Analysis Plan

The existing groundwater monitoring program will be enhanced to provide additional monitoring in the vicinity of the Plant 1 Pad Silos to identify any changes in groundwater quality so as to ensure the continued protection of human health and the environment.

Groundwater monitoring will be performed in the glacial overburden by sampling piezometers screened in a perched water zone under the area of concern. The piezometers will be sampled for contamination indicators and parameters specific to the Plant 1 Pad Silo waste. An assessment of sampling data from the perched groundwater will be performed to determine if any changes occur in perched water quality, and to determine if Plant 1 Pad Silo waste parameters are present.

There are a number of monitoring locations in the glacial overburden near the Plant 1 Pad 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 boring logs for monitoring location around the Silos (1352, 1353, 1356, and 1359) document a silty sand lense approximately 3 to 8 feet thick and 12 to 15 feet BGS in all of the borings. All the lithologies encountered in the borings were moist to wet, and most clays contained silts, sands, or gravels. Hydrographs illustrate that water elevations behave similarly in all of the monitoring locations, suggesting that there may be some degree of connectivity.

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[5] All water samples will need to be taken consistent with the weather conditions. If there has not been a storm event during the given time frame, no sample will be taken due to the lack of stormwater runoff.

The perched water identified under the Plant 1 Pad Silos will be monitored by sampling Monitoring Locations 1353, 1352, 1357, and 1359. These monitoring locations were chosen because they provide monitoring of the perched water on four sides of the Plant 1 Pad Silos, and because they are the closest monitoring locations to the unit. The assumption has been made that the perched water zone under the Plant 1 Pad Silos is connected and uniform.

Sampling will occur on a quarterly basis during removal activities and for one year following completion of the removal action. Quarterly sampling was chosen because groundwater movement in the perched zone is expected to be slow, but seasonal effects may impact migration of contaminants. If no change in groundwater quality is detected by analysis of the data, sampling events will be conducted on a semi-annual basis.

The samples collected for this sampling plan will be collected in a manner consistent with the protocols and procedures defined in the RI/FS QAPP. The samples will be analyzed for the following list of parameters:

1) pH
2) Specific Conductivity
3) Total Organic Carbon
4) Total Organic Halide
5) Total Uranium
6) Isotopic Thorium
7) Isotopic Radium
8) Barium
9) Lead
10) Chromium

These parameters were chosen because they are representative of the constituents that are in the Silos. If significant changes in the above-listed parameters are identified during or after removal activities, then full radiological and HSL samples will be collected for a more complete analysis.

Analysis of semi-annual and quarterly samples will be completed in the FS Analytical Laboratory in accordance with the Analytical Laboratory Quality Assurance Plan, October 1987. In the event that organic compounds are added as a result of an HSL sampling event, these analyses will be performed at a laboratory as defined in the RI/FS QAPP.

The boundary between the glacial overburden and the sand and gravel is approximately 30 feet BGS. No monitoring locations near the Silos are available to monitor this zone. In the event that sample results from the perched water under the Silos indicate changes in groundwater quality, a sand and gravel aquifer monitoring well should be located downgradient of the perched zone to determine it the sand and gravel

aquifer is being affected. The sand and gravel aquifer monitoring well (if placed) should be sampled on the same schedule and for the same constituents as the perched water monitoring locations.

This monitoring and sampling program will be performed in conjunction with sampling and analysis activities under Operable Unit 3 of the ongoing RI/FS and resultant final remedial actions. The scope of this monitoring and sampling program will not interfere with any activity in this area.

As stated in the Consent Agreement, if the DOE determines that any activities of 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 a hazardous substance, pollutant, contaminant, or hazardous constituent, it may stop any work or activities for such a period of time as needed to respond and take whatever action is necessary to abate the danger.

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.

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 ASME NQA-1, Federal 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

PLANT 1 ORE SILOS REMOVAL SITE EVALUATION

Removal Site Evaluation

Plant 1 Ore Silos

Fernald Site Office (FSO)
Fernald, Ohio

September 1991

U. S. DEPARTMENT OF ENERGY

REMOVAL SITE EVALUATION

PLANT 1 ORE SILOS

FERNALD SITE OFFICE (FSO)

FERNALD, OHIO

SEPTEMBER, 1991

U. S. DEPARTMENT OF ENERGY

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1.0 INTRODUCTION

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

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

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

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

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

1.1 Status of Plant 1 Ore Silos

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

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

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

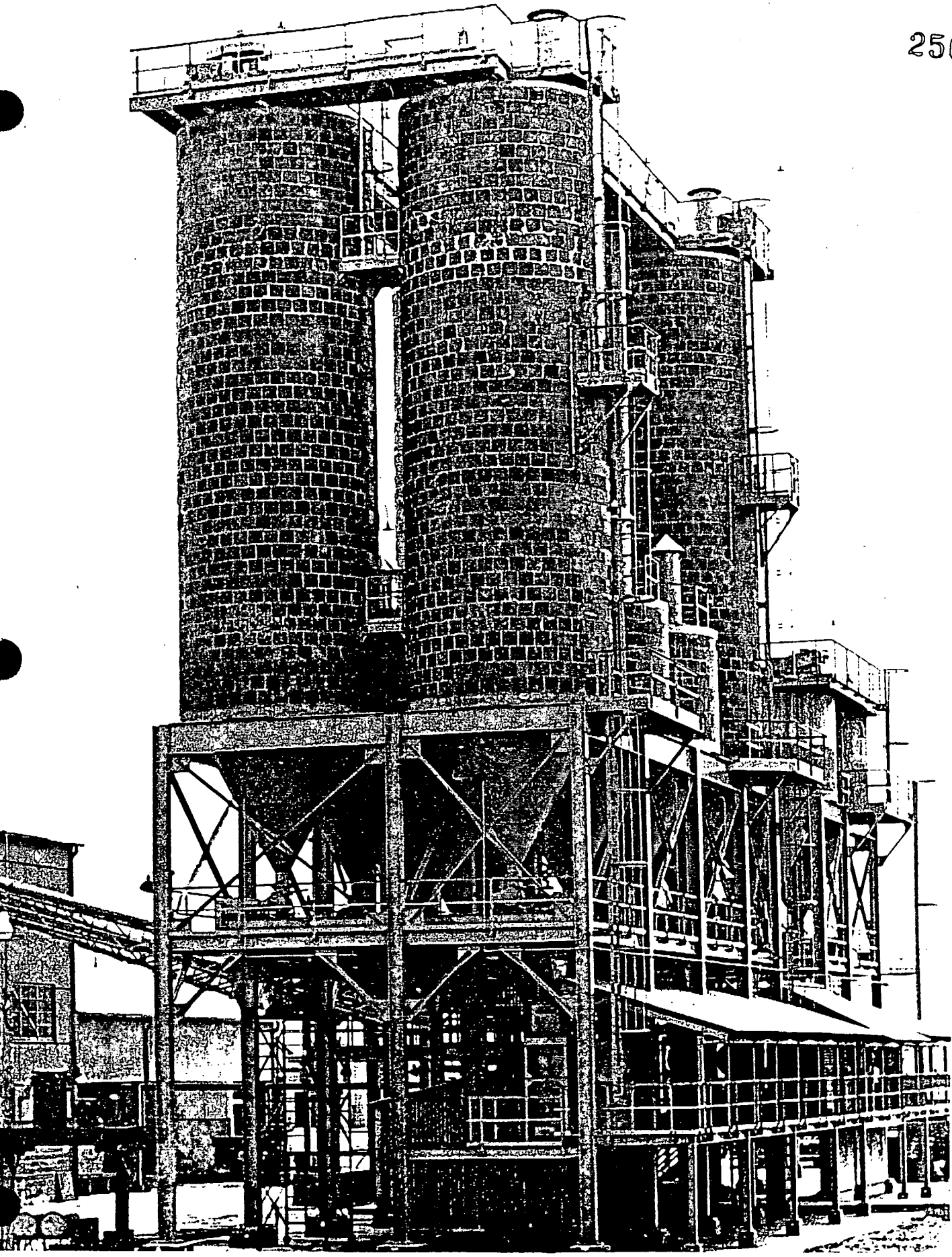
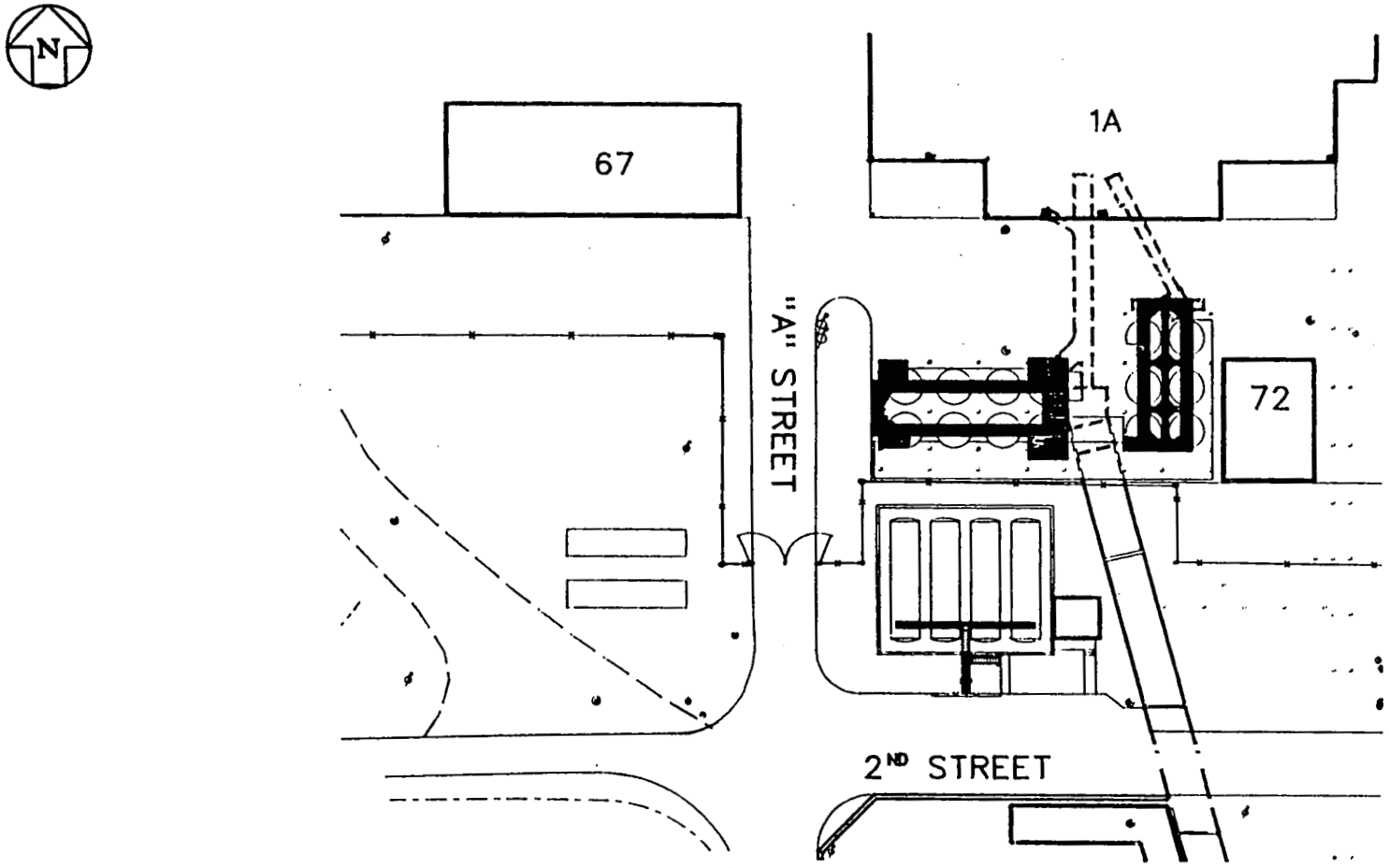


FIGURE 1

Overview of Plant 1 Silos Looking East



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APPROVALS		
CHEMICAL		
CIVIL & STR.		
ELECTRICAL		
ENGINEER		
INSTRUMENT		
MECHANICAL		
CHECKED		
APPROVED		

Executive Resource Associates, Inc.
A Technical Services Company

10991 HAMILTON-CLEVES HIGHWAY • OAKRIDGE INDUSTRIAL PARK
HARRISON, OHIO 45030 • TELEPHONE (513)738-0002
FAX (513)738-0405

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

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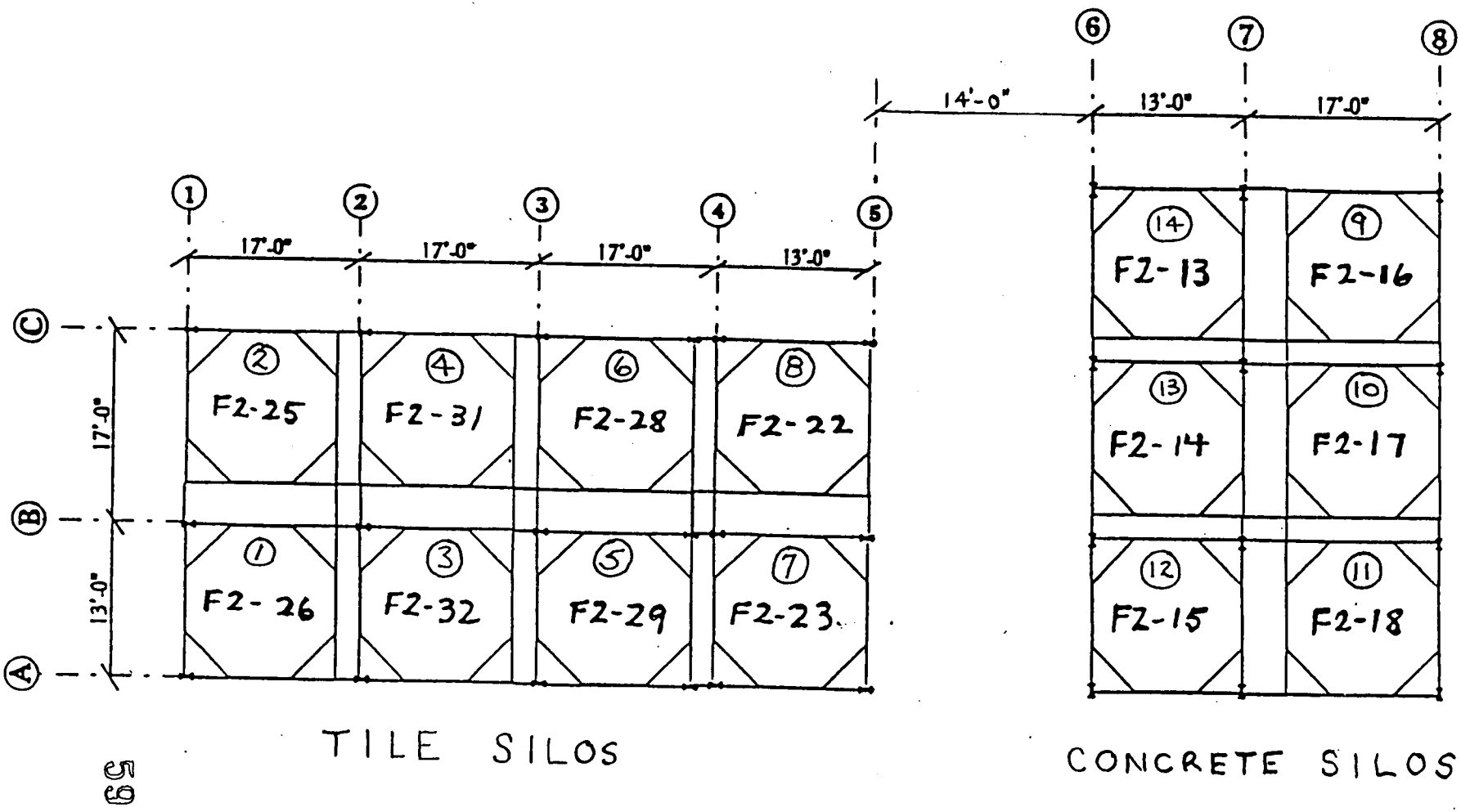
DATE	6-12-91
DRAWN	WILLIAMS

047-3-0005

FERNALD PLANT 1 SILOS



NTS

FIGURE 3

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

1.2 Status of Adjacent Facilities

1.2.1 Uranyl Nitrate Tanks

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

1.2.2 Building 67

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

1.2.3 Building 72

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

1.2.4 Plant 1

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

1.3 Basis for the Removal Site Evaluation

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

2.0 SOURCE TERM

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

Table 1. Estimated Residue Volumes in the Plant 1 Silos

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

* inspection not possible

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

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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	0.25
Thorium-228	1.9	0.42
Uranium-238	2.7	0.20
Uranium-234	2.5	0.19

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

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

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

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

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

Table 4. Sample Concentrations Compared to TCLP Results

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

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

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

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

Table 5. 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.

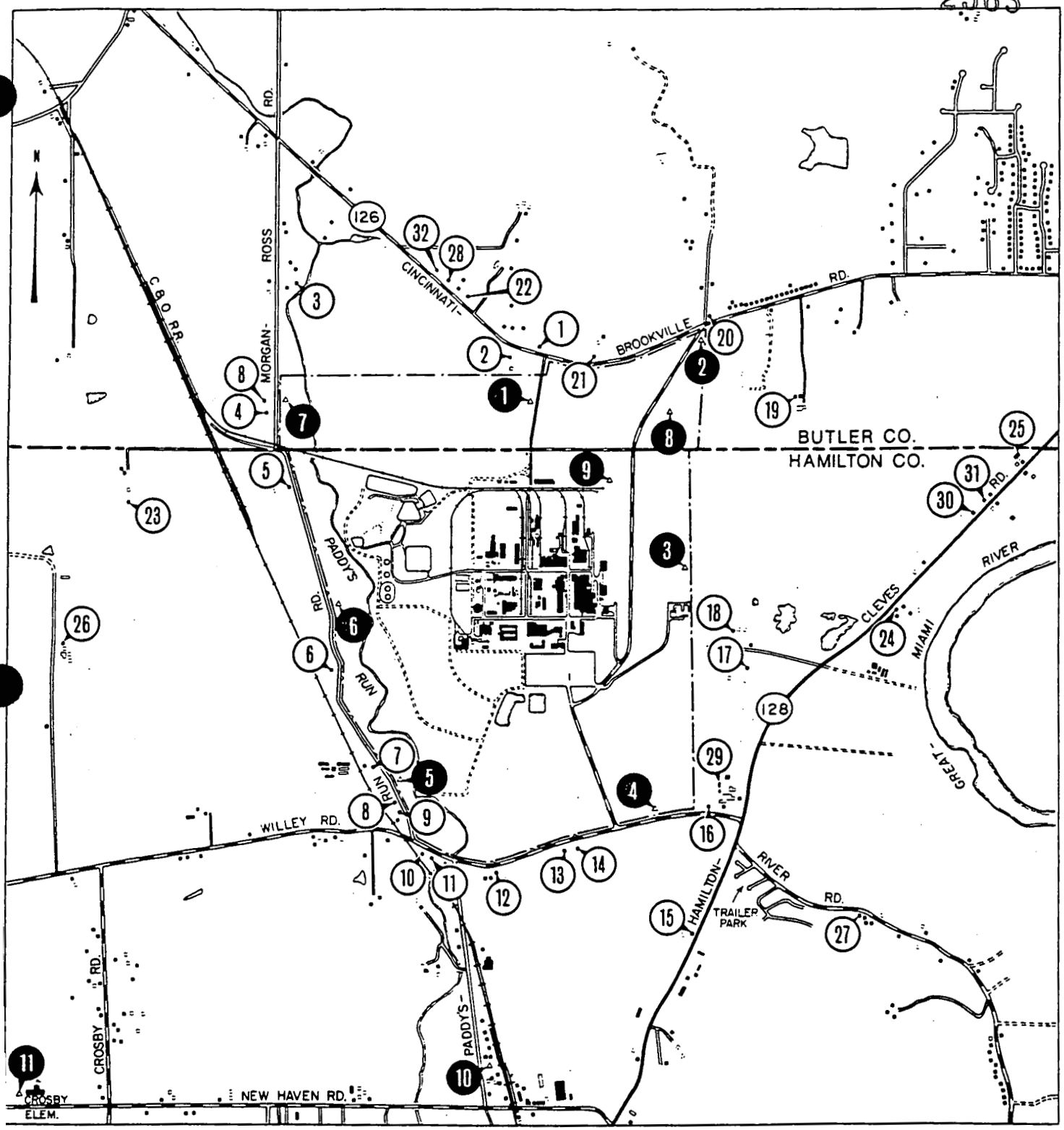
Table 7. Estimated Airborne Concentrations Compared to Table 1 of Attachment 1 of DOE Order 5480.11

	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.

FMPC ENVIRONMENTAL RESIDENTIAL CENSUS, 1989

2563



0 1/2 1 2

SCALE OF MILES

LEGEND

67

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

FIGURE 4

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

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

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

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

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

4.0 ASSESSMENT OF THE NEED FOR A REMOVAL ACTION

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

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

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

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

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

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

5.0 APPROPRIATENESS OF A RESPONSE

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

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

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

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

REFERENCES

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

PLANT 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) 140000(EM-2504) 160000(EM-2507)	1200(EM-2509) 1200(EM-2570) 1400(EM-2571) 1600(EM-2001)	2300(EM-2504) 2500(EM-2507)	79(EM-2570) 83(EM-2571) 130(EM-2001)	660(EM-2507) 1600(EM-2504)	1100(EM-2507)

		Uranium-234	Uranium-235	Uranium-236	Plutonium-238	Plutonium-239	Plutonium-239,40
Fraction Detectable	[1]	(11/14)	(11/14)	(11/14)	(14/14)	(6/14)	(14/14)
Mean + 1 Std. Dev.	[2]	167.4 + 291.2	8.36 + 14.2	0.433 + 0.579	0.18 + 0.085	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) 5.2(EM-2506)	3.1(EM-2571) 3.1(EM-2571)
Concentrations Greater Than Mean + 1 Std. Dev.	[3]	10(EM-2570) 11(EM-2504) 13(EM-2507)	43(EM-2571) 55(EM-2572)	

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

PLANT 1 TILE SILO RESIDUES
(picocures per gram)

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

* Units = ug/g + = Duplicate Sample

PLANT 1 TILE SILO RESIDUES
(picocures per gram)

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

+ = Duplicate Sample

PLANT 1 CONCRETE SILO RESIDUES

(picocures per gram)

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

* = pci/ml
+ = Duplicate Sample

PLANT 1 CONCRETE SILO RESIDUES

(picocures per gram)

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

* = pci/ml
+ = Duplicate Sample

RI Analytical Detection
(Soil Samples)

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

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APPENDIX A.2

CHEMICAL ANALYTICAL RESULTS

PLANT 1 ORE SILOS
Summary
Chemical Results

METALS (ug/g)		Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
Fraction Detectable	[1]	(8/14)	(14/14)	(9/14)	(13/14)	(15/15)	(9/14)	(6/14)	(11/14)
Mean + 1 Std. Dev.	[2]	166.7 + 321.5	52.5 + 59.3	16.0 + 9.1	188.1 + 178.0	3973 + 8342	664.3 + 1328.3	15.91 + 4.31	0.68 + 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

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

+ = Duplicate Sample

PLANT 1 CONCRETE SILOS RESIDUES
(micrograms per gram)

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

+ = Duplicate Sample

PLANT 1 CONCRETE SILOS RESIDUES
(micrograms per gram)

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

+ = Duplicate Sample

PLANT 1 CONCRETE SILOS RESIDUES
(micrograms per gram)

SILO NO. DRAWING NO.	EM SAMPLE NO. LABORATORY NO.	PARAMETER	CONCENTRATION
12 F2-15	EM-2572 910501-041	Arsenic	30.2
		Mercury	0.57
		Selenium	8.41
		Lead	555.81
		Silver	12.53
		Barium	115.03
		Cadium	24.6
		Chromium	171.98
13 F2-14	EM-2573 910501-042	Arsenic	32.2
		Mercury	0.56
		Selenium	18
		Lead	560.52
		Silver	11.59
		Barium	7.92
		Cadmium	24.16
		Chromium	182.06
14 F2-13	EM-2574 910501-043	Arsenic	27.9
		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	200	216	100,000
		Lead	200	441	5,000
11+ F2-18	EM-2575 910430-111	Barium	200	252	100,000
		Lead	200	462	5,000
11+ F2-18	EM-2571 910501-112	Methyl Ethyl Ketone	50	83	200,000
		Selenium	420	738	1,000
		Mercury	0.2	0.2	200
12 F2-15	EM-2572 910501-041	Barium	200	252	100,000
		Lead	200	462	5,000
13 F2-14	EM-2573 910501-042	Lead	200	203	5,000
14 F2-13	EM-2574 910501-043	Barium	200	213	100,000

+ = Duplicate Sample

APPENDIX B

SOURCE TERM

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

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

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

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

** Not Sampled. Assumes Highest Concentrations Equal to the Silo 1 Recaptured Residue Sample (Silo 1 is empty).

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.

B

APPENDIX B

PLANT 1 SILOS STRUCTURAL EVALUATION

Note: Calculations supporting this evaluation are in the administrative record of the project.

INTRODUCTION

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

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

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

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

STRUCTURE

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

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

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.

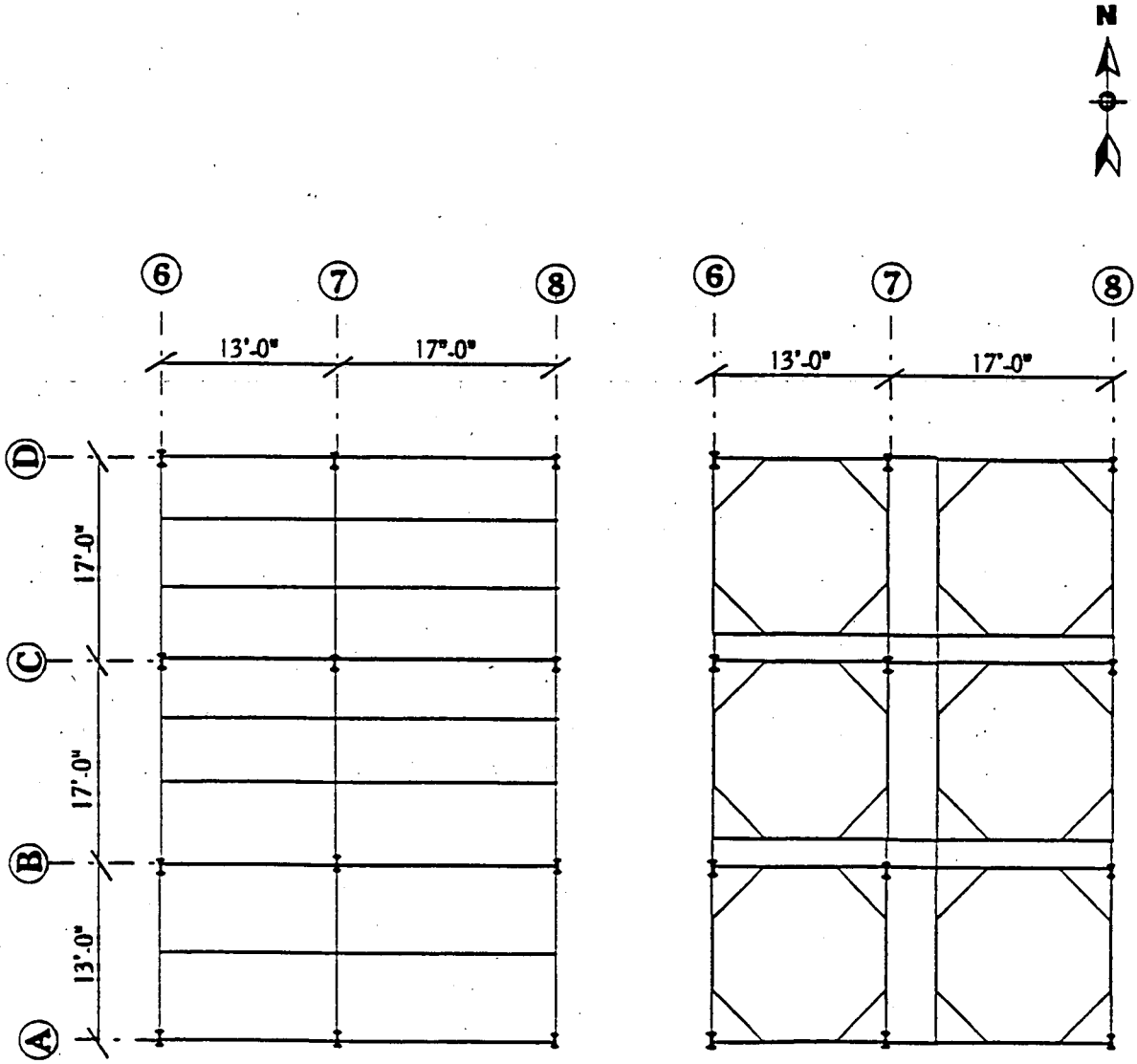
Silos at the westerly eight silo structure are constructed of hollow clay tile with circumferential reinforcing at each course line. Wind load stresses are critical in the 44 ft. tall tile silos. Significant vertical tension (tension across bed joints) will be induced by wind loads in the walls at the 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

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



6 - SILO (EAST) STRUCTURE

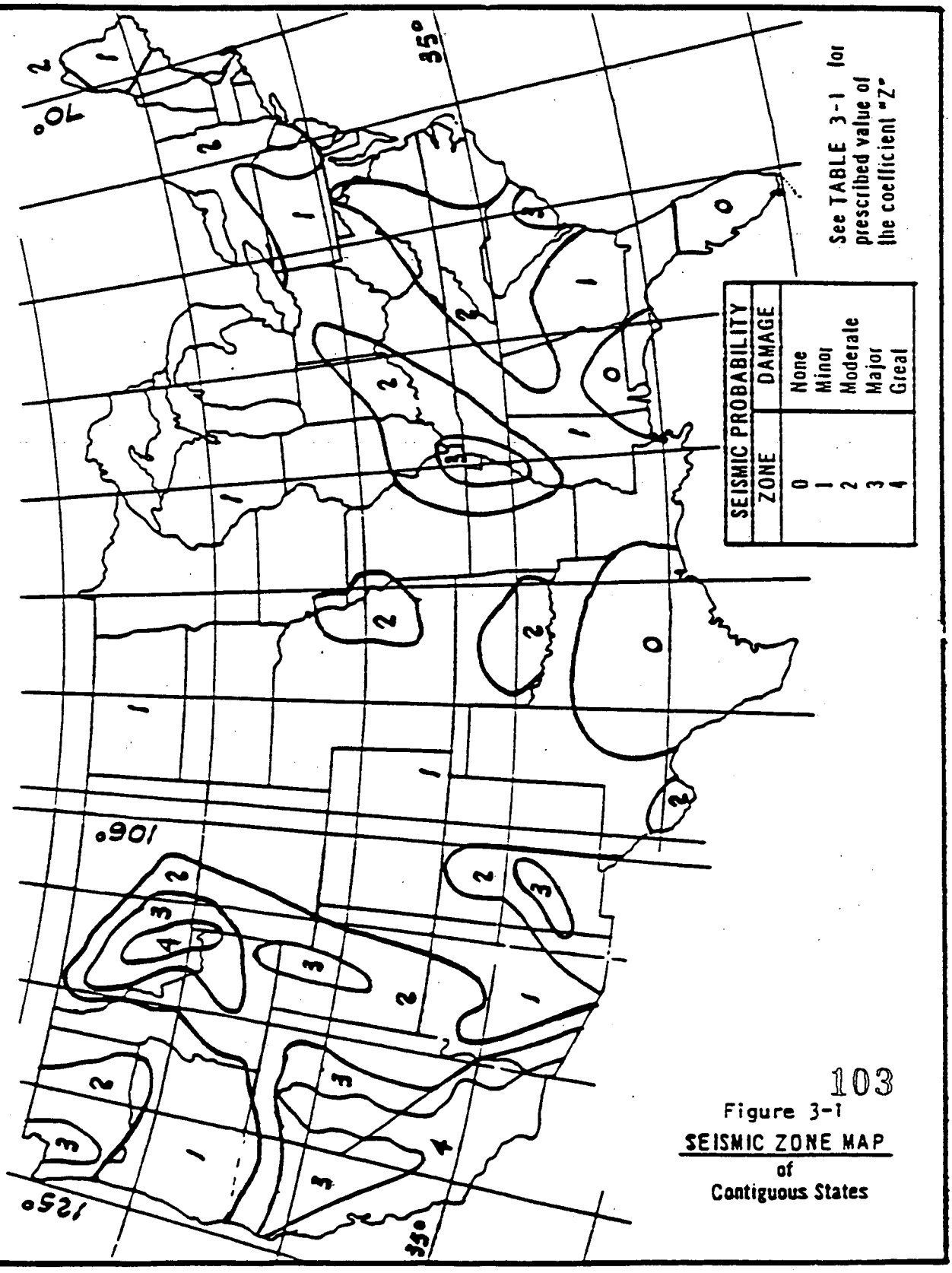


Figure 3-1
SEISMIC ZONE MAP
of
Contiguous States

C

APPENDIX C

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

Control No.:

Westinghouse Materials Company of Ohio

	INDUSTRIAL HYGIENE AND SAFETY MANUAL		
	CONTROL OF WORK INVOLVING ASBESTOS		Industrial Hygiene
IH&S-IH-03	Date: 03-20-89	Rev: 0	

1.0 PURPOSE

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

2.0 SCOPE

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

3.0 DEFINITIONS

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

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

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

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

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

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

3.0 DEFINITIONS (continued)

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

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

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

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

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

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

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

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

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

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

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

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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.

4.0 RESPONSIBILITIES (continued)

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

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

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

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

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

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

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

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

4.4 Asbestos Worker

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

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

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

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

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

4.0 RESPONSIBILITIES (continued)

4.5 Industrial Hygiene

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

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

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

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

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

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

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

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

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

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

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

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

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

4.0 RESPONSIBILITIES (continued)

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

4.6 Medical Services

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

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

4.7 Procurement

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

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

4.8 Project Engineer

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

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

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

4.8.4 Specifies asbestos-free substitutes whenever possible.

4.8.5 Notes on drawings when asbestos is required or removed.

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

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

4.0 RESPONSIBILITIES (continued)

4.9 Waste Operations

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

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

4.10 Waste Technology

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

4.11 Environmental Compliance

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

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

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

4.12 Assistant Emergency Duty Officer (AEDO)

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

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

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

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

5.0 GENERAL

5.1 Asbestos Awareness and Hazard Control 111

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.

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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.

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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.

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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.

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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. 122

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)

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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.

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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.

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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". 126

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

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) Start Date: _____

Schedule: Completion Date: _____

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

_____

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

Removal Procedures (Wetting, 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:

FMPC-OS&H-2940 (REV 3/15/88)

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ATTACHMENT D

ASBESTOS SAFETY SUPPLIES AVAILABLE THROUGH INVENTORY CONTROL & WAREHOUSING

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

ATTACHMENT D (continued)

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

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

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

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

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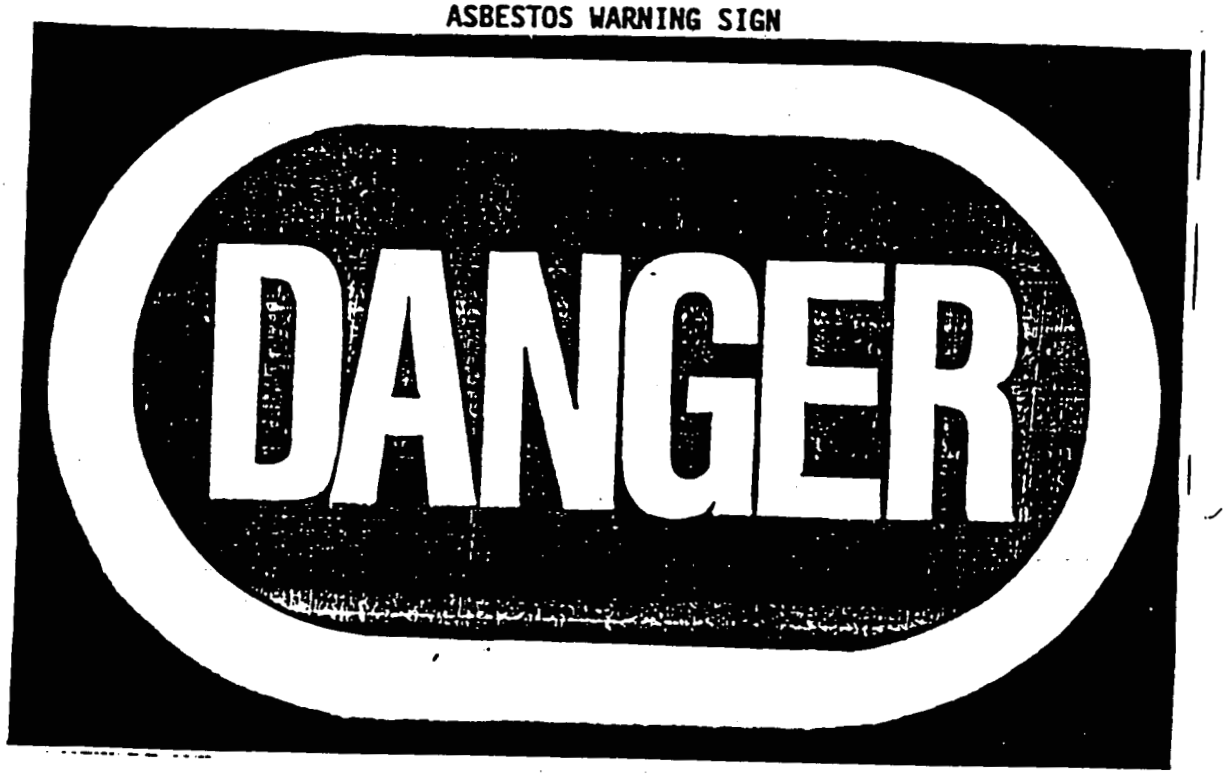
ATTACHMENT E

ASBESTOS WARNING SIGN



ASBESTOS

CANCER & LUNG DISEASE

HAZARD

AUTHORIZED PERSONNEL ONLY

RESPIRATORS & PROTECTIVE

CLOTHING

ARE REQUIRED IN THIS AREA

WARNING DO NOT BREATH ASBESTOS FIBERS

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ISSUE AND REVISION RECORD

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

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

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MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

1.0 Introduction

Background

Plant 1 is the "Sampling Plant" for the Fernald site and was therefore involved in the sampling of large amounts of uranium metal process residues and waste materials prior to further processing. Plant 1 Ore Silos were constructed in 1953 for the purpose of blending ore concentrates for feed into the refinery, Plant 2/3, for initial processing after sampling was completed. This system proved to be inefficient and was terminated from use for the original purpose. In approximately 1955, the silos were utilized as overflow storage for the cold metal oxides stream which is a by-product of ore processing. These silos have not been actually used since late 1962 when the majority of the contents were removed.

Description

This plan will provide the roadmap for completing the Plant 1 Ore Silo Removal Action. The work to be performed under this action includes preparation of the RSE, preparation of the Work Plan, preparation of the dismantling design documentation, implementation of the Work Plan, and preparation of the final project report.

Objectives

The primary objective of the plan is to provide an overall technical and management approach to the dismantling of the Plant 1 Ore Silos. This plan will provide the basis for DOE to concur with the best approach for facilitating the removal action. The secondary objective is to identify critical issues to be resolved during planning for the removal action. Issues identified to date include uranyl nitrate hydrate (UNH) hazard mitigation, sequence of work, containment of contaminants, and minimization of interferences.

The objective for the action is to mitigate the potential threat posed by the glazed tile structure for additional releases of the residues from one or more of the silos, due to the current state of deterioration of these units. The potential threat is for 1) exposure via inhalation to on-site personnel; 2) potential migration to previously uncontaminated areas; 3) releases to the stormsewer system, and 4) air release of radionuclides. The mechanism for transport is via wind, rainwater run-off and land use of the area. Additional hazards exist due to on-going structural deterioration of both the tile and concrete silos and the supporting steel structure.

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The implementation of this action will eliminate this source of a potential release and will eliminate the safety hazard due to the structural deterioration of the silos and their supporting structure.

2.0 Site Characterization

Site Background

The Fernald site is currently undergoing a Remedial Investigation and Feasibility Study (RI/FS) which is required prior to site remediation. The Plant 1 Ore Silos are part of Operable Unit 3, Former Production Area and Suspect Areas. Preliminary structural analysis studies have already been completed on the silos and indicated a substantial degradation which could result in the structure collapsing. Based on this preliminary analysis, planning was initiated to examine the potential of implementing a removal action to address potential environmental concerns.

On February 6, 1991, a spill was observed on the ground level under Silo Number 2 during routine inspections by plant personnel. It is hypothesized that heavy rain on the previous day wetted the residues to the point of flow from this silo. Further inspections also indicated the collection of residues under Silos 1, 2, and 5 on the mezzanine of the silo structure. Condensation, coupled with freezing and thawing, could have loosened any remaining residues which have collected in the silo bottoms and eventually leaked through the caps as they became corroded to the point of failure. The spill was cleaned up with the residues being placed into drums prior to analysis and storage.

After the residues were cleaned up, further inspection and emergency maintenance activities of sealing the silo vents was performed to prevent the influx of wind and rain thus reducing the potential for further releases. Caps were fabricated, sealed with room temperature vulcanizing (RTV) material, and held in position with clamps or sandbags. After collection of representative samples for the silos, maintenance work on the bottoms of the silos involved installation of boxes to catch any remaining residues and installation of cover plates over the sampling/inspection ports.

All work on the silos was performed with Level 2 personal protective equipment (PPE) to ensure worker protection from radiological/chemical hazards and the workers tied off to prevent falls. The workers were required to work from scaffolding pics, again to ensure safety on the corroded flooring.

As a result of the inspections and structural integrity concerns, the DOE has directed immediate actions be initiated to prepare for decontamination and demolition of the silos. Additional characterization is being performed through

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historical research and the collection of residues which have been sent to the laboratory for analysis.

Site Setting

The Plant 1 Ore Silos include the two groups of silos in an area directly south of Plant 1, consisting of the eight glazed tile silos to the west and the six reinforced concrete silos to the east. Four of the glazed tile silos are 44 feet tall and the remaining four are 10 feet tall. The six reinforced concrete silos which are 10 feet tall and the eight glazed tile silos sit on separate superstructures which are approximately 38 feet tall and are connected by a mezzanine. The estimated height of material in each of the eight glazed tile silo cones ranges from 1 - 4 feet. The material in the concrete silos is minimal.

The silo area is bounded on the south by four UNH tanks which presently contain approximately 100,000 gallons of ~ 1% U-235 UNH in weak nitric acid solution. Building 72, which contains slightly enriched uranium material, and Plant 1 waste shipping dock are located on the east side. Building 67 Thorium Warehouse is on the west side. Significant material handling activities, Thorium overpacking, waste shipping, and Plant 1 Pad Continuing Release Removal Action construction activities will be on-going during the same time frame as the Plant 1 Ore Silo work.

The work planned for the material in the UNH tanks (part of another action) involves removal, stabilization, and interim storage pending a decision for further processing. The tanks will be left in an industrial and environmentally safe condition upon completion of this effort.

The containers of Thorium material in Building 67 (part of another action) will be stabilized through overpacking and pH adjustment as appropriate from earlier characterization activities. This is an intense effort involving significant material handling and exposure control methods.

Waste shipping is an on-going operation from the Plant 1 dock. This involves the preparation, inspection, and documentation of 80,000-350,000 pounds of material each week. Building 72 is currently used for storage of 88 containers of uranium materials with enrichments from 2.0% to 19.9% U-235. The higher enrichments constitute a small volume of uranium contamination on miscellaneous waste materials.

The Plant 1 Pad Continuing Release construction activities involve the movement of approximately 3300 cubic yards of soil, installation of approximately 450,000 square feet of new or capped concrete pad, and erection of 102,000 square feet of tension support structures.

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Analytical Data

On March 16, 1991, WEMCO measured the dose rate, took smear samples from the silo surfaces, and collected grab samples from inside the tile silos. The contact dose rates ranged from <0.5 to 7.5 mrem/hr, with the highest reading at the base of the northwest silo, Silo 1. At 3 feet from the silos, the highest dose rate was 2 mrem/hr at Silo 5. The smear samples ranged from non-detectable to 12,101 dpm alpha/100 cm^2 and 4754 dpm beta-gamma/100 cm^2 on the floor underneath Silo 1. The highest levels measured on the surfaces of the silos were 3253 dpm alpha/100 cm^2 and 1002 dpm beta-gamma/100 cm^2 also found on Silo 1. The results of grab samples taken are listed in Table 1 in the Appendix. Silos 1 and 8 did not have grab samples taken because there was not enough sample matrix present in Silo 1 and the openings in Silo 8 were covered.

Asbestos, lead, polychlorinated biphenyls (PCBs), crystalline silica, and other unknown materials were identified during the industrial hygiene investigation survey conducted on March 27, 1991. Possible asbestos containing materials are the tiles, tile mortar, electrical wire insulation, pipe insulation, and building transite panels. Lead has been confirmed to exist in the paint on the steel structures and in the contents of the residue in the silos. PCBs may exist in the transformers, capacitors, and switchgear in the panelboard located on the south side of the silo mezzanine. These determinations are in progress and will be required to finalize the disposition of these materials of concern.

Sampling will be performed on the drummed materials from the spill cleanups. All materials removed during the release cleanups were containerized and are currently stored on Plant 1 Pad pending their evaluation. Additional sampling and analysis will be performed as outlined in the Sampling and Analysis Plan which will prepared as part of the Work Plan. Table 1 of the Appendix shows the preliminary estimates of rubble to be generated as part of this removal action. The summary results of sample analyses to date are in Tables 2 and 3 of the Appendix.

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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.

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The potential threat associated with the existing configuration and waste generation of the Plant 1 Ore Silos demolition arises from the potential spillage of material during removal or from fugitive emissions from the Plant 1 Ore Silos dismantling activities. These threats will be appropriately minimized through the use of administrative controls for storage and handling of waste material and the implementation of focused actions to ensure safety during the implementation of the plan.

The issues to be resolved as part of this work are further described as follows:

1) Sequence of Work

   - Order of dismantling
   - Advantages/disadvantages for each alternative

2) Access Restrictions

   - Plant 1 Pad work
   - Thorium overpacking activities
   - UNH removal/processing
   - Waste shipment activities
   - Enriched uranium storage in Building 72

3) UNH Removal

   - Risk of tank damage
   - Method of protection
   - Working space congestion

4) Containment of fugitive emissions

   - During disassembly
   - During size reduction
   - During containerization
   - During storm events

5) Material/residue disposition requirements

   - Characterization
   - Interim storage
   - Segregation
   - Size reduction
   - Containerization
   - Disposal

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6) Design constraints

- Accessibility
- Scaffolding
- Ventilation
- Incident due to dismantling
- Remote activities to allow work completion

7) Interfaces

- Between organizations
- Between analytical data and work progression
- At the work area boundaries

4.0 Removal Action Alternatives

General Alternatives

1) No action.

The "no action" alternative involves taking no pro-active measures to deal with source control or mitigation of potential releases. This alternative would leave the silos abandoned-in-place until final remediation activities. The silo openings have been sealed, the area will remain cordoned off, and routine inspection will continue.

2) Containment/reinforcement

This action would leave the silos and structures in place but provide for enhanced stability and source control. This alternative involves the necessary design and construction of a containment to contain the contaminants until final remediation which also includes sufficient reinforcement of the structure to minimize the potential for collapse. This work would include any bracing and/or sealing necessary to maintain structural stability and control of potential contaminant releases until final remediation.

3) Removal/disposal

This alternative involves the necessary design and field activities to remove and dispose of the contaminant source. Removal/disposal was determined to be the general action most consistent with all requirements.

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This alternative would completely remove all 14 silos, supporting structures, and associated equipment down to the concrete pad. The concrete piers would be removed to just below the pad surface and the pad surface refurbished. The work area will be decontaminated and sampled for residual contaminants.

Field Work

Plant 1 Ore Silos dismantling is a stand alone action which must be integrated with all other activities which may be impacted by its implementation. The following requirements will be discussed during the evaluation of each specific removal/disposal alternative in Section 5.0:

- Protectiveness of Human Health and Environment.
  This section will include discussion of the following:
  - *Environmental elements*; air, water, soil
  - *Human Health*; industrial safety, rad dose
  - *Protectiveness*; materials, equipment, or adjacent structures

- Compliance with ARARs.
  Self-explanatory.

- Consistency with Final Action.
  Self-explanatory.

- Reduction of Toxicity, Mobility, or Volume of Contaminant.
  This section will include discussion of the following:
  - *Control Measures*
  - *Containerization*
  - *Storage/Disposal*

- Technical Feasibility.
  This section will include discussion of the following:
  - *Work Area*
  - *Vertical Access*
  - *Method of Removal*
  - *Method of Packaging*
  - *Integration with other activities*

- Schedule.
  This section will include discussion of the following:
  - *Procurement*
  - *Dismantlement period*
  - *Resources*

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Assumptions

Materials

- Collected silo contents include process equipment contents and decontamination wastes and are assumed to be only radioactive material not otherwise specified (NOS) based on preliminary evaluation of sample analyses. No hazardous/mixed wastes are present in this work effort.
- Silo rubble is assumed as all low specific activity (LSA) based on the premise that silo internals will be sufficiently decontaminated during the dismantling activity.
- All dismantled materials which are contaminated will be boxed and shipped to Nevada Test Site (NTS). Nevada Operations (NVO) critieria will be adhered to for all shipments.
- Twenty percent of structural steel is assumed to be LSA, and eighty percent free release based on preliminary evaluation of radiological surveys.
- Construction wastes would include discarded gloves, anticontamination clothing, plastic and wood used for containment. The assumption of five type 7A containers is an arbitrary judgement amounting to about four percent of the total LSA waste.

Site Conditions

- Activities in the Plant 1 Ore Silo Area other than dismantling will not be cause for unforeseen delays due to interferences from space or access requirements of adjacent activities.
- The work area for silo dismantling will minimize impact on other adjacent activities.

Resources

- A subcontractor will provide all necessary equipment, materials, and qualified personnel to perform the dismantling work.

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- WEMCO will perform the ground support work for the dismantling activities. This will include supply, preparation as per procedure, inspection, and transportation of containers and maintenance of dust collectors and monitoring equipment.

- WEMCO will provide site health and safety surveys, rad/con surveys, and waste container certification.

Criteria

Documentation

- CERCLA, DOE, and WEMCO documentation requirements will be implemented.

- Documentation requirements include a Removal Site Evaluation, a Management Implementation Plan, a Work Plan, a CFC design package, and a final report documenting the removal action. The Management Implementation Plan is a prerequisite to completing the other work except the RSE.

- The work plan is to be submitted for DOE/EPA approval which will also include the approved RSE and Sampling and Analysis Plan.

- The Title I/II effort will provide biddable drawings and specifications, a government estimate, a description of WEMCO construction support, a safety assessment, and a risk assessment.

- All construction drawings and specifications will meet requirements of DOE Order 6430.1A and Fernald Site criteria.

Health and Safety

- DOE, OSHA, and WEMCO health and safety requirements will be implemented.

- The site will be surveyed for determination of the level of PPE.

- Personnel will be monitored at the egress points of the exclusion zone.

- All construction equipment will be required to pass inspection requirements.

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Characterization

- The work area will be routinely surveyed for hazards and PPE requirements.
- Containers and equipment will be surveyed for contamination before leaving the controlled area.
- Materials in containers which have not been adequately characterized will be sampled for RCRA determinations.
- The work area will be surveyed (sampled) for contaminants as indicated in the Sampling and Analysis section of the approved Work Plan.

Work Site

- Structures to remain (Buildings 1A, 67, and the UNH Tanks) will be protected from flying debris or other inadvertent damage.
- Fugitive emissions, solid, particulate, or liquid, will be controlled to ALARA principles within the construction area during the work.
- Other activities in the area will have access between Plant 1 Pad and 2nd street.
- Dismantling interfaces at the work area boundaries and/or equipment removed to facilitate the work will be repaired to as was or construction specification requirements to assure worker safety and weather resistance.
- Planning for shipment/storage of inventories of product, residue, and/or construction debris will be completed prior to initiation of the field work.

Shipping

- Materials from this project will be appropriately prepared for loading in shipping containers per the applicable site procedure. The issues to be addressed are free liquids, respirable fines, waste category, and condition of container as to meet NVO criteria.

- 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.

pecific 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.

;.0 Evaluation of Alternatives

)iscussion

5.1 NO ACTION

- Protectiveness of Human Health and Environment

This alternative leaves the potential hazard unchanged. This is unacceptable for the following reasons:

(1) The silos, in their severely deteriorated condition, pose an imminent threat of catastrophic failure. Such failure could result in personal injury and/or loss of life, spread of radioactive contamination, and damage to nearby facilities. Of particular concern, relative to nearby facilities, are the four (4) uranyl nitrate hydrate (UNH) storage tanks.

(2) The silos are also a potential source of chronic release of contaminants. Significant releases have already occurred from the tile silos and the mitigation of the release was temporary. The impact of the release and potential of future release is principally the contamination of water and soil through rain water run-off. A secondary impact on the environment is the potential spread by the wind. The principal contaminant

is natural uranium present, although thorium-230 was present to 1.5 percent. Conclusion: Not acceptable.

- Compliance with ARARs.

  Not applicable.

- Consistency with Final Action

  This alternative does not interfere with or contribute to final action. Conclusion: No effect.

- Reduction of Toxicity, Mobility, or Volume of Contaminant

  This option does not reduce toxicity, mobility, or volume of contaminant. Conclusion: No effect.

- Technical Feasibility

  Not applicable.

- Schedule

  Not applicable.

5.2 CONTAINMENT / REINFORCEMENT

- Protectiveness of Human Health and Environment

  The principle impact of this option is the industrial safety of workers providing containment/reinforcement. The workers would be exposed to potential injury in the event of failure of the existing structure during modification. However, with proper design and work planning the risk can be made acceptable. Conclusion: Acceptable.

- Compliance with ARARs

  Alteration of the existing structure would require compliance with applicable ARARs. These would include enclosure of work areas where spread of contamination is a potential threat. Conclusion: Acceptable.

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- Consistency with Final Action

  A strong objection to this alternative is the fact that it is not consistent with the final action for the facility. Containment/reinforcement does not contribute to the final action of silo removal. Indeed, containment/reinforcement would be a temporary measure and, in the final analysis, would add to eventual waste volume. Also, this alternative would add significantly to the cost. Conclusion: Not acceptable.

- Reduction of Toxicity, Mobility, or Volume of Contaminant

  This alternative includes an enclosure which would reduce the mobility of contaminants; but, in the final analysis, the added materials would probably become contaminated and add to the total volume of low specific activity (LSA) radioactive waste. Conclusion: Adds to LSA waste.

- Technical Feasibility

  Containment/reinforcement could be accomplished, but would be an expensive option. The same work approach could be used for this option as for the removal action. Work would have to be accomplished without depending on the existing structure for work platform or scaffolding support. However, new materials and erection of containment/reinforcement would constitute added expense (at least compared with the final action of removal). Conclusion: Expensive compared to removal/disposal alternative.

- Schedule

  The schedule for this alternative would be much longer than that required for removal. The design would be more extensive and the installation of containment/reinforcing would require more time. A significant extension of the schedule compared to the schedule for the removal alternative would be in the time required for materials procurement. Conclusion: Completion long compared to removal/disposal alternative.

5.3 REMOVAL/DISPOSAL

This action will remove the threat to the environment posed by the potential for leakage of residual contaminants and is, therefore, consistent with the final action planned for the silos facility. The key issues of concern with the removal activity include protection of human health and the environment, compliance with ARARs, reduction of contaminants, technical feasibility, and schedules. Several other site specific issues as listed in Section 3 will also be addressed during the design phase.

The silos, their structural supports and other appurtenances, and concrete piers will be dismantled, decontaminated (to the extent practical), size reduced, and packaged in accordance with the required controls for protection of the environment and human health. The packaged materials will be transported and disposed per the requirements of the waste category. The control measures implemented during the removal action will be consistent with requirements at the FEMP, DOE, DOT, and EPA for the handling of low level wastes materials. The potential for worker exposure, radionuclide releases, and construction related accidents will be assessed. The results of the assessment will be factored into the planning activity to qualify controls. The project planning, engineering design, and administrative controls will effectively reduce the risks of personnel exposure and environmental insult to acceptable levels. The removal is being planned and designed by the standards as would govern a final remedial action and is, thereby, consistent with requirements anticipated with the terms and conditions of a respective Consent Agreement.

There are a few key factors which will predominate the concerns for safety and environmental protection. These are mentioned below and are being considered in the project's planning activities.

5.3.1 Sequence of Work

a. The tile silos, four of which are taller than the other silos, are located in close proximity (within impact range if silos collapse) of the UNH storage tanks.

b. The tile silos are considered to be in worse structural condition because of the deteriorated masonry evidenced in the spalling of several tiles. These tiles have fallen to the decking below and in some cases have fallen to the foundation slab at ground level. The monolith construction of the concrete silos does not present this problem. The steel

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 SIZE REDUCTION AND PACKAGING BUILDINGS ~~Containments~~ will be designed and constructed to operate in a flow-through manner while providing the appropriate containment. A negative air pressure will be maintained with HEPA filtration to assist with this containment provision. Other ventilation filters and blowers will be put in place to support localized containment at points of actual disassembly work on the silos. Airborne particles will be controlled by forced air flows, contained by physical barriers, and captured in filters for packaging and disposal with other silo materials. All emission points will be sampled or calculations performed to assure compliance with ARARs.

5. Check structural framework and install temporary bracing as necessary.

   The checking of framework will include a thorough inspection to locate extensive deterioration in structural members which might subject a member to premature failure during the disassembly work. Methods of bracing or repair which will not add additional stresses to the structure will be employed. The structure will not be used for support or anchor~~s~~ during the course of the project.

6. Install scaffolding as needed for the initial sequenced disassembly work at the tile silos.

   This will include the installation of scaffolding up to work levels as required above grade to remove non-load bearing structures and equipment which would interfere with the placement of the primary scaffold structure. The scaffolding will be self-supporting with no dependence on anchors off of the silos structures and with minimum guy wire interferences. Shop drawings will be submitted by the subcontractor for approval prior to field work initiation.

7. Process support equipment, non-essential enclosures, and non-load bearing structures at ground level will be removed.

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The ground level area underneath and around the silos in the project area will be cleared of potential obstructions. This will be done in a manner to insure that load-bearing structural members are not disturbed.

8. Remove the conveyors which extend between Building 1A and the silos.

   The two conveyor systems will be disassembled as in Section 9 with similar provisions for containment and sealing of exposed surfaces.

9. Remove the structures and equipment located on the top of the tile silos.

   This will include the removal of platforms, catwalks, handrails, conveyors, hoppers, and motors. The removal will be conducted by accessing the silos from the north side of the facility. Containment will be provided by the erection of localized physical enclosures at the points of disassembly. The enclosures will be furnished with a negative airflow forced through HEPA filters as a means of secondary containment and to provide a measure of comfort to the workers. The appropriate FEMP Procedures for cutting, working in enclosed areas, and employment of HEPA filters will be observed. Exposed process surfaces and end cuts will be wrapped and sealed with plastic and tape as they are removed to the ground level.

   A large crane will be employed to remove the heavy equipment and sections of the structure. The crane will remain in place to be used in follow on work. The weights of items to be handled are being calculated as part of detailed design to determine the size crane required. Analyses of access routes, space requirements, and potential interferences (motion studies) during removal will be performed as a function of design.

10. Remove the checker plate decking, the decking support structure below the silo bottom cones, and the bottom cones from the tile silos.

    This will provide the opening needed to hoist the packaging (shipping boxes) through the bottoms of the tile silos to the level of disassembly activity. This will facilitate placing tiles into the boxes without generating excessive amounts of

debris. Reinforcing of the silos structures will be installed as determined by design engineering to compensate for the checker plate and decking supports. This is intended to avoid premature failure of the structural members during disassembly. The residues remaining in the hoppers will be drummed and the hoppers then size reduced.

11. Remove the structure and equipment located on top of the concrete silos.

    This activity will be conducted as in Section 9, above.

12. Remove the concrete silos.

    The complete cap of each silo will be removed as a unit. The individual concrete silos will be removed as units. They will be secured in a specially designed lifting device prior to the disassembly from current anchors. They will be lowered to ground level to an area designated for size reduction. Motion studies for determining clearances to avoid interferences with other structures are being conducted as part of detailed design. Each cap weighs approximately 5 tons. Each silo weighs approximately 15 tons.

13. Remove the caps from the tile silos.

    The complete cap of each silo will be removed as a unit. A sequence of activities as with the concrete silos is being developed. The caps will be lowered to ground level and moved to the area designated for size reduction operations. Newly exposed surfaces will be wrapped and sealed. Each cap weighs approximately 5 tons.

    After the removal of the caps, the large crane will be dismissed.

14. Complete the installation of the physical enclosure for containment of the tile silos.

    The enclosure will be supported by the scaffold structure. Ventilation will be extended to this additional section of enclosure to provide further containment of particulates and to serve as a measure of comfort to the workers. The cylindrical configuration of the silos will be used as a downdraft chimney. A specially designed hood arrangement will enhance the enclosure effect to allow forced air to be

directed through the silo being disassembled and to the HEPA filters at the ground level.

15. Remove the tile silos.

The tile silos will be disassembled, tile-by-tile, to minimize particulate migration. The tall tile silos will be removed first and will progress from north to south. The previously described hoist system for raising shipping boxes to a level near the disassembly activity will be employed during this part of the work. A specially designed lifting platform, lifting fixture, and loading chute arrangement will be used.

The shipping boxes will be removed at the ground level by a dolly jack through an air lock. The air lock will double as a decontamination area prior to moving the boxes from the controlled area.

16. Remove the remaining structural steel.

The remaining structural steel will be disassembled in a progression from north to south as with the tile silos removal described above. Once the remaining structural steel of the tile silos is removed, the work will shift to the remaining structure of the concrete silos. The exposed surfaces will be surveyed and wrapped and sealed as required. Localized containment via physical enclosures, controlled air, and HEPA filtration will be furnished as necessary to minimize the migration of particulates. This group of materials has the greatest potential for free release. These materials will be surveyed and decontaminated to maximum extent practical.

17. Remove the concrete supporting piers and refurbish the concrete surface of the existing support pad.

The concrete piers will be demolished. The debris will be loaded into shipping boxes and removed. The appropriate containment will be developed by design engineering with similar provisions being planned as with the physical enclosures, controlled air, and HEPA filtration described above. The applicable FEMP Procedures for work involving dust and being conducted in enclosed areas will be observed.

18. Remove the temporary demolition structures, protective barriers, and the demolition area isolation barriers.

The temporary structures and barriers will be disassembled. Components will be decontaminated as possible. Where decontamination is not possible, the components will be disposed with silo debris. The area will be cleared of all equipment and materials in the same manner. All surfaces in the construction area will be restored to their intended condition after work is complete. The applicable FEMP Procedures for monitoring of exiting vehicles and equipment will be observed. The area will be returned to the administrative control of FEMP Site Services after final inspection.

5.3.2 Access Restrictions

Access, work-around, and lay-down areas for materials, heavy equipment, scaffolding, temporary containment structures for size reduction operations, staging, etc., are limited. The enriched uranium stored in Building 72 will be relocated by WEMCO. The other access issues will be resolved during the design. Several methods on how to access the high level work were considered. This included use of the existing platforms, manbaskets supported by cranes or manlifts, and scaffolding. Only the scaffolding alternative would support the necessary requirements for safety, containment, and accessibility.

5.3.3 UNH Removal

The risk of tank damage will be minimal based on the proposed design of scaffolding and engineered tank protection. The details will be completed during the detailed design phase of the activity.

5.3.4 Containment of fugitive emissions

The issues of containment during disassembly, size reduction, and containerization are addressed in Section 5.3.1. Contaminant control during storm events will be addressed by the detailed design. Stormwater runoff from the work area will be controlled to contain suspended solids and the clarified water discharged to the storm sewer system. Debris from dismantling work will be prevented from inadvertent exit from the work area through the use of appropriate barriers.

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

5.3.5 Material/residue disposition requirements

Characterization of materials will be completed prior to initiation of dismantling activities. The disposition requirements will be addressed during the detailed design. This activity will be performed on materials as appropriate to the next step of disposition. Personal protective equipment will dispositioned per site procedures. Tools and equipment used in the dismantling work will be cleaned to "free release" or disposed with other contaminated materials.

Silo material (tile and concrete) will be cleaned of loose residues prior to dismantling. Structural steel will be cleaned to permit "free release" to the extent practicable. Residues in the silos, hoppers, or conveyors will be placed in drums for appropriate disposition. Process equipment will be cleaned sufficiently to permit shipment as LLW. The equipment which cannot be decontaminated to "free release" will be size reduced to fit in sea/land containers. The tiles will be loaded directly in Type 7A shipping containers for shipment offsite after appropriate characterization. The concrete silos and silo tops will be size reduced in on-ground containments and placed in Type 7A containers.

Interim storage of empty containers will be managed by WEMCO. The full containers will be inspected, closed, and transported to storage by WEMCO awaiting shipment. Locations for potential storage will be identified in order to evaluate the traffic patterns for this work.

5.3.6 Design constraints

The major impetus for this design effort is to resolve the issues listed in this plan. Extremes in the weather conditions outside the prevailing patterns may present additional hazards to the work force, add destructive loads to the silos structural supports, or act as media for migration of contaminants. Premature failure of structural supports and collapse of a silo will require an alternative response to minimize the risks to personnel and the environment.

5.3.7 Interfaces

The nature of the removal work may require a division of labor functions among organizations. Coordination of several contracted work forces will be necessary.

Summary

Removal/Disposal is the alternative which is the most acceptable for all of the criteria of selection listed in Section 4.0. A summary of acceptability of each alternative for these criteria is given in Table 5 of the Appendix.

The conclusion is also made that the removal action can proceed independently of the removal of UNH from the storage tanks south of the tile silos and any other activities in the Plant 1 area. The key basis for this recommendation is that the control measures that will be implemented during the removal action will avoid increasing the risk of release of UNH or any other contaminant.

6.0 Roles/Resources

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

USEPA and OEPA shall review, comment and approve the work plan and follow progress through meetings and the Consent Agreement progress reports.

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

This removal action shall be managed by the Operable Unit 3 team, to ensure compatibility with the final remedial action(s) selected for Operable Unit 3.

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PLANT 1 ORE SILO WORK

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.

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

Section 7.0

Appendices

MANAGEMENT IMPLEMENTATION PLAN

PLANT 1 ORE SILO WORK

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

Table 4 - List of Potential Hazards, Requirements and Assumed ARAR Compliance

POTENTIAL HAZARD	REQUIREMENT	ARAR
5. Radionuclide Emissions	DOE 5820.2H Chapter 3	To Be Considered
6. Hazardous Waste Determination	40CFR 261	Relevant and Appropriate
7. Hazardous Waste Determination	40CFR 262.11	Relevant and Appropriate
8. Radiation Hazard	10CFR 20	Relevant and Appropriate
9. Fugitive Dust	OAC 3745-17-08	Relevant and Appropriate

Additional ARARs will be identified and added as part of the work plan.

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Notes: A brief summary of requirements is given as follows:

1. 40CFR61, Subpart H

   Emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem per year.

2. DOE Order 5400.5, Chapter II, Section 1.a

   The exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall not cause, in a year, an effective dose equivalent greater than 100 mrem from all exposure pathways.

3. DOE Order 5400.5, Chapter II, Section 1.d

   Provide a level of protection for persons consuming water from a public drinking water supply operated by the DOE so that persons consuming water from the supply shall not receive, for multiple radionuclides, the sum of the effective dose equivalents from the radionuclides (excluding Radium-226, and Radon-228, and Radon) exceeding 4 mrem in a year from drinking water.

4. 40CFR141.15, OAC 3745-81-15

   Maximum Contaminant Levels (MCLs) for radioactivity in community water systems are set as follows:

5 pCi/l of combined Radium-226 and Radium-228	15 pCi/l of gross alpha particle activity (including Radium-226 but excluding radon and uranium).

   40CFR141.16, OAC 3745-81-16

   The average annual concentration of beta particle and photon (i.e., gamma) radioactivity from man-made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 mrem. The concentration limit for Strontium-90 is 8 pCi/l.

MANAGEMENT IMPLEMENTATION PLAN

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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.

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

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APPENDIX E

THE ON-SITE TRANSPORTATION OF RADIOACTIVE AND NONRADIOACTIVE HAZARDOUS MATERIALS

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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

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Topical Manual

The Onsite Transportation of Radioactive and Nonradioactive Hazardous Materials

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February 29, 1988

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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

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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.

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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: _____
FMPC-OPR-2947 (REV. 5/15/90)

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

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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.

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APPENDIX F

CONTROL OF CONSTRUCTION WASTE

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		SITE STANDARD OPERATING PROCEDURE Page 1 of 29
Title: PACKAGING LOW LEVEL RADIOACTIVE WASTE (LLRW) FOR OFFSITE DISPOSAL		DOCUMENT NO: SSOP-0024 REVISION NO. 0
Authorization: (SOF) W. H. Britton, President	Supersedes: SOP 20-C-601, Dated 7-12-90, Rev. 1	Issue Date: 10-14-91

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1.0 PURPOSE

This document provides the procedure for packaging low level radioactive waste (LLRW) for offsite disposal.

2.0 APPLICABILITY

This procedure is applicable to the packaging methods required for shipping LLRW off site at packaging areas.

3.0 RESPONSIBILITIES

3.1 The waste generator/packager shall be responsible for complying with this procedure.

3.2 The supervisor of the waste generation area or packager shall be responsible for the following:

3.2.1 Specifying applicable scale check procedures and standard tare weight of packages.

3.2.2 Ensuring packaging materials are available for operators.

3.2.3 Ensuring that trained personnel package waste material.

3.2.4 Determining disposition of material identified in this procedure.

3.2.5 Ensuring that personnel package waste for shipment to meet applicable NTS, DOT, and EPA regulations.

3.2.6 Contacting Industrial Hygiene or Radiological Safety to determine the appropriate respiratory protection for the process being performed.

3.2.7 Providing operators with the required respiratory protection.

3.2.8 Ensuring the lid on an unfilled waste container is secured when no packaging is occurring to prevent additions of unknown materials.

3.2.9 Ensuring waste packages are weather-protected before, during, and after use to prevent moisture build-up.

3.2.10 Contacting Radiological Safety prior to opening any drum of radioactive or unknown material.

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3.2.11 Contacting Industrial Hygiene prior to opening any container suspected of containing asbestos.

3.0 RESPONSIBILITIES (cont.)

3.3 Traffic shall be responsible for specifying the required waste container, transporting packaged waste to the applicable storage area, and weighing sea/land containers.

3.4 Materials Control and Accountability (MC&A) shall be responsible for completing a tally sheet for drums of non-RCRA wet and dried residues.

4.0 DEFINITIONS

4.1 Low Level Radioactive Waste (LLRW) - Waste the contains radioactivity and is not classified as high level waste, transuranic waste, or spent nuclear fuel or 11e(2) byproduct material as defined by DOE Order 5820.2A. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as low-level waste, provided the concentration of transuranic is less than 100 n Ci/g.

4.2 Waste Generator - Organization (point of generation) at which waste is originated.

4.3 Overpack - A container into which one or more smaller containers are placed.

4.4 Waste Container - A container which meets DOT requirements and NTS acceptance criteria.

4.5 RCRA (Resource Conservation and Recovery Act) - The Congressional Act which established safe and environmentally acceptable management practices for specific wastes. RCRA requires strict "cradle to grave" control and proper management of hazardous wastes.

4.6 Respirable Fines - Particulates and vapors capable of being inhaled.

5.0 GENERAL

5.1 The waste generator/packager shall package waste material in a container specified for disposal by Traffic.

5.2 Stencilling shall be 1-1/2 inch (minimum) legible block letters using waterproof ink/paint unless otherwise specified.

6.0 INDUSTRIAL HEALTH AND SAFETY REQUIREMENTS

6.1 A defined safety system is not involved.

6.2 Safety glasses with side shields shall be worn unless other eye protection is specified.

6.3 Respiratory protection provided by the supervisor shall be worn when required.

6.4 Leather-palm gloves shall be worn when handling drums/boxes/ containers, operating equipment, and when handling rough, sharp-edged, or contaminated material.

6.5 HEPA type filter vacuum cleaners or a vacuum system approved by IRS&T with a current DOP test label properly affixed to vacuum shall be used for cleaning.

6.6 Only trained personnel shall handle asbestos-containing materials.

6.7 Adequate ventilation must be provided when using silicone adhesive sealant.

6.8 Any circumstance which could have resulted in an intake of radioactive materials by inhalation, ingestion or absorption shall immediately be reported to a supervisor. The supervisor shall immediately report the circumstance or possible radioactive materials intake to IRS&T Radiological Safety Section for evaluation. The involved personnel shall report to the Urine Sampling Station at the end of their shift to complete an Incident Investigation Report (IIR) (Form FMPC-ES&H-1458), and submit a urine sample. The involved employees shall also report to the Urine Sampling Station at the start of their next shift to submit a followup urine sample. Employees are responsible for complying with additional requirements as specified by the Radiological Safety Section.

NOTE: WARNINGS, CAUTIONS, and NOTES precede the step/item to which they apply.

7.0 PROCEDURE

WARNING: A RADIOLOGICAL SAFETY TECHNICIAN SHALL BE PRESENT PRIOR TO OPENING ANY CONTAINER OF UNKNOWN RADIOACTIVE MATERIAL.

WARNING: AN INDUSTRIAL HYGIENE REPRESENTATIVE SHALL BE PRESENT PRIOR TO OPENING ANY DRUM SUSPECTED OF CONTAINING ASBESTOS.

CAUTION: PRIOR TO PERFORMING THE PACKAGING OPERATION, EACH CONTAINER SHALL BE INSPECTED BY THE WASTE GENERATOR/PACKAGER TO ENSURE THE CONTAINER IS EMPTY.

NOTE: Items 7.1 through 7.3 shall be performed prior to the packaging of any waste.

7.1 Prohibited Material Check

WASTE GENERATOR/PACKAGER

7.1.1 Check that a "Prohibited Materials List" (Figure 1) is displayed in the loading area or on the container.

7.1.1.1 If the list is not posted, notify the supervisor.

WASTE GENERATOR AND QUALITY ASSURANCE

7.1.2 Ensure the waste to be packaged is not on the "Prohibited Materials List".

7.1.2.1 If the waste is listed on the "Prohibited Materials List", do not package this waste. Notify the supervisor for disposition.

SUPERVISOR

7.1.2.2 Dispose of the waste on a case by case basis.

7.0 PROCEDURE (cont.)

7.2 Waste Characterization

WASTE GENERATOR/PACKAGER

7.2.1 Ensure a Material Evaluation Form (MEF), FMPC-OPR-3252 has been completed determining the material as RCRA/Non-RCRA and additional documentation from Environmental Compliance is provided specifying evaluation results for LLRW.

NOTE: A sample of the waste for TCLP may be required as requested by Operable Unit 3 (OU3) Compliance.

7.2.1.1 If an MEF has not been generated, obtain a numbered MEF from Waste Management Records and initiate a "Material Evaluation" per SSOP-0002.

NOTE: RCRA waste shall not be shipped.

7.2.1.2 If the waste is determined to be RCRA, notify the supervisor for disposition.

7.2.1.3 If the waste is determined to be non-RCRA, proceed to 7.2.2.

7.2.2 If notified by the supervisor a sample is required for major radionuclides and other suspected nuclides, obtain a sample of the waste per SOP 1-C-101.

7.3 Waste Inspection

WASTE GENERATOR/PACKAGER

7.3.1 Check waste for free liquid.

7.3.1.1 If free liquid is present which exceeds 0.5% of the material volume, notify supervisor.

7.3.1.2 If free liquid exists which does not exceed 0.5% of the material volume, proceed to the applicable packaging section of this SSOP.

7.3.2 When weather drops below 32°F, carefully inspect waste for ice.

7.3.2.1 If ice is present in waste, notify supervisor.

7.0 PROCEDURE (cont.)

7.4 Filling 55 and 85 Gallon Drums

WASTE GENERATOR/PACKAGER

7.4.1 Inspect the empty drum for damage, such as corrosion, dents, holes or other defects (Refer to Tables 1 and 2).

7.4.1.1 If damaged, mark the lids or side of the damaged drums with a red "X" and refer to Tables 1 and 2 for corrective action, as applicable.

7.4.2 Stencil on the drum the lot and drum number in accordance with the FEMP Lot Marking and Color-Coding System, RM-0005 or apply designated preprinted label (See Figure 2).

7.4.3 Weigh the empty drum per substeps 7.4.3.1 through 7.4.3.5.

SUPERVISOR

7.4.3.1 Specify the scale and the method of transporting the drum to the scale.

WASTE GENERATOR/PACKAGER

NOTE: The scale shall be inspected and operated in accordance with the SOP applicable to the area.

7.4.3.2 Inspect the scale to be used.

7.4.3.3 Move the drum on to the scale.

7.4.3.4 Obtain the tare weight.

7.4.3.5 Remove the drum from the scale and move to the loading area.

7.4.4 Stencil the tare weight on the drum (See Figure 2).

7.4.5 Record the data from the drum on to "Item Production/ Certification/Identification" XX Card, Form FMPC-CONT-1945-XX.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.4.6 Remove the drum lock ring and lid.

CAUTION: DO NOT FILL THE DRUM ABOVE THREE INCHES FROM THE TOP.

NOTE: Because density varies according to material type, the volume of material to be packed will vary.

7.4.7 By estimation, fill the 55 gallon drum to a maximum of 1,200 pounds (plus tare weight) and the 85 gallon drum to 1,000 pound maximum (plus tare weight).

7.4.8 Place a lid on the drum.

7.4.9 Secure the drum lid by installing a bolt-type lock ring and tighten the bolt.

7.4.10 Weigh drum per Item 7.5.

7.4.11 Mark the drum with the gross weight and net weight using two inch (minimum) letters.

WASTE GENERATOR/PACKAGER

7.4.12 Complete the "Item Production/Certification/Identification" XX Card, Form FMPC-CONT-1945-XX by entering the gross and net weights and transmit card to MC&A.

7.4.13 If the drum contains respirable fines, overpack per SOP 20-C-600.

7.4.14 Using the hoist/crane and barrel grab or equipment specified by supervisor, place the drum with bolt of lock ring facing outward on a pallet.

TRAFFIC

7.4.15 Strap the drum(s) and move the pallet(s) to the storage area designated by the supervisor.

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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.

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NOTE: The removed material may be included in an underweight drum of the same lot or packaged in another drum of the same lot.

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7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.5.7.2 Remove material from the drum until the drum is within limit. Place the removed material in an approved container.

7.5.7.3 Place lid securely on the drum.

MVO/PACKAGER

7.5.8 Remove the drum from the scale.

WASTE GENERATOR/PACKAGER

7.5.9 If the drum contains respirable fines, install lever lock ring or bolt with a wire seal, record the seal number and date on Form FMPC-CONT-1945-XX, and overpack per SOP 20-C-600.

7.6 Filling Metal Boxes With Loose Material

WASTE GENERATOR/PACKAGER

7.6.1 Visually inspect boxes for rust, dents, or holes, including the bottom per Tables 1 and 2.

7.6.1.1 If damaged, mark side of box with a red "X" and complete corrective action per Tables 1 and 2.

7.6.2 If the bottom of the box has a drain plug, ensure plug is securely in place.

SUPERVISOR

7.6.3 Specify the scale and the method of transporting the box.

WASTE GENERATOR/PACKAGER

7.6.4 Move the empty metal box to the staging area.

7.6.5 Remove banding and cardboard packing material from the metal box and place in a designated container.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.6.6 Tare weigh each twentieth box to verify standard tare weight as follows:

NOTE: The scale shall be inspected and operated in accordance with the SOP applicable to the area.

7.6.6.1 If scale to be used as specified by the supervisor has not been checked, inspect scale.

7.6.6.2 Place box on the scale, obtain tare weight.

7.6.7 Record the weight on a "Box Tare Weight Check", Form FMPC-PRO-2867.

7.6.8 Remove box from the scale.

7.6.9 Remove lid and place in a designated location to prevent damage.

7.6.10 Add one fifty-pound bag of uncalcined diatomaceous earth spread evenly or sheets of wet-strength polypropylene pulp, super-absorbent fabric in the bottom of the box.

7.6.11 Place a clean, used skid over dicalite or fabric in the bottom of the box.

CAUTION: MATERIAL SHALL NOT BE LOADED IN BOX ABOVE THREE INCHES FROM THE TOP.

7.6.12 Load loose materials in box as tightly as possible.

7.6.13 When box is full, place lid on box and notify supervisor box is loaded.

SUPERVISOR

7.6.14 Specify the scale to be used and the method of transporting the box to the scale.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

NOTE: The scale shall be inspected and operated in accordance with the applicable scale procedure for the area of the packaging operation.

7.6.15 If not already completed, perform scale check according to the applicable SOP in the area of the packaging operation.

7.6.16 Move the box on to the scale.

7.6.17 Weigh the box including box pins and other hardware to ensure gross weight does not exceed 6000 lbs.

7.6.18 Remove the box from the scale.

7.6.19 Mark the side of the box with the gross weight and content description in 1-1/2 inch (minimum) block letters (See Figure 4).

7.6.20 Affix a Hazardous Waste Label (See Figure 3) on the box as shown in Figure 4.

7.6.21 Notify QA the box is ready for certification.

QUALITY ASSURANCE

7.6.22 Certify the box per applicable department procedures.

7.6.22.1 If the box does not meet certification requirements, complete a DCAR per SSOP-0023, tag the box for correction, and notify the generator.

WASTE GENERATOR/PACKAGER

7.6.23 Fill out an "Item Production/Certification/Identification card, Form FMPC-CONT-1945-XX, including standard tare weight specified by the supervisor, and the content description and transmit to MC&A.

7.6.24 Using fabric strapping or closure bolts, secure lid on the box for interplant shipment.

7.6.25 Notify the supervisor that boxes are ready to be moved to the Waste Management staging area.

7.0 PROCEDURE (cont.)

7.7 Loading Drums in Metal Boxes

WASTE GENERATOR/PACKAGER

7.7.1 Prior to completing Item 7.7, proceed to 7.10 or 7.11 (as applicable) for drum inspection.

7.7.2 Visually inspect boxes for corrosion, holes, or dents per Tables 1 and 2.

7.7.2.1 If damage is found, mark side of box with a red "X" and complete corrective action per Tables 1 and 2.

7.7.3 Place empty metal box in staging area.

7.7.4 Remove the banding and cardboard packing material from box and place in designated container.

7.7.5 Tare weigh each twentieth box per 7.6.6.1 through 7.6.6.2.

7.7.6 Record the weight on a "Box Tare Weight Check", Form FMPC-PRO-2867.

7.7.7 Remove lid from metal boxes.

7.7.8 Add a 50 lb bag of uncalcined diatomaceous earth or sheet(s) of wet-strength polypropylene pulp, super-absorbent fabric to the floor of the box.

7.7.9 Using a forklift, move box to a designated location to prevent damage.

7.7.10 Check drums to ensure that lever lock rings are closed.

7.7.10.1 If the drum contains respirable fines, install wire seal through lever lock ring.

7.7.11 Complete an "Item Production/Certification/Identification Card", Form FMPC-CONT-1945-XX per drum and insert the drum lot number and tare weight on the card and transmit to MC&A.

NOTE: Inspect and operate the hoist/crane in accordance with the applicable SOP for the area.

7.7.12 Ensure that the hoist/crane to be used has been inspected.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.7.13 Place barrel grab over drum.

7.7.14 Attach the lifting device specified by the supervisor on each side of the drum ring.

7.7.15 Position drum over the top of the box.

7.7.16 Lower drum into box and remove the lifting device.

CAUTION: DO NOT EXCEED A MAXIMUM GROSS WEIGHT OF 6,000 POUNDS.

7.7.17 Ensuring the weight does not exceed 6,000 pounds, repeat steps 7.7.1 through 7.7.16 until enough drums are loaded to fill a box.

7.7.18 When the box is filled, add a fifty-pound bag of uncalcined diatomaceous earth or sheets of wet-strength polypropylene pulp, super-absorbent fabric to the top of drums if condensation/frost is present or could develop on exterior of drums.

7.7.19 Place the lid on the box.

7.7.20 Obtain tabulated tare weight of box and contents. Record the tabulated tare box weight, contents, and gross weight on the FMPC-CONT-1945 card.

7.7.21 Stencil on the box the shipment log number, box identification, and gross weight (See Figure 4).

7.7.22 Affix a Hazardous Material Warning Label (See Figure 3) as shown in Figure 4.

7.7.23 Notify QA the box is ready for certification.

QUALITY ASSURANCE

7.7.24 Certify the box per the applicable department procedure.

7.7.24.1 If the box is not certified, complete a DCAR per SSOP-0023, tag the box for correction, and notify the generator.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

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

AIS

7.9.1.2 If the container is free from damage, proceed to 7.9.2 213

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.9.2 Notify Waste Shipping that the container is ready for shipping preparation.

7.9.3 Attach a Prohibited Materials List (See Figure 1) to the container in a visible location.

WARNING: VAPOR FROM SILICONE ADHESIVE IS HAZARDOUS.

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

NOTE: The bead of sealant shall be a minimum of 1/4 inch.

7.9.4 In a well ventilated area, apply a continuous bead of GE RTV SILICONE RUBBER ADHESIVE SEALANT, or equivalent, on all seams and corners of the container interior.

7.9.5 Check to ensure all vents are closed and sealed.

7.9.6 Line the container floor with wet-strength polypropylene/pulp super-absorbent fabric, blotter paper, or uncalcined diatomaceous earth.

7.9.7 Cover the absorbent fabric, blotter paper or uncalcined diatomaceous earth with a 0.006 inch thick plastic sheet that extends at least 36 inches up each side of the container.

7.9.8 Place plywood on the container floor and up to approximately four feet in height on all sides.

7.9.9 Remove all container outside markings not related to load (See Figure 5).

CAUTION: THE GROSS WEIGHT OF THE CONTAINER SHALL NOT EXCEED 42,000 LBS.

CAUTION: AN UNSEALED CONTAINER SHALL BE LOCKED OR TEMPORARILY SEALED WHEN NOT ATTENDED.

7.9.10 Load the container. Use all the space in the container.

7.0 PROCEDURE (cont.)

WASTE GENERATOR/PACKAGER

7.9.11 After the container has been filled, clean the back ledge of the container.

7.9.12 Add a roll of wet-strength polypropylene/pulp super absorbent fabric extending width of container on base of lid/door.

7.9.12.1 If moisture is still present, add additional uncalcined diatomaceous earth or sheets of wet-strength polypropylene, super-absorbent fabric as needed.

7.9.13 Shut the container doors.

7.9.14 Complete applicable sections of the "Item Production/ Certification/Identification" card, Form FMPC-CONT-1945-XX and transmit to MC&A.

7.9.15 Notify the supervisor that sea/land containers are ready to be weighed.

WASTE GENERATOR SUPERVISOR

7.9.16 Notify Traffic to transport containers to Waste Management staging area.

TRAFFIC (HEAVY EQUIPMENT)

7.9.17 Move containers to Waste Management staging area per applicable department procedures.

7.9.18 Weigh the containers per applicable department procedure.

7.9.19 Deliver weigh ticket to Waste Shipping Coordinator.

7.10 Inspecting Drums Containing Non-RCRA Dried Residues

WASTE GENERATOR/PACKAGER

7.10.1 For a drum not in an overpack, proceed to step 7.10.3.

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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

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7.11.5 Remove the lid from drum and inspect for free-standing liquid.

7.11.5.1 If the drum contains oil, use a forklift and move drum to designated area. Notify supervisor for disposition of drum.

7.0 PROCEDURE (cont.)

PACKAGER

7.11.5.2 If the drum contains other free-standing liquids, complete steps 7.11.6 through 7.11.12.

7.11.5.3 If no free-standing liquid is present in the drum, proceed to 7.11.12.

7.11.6 Obtain a drainage lid and place on the drum.

7.11.7 Using forklift, rotate drum approximately at a 45 degree angle, drain liquid from drum into the Plant 1 Sump System until no liquid flows from drainage lid, and lower drum to floor.

7.11.8 Inspect and drain the remaining drums per steps 7.11.5 through 7.11.7.

7.11.9 After draining the drums, inspect each drum for damage.

7.11.9.1 If drum is damaged, complete 7.11.10 and then using a forklift, move damaged drum to holding area, as specified by supervisor, for disposal.

7.11.9.2 If drum is not damaged, proceed to 7.11.10.

7.11.10 Using a forklift, transfer the drained material into another drum of drained material filling the drum approximately six inches from the top.

NOTE: Steps 7.11.11 through 7.11.12 are applicable to filled and partially filled drums of drained material.

7.11.11 Add a minimum of one inch of dicalite to each drum.

7.11.12 Replace lid on the drum, close lever lock/bolt ring, and load the drum into a metal box per Item 7.8.

7.11.13 Using a forklift, move any empty drums to holding area for disposal.

8.0 REFERENCE DOCUMENTS

8.1 SSOP-0002, "Completing the Material Evaluation Form"

8.2 SSOP-0023, "Deviation and Corrective Action Reporting"

8.0 REFERENCE DOCUMENTS (cont.)

8.3 RM-0005, "FEMP Lot Marking and Color-Coding System"

8.4 20-C-600, "Overpacking Defective Containers"

9.0 APPLICABLE FORMS

9.1 FMPC-CONT-1945-XX, "Item Production/Certification/Identification"

9.2 FMPC-PRO-2867, "Box Tare Weight Check"

9.3 FMPC-OPR-3252, "Material Evaluation"

10.0 FIGURES

10.1 Figure 1, "Prohibited Materials List"

10.2 Figure 2, Diagram of LLRW Drum Labeling

10.3 Figure 3, Diagram of Hazardous Waste Label

10.4 Figure 4, Diagram of Metal Box Identification

10.5 Figure 5, Diagram of Sea/Land Identification

TABLE 1
CORROSION INSPECTION CATEGORIES

CATEGORY	CHARACTERISTIC	COULD CAUSE LOSS OF DRUM INTEGRITY		CORRECTIVE ACTION
		YES	NO	
A	Severe corrosion with deep pitting and/or metal flaking	X		1. Notify supervisor. NOTE: The drum requires disposition as directed by supervision within 24 hours.
B	Corrosion with shallow pitting and/or mild metal flaking		X	1. Proceed as directed by the supervisor. NOTE: Disposition shall be determined by the supervisor following review of completed inspection form.
C	Surface rust with no pitting and mild paint flaking which exposes bare metal		X	1. Proceed as directed by the supervisor. Repainting shall be scheduled by supervisor.

TABLE 2
LLRW CONTAINER INSPECTION

INSPECTION ITEM	INSPECTION CRITERIA	CORRECTIVE ACTION REQUIRED
Hole	An opening in the container including breach, gouge, puncture or leak.	Notify supervisor of condition and request disposition instructions.
Dent	A crease, depression of hollow made by blow or pressure; a concave distortion which jeopardizes the integrity of the container. A dent in the top or bottom rim.	Notify supervisor of condition and request disposition instructions.
Bulge	A swollen area, a convex distortion, an outward bend which jeopardizes the integrity of the container.	Notify supervisor of condition and request disposition instructions.

PACKAGING GUIDELINES

FOR

WASTE GENERATOR

PACKAGE HAS BEEN PROPERLY PREPARED FOR CLOSING:

- NO LIQUIDS OF ANY KIND HAVE BEEN PLACED IN CONTAINER
- HEAVY/BULKY ITEMS HAVE BEEN SECURED WITHIN CONTAINER
- ALL AVAILABLE SPACE HAS BEEN UTILIZED EFFICIENTLY
- PROHIBITED MATERIALS HAVE BEEN EXCLUDED (SEE BELOW)
- PACKAGING HAS NOT BEEN DAMAGED DURING LOADING
- LINER IS IN PLACE AND PROPERLY LAPPED AND SEALED

PROHIBITED MATERIALS

COMPRESSED GASES
(UNPUNCTURED AEROSOL CANS INCLUDED)

EXPLOSIVES

FREE LIQUIDS

FINE PARTICULATES (RESPIRABLE FINES)

HAZARDOUS WASTE
(SUSPECT RCRA MATERIALS INCLUDED)

CORROSIVE MATERIALS

ETIOLOGIC AGENTS

PROHIBITED MATERIALS LIST
Figure 1

NON-RCRA, RADIOACTIVE, OR ASBESTOS DRUM

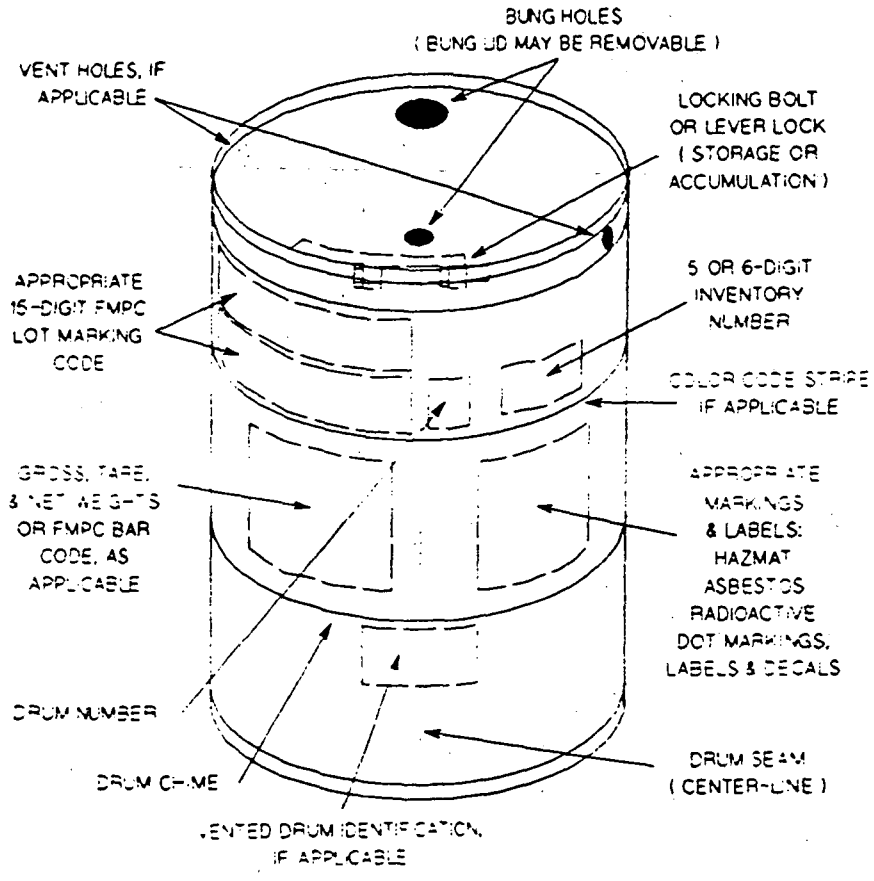

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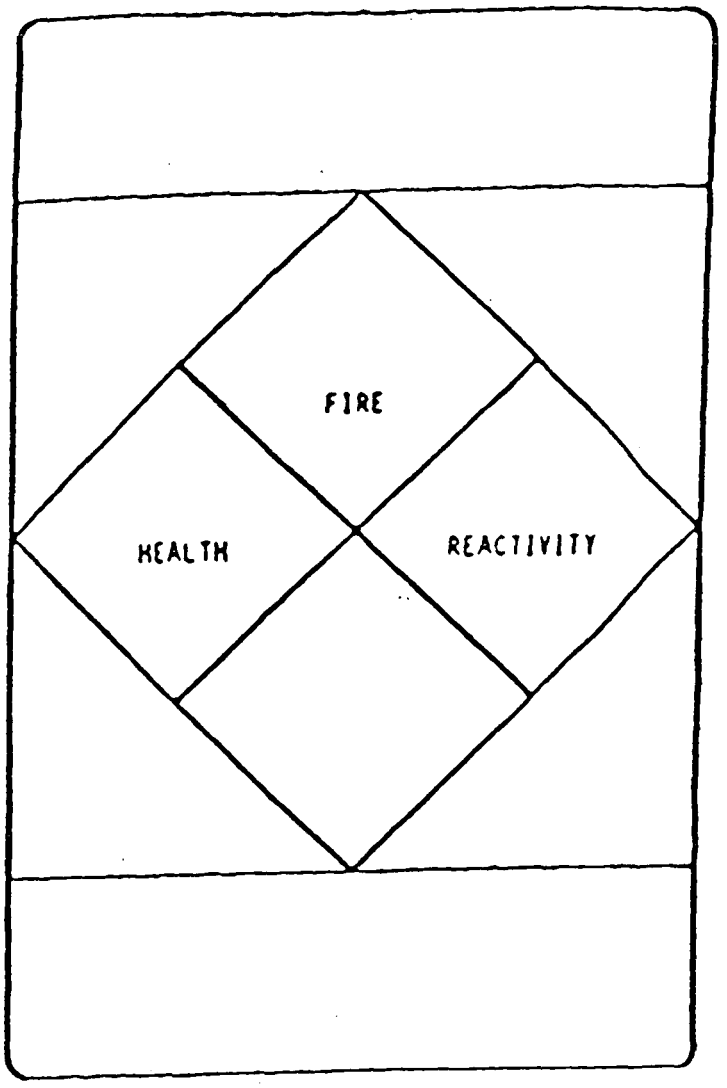
DIAGRAM OF LLRW DRUM LABELING
Figure 2



253

DIAGRAM OF HAZARDOUS WASTE LABEL
Figure 3

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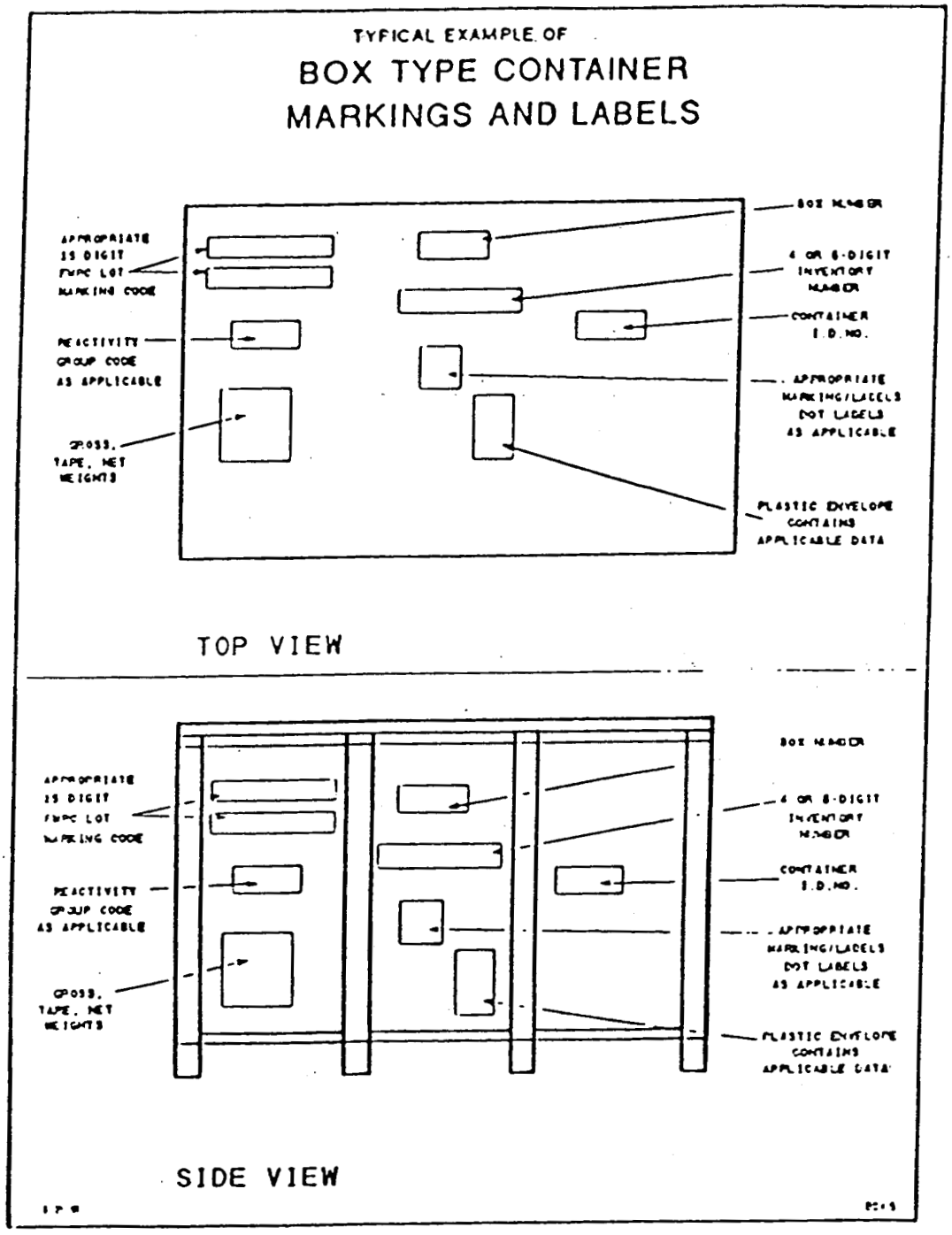


DIAGRAM OF METAL BOX IDENTIFICATION
Figure 4

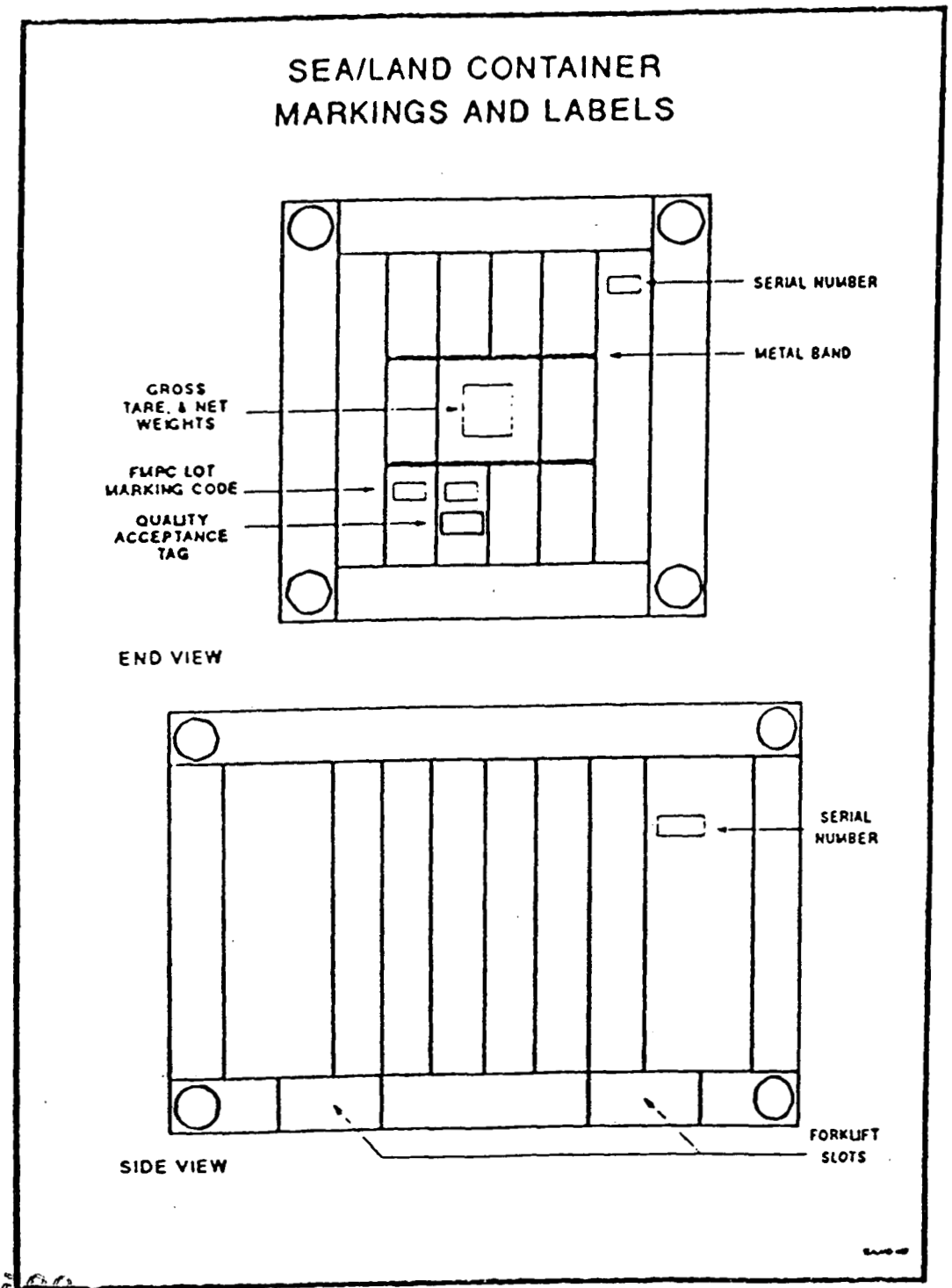


DIAGRAM OF SEA/LAND IDENTIFICATION
Figure 5

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 2563
Title: **PREPARING AND EVALUATING WASTE STREAMS DESIGNATED AS LOW LEVEL RADIOACTIVE WASTE (LLRW)**		DOCUMENT NO: IN-6028 SITE STANDARD OPERATING PROCEDURE
Authorization: HFD 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 lle 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.

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

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.

DRAINAGE VERIFICATION TAG

DATE:

TYPE OF EQUIPMENT:

DRAINING METHOD:

LOCATION WHERE DRAINED:

SUPERVISORS SIGNATURE:

ORGANIZATION:

DIAGRAM OF DRAINAGE VERIFICATION TAG
Figure 1

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.

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.

SAS

4.0 RESPONSIBILITIES

4.1 **Project Management and Acquisition (PM&A) and Site Services** shall be responsible for the following:

4.1.1 Ensuring that the requirements of this document are implemented.

4.1.2 Coordinating with Environmental Engineering to determine waste type.

4.1.3 Coordinating planning and handling of construction waste during removal, packaging, and disposition.

4.1.4 Developing the waste sampling plan.

4.2 **Industrial Radiological Safety and Training (IRS&T)** shall be responsible for the following:

4.2.1 Performing surveys of proposed construction sites to obtain data used to support the waste sampling plan, determine surface contamination, and specify protective equipment required.

4.2.2 Sampling suspect asbestos material and arranging for analysis to determine asbestos content.

4.3 **Environmental Management (EM)** shall be responsible for conducting sampling in accordance with the waste sampling plan.

4.4 **Environmental Compliance and Quality Assurance (EC&QA)** shall be responsible for the following:

4.4.1 Designating a storage area for PCB contaminated material.

4.4.2 Making a RCRA determination/radiological characterization (RDRC) based on process knowledge and/or analytical data.

5.0 GENERAL

5.1 Construction waste may consist of soil, rubble, wood, general refuse, PCBs, metal, asbestos, or equipment and can be liquid or solid.

6.0 REQUIREMENTS

6.1 Soil

6.1.1 Soils within the Category 1 limits (Refer to Table 1) may be used as backfill in controlled and uncontrolled areas or stockpiled in designated areas.

6.1.2 Soils exceeding the Category 1 limits but within Category 2 limits may be stockpiled in designated areas or used as backfill in controlled areas.

6.1.3 Soils that exceed Category 1 limits shall not be built over without DOE approval nor used as backfill in uncontrolled areas.

6.1.4 Soils exceeding Category 2 limits shall be packaged for disposal as low level waste (LLW).

6.1.5 Site certification samples shall be obtained and analyzed after excavation is complete to verify that build over requirements were met.

TABLE 1
SOIL/RUBBLE CONTAMINATION LIMITS

MATERIAL	MAXIMUM CONCENTRATION[1]	
	Category 1	Category 2
Depleted uranium	35	100
Enriched uranium	30	100
Thorium	10	50

[1] In Picocuries per gram (pCi/gm).

6.0 REQUIREMENTS (cont.)

6.2 RUBBLE (includes concrete, block, stone, asphalt)

6.2.1 Rubble within the Category 1 limits (Refer to Table 1) is classified as uncontaminated. Category 1 rubble may be stockpiled in designated areas.

6.2.2 Rubble exceeding the limits of Category 1 is considered contaminated material that can not be decontaminated to less than Category 1 limits shall be packaged as low level waste (LLW) and staged for disposal.

6.3 METAL

NOTE: Metal waste is categorized as reusable or refuse. Reusable metal consists of ferrous (carbon steel material such as structural shapes & pipe) and non-ferrous (stainless steel, copper, aluminum, lead, brass, monel inconel, or nickel) material. Metal refuse consists of oxidized sheet metal and mixed metals.

6.3.1 Metal is considered uncontaminated if 100 cm^2 smears from the surface of the material shows removable contamination levels less than 100 disintegrations per minute (dpm) beta/gamma and less than 20 dpm alpha, the average fixed plus removable contamination level shall be less than 1000 dpm/100 cm^2, and the maximum fixed plus removable contamination level at any point of the surface shall be less than 3000 dpm/100 cm^2.

NOTE: All uncontaminated metals can be released for unrestricted use or disposal.

6.3.2 Contaminated metal that is decontaminated to meet free release limits shall be released for burial at a sanitary landfill or sold as scrap.

6.3.3 Metal that cannot be decontaminated to meet free release limits shall be segregated into one of the following categories: ferrous, non-ferrous, and metal refuse.

6.3.4 Metal refuse shall be packaged into approved waste containers for eventual shipment to a designated DOE burial site.

6.3.5 Usable ferrous and non-ferrous metals shall be stored on-site to support the excess metal sales program.

6.0 REQUIREMENTS (cont.)

6.3.6 The requirements for handling metallic waste shall conform with the excess metal sales program and the WEMCO Radiation Control Manual.

6.4 PROCESS EQUIPMENT

6.4.1 Reusable equipment, such as machine tools, valves, and instruments, shall be classified as future-use material.

6.4.2 Equipment that is not re-usable shall be classified by waste type and disposed of in the same manner as other waste.

6.5 WOOD

NOTE: Pressure treated wood shall be segregated pending RCRA determination.

6.5.1 Wood scrap (such as pallets, crates, form lumber, sheeting, and similar material) generated by construction activities shall be surveyed. If the surface contamination is 100 ccpm or greater, the wood shall be treated as LLW.

6.5.2 Wood removed during the demolition phase of construction shall be reviewed by the Radiological Safety Lead Technician, on a case by case basis.

6.5.3 The Radiological Safety Technician (RST) shall determine if the wood has been exposed to radioactive materials and if the material is surveyable.

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

6.6 ASBESTOS

6.6.1 Materials that contain asbestos or that are suspected to be asbestos, shall be handled as asbestos.

6.6.2 All asbestos material shall be handled according to applicable IRS&T Department Procedures.

6.0 **REQUIREMENTS** (cont.)

6.7 POLYCHLORINATED BIPHENOLS (PCBs)

6.7.1 PCB material consists of transformers, capacitors, fluorescent light bulbs, and similar electrical equipment containing PCBs and material (gloves, rags, spill absorbents) which have been used in the removal from service of PCB containing equipment or for clean-up of spills of PCB containing materials.

6.7.2 PCBs shall be packaged and stored at a location specified by Environmental Compliance.

6.8 OTHER

6.8.1 Construction waste (liquid or solid) not specifically categorized on the Construction Waste Identification and Disposition (CWID) Form posted in the area shall be handled on a case-by-case basis by Environmental Engineering.

7.0 **APPLICABLE DOCUMENTS**

7.1 Drivers

7.1.1 40 CFR 260, 261 and 300

7.1.2 IN-6032, Control of Construction/Maintenance Waste

7.2 References

None

8.0 **FIGURES**

None

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
11-27-91	INTERIM	Document establishing requirements for disposing of construction and maintenance waste required per Request No. P91-686, initiated by S. Lund.

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM		INTERIM 2563 Page 1 of 4
Title: CONTROL OF CONSTRUCTION/MAINTENANCE WASTE		DOCUMENT NO: IN-6032 SITE POLICY AND PROCEDURE
Authorization: W. H. Britton, President	Supersedes: IN-6016, Dated 09-27-91	Issue Date: 11-27-91 Expiration Date: 01-27-92

1.0 POLICY

The Westinghouse Environmental Management Company of Ohio (WEMCO) shall manage and control the generation and processing of construction and maintenance waste generated at the Fernald Environmental Management Project (FEMP) to protect the environment and ensure worker safety.

2.0 SCOPE

This document establishes the WEMCO policy for controlling all phases of handling construction and maintenance waste in order to minimize waste and comply with applicable DOE orders and federal, state, local regulations, and site policies and procedures.

3.0 DEFINITIONS

3.1 Administrative Record File - An organized collection of documents opened to public review that form the basis for the selection of a removal or remedial response action pursuant to requirements set forth by the Comprehensive Environmental Response, Compensation, and Liability Act.

3.2 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) - The law that mandates the development of an organizational structure and procedures to respond to releases, or threats of releases, of hazardous substances or pollutants/contaminants.

3.3 Construction Waste - Unusable material or equipment (such as soil, rubble, wood, metal, or hazardous waste) generated during the execution of a construction, demolition, excavation, or maintenance project.

NOTE: Waste generated as a result of planned maintenance activities shall be handled as construction waste.

3.4 Removal Site Evaluation (RSE) - The documented results of an inspection (if necessary) and assessment of a release or threat of release of a hazardous substance, pollutant, or contaminant to determine if a CERCLA response is required. The RSE is submitted to the Department of Energy (DOE) for review/approval and is also maintained as a part of the Administrative Record File.

3.5 Resource Conservation and Recovery Act (RCRA) - The regulatory statute that mandates "cradle-to-grave" control of specified hazardous waste by imposing management requirements on generators, transporters, and owners/operators of treatment, storage, and disposal (TSD) facilities.

3.0 DEFINITIONS (cont.)

3.6 Resource Conservation Recovery Act (RCRA) Waste - Hazardous waste identified as meeting the criteria defined by, or specifically listed in,the Resource Conservation and Recovery Act.

3.7 Waste Sampling Plan - Document prepared by Environmental Engineering to provide the number, type, location, and laboratory analyses required on samples to allow a comprehensive characterization or project waste.

4.0 RESPONSIBILITIES

4.1 **Project Management and Acquisition (PM&A) and Site Services** shall be responsible for acting as the construction coordinator/planner/ estimator to monitor compliance with "Construction Waste Identification/Disposition" (CWID) requirements (when a CWID is used), and for ensuring the proper handling and packaging of construction waste. The PM/PE also coordinates construction waste planning and handling, including the determination of reusable or waste material. Coordinates with representatives from other departments to provide project support and documentation. PM&A shall also be responsible for ensuring waste minimization by developing a waste sampling plan, reviewing the CWID with the PM/PE and responding to special waste handling problems on a case-by-case basis.

4.2 **Industrial, Radiological Safety and Training (IRS&T)** shall be responsible for surveying waste generated during construction prior to release as waste, and verifying that construction wastes meet disposition location criteria specified in the CWID. Also, monitoring radiological safety of the construction site.

4.3 **Environmental Management (EM)** shall be responsible for the following:

4.3.1 Performing field sampling of waste in accordance with the project waste sampling plan.

4.3.2 Providing CERCLA integration guidance and maintaining the Administrative Record.

4.4 **Environmental Compliance and Quality Assurance (EC&QA)** shall be responsible for participating in project waste sampling planning and issuing a RCRA Determination/Radiological Characterization (RD/RC) Letter.

5.0 GENERAL

5.1 Conceptual designs and drawings shall be completed, if required.

5.2 Clean packing and shipping materials shall be segregated from contaminated waste.

5.3 An RSE shall be completed for all planned excavation/demolition activities which involve hazardous substances and the removal of one cubic yard of material or more.

NOTE: Exceptions may be made for emergency and maintenance activities which have approved standard operating procedures containing control measures to be used.

5.4 Plans for the safe handling and disposal of wastes shall be developed and implemented to ensure the safety of site workers and the protection of the environment.

6.0 PROCEDURE

6.1 Detailed procedures for managing and controlling construction and maintenance wastes are found in IN-6033, "Controlling the Generation of Construction/Maintenance Waste."

6.2 Requirements for construction waste handling and construction excavation are contained in IN-6031, "Disposition Requirements for Radiologically Contaminated and Uncontaminated Construction and Maintenance Waste."

7.0 APPLICABLE DOCUMENTS

7.1 Drivers

7.1.1 40 CFR 260 & 300

7.2 References

7.2.1 IN-6033, "Controlling the Generation of Construction/ Maintenance Waste"

7.2.2 IN-6031, "Disposition Requirements for Radiologically Contaminated and Uncontaminated Construction and Maintenance Waste"

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
11-27-91	INTERIM	Policy statement for the control and minimization of waste material generated by construction and maintenance projects required per Request No. P91-687, initiated by S. Lund.

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY OF OHIO SITE DOCUMENT PROGRAM	INTERIM Page 1 of 19 2563
Title: CONTROLLING THE GENERATION OF CONSTRUCTION/ MAINTENANCE WASTE	DOCUMENT NO: IN-6033 SITE STANDARD OPERATING PROCEDURE
Authorization: W. H. Britton, President / Supersedes: IN-6017, Dated: 09-27-91	Issue Date: 11-27-91 Expiration Date: 01-27-92

1.0 PURPOSE

To provide the procedure for controlling and minimizing construction and maintenance waste while maintaining worker safety standards and environmental protection requirements.

2.0 SCOPE

This procedure describes the requirements and responsibilities for minimizing the generation of construction/maintenance waste, separating and segregating waste materials, determining the contamination level of waste, establishing handling and packaging requirements, and determining disposition. Also controls the release of hazardous substances to the environment during construction, maintenance excavation, and demolition projects (See Figure 1).

3.0 DEFINITIONS

3.1 Administrative Record File - An organized collection of documents open to public review, that form the basis for the selection of a removal or remedial response action pursuant to requirements set forth by the Comprehensive Environmental Response, Compensation, and Liability Act.

3.2 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - The law that mandates the development of an organizational structure and procedures to respond to releases, or threats of releases, of hazardous substances or pollutants/contaminants.

3.3 Characterization/Certification Sampling - Sampling waste material from pre and post excavation areas to determine excavation area and depth, quantity of waste generation, type of contamination, Site Safety and Health Plan (SSHP) worker protection requirements, and build over certification.

3.4 Construction Excavation/Penetration Permit - A document than lists known hidden hazards or obstructions in an area where excavation or penetration activities will take place.

3.5 Construction Waste - Unusable material or equipment (such as soil, rubble, wood, metal, RCRA, and hazardous waste) generated during the execution of a construction, demolition, or maintenance project.

NOTE: Waste generated by planned, non-emergency, non-custodial maintenance activities shall be handled as construction waste.

3.0 DEFINITIONS (cont.)

3.6 Construction Waste Packaging Area - A site adjacent to the construction site where empty waste containers are filled with construction waste.

NOTE: The packaging area background radiation level shall not exceed limits established by IRS&T if waste will be transferred to a dedicated clean storage area or transported from the site.

3.7 Disposition Location - Area designated by Environmental Engineering and the CERCLA Group for the storage of construction waste.

3.8 Fixed Contamination - Residual contamination remaining after decontamination.

3.9 Future Use Material - Reusable material held for anticipated use in the plant and/or in projects.

3.10 Hazardous Substance - A substance designated for special consideration under the Clean Air Act, Clean Water Act, or TSCA, any hazardous waste that is designated as RCRA, and any material that the EPA lists as presenting a substantial danger to health and the environment.

3.11 Hazardous Waste - Discardable material containing or exhibiting hazardous or toxic waste characteristics as defined in Title 40 of the Federal Regulations, Part 261 (RCRA).

3.12 Metal Refuse - Metal not suitable for reclamation due to a hard-to-remove non-metallic wrapping, mixed metal composition, heavily rusted, less than 1/4 inch thick, or internal non-decontaminatable surfaces.

3.13 Pollutant/Contaminant - A substance, not listed as hazardous, that may cause an adverse affect in organisms and/or the offspring of organisms if inhaled, absorbed, or ingested.

3.14 Project Sampling Plan - A plan developed by Environmental Monitoring that specifies sampling to be conducted for a specific operation.

3.15 Radioactive Contaminated Waste - Construction waste that contains radionuclides that exceed limits specified in IN-6015.

3.16 RCRA Project File - A file that consist of a scope of work, "Construction Waste Identification/Disposition (CWID), NEPA documents, activity drawings, process knowledge, sampling plan, and analytical results.

3.0 DEFINITIONS (cont.)

3.17 Removable Contamination - Surface contamination that can be removed using standard decontamination practices.

3.18 Removal Site Evaluation (RSE) - The documented results of an inspection (if necessary) and assessment of a release or threat of release of a hazardous substance, pollutant, or contaminant to determine if a CERCLA response is required. The RSE is submitted to the Department of Energy (DOE) for review and is also maintained as a part of the Administrative Record File.

3.19 Resource Conservation and Recovery Act (RCRA) - The regulatory statute that mandates "cradle-to-grave" control of specified hazardous waste by imposing management requirements on generators, transporters, and owners/operators of treatment, storage, and disposal (TSD) facilities.

3.20 Rubble - Non-metallic material (such as tiles, gravel, concrete, asphalt, masonry) greater than two inches in diameter, that cannot be reused.

3.21 Soil - Particles of dirt and gravel with maximum dimension of two inches.

3.22 Toxic Substance Control Act (TSCA) - The law that enables the Environmental Protection Agency (EPA) to control chemicals and substances, such as PCBs, dioxins, and asbestos, by requiring the testing of all materials, old and new, entering the environment and regulating the release of chemicals and substances when necessary.

3.23 Uncontaminated Waste - Construction waste that contains radioactive concentrations below limits specified in IN-6015.

3.24 Usable Metals - Uncontaminated metals that are suitable for reuse as part of the DOE Metals Program.

3.25 Waste Sampling Plan - Requirements established by Environmental Engineering (per a sample request form) on sample number, type, location, and lab analysis to characterize project waste.

4.0 RESPONSIBILITIES

4.1 Project Management and Acquisition (PM&A) shall be responsible for the following:

4.1.1 Coordinating with representatives of other departments to plan construction waste handling, determine if material is reusable or waste, discuss waste minimization options, and provide project support and documentation.

4.1.2 Initiating a request for RCRA Determination/Radiological Characteristion (RDRC) for a construction project.

4.1.3 Coordinating delivery of empty waste containers to the construction packaging site.

4.1.4 Monitoring subcontractor and FEMP employee compliance with the "Construction Environmental Safety and Health Work Survey" (CESHWS) and CWID to ensure contaminated construction waste 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.

4.0 RESPONSIBILITIES (cont.)

4.4.3 Completing material identification documentation, obtaining the supervisors signature on the documents, and delivering the documentation to Materials Control and Accountability (MC&A).

4.4.4 Issuing Deviation and Corrective Action Reports (DCARs) when waste is not handled in accordance with procedures, the CWID, or CESHWS.

4.4.5 Preparing and issuing a "Quality Operations Assessment Checklist".

4.4.6 Participating in the development of the Waste Sampling Plan.

4.4.7 Issuing an RD/RC Letter based on process historical knowledge and/or sample results.

4.5 The Controller shall be responsible for the following:

4.5.1 Maintaining an inventory of filled waste containers.

4.5.2 Generating documentation for moving filled containers to storage.

4.6 Site Services shall be responsible for the following:

4.6.1 For maintenance projects, the Site Services Department Maintenance Planner/Estimator shall perform the PM/PE responsibilities as follows:

4.6.1.1 Coordinating with representatives of other involved Departments to plan waste handling methods, determine material disposition (reusable or waste), discuss waste minimization options, and provide project support and documentation.

4.6.1.2 Initiating RD/RC requests for maintenance projects.

4.6.1.3 Coordinating delivery of empty containers to the packaging site.

4.6.1.4 Monitoring FEMP and subcontractor personnel to ensure that contaminated waste is handled in accordance with applicable SOPs.

4.6.2 Preparing a designated location for receiving contaminated materials for storage prior to shipment.

4.0 RESPONSIBILITIES (cont.)

4.6.3 Obtaining approved on-site disposition locations for RCRA construction waste.

4.6.4 Notifying MC&A of the container inventory and/or serial number.

4.6.5 Making the required preparation for ISO container loading.

4.6.6 Providing final closure for ISO containers.

4.6.7 Providing material movement services (including weighing filled waste containers and delivering containers to and from the site).

5.0 GENERAL

5.1 A "Property Disposal Request", Form FMPC-CONT-563 shall be prepared before equipment (tagged or untagged) is removed.

5.2 Project subcontractors shall be instructed to segregate clean packing and shipping materials to prevent contact with contaminated waste.

5.3 Packing materials shall be removed before entering a controlled area.

5.4 The "Contaminated Waste Packaging Guidelines" (Refer to Table 1) shall be followed for each type of contaminated construction waste shipped to a DOE burial site.

TABLE 1
CONTAMINATED WASTE PACKAGING REQUIREMENTS

MATERIALS[1]	METAL CONTAINERS	DRUMS	INTERNATIONAL SHIPPING ORGANIZATION (ISO)	CONTAMINATED DUMPSTERS
Metal refuse	Yes	N/A	Yes[2]	N/A
Scrap wood/pallets	Yes	N/A	Yes	Yes
Concrete	Yes	N/A	N/A	N/A
Soil	Yes	N/A	N/A	N/A
Asbestos	Yes	N/A	Yes	N/A
Misc. trash	N/A	N/A	N/A	Yes[2]
Floor sweepings/dust collector residues	N/A	Yes[2]	N/A	N/A

(1) RCRA material shall be handled on a case-by-case basis.

(2) Refer to SOP 20-C-601 for specific packaging guidelines.

5.0 GENERAL (cont.)

5.5 Waste containers shall be prepared in accordance with applicable procedures.

5.6 Filled containers that exceed the specified capacity shall be returned to the job site for removal of contents to bring the container within limits.

5.7 Packaging the following materials in box type containers is prohibited:
(A) Resource Conservation and Recovery Act (RCRA) hazardous wastes.
(B) Pressurized vessels
(C) Explosives
(D) Radioactive gases
(E) Pyrophoric materials
(F) Toxic or poisonous substances (except asbestos containing materials)
(G) Reactive material
(H) Liquid metals
(I) Flammable substances
(J) Alkaline metals
(K) Liquid organic waste
(L) Waste containing free liquid, dry powder, or respirable fines that have not been immobilized per NVO-325.
(M) PCBs
(N) Etiologic agents

5.8 Packaging of materials listed in Item 5.7 shall be on a case-by-case basis by Environmental Engineering.

5.9 Asbestos shall be packaged in accordance with applicable procedures.

5.10 The appropriate CERCLA Programs Operable Unit Manger shall review completed RSE documents to ensure that all CERCLA requirements are met and then forward the RSE to DOE for review and approval.

6.0 PROCEDURE

6.1 Pre-construction Planning/Estimating

NOTE: A pre-construction meeting (usually during Title I design) attended by groups involved in the Project shall be held. Project interface requirements shall be addressed/agreed to by all service organizations. The meeting shall identify interfaces with service organizations. The meeting may incorporate the project site walkdown to review the project scope for sampling and waste characterization.

PM&A AND SITE SERVICES

6.1.1 Prepare a draft "Construction Waste Identification/Disposition" (CWID) sheet, Form FMPC-CONT-2716.

NOTE: Accuracy and detail are required in preparing the CWID since the CWID and supporting documentation may be used by the planner/estimator or the subcontractor to estimate the costs associated with handling construction wastes and by OU3 Compliance for completion of RD/RC. The CWID is also used to report and quantify the estimated waste versus the actual waste generated at the completion of the project and to quantify the amounts and waste types for use on the CESHWS form.

6.1.2 Provide preliminary project information to Environmental Engineering.

NOTE: Process knowledge provided to Environmental Engineering will expedite RCRA Determination/Radiological Characterization (RDRC).

6.1.3 Initiate a RCRA Project File for each construction project.

6.1.4 Set project priorities and issue priorities list and status information.

6.0 PROCEDURE (cont.)

PM&A

6.1.5 Coordinate with the applicable departments and conduct a Project Site Walkdown.

NOTE: The following groups should be represented: Facility Owner, PM/PE, Radiological Safety, Solid Waste Compliance, Environmental Characterization and Surveillance, CERCLA Program Group, and groups required due to the nature of the project.

6.1.6 Submit a request for Radiological Safety to survey the project site.

NOTE: The result of this survey, along with historical and process knowledge, shall be used in the preparation of a Waste Sampling Plan.

6.1.7 Document the walkdown, using process and historical knowledge, on a "Rubble Characterization Information Checklist", Form FMPC-EM-3306.

6.1.8 Complete an "Environmental Media Sampling Request", Form FMPC-EM-3307.

6.1.9 Obtain OU3 Compliance, the CERCLA Program Group, and Radiological Safety concurrence with the Waste Sampling Plan.

6.1.10 Submit the Waste Sampling Plan (per a sample request form) to EM.

6.1.11 Prepare and obtain approval of a "Construction Excavation/ Penetration Permit", Form FMPC-T-2711 for field sampling.

6.1.12 Forward the permit to EM.

EM

6.1.13 Using the sample request form, develop the Project Sampling Plan.

6.1.14 Take samples in accordance with the sampling plan.

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 262

6.1.25 Using the analytical data, revise the CWID.

6.0 PROCEDURE (cont.)

6.1.26 Coordinate with Environmental Engineering and review the CWID form to identify and document the disposition location for each waste.

NOTE: A consideration of waste minimization possibilities shall be included.

6.1.27 Obtain required approvals of the completed CWID.

NOTE: The waste planning phase of a construction project is complete when the CWID is approved and issued.

6.1.28 Contact the Environmental Engineering to determine the type of waste containers for packaging contaminated and hazardous waste.

6.1.29 Develop a set of excavation and demolition drawings 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.

6.0 PROCEDURE (cont.)

6.2.2.8 As waste is generated, ensure that material is moved to the staging area and placed outside the dumpster until the waste is monitored by Radiological Safety.

NOTE: Waste shall not remain outside the dumpster overnight.

IRS&T

6.2.2.9 Survey collected waste to ensure that no contaminated waste enters the dumpster.

PM&A

6.2.2.10 Have the subcontractor place the verified clean waste in the dumpster.

NOTE: The dumpster shall be picked up after project completion or when the dumpster is full.

6.3 Controlling and Disposing of Contaminated Construction Waste

NOTE: Loose or removable contamination shall be removed (as practicable) prior to demolition or removal of contaminated or hazardous construction waste.

NOTE: Contaminated waste removal shall be coordinated with Waste Operations High Level Cleaners and Site Maintenance.

NOTE: Excavation/demolition activities involving contaminated materials shall be accomplished in accordance with the Site Specific Safety and Health Plan (SSHP). The SSHP addresses abatement processes required to protect human health and the environment.

PM&A

6.3.1 Contact Inventory Control and obtain containers specified on the CWID.

6.3.2 Contact Sitewide Quality and request that waste containers be inspected during preparation and loading.

NOTE: Sitewide Quality shall be notified at least one hour in advance.

6.0 PROCEDURE (cont.)

EC&QA

6.3.3 Ensure that the container is loaded and secured in accordance with applicable SOPs.

6.3.4 Coordinate with the subcontractor to segregate and package construction waste (Refer to CWID OR CESHWS).

NOTE: Packaging shall be in accordance with the SSHP.

NOTE: Material too large for the designated container shall be reduced in size by the subcontractor.

NOTE: Material designated for future use shall be handled as specified on the CWID.

NOTE: Containers shall be weighed at the job site to ensure weight requirements are met.

6.3.5 Install a non-tamperable seal on the container.

EM

6.3.6 Take certification samples for analysis (if required) to verify that buildover limits have been met.

PM&A

6.3.7 When the container is secure, sign the W-65 card as "generator".

6.3.8 Coordinate with MC&A to transport waste to the disposition location.

SITE SERVICES

6.3.9 Transport waste containers from the job site to the scale to be used for weighing.

6.3.10 Weigh the material in accordance with the applicable SOP.

6.3.11 Record the weight on the W-65 card.

6.3.12 Transport the containers to designated storage location.

6.0 PROCEDURE (cont.)

6.3.13 Contact MC&A and EC&QA when a box has been emptied.

PM&A

6.3.14 Prepare a final CWID when construction is complete.

7.0 APPLICABLE DOCUMENTS

7.1 Drivers

7.1.1 Title 40 CFR, Parts 260, 261, and 300

7.1.2 IN-6032, Control of Construction/Maintenance Waste

7.2 References

7.2.1 Toxic Substance Control Act of 1975

7.2.2 Resource Conservation and Recovery Act

7.2.3 SW-846, "Test Methods for Evaluating Toxic Waste"

8.0 APPLICABLE FIGURES

8.1 "Construction Waste Flow Diagram"

9.0 APPLICABLE FORMS

9.1 FMPC-CONT-563, "Property Disposal Request"

9.2 FMPC-PM&A-2716, "Construction Waste Identification and Disposition"

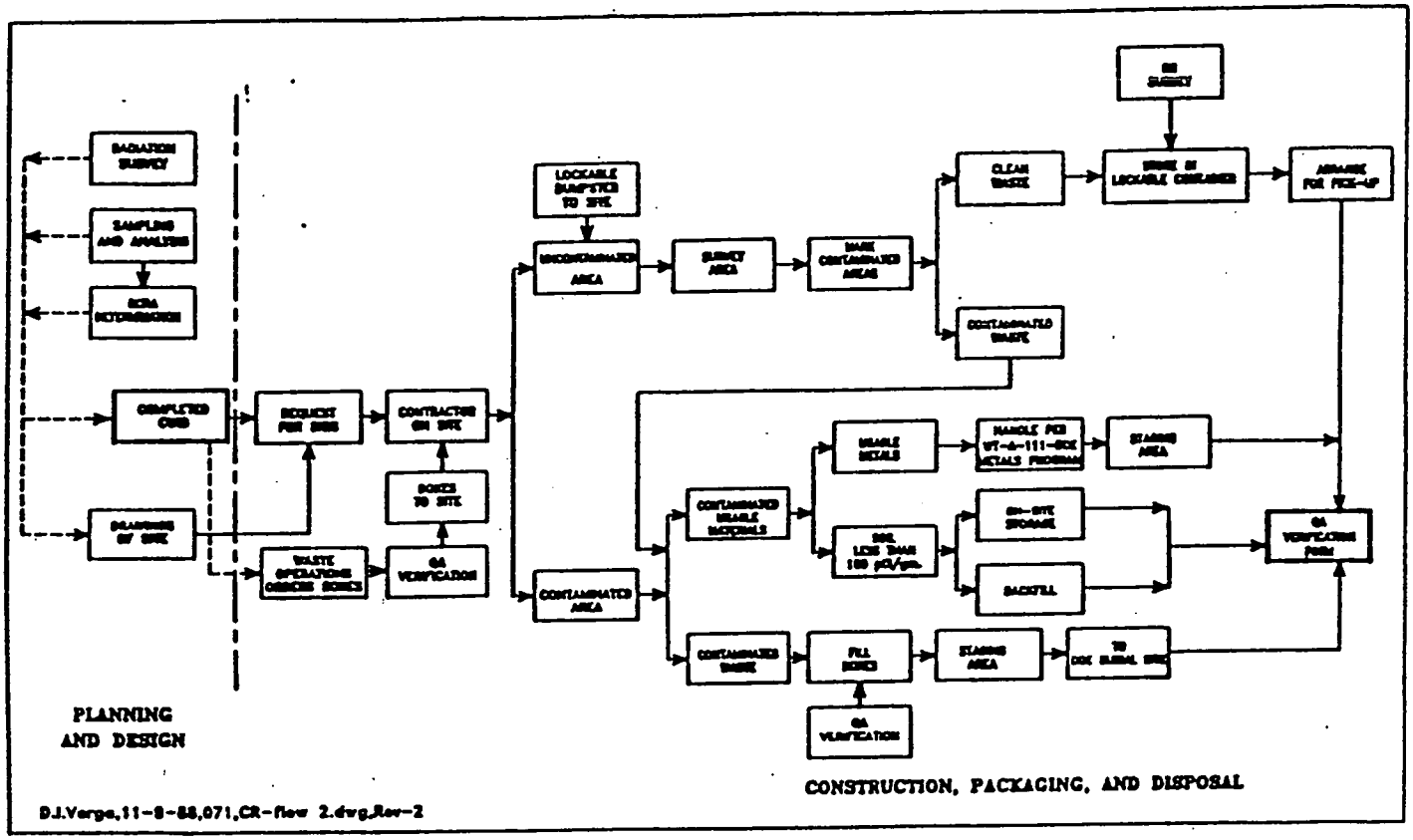
9.3 FMPC-EM-3306, "Rubble Characterization Information Checklist"

9.4 FMPC-EM-3307, "Environmental Media Sampling Request"

9.5 FMPC-T-2711, "Construction Excavation/Penetration Permit"

9.6 FMPC-Q-2717, "Construction Environmental Safety and Health Work Survey"

9.7 FMPC-CONT-1945-XX, "Item Production/Certification/Identification"



CONSTRUCTION, PACKAGING, AND DISPOSAL DIAGRAM
Figure 1

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.

G

APPENDIX G

QUALITY ASSURANCE PLAN

2563

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

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WEMCO QUALITY ASSURANCE PROGRAM PLAN

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.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

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WEMCO QUALITY ASSURANCE PROGRAM PLAN

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.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

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.

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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.

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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.

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.

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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.

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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.

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.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

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.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

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.

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.

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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.

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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.

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.

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.

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.

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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.

15.4 Procedure

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.

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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.

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.

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.

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-0602	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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WEMCO QUALITY ASSURANCE PROGRAM PLAN

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.

WEMCO QUALITY ASSURANCE PROGRAM PLAN

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.

H

APPENDIX H

SITE MEDIA SAMPLING

SMS-WRKPLN-REQ-104
REVISION 0

ENVIRONMENTAL MONITORING

SITE MEDIA SAMPLING, WORKPLAN

TITLE: SAMPLING OF RESIDUAL MATERIALS, PLANT 1 ORE SILOS, PROCESS FEED AND/OR WITHDRAWAL FLOW LINES, CONVEYOR SYSTEMS, VALVES, PUMPS, MOTORS, DRUMMING STATIONS, EXTERNAL TILE SILO SURFACE CORE, AND EXTERNAL CONCRETE SILO SURFACE CORE

December 13, 1991

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REVIEWED BY: Greg Henderson DATE: 12/16/91
(ENGINEER/TECHNOLOGIST)

APPROVAL _____ DATE _____
(SITE MEDIA SAMPLING)

APPROVAL _____ DATE _____
(QA/QC)

APPROVAL _____ DATE _____
(EC/QA)

WORK PLAN

SITE MEDIA SAMPLING

SMS-REQ-104, SAMPLING: PLANT 1 SILOS - PROCESS FEED AND/OR WITHDRAWAL FLOW LINES, CONVEYOR SYSTEMS, VALVES,PUMPS,MOTORS,DRUMMING STATIONS, EXTERNAL TILE SILO SURFACE CORE, AND EXTERNAL CONCRETE SURFACE CORE

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ENVIRONMENTAL MONITORING

SITE MEDIA SAMPLING, WORKPLAN

I. INTRODUCTION

This document provides a work plan which describes those actions which will be instituted by Site Media Sampling (SMS), and Fernald Environmental Management Project (FEMP) Operations Maintenance, prior to the planned demolition/removal of the Plant 1 Ore Silos. Preliminary actions to be performed by Site Media Sampling relative to the removal/demolition of the Plant 1 Ore Silos will include a comprehensive, visual inspection/sampling effort of the internal surfaces of Process Feed and/or Withdrawal Flow Lines, Conveyor Systems, Valves, Pumps, Motors, Drumming Stations, External Tile Silo Surface Core (tile material), and of the External Concrete Silo Surface Core (concrete material). During this phase of requested sampling SMS will conduct composite sampling of any of the suspect encased residual material uncovered during this effort.

In order to complete this initiative, SMS will require the support of FEMP Operations Maintenance Department personnel, whose role will be defined further in section III. and IV. of this work plan. This will be a jointly conducted effort to support the further investigation/sampling of any remaining residual materials associated with the past operative manufacturing function of the suspect silos. This sampling initiative will be essential in determining the full extent or presence of any remaining low level radiological, and/or hazardous constituents of any suspect waste that may be incurred during the actual demolition/removal action involving the Plant 1 Ore Silos. This further investigation, will collectively supply finalized data required to comprehensively characterize the full extent of the chemical/radiological constituency of the residual material.

Finalized data from this proposed sampling initiative, which will be outlined in section V. Sampling and Analysis Plan, of this workplan, will be utilized by the project engineer, Parsons, and FEMP Industrial/Radiological Safety. Finalized analytical data will guide the following applicable FEMP groups, Industrial Radiological Safety, Fire and Safety, and Industrial Hygiene, in instituting administrative controls for the protection of personnel safety and health, along with the protection of

the existing environment. The various administrative controls which will be required of this project will support the preliminary visual inspection/sampling effort, both preliminary to and during the actual removal/demolition sampling action. These controls, once established (see Health & Safety Plan) will insure that all work to be performed pursuant to this project can be performed safely, to maintain all exposures to FEMP site, and contractor personnel, along with the existing environment, As Low As Reasonably Achievable (ALARA). All requested sampling relative to this project will be conducted by Site Media Sampling.

Further, finalized data which will be compiled as a result of the laboratory analyses of all extracted samples will be used to (1) provide finalized data that will assist OU/3 Compliance in the characterization of the resultant demolition waste to its appropriate waste stream, relative to established FEMP Waste Analysis and Waste Determination Plans, and (2) to assist the project engineer (PARSONS), and OU/3 Compliance in determining the proper containment and shipping of the generated waste in accordance with 49 Code Of Federal Regulations 173.421, and (3) will provide a characterization that will be relative to a site for the final deposition of suspect material.

II. BACKGROUND

1.0 HISTORY PLANT 1 & PLANT 1 SILOS

The Plant 1 Ore Silos are located in the western sector of the FEMP complex, north of Second Street, and due east of A Street. A total of 14 structures make up the physical configuration and design of the Plant 1 Ore Silos. The Tile Silos which are the largest of the silos on a vertical plane are 8 in number (4 of which are approximately 44' in height and 4 of which are approximately 10' in height), and are arranged in a east to west geographical pattern. The numerical identification of the tile silos are as follows: #1 thru #8 **(see attachment #1 Plant 1 Tile Silos)**. In conjunction with the tile silos there are a total of 6 concrete silos (approximately 10' in height) that are configured in a south to north geographical pattern and are numbered as follows: #9 thru #14 **(see attachment #2, Plant 1 Concrete Silos)**.

The primary function of the plant 1 facility during production years was to obtain representative samples of the large quantities of incoming ore concentrates, and to provide for the storage of this material prior to the FEMP intended manufacturing processes. The storage of this material in the past and during production years after processing at the plant 1 facility, was accomplished by means

of an enclosed conveyor system capable of moving uranium bearing material to the individual silos.

The silo contents included K-65 residues which were the hot and cold metal oxides byproduct for the processing of pitchblende ores. Due to the processes, the more soluble radionuclide forms, including isotopes of radium, were dissolved from the byproduct. At times, the silos contained the pitchblende ores (Q-11 Material) prior to processing. Recently, the primary function of the Sampling Plant has been to store recycled materials until they were needed by the production plants. However the actual manufacturing of these materials ceased during the 1960's. At this time all encased material was shipped offsite and the Ore Silos were "abandoned in place".

During February of 1991, a leakage of the enclosed residual materials from the Plant 1 Ore Silos occurred. Due to the suspect nature of the material confined in the silos, a report was filed in accordance with 40 Code Of Federal Regulations (CFR) 300 Comprehensive Environmental Response Compensation Liability Act (CERCLA) with the lead agency and the following response action was initiated.

The FEMP instituted sampling of the spilled material to determine its hazardous constituency based on mandatory requirements established by the Environmental Protection Agency (EPA) to govern the generators of suspect hazardous wastes also listed by the EPA. Approximately 2600 pounds of suspect residual materials were released below Silos #1, #2, and #5.

In order to reduce the further threat of a release, the FEMP Operations Maintenance department immediately instituted the temporary closure of the leaking silos by welding plates at the bottom opening of each of the silos. Coinciding with the immediate response action to contain the leaking material from the Ore Silos, FEMP Operations Maintenance conducted a visual inspection of all associated systems (ie. process feed lines, the encased conveying systems etc.) for any signs of visual openings that could lead to a continued release of the suspect materials. Any opening that was discovered during this inspection was permanently sealed, thus greatly reducing any further threat of a release of hazardous materials to the environment.

Following the temporary closure (containment of remaining residual material) of the suspect silos, Site Media Sampling upon request of Operable Unit 3, undertook the characterization of the internal

contents of the existing silos by conducting several planned sampling initiatives involving the tile and concrete silos. Samples from each of the individual silos were extracted and submitted for laboratory analysis. The analytes of concern were determined by the Operable Unit 3 project engineer, based on historical process data, and from recommendations by the FEMP Analytical Laboratory, and Environmental Monitoring/Site Media Sampling.

2.0 SUMMARY OF POTENTIAL THREAT

Several scenarios of potential threats have been carefully discussed in the Removal Site Evaluation submitted to the Department Of Energy (DOE)/Fernald Site Office (FSO) September 1991, and are briefly summarized as follows. However remote, the immediate threat to the FEMP and the neighboring environment is the total collapse of any one of these silos due to natural occurrences, such as an earthquake, high winds or tornadoes, or from the natural deterioration of the support structure.

In the event that one of these silos collapsed, several resulting actions could occur. To the immediate south of the Silos are four Uranyl Nitrate holding tanks **(site identification #2E)** whose external structure could possibly be breached leading to a release of nitric acid and uranium bearing materials. Any release of nitric acid would present an immediate threat to the existing environment, and to the life and health of workers in the vicinity.

To the northwest of the silos is located a storage building **(site identification #67)**. This building, which is part of the plant 1 area, houses contained thorium residues. Any collapse of the silos due to high winds, could possibly extend some external damage to the physical storage facility, and could lead to the breaching of contained Thorium process residues. Any release of this nature, while not posing an immediate threat to life, could however present a potential for the atmospheric suspension of airborne radionuclides. This would inevitably create a surface area and associated external facilities contamination problem. The affect to the environment would also be significant in that any spillage of uranium and thorium bearing materials could migrate by absorption to the underlying groundwater, and to any existing exit designed for the containment of surface water runoff. Any site employee in close proximity in the event of a release of this nature would be subject to airborne radionuclides which could result in a significant internal body uptake, and external contamination of the body.

Building 72 which is used to house up to 20% enriched uranium is directly southeast of the concrete silos. Building 1A directly north of the Ore Silos is also used to store containerized thorium process residues. Again any collapse of the Ore Silos in the direction of these facilities again could extend some external damage to these storage facilities, which could in turn lead to the breaching of contained process residues. Finally, any collapse of the Plant 1 Ore Silos would lead to the inevitable spillage of its internal contents.

3.0 FEMP PRELIMINARY/CONTINUED ACTIONS IN SUPPORT OF REMOVAL/DEMOLITION ACTION PLANT 1 SILOS

Site Media Sampling in order to complete the requested sampling of the Plant 1 Ore Silos in both the pre - removal action phase and during the actual demolition phase will establish an orderly protocol that will assist all of the involved site disciplines in the completion of this task. The list of preliminary/continued actions to support the removal/demolition phase are as follows. Each individual disciplines role will be further defined in section IV. FIELD ACTIONS.

III. SUPPORT ACTIVITIES

1.0 FEMP Fire and Safety

a. Review project specific Health and Safety Plan
b. Conduct preliminary assessment of the plant 1 Silos and make recommendations pertaining to safety related issues involved in completing the requested sampling of the Plant 1 silos.
c. Inspect equipment to be used in the completion of this project and insure that all equipment is in a satisfactory condition to perform projected work.
d. Conduct ongoing inspection of project site and equipment to insure conformance to all safety related actions.

2.0 FEMP Radiological Safety

a. Conduct preliminary radiological survey of external surfaces, process piping, valves, inspection plates, and other miscellaneous systems.
b. Prepare and establish a project control zone
c. Conduct real time survey of exposed areas and equipment to be sampled.

d. Provide personal air breathing zone monitoring for all personnel involved in the sampling of exposed material.
e. Issue Radiation Work Permit governing work to be performed
f. Track real time personnel exposure
g. Determine adequacy or inadequacy of Personal Protective Equipment (PPE) to perform requested sampling - upgrade or downgrade (PPE) as needed
h. Provide continued real time field radiological project assessment

3.0 FEMP Industrial Hygiene

a. Review Project Specific Health and Safety Plan
b. Provide preliminary Industrial Hygiene Assessment of Plant Silos
c. Review and sign FEMP generated Safety Work Permit
d. Provide continued Industrial Hygiene coverage during project.
e. Determine adequacy or inadequacy of Personal Protective Equipment (PPE) to perform requested sampling - upgrade or downgrade (PPE) as needed.

4.0 FEMP Site Media Sampling

a. Prepare Project Specific Work Plan
b. Prepare Project Specific Health and Safety Plan
c. Prepare Sampling and Analysis Plan
d. Conduct safety meeting reviewing project specific Health and Safety plan, and Sampling plan.
e. Concur with all precautionary permits regarding worker safety and health.
f. Extract all requested samples
g. Submit all samples to the FEMP analytical laboratory for analysis

5.0 FEMP Operations Maintenance

a. Review project specific Health and Safety with assigned personnel.
b. Operate all equipment, manlifts, or hoists required to transport personnel to the top of the suspect silos.
c. Open all bolted inspections plates, process lines, miscellaneous systems etc. where as a visual inspection and/or sampling may be required.
d. Close all systems opened after the visual inspection and sampling has been performed to insure the continued containment of any suspect hazardous/radiological materials.

6.0 FEMP Quality Control/Quality Assurance

a. Review project work plan
b. Conduct periodic survey of work site to assure the quality conformance to sampling protocol.

IV. FIELD ACTIONS

1.0 FEMP FIRE AND SAFETY

The role of each FEMP group will be essential to the successful completion of the preliminary and ongoing sampling effort to characterize the remaining material encased in feed lines, conveying systems, and other miscellaneous components of the Plant 1 Ore Silos storage system. FEMP Fire and Safety will conduct continued, ongoing field inspections of the operations pertinent to the sampling initiative to insure that conformance to the approved project Health and Safety Plan is adhered to at all times. FEMP Fire and Safety will also be responsible for the inspection and approval of the use of safety belts, lanyards, and mechanical machinery to be utilized during the extraction of all samples of component parts related to the Plant 1 Silos.

2.0 FEMP RADIOLOGICAL SAFETY

To maintain all exposures As Low As Reasonably Achievable (ALARA) FEMP Industrial Radiological Safety based on pre radiological survey results will establish a control zone where as all aspects of the preliminary and continued demolition phase sampling initiative will occur. All personnel are expected to concur with all Radiological Safety precautions and administrative controls established for the protection of personnel Health and Safety. Field monitoring of all systems prior to entry shall be performed so that an accurate assessment of personnel exposure in relationship to the project are formally maintained and documented. Industrial Radiological Safety is expected to evaluate Personal Protective Equipment (PPE) as outlined in the approved project specific Health and Safety plan and to upgrade or downgrade as necessary. The sampling of residual material encased in closed component parts of the Plant 1 Silos System, could increase the possibility of suspect media becoming airborne. Aspects of the inplace sampling of the component systems, SMS extraction methodologies, along with containment of the residual material will be discussed in section V. Sampling and Analysis Plan.

Breathing zone area samples are to be taken and airborne radioactive concentrations determined to assess potential airborne radiological hazards, and to detect any possible breach of inplace containment mechanisms, designed to minimize the potential for the release of radiological/hazardous constituents. Radiological Safety will issue and update all radiation work permits, and, insure that all involved personnel have read and understood all requirements thereof. Radiation work permits will be updated based on the guidance of FEMP Industrial Radiological Safety. Continued support during the sampling initiative is to be provided by FEMP Industrial Radiological Safety.

3.0 FEMP INDUSTRIAL HYGIENE

As required by FEMP SOPP , Industrial Hygiene will be responsible for a preliminary survey of the Plant 1 Silos. The area facility owner will be notified of work to be performed in the area and will initiate an FEMP Work Permit. Industrial Hygiene based on the preliminary survey will complete the applicable FEMP Work Permit. Industrial Hygiene will conduct continued surveys, and will supply as needed, continued IH technical support and evaluation of the activities to be incorporated by the involved disciplines in the Plant 1 Silos Removal Action.

4.0 FEMP SITE MEDIA SAMPLING

Site Media Sampling will be responsible for the extraction, collection, containment, and custody of all samples in support of the demolition/removal of the Plant 1 Silos. Protocol established in this work plan, and in the sampling and analysis section, will be adhered to at all times by Site Media Sampling, to verify and validate the quality of the effort enlisted to extract the required sample. Site Media Sampling, prior to the commencement of the preliminary, and ongoing sampling to support the demolition/removal action Plant 1 Silos', will conduct a precursory meeting in which all SMS personnel will review the project specific Health and Safety plan, the prescribed sampling and analysis plan, and the applicable Quality Assurance Protocol. Concurrence to this review will be by signature of all SMS personnel on the appropriate form (FEMP-IRS&T-470) for attendance at FEMP safety meetings. Any SMS personnel who has not confirmed this review by signature on the appropriate attendance roster will be exempt from any activities to be conducted by SMS in the completion of the assigned task.

5.0 FEMP OPERATIONS MAINTENANCE

Component systems associated with the Plant 1 Ore Silos, Process Feed and/or Withdrawal Flow Lines, Conveyor Systems, Valves, Pumps, Motors, Drumming Stations, External Tile Silo Surface Core (tile material), and of the External Concrete Silo Surface Core (concrete material) are encased systems secured by weld, or with nuts and bolts. Inspection plates are located at the top of the silos and throughout the materials conveying system. FEMP maintenance will be required to attend all precursory meetings associated with this sampling effort. A review of the project specific Health and Safety Plan, Sampling and Analysis Plan, and Quality Assurance Protocol will be reviewed prior to the initiation of any activity to be conducted in the extraction of all requested samples. Concurrence to this review will be by signature of all FEMP Operations Maintenance personnel on the appropriate form (FEMP-IRS&T-470) for attendance at FEMP safety meetings. Any FEMP Operations Maintenance personnel who has not confirmed this review by signature on the appropriate attendance roster will be exempt from any activities to be conducted by SMS and FEMP Operations Maintenance in the completion of the individual assigned tasks.

Access to the top of the silos will be accomplished by the utilization of a man lift to be operated by FEMP Operations Maintenance. All FEMP operations Maintenance will be fully trained in the operation of the applicable manlift. FEMP Operations Maintenance will be responsible for the removal 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. After the inspection and requested sampling has been completed, all process lines, and inspection and/or cover plates, will be reinstalled insuring the containment of any remaining residual suspect hazardous/radiological material.

6.0 FEMP QUALITY CONTROL/QUALITY ASSURANCE

The overall quality assurance program at the FEMP is described in the site Quality Assurance Plan, FEMP 2139. Quality Control/Quality Assurance will periodically monitor and conduct surveillances at the project site to verify that all measures are implemented to insure the quality of the extracted samples. (see section **VIII. Quality Assurance Plan for SMS specific project protocol).**

V. SAMPLING AND ANALYSIS PLAN

Any sampling to be conducted in association with the Plant 1 Ore Silos by SMS will be performed in an established control zone. The boundary and extent of the control/entrance/exit zone will be established by FEMP Radiological Safety. The control/entrance/exit zone will bound the north, south, east, and west perimeters of the established zone to one centrally located point that will allow for the access & egress of all required personnel, and equipment. All required samples to be submitted relative to this project will be prepared and containerized in a sample preparation area to be established in the control/entrance/exit zone. Egress from the controlled area will be permitted only after a real time field survey of personnel, equipment, and prospective samples has been performed.

Decontamination reduces contaminant concentrations to acceptable levels. Any equipment contaminated in the control zone will be decontaminated and monitored by Radiological safety for free release from the control zone area. A decontamination line shall be established in accordance with Environmental Monitoring procedure EM-CS-001, Environmental Monitoring On - Site Media Sampling. SMS equipment utilized in the extraction of samples specific to this project will be decontaminated in the control/ entrance/exit zone. Any equipment that cannot be decontaminated inside the established control zone will be doubled bagged and taped shut for later decontamination at the FEMP site D & D facility.

Personnel decontamination if necessary will be conducted inside the established control/entrance/exit zone. All SMS personnel are required to decontaminate themselves and then confirm the effectiveness of the decontamination as per IRS&T SPP35017, Procedure for Personnel Decontamination.

NOTE* Prior to the bagging of contaminated equipment, all visible and/or non fixed material will be removed, and a real time radiological field survey of suspect equipment will be performed. Each item that has been decontaminated will be individually tagged relative to real time radiological activity levels.

SMS sampling to support the Plant 1 Ore Silos Removal/Demolition action will be accomplished as follows:

1.0 PRELIMINARY SAMPLING

In accordance with sampling request #SMS-REQ-104, Sampling: Plant 1 Ore Silos, Process Feed and/or Withdrawal Flow Lines, Conveyor

Systems, Valves, Pumps, Motors, Drumming Stations, External Tile Silo Surface Core (tile material), and of the External Concrete Silo Surface Core (concrete material) and Other Miscellaneous Systems, SMS will extract a representative composite sample of residual material internally encased in the afore mentioned systems. SMS is projecting two sampling initiatives to support the planned removal/demolition of the Plant 1 Silos and associated system components. The first phase of sampling will be preliminary in nature, and as discussed earlier, will focus on extracting samples that will achieve the total characterization of any remaining residual suspect hazardous/radiological materials. In addition to the sampling of all associated component parts, SMS will extract samples of soil to the south and west of the plant 1 Silos to establish a baseline extent of any previously existing contaminants, prior to the initialization of the removal/demolition of the Plant 1 Silos. The total number of samples, residual suspect materials and soil samples, requested analytes, **(as concurred by Operable Unit 3 Compliance)**, sample volumetric requirements, analytical test methods, proper sample containers, preservatives, and SMS extraction methodologies will be extensively outlined and included to this work plan as attachment #3.

2.0 SAMPLING - DEMOLITION/REMOVAL PHASE

During the demolition/removal phase SMS will continue the sampling of residual materials from removed component parts (ie. process flow lines, valve assemblies etc.) as requested by the project engineer to support preliminary data, and to insure that generated wastes will be assessed to its appropriate waste stream. Soil sampling will continue on a weekly basis along the south and west perimeter of the asphalt/concrete pads that support the structure maintaining the Plant 1 Ore Silos. Finalized data from proposed soil sampling will be used to confirm that all efforts conducted for the containment of suspect hazardous/radiological materials are successful.

VI. HEALTH & SAFETY PLAN

N/A if not applicable

CONCURRENCE RADIOLOGICAL SAFETY _____

CONCURRENCE FIRE AND SAFETY _____

CONCURRENCE INDUSTRIAL HYGIENE _____

The work to be performed and outlined in this sampling plan will be accomplished in accordance with the site specific Health and Safety Plan developed for Environmental Monitoring (EM)/Site Media Sampling (SMS). As a minimum all SMS technicians while working in the FEMP process area are required to wear level D protective clothing. SMS technicians will

conform to all precautionary surveys performed by the FEMP Westinghouse employees representing site Safety, Industrial Hygiene, and Health Physics. Concurrence to all applicable safety permits (indicated by signature of the SMS technicians assigned to the perspective project) is expected by SMS technicians in the performance of their assigned duties.

The SMS Senior technician and responsible sampling team lead will insure that all SMS technicians performing sampling related to any project has read and understands all applicable surveys that protect worker safety and health. EM technicians who do not sign the applicable health and safety survey forms will not participate in the execution of sampling activities related to the completion of assigned project responsibilities. A copy of all applicable safety surveys issued for worker safety and health shall be stored for easy reference in the applicable project files maintained by Environmental Monitoring/Site Media Sampling. **(see attachment # IV Project Specific Health and Safety Plan)**

VII. QUALITY ASSURANCE PLAN

CONCURRENCE QA/QC _____

All QA/QC requirements shall follow the protocol as specified in internal EM procedure EM-CS-001 "Environmental Monitoring On-Site Media Sampling. All samples will be contained in glass containers cleaned to EPA protocol A **(manufacturers specifications can be obtained)** using Teflon Lined Closures (TLC) where applicable. Site Media Sampling will prepare a trip blank prior to transit to the requested sample field site. The trip blank media will consist of distilled water or sterilized silica sand and will be contained in glass containers with (TLC) closures where applicable.

The specific weighted volume requirements will be the same as those weighted volumes applicable to the requested sample are as outlined in the SMS Sampling Plan. Prior to transport to the field sample site the trip blank will be assigned a sequential EM sample number, recorded into the field logbook and the EM/SMS permanent logbook file. The trip blank sample will, (1) be permanently sealed using an approved tamper proof custody tape, and (2) will be preserved in a manner applicable to the designated sample or as outlined in the SMS sampling plan. Since all EM sample numbers are sequential, the trip blank sample number will also be consistent with the requested sample number and will be applied in a manner such that the receiving laboratory will not know that the sample is representative of a trip blank.

In addition to the trip blank sample, a duplicate sample as directed by procedure EM-CS-001 "ENVIRONMENTAL MONITORING ON - SITE MEDIA SAMPLING" will be extracted every **20th sample** regardless of matrix

involved. The SMS sampling team lead shall be notified by the Sample Coordination Unit (SCU) when a duplicate sample is required. In the event that a duplicate sample is required it will be noted in the field logbook as a duplicate of the requested sample. As a matter of accessibility for SMS tracking and accountability purposes, the duplicate sample number will also be recorded into the permanent SMS sample log. The sample log will be permanently maintained by the SMS Sample Coordination Unit (SCU).

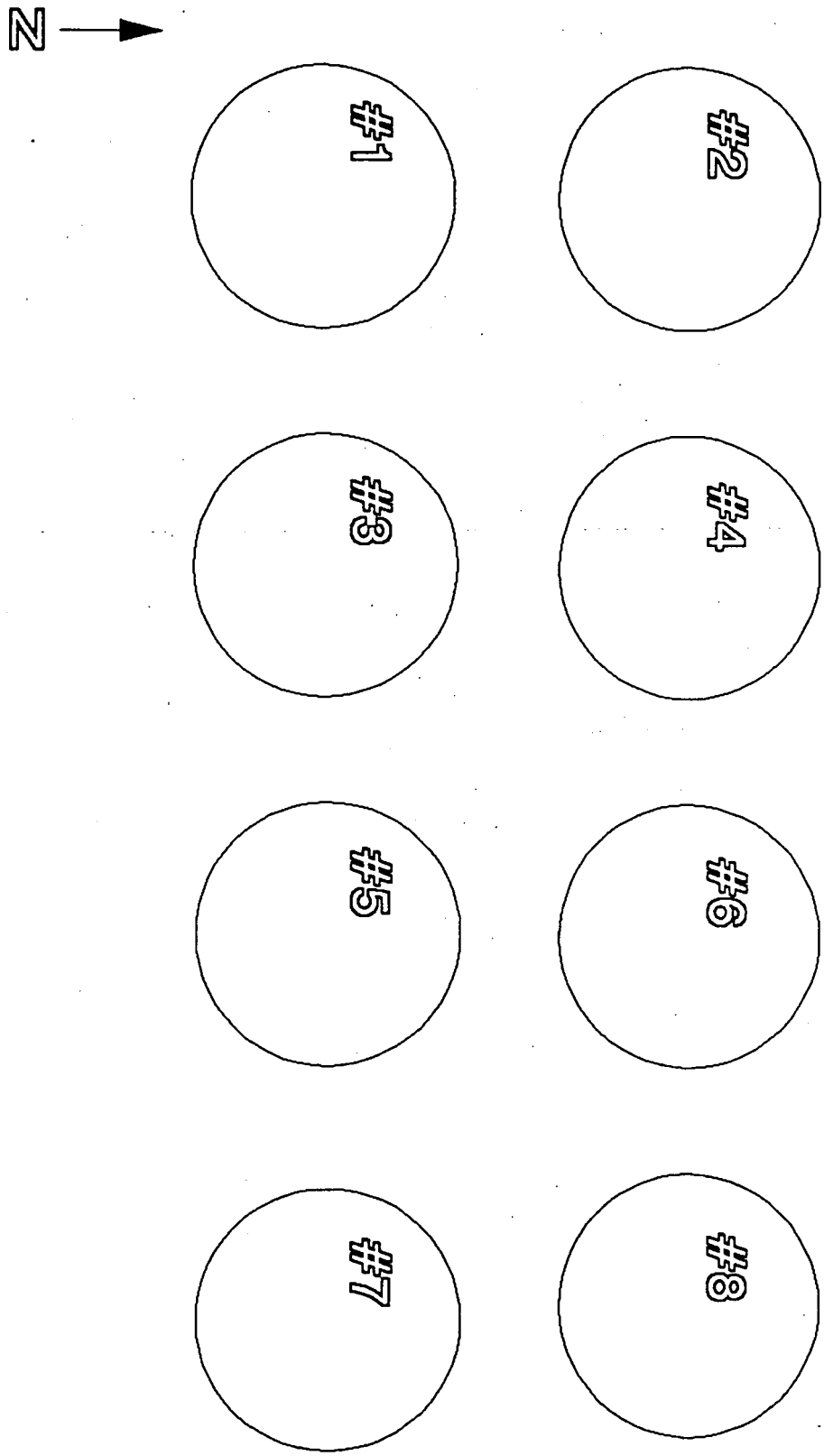
If at any time a duplicate sample cannot be extracted due to inadequate sample volume, the SMS sampling team lead shall note condition into the field logbook and notify the SCU. The duplicate sample extraction shall then be forwarded to the next available sample extraction.

To verify the status of equipment (free of contaminants) to be used in any sample extraction, all equipment will be decontaminated prior to transport to the field sample site, or immediately preceding the requested sample extraction. The decontamination procedure will be in accordance with that specified in EM-CS-001, "ENVIRONMENTAL MONITORING ON - SITE MEDIA SAMPLING. A sample of the final rinsate will be collected and submitted for the appropriate analysis as outlined in the project sampling plan. The containers, weighted sample volume requirements, and preservatives will also be as specified for the requested project sample(s).

ATTACHMENT I

PLANT 1 TILE SILOS

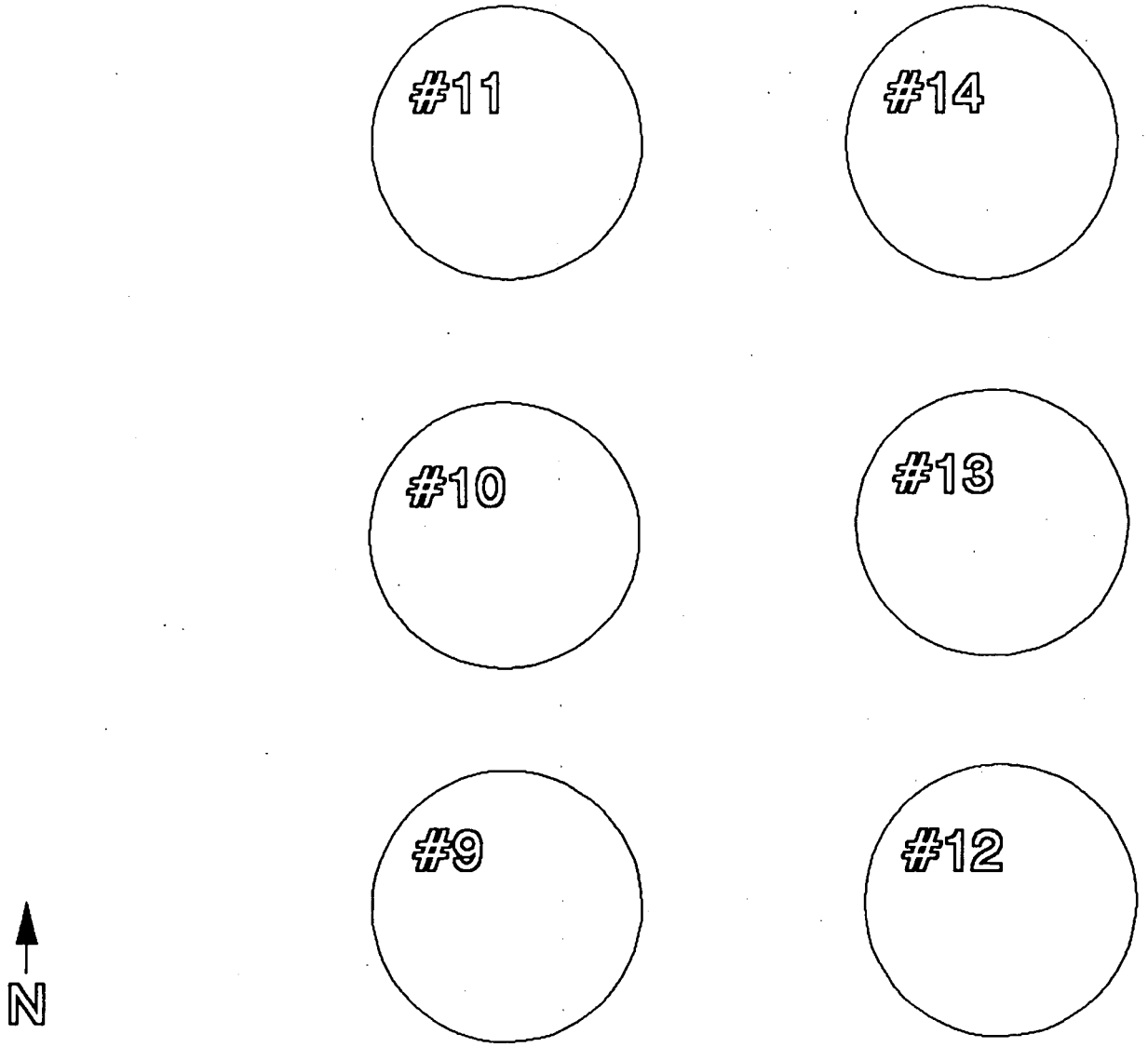
Plant 1 Tile Silos



ATTACHMENT II

PLANT 1 CONCRETE SILOS

Plant 1 Concrete Tile Silos



ATTACHMENT III

SAMPLING AND ANALYSIS PLAN

1.0 Site Media Sampling request #SMS-REQ-104, has requested that SMS extract representative composite samples of the encased materials Plant 1 Ore Silos Process Feed and/or Withdrawal Flow Lines, Conveyor Systems, Valves, Pumps, Motors, Drumming Stations, External Tile Silo Surface Core (tile material), and of the External Concrete Silo Surface Core (concrete material) and Other Miscellaneous Systems, etc. The proposed sampling relative to the support of this project will be conducted by SMS using its best available protocol to insure the quality and validity of extracted samples for this project action. SMS will enlist the following extraction methodologies EM-EXM-90-001, "Environmental Monitoring Extraction Methodology for Using A Stainless Steel Auger and a Stainless Steel Scoop", EM-EXM-90-005, "Environmental Monitoring Extraction Methodology for Using a Milwaukee Rotary Hammer and a Tungsten Carbide Tipped Coring Bit, EM-EXM-91-013, "Environmental Monitoring Extraction Methodology, Using A Stainless Steel Scoop" and EM, Operational Methodology EM-OPM-91-015, "Operational Methodology for Using a Winco Model HP4500H Electrical Generator" (see attachment #V).

1.1 REQUESTED SAMPLING LOCATIONS

As per sampling request #SMS-REQ-104, SMS is requested to conduct an inspection/sampling initiative of the Plant 1 Ore Silos (Tile and Concrete). The following is a list of those areas specified by SMS sampling request #SMS-REQ-104.

* COMP. = (COMPOSITE)

Plant 1 Tile Silos Sampling Location	Type of Sample	Plant 1 Concrete Silos Sampling Location	Type of Sample
1. Equipment	Comp.	1. Equipment	Comp.
. Process Feed and/or Withdrawal Lines	"	. Process Feed and/or Withdrawal Lines	"
. Conveyor System	"	. Conveyor System	"

Plant 1 Tile Silos Sampling Location	Type of Sample	Plant 1 Concrete Silos Sampling Location	Type of Sample
. Valves, Pumps and motors	"	. Valves, Pumps and motors	"
. Drumming Stations	"	. Drumming Stations	"
. Tile Core	"	. Concrete Core	"

2. Soil Samples

. Soil Samples	Surface (0" to 6")
. Soil Samples	One Foot (0" to 12")

1.2 EQUIPMENT SAMPLING

1.2.1. * PROCESS LINES, FEED AND/OR WITHDRAWAL - SMS will conduct the visual inspection/sampling of process material feed flow lines, and withdrawal materials flow lines, Plant 1 Ore Silos (Tile and Concrete). FEMP Operations Maintenance will disconnect several process lines (feed and withdrawal), Plant 1 Ore Silos, at the discretion of SMS and Parsons. These locations have been selected, based on preliminary photographs of the process materials (uranium) flow systems associated with the Plant 1 Silos. The inspection/sampling of these materials will be in conjunction with maintenance support to open process, and withdrawal flow lines at the flanged unions. The SMS sampling effort being conducted is to assist the total characterization of remaining residual materials enclosed in the feed and withdrawal process flow lines.

The requested samples will consist of 1 composite sample, process feed flow lines Plant 1 Ore Silos (Tile), and 1 composite sample, process withdrawal flow lines, Plant 1 Ore Silos (Tile). To characterize the contents of the Plant 1 Ore Silos (Concrete), SMS will extract 1 composite sample, flow lines Plant 1 Ore Silos (Concrete), and 1 composite sample, withdrawal lines, Plant 1 Ore Silos (Concrete).
SMS will submit for laboratory analysis, (see 1.2 REQUIRED ANALYTES) a total of 2 composite samples representing that

material enclosed in the Plant 1 Ore Silos (Tile and Concrete) process feed flow lines, and 2 composite samples of that material enclosed in the withdrawal process flow lines Plant 1 Ore Silos (Tile and Concrete).

The inspection/sampling of process and withdrawal flow lines shall be completed as follows.

1.2.2 At the direction of SMS, FEMP Operations Maintenance will disconnect selected process feed and/or withdrawal flow lines at their flanged unions. **(UNLESS MANDATED OTHER WISE BY THE ASSIGNED FIELD RADIOLOGICAL TECHNICIAN OR INDUSTRIAL HYGIENE TECHNICIAN, THE MINIMUM PPE TO BE UTILIZED IN THE OPENING OF ANY FLANGED UNION, PROCESS OR WITHDRAWAL FLOW LINE, WILL BE LEVEL B PPE)**. Sampling locations will be described in attachment III - Sample Point Location.

1.2.3 All accessible process feed and withdrawal flow lines located on the ground or mezzanine level shall be sampled in accordance with SMS procedure EM-CS-001, "Environmental Monitoring On-Site Media Sampling", and as follows.

1.2.4 SMS technicians shall prepare the area to be sampled by placing plastic sheeting beneath the process feed and/or withdrawal flow lines to be inspected/sampled.

1.2.5 Once the process feed and/or withdrawal flow line has been disconnected, a radiological survey of any existing residual material will be conducted.

1.2.6 The radiological safety technician shall advise FEMP Operations Maintenance, and SMS if the pre-selected PPE is appropriate. **(The Upgrade or downgrade of the assigned PPE is at the discretion of the radiological safety technician).**

1.2.7 The SMS lead technician shall inspect the opened process or withdrawal flow lines for the presence of residual materials.

1.2.8 If residual materials are present the SMS field crew wearing the appropriate PPE, will obtain a stainless steel spatula or scoop, and remove the contents to a stainless steel bucket.

1.2.9 After all visible material has been removed, and deposited into the stainless steel bucket from this location, the SMS field sampling crew shall cover the stainless steel bucket using plastic sheeting, and seal with utility tape.

1.2.10 FEMP Operations Maintenance shall reseal the process feed or withdrawal flow line by rebolting the flanged unions.

1.2.11 If the gasket material between the flanged unions has been damaged, FEMP Operations Maintenance shall replace such material, thus insuring permanent containment of any possible remaining residual material.

NOTE: If replacement gasket material is not available, FEMP Operations Maintenance shall rebolt the flanged unions, and permanently seal flanged unions using a utility type tape.

1.2.12 Repeat 1.2.1 thru 1.2.11 until all designated process feed or withdrawal flow lines have been inspected/sampled.

1.2.13 When all process and/or withdrawal flow lines have been inspected/sampled the SMS technicians shall remove the stainless steel bucket with contents intact to the sample preparation area.

1.2.14 Using a stainless steel scoop the SMS sampling team shall remove the contents (residual material) from the stainless steel bucket for composite sampling (see *1).

1.2.15 After compositing of the requested sample has been completed, the SMS sampling team using a stainless steel spatula or scoop shall deposit the composited material into the appropriate sample containers, utilizing the correct closure (see sample container and closures), and seal using an appropriate custody tape.

1.2.16 Properly label, and log all extracted samples onto the SMS Chain of Custody/Analytical Sample Request form (see attachment #VI, and onto the SMS project field logbook. **The SMS Sr. Technician shall maintain the ultimate responsibility for all annotations into the appropriate project specific field log book.**

* NOTE - The above extraction methodology shall apply to the process feed and withdrawal flow lines associated with both the Plant 1 Tile and Concrete Silos. The descriptive identification for all process and withdrawal flow line samples will be as follows:

. Plant 1 Tile Silos Process Feed Flow Line "TS1-PFLW-COMP"
. Plant I Tile Silos Product Withdrawal Flow Line "TS1-PWDRWL-COMP"
. Plant 1 Concrete Silos Process Feed Flow Line "CS1-PFLW-COMP"
. Plant I Concrete Silos Product Withdrawal Flow Line "CS1-PWDRWL-COMP"

1.2.17 All prospective samples shall be placed in a cooler, cooled to 4°C. (blue ice shall be utilized as the cooling media)

1.2.18 SMS technicians shall reserve all remaining residual material from all locations (process feed and/or withdrawal lines) relative of the Plant 1 Tile Silos that have been sampled in a stainless steel bucket. Reserve any remaining residual material for a later composite sample to be submitted for Hazardous Substance List analysis (HSL). This composite sample shall be identified as "TS1-SYS-COMP".

1.2.19 SMS technicians shall reserve all remaining residual material from all locations (process feed and/or withdrawal lines) relative of the Plant 1 Concrete Silos that have been sampled in a stainless steel bucket. Reserve any remaining residual material for a later composite sample to be submitted for Hazardous Substance List analysis (HSL). This composite sample shall be identified as "CS1-SYS-COMP".

1.2.20 Any remaining residual material will be double bagged (using an appropriate polyethylene bag for the disposal of radiological material) and sealed using a utility type tape.

1.2.21 Place bagged radiological (residual material) waste in a 55 gallon drum for later disposal.

1.2.22 All other generated wastes, eg. plastic, paper towels, rags, and PPE shall be placed in a separate 55 gallon drum specified for the disposal of said wastes.

1.2.23 All equipment shall be surveyed by a radiological safety technician and will be decontaminated by SMS as outlined in procedure EM-CS-001, "Environmental Monitoring On-Site Media Sampling".

1.2.24 Liquid waste generated as a result of equipment decontamination shall be decanted into an appropriate 55 gallon drum as per procedure EM-CS-001, "Environmental Monitoring On-Site Media Sampling".

1.2.25 The inspection/sampling of process flow and withdrawal lines that are not readily accessible from the structures of the Plant 1 Silos shall be accomplished from the bucket of the manlift operated by FEMP Operations Maintenance, and as follows.

1.2.26 All SMS personnel and FEMP Operations Maintenance shall place all required equipment, eg. stainless steel bucket, stainless steel scoop, utility tape, and iso glove bags into the bucket of the manlift. **(the inspection/sampling of process and withdrawal flow lines, freely suspended (alternate sample locations), of the Plant 1 Silos that require transport via the manlift, shall only occur in the event that a significant amount of residual material cannot be obtained from other sample locations).**

1.2.27 During transport in the manlift, FEMP Operations Maintenance Personnel, and SMS technicians wearing prescribed PPE, will also be required to wear safety belts with accompanying lanyards attached to the bucket of the manlift, and hard hats.

1.2.28 FEMP Operations Maintenance personnel will center and attach the iso glove bag to the process and/or withdrawal flow line to be inspected/sampled.

1.2.29 FEMP Operations Maintenance, working in the iso glove bag, will remove all bolts at the flanged unions.

1.2.30 Once the process and/or withdrawal flow lines have been separated, SMS technicians through the iso glove bag will inspect the exposed area.

1.2.31 If residual materials are present repeat 1.1.8 through 1.1.24 until all alternate locations are completed.

NOTE: After the sampling of process lines, feed and /or withdrawal, associated with the Plant 1 Ore Silos, Tile and Concrete, all remaining residual material will be doubled bagged, sealed with a utility tape, and deposited into a 55 gallon drum for later disposition in accordance with the FEMP Waste Analysis and Waste Determination Plan.

1.2.32 *** CONVEYOR SYSTEM** - The transport of uranium material to the Plant 1 Silos (concrete and tile) was accomplished by a chain driven conveyor in an enclosed self contained system.

1.2.33 Inspection plates that are permanently bolted inplace will be removed by FEMP Operations Maintenance Department.

1.2.34 SMS field technicians will visually inspect/sample each inspection plate along the conveyor systems Plant 1 Tile and Concrete Silos.

1.2.35 Radiological Safety will perform a real time field radiological survey of the exposed inspection plate housing and any existing residual contents.

1.2.36 The radiological safety technician shall advise FEMP Operations Maintenance, and SMS if the pre-selected PPE is appropriate. **(The upgrade or downgrade of the appropriate PPE shall be as directed by the assigned radiological safety technician, and continue)**

1.2.37 If residual materials are present at the inspection plates, SMS technicians will prepare the area to be sampled by placing plastic sheeting beneath the conveyor system and open inspection plate housing.

NOTE: **The inspection/ sampling of any inspection plate location, located on a suspended conveyor system line only accessible by the manlift bucket, shall be accomplished from the manlift bucket. The area to be inspected/sampled will be prepared by placing an iso glove bag around the periphery of the metal piping line. All required PPE, including safety belts and lanyards attached to the manlift bucket, along with hard hats will be utilized at all times.**

1.2.38 SMS technicians as a minimum shall wear level B Personal Protective Equipment (PPE) **(unless directed otherwise by the radiological safety technician, or the current Radiological Work Permit)** during the sampling of any enclosed material Plant 1 Tile and Concrete Silos inspection plates.

1.2.39 SMS technicians wearing the appropriate PPE shall obtain a clean stainless steel bucket and stainless steel scoop.

1.2.40 Using a stainless steel scoop the SMS technician shall deposit any existing residual material at the inspection plates into a stainless steel bucket.

1.2.41 Repeat 1.2.33 thru 1.2.40 until each inspection plate location has been visually inspected and contents removed to a stainless steel bucket.

1.2.42 All material extracted from the inspection plates located on the mezzanine level shall be thoroughly mixed (see *1) for composite sampling using a stainless steel scoop, and deposited into the proper sample containers.

1.2.43 Samples extracted from the inspection plates, mezzanine level shall be a composite sample, and will be identified as **IPTS-COMP** (inspection plate mezzanine level tile silos) and **IPCS-COMP** (inspection plate mezzanine level concrete silos).

1.2.44 All samples will be placed in an appropriate cooler and cooled to 4°C using blue ice.

1.2.45 FEMP Operations Maintenance personnel will replace the inspection plate cover once the visual inspection/sampling has been completed.

1.2.46 The visual inspection/sampling of the conveyor system inspection plates located above ground level and at the top of the Plant 1 Tile Silos, shall be accomplished by transporting SMS personnel and required equipment to the inspection plate location via a manlift operated by FEMP Operations Maintenance.

1.2.47 All personnel, SMS technicians, and FEMP Operations Maintenance heavy equipment operators, shall place required sampling materials, buckets, stainless steel scoops, plastic sheeting, and iso glove bags, into the manlift for transport to the above ground inspection plate locations or to the top of the silos.

1.2.48 All personnel during transport in the manlift bucket will be required to wear hard hats, safety belts or harnesses, and lanyards, attached to the transport bucket of the manlift.

1.2.49 When all required personnel, and equipment, has been transported to the inspection plate locations, SMS technicians along with required equipment will exit the transport bucket, attach their safety belts and lanyards to the structural steel railing support, and transfer all equipment to the metal catwalk above the Plant 1 Silos.

NOTE: All necessary safety precautions for work to be performed from the metal catwalk structures located at the top of the Plant 1 Silos will be adhered to at all times. To minimize any associated risk to all personnel, due to the structural condition of said metal catwalks, SMS will conduct the inspection/sampling only of those inspection plates located directly above the top of the individual silos.

1.2.50 SMS personnel using iso glove bags will prepare the area to be inspected/sampled.

1.2.51 FEMP operations maintenance will remove the inspection plate cover.

1.2.52 Repeat 1.2.33 thru 1.2.45

1.2.53 Samples extracted from the inspection plates, above the top of the silos shall be a composite (see *1) sample, and will be identified as IPTS-COMP (inspection plate, top Tile silos), IPCS-COMP (inspection plate, top Concrete silos).

1.2.54 When all requested sampling, representative of the inspection plate locations has been completed, all remaining material shall be reserved in a stainless steel bucket for later compositing, as two samples, to be submitted for HSL analysis, and that will be identified as "TS1-SYS-COMP" (tile silo plant 1 system components) and "CS1-SYS-COMP" (concrete silo plant 1 system components).

NOTE: After the sampling of the conveyors systems associated with the Plant 1 Ore Silos, Tile and Concrete, all remaining residual material will be doubled bagged, sealed with a utility tape, and deposited into a 55 gallon drum for later disposition, in accordance with the FEMP Waste Analysis and Waste Determination Plan.

1.2.55 *** VALVES, PUMPS, MOTORS** - The inspection/sampling of valves, pumps, and motors associated with the Plant 1 Ore Silos shall be as follows.

1.2.56 Pre selected valves, pumps, and motors shall be removed from various locations by FEMP Operations Maintenance so that the inspection/sampling of residual materials deposited on valve seats or the internal valve body, motor end plates and the motor body, and from pump diaphragms and pump housings can be performed.

1.2.57 At any location where a valve, pump or motor has been removed for inspection/sampling purposes, FEMP Operations Maintenance after removal, will insure that metal plates are welded, or clamped to any line that is opened as a result of this effort. Any metal plate that is clamped on, will be further wrapped with utility tape to insure the containment of any remaining residual materials.

1.2.58 Any valve, pump or motor selected will be moved by FEMP Operations Maintenance to an area in the boundaries of the control zone and carefully dismantled.

1.2.59 Any valve, pump or motor dismantled will be resurveyed by the radiological safety technician. **(APPROPRIATE PPE WILL BE EVALUATED AND UPGRADED OR DOWNGRADED AT THE RADIOLOGICAL TECHNICIANS DISCRETION).**

1.2.60 After the dismantling of the selected valve, pump, or motor, SMS will inspect/sample any of the enclosed suspect contaminated material.

1.2.61 Wearing the appropriate PPE and using a stainless steel scoop carefully remove all visible material and deposit it in a stainless steel bucket.

1.2.62 After all selected valves, pumps, and motors have been inspected/sampled, thoroughly mix all materials for a composite (see *1) sample.

1.2.63 Using the stainless steel scoop deposit the suspect material in the proper sample containers.

1.2.64 Properly label all sample containers as per the following <u>VPMTS-COMP</u> (valves, pumps, motors Tile silos) <u>VPMCS-COMP</u> (valves, pumps, motors, Concrete silos).

1.2.65 All samples will be placed in coolers, cooled to 4°C, utilizing blue ice as a cooling media.

1.2.66 Log all samples onto the appropriate chain of custody/analytical request form and the project specific field logbook. **The SMS Sr. Technician shall maintain the ultimate responsibility for all annotations into the appropriate project field log book.**

1.2.67 Reserve all remaining material in a stainless steel bucket for a composite sample as in 1.2.18 thru 1.2.19.

NOTE: After the sampling of all selected valves, pumps, and motors associated with the Plant 1 Ore Silos, Tile and Concrete, all remaining residual material will be doubled bagged, sealed with a utility tape, and deposited into a 55 gallon drum for later disposition, in accordance with the FEMP Waste Analysis and Waste Determination Plan.

1.2.68 *** DRUMMING STATIONS** - Several Drumming stations are located on the mezzanine level associated with both the Tile and Concrete Silos. At this location residual material was drummed and weighed either for transport to another FEMP facility or stored for future use.

1.2.69 SMS will conduct a visual inspection/sampling effort involving each individual drumming station.

1.2.70 SMS will prepare an area contiguous to the individual drumming station to be visually inspected/sampled by placing plastic or sheeting beneath each drumming station.

1.2.71 Inspection plates located on the north and west side of each drumming station will be removed by FEMP Operations Maintenance. All prescribed PPE will be required for the removal of these inspection plates **(minimum - level B protection required unless indicated otherwise by the assigned field Radiological Safety Technician).**

1.2.72 After the inspection plates have been removed the field Radiological Safety Technician will conduct a real time field survey of contents using a scintillation beta + gamma detector. **(PPE can be downgrade or upgraded based on the reccomendations of the assigned radiological technician).**

1.2.73 SMS technicians wearing the appropriate PPE shall obtain a clean stainless steel bucket and stainless steel scoop.

1.2.74 If residual materials are present the SMS technician will remove material from the drumming station and deposit it in the stainless steel bucket.

1.2.75 Repeat 1.2.69 thru 1.2.74 until the inspection/sampling of all associated drumming stations has been completed.

1.2.76 As the inspection/sampling of all drumming stations has been completed, the SMS technician shall remove the stainless steel bucket with contents intact to the sample preparation area for compositing (*** *1).

1.2.77 After the compositing of the suspect material is completed the SMS technician using a stainless steel scoop shall transfer suspect material to the appropriate glass containers, apply the correct closure, and accurately label.

1.2.78 Log all samples onto the SMS Chain of Custody/analytical request form and the SMS project specific field logbook.

1.2.79 Store all samples in a cooler cooled to 4°C utilizing blue ice as a cooling media.

1.2.80 **STEPS 1.2.67 THRU 1.2.79 SHALL APPLY TO BOTH THE PLANT 1 TILE SILOS AND THE PLANT 1 CONCRETE SILOS. A TOTAL OF TWO COMPOSITE SAMPLES SHALL BE SUBMITTED AND IDENTIFIED AS DS-COMP-TS** (Drumming Station - Composite, Tile Silo, Plant 1) and **DS-COMP-CS** (Drumming Station - Composite, Concrete Silos, Plant 1).

1.2.81 Reserve any residual material remaining for a total composite sample to be submitted for HSL background analysis as in 1.2.18 and 1.2.19.

NOTE: After the sampling of all drumming stations associated with the Plant 1 Ore Silos, Tile and Concrete, all remaining residual material will be doubled bagged, sealed with a utility tape, and deposited into a 55 gallon drum for later disposition, in accordance with the FEMP Waste Analysis and Waste Determination Plan.

1.2.82 Obtain a clean stainless steel scoop and bucket and proceed to the next location.

1.2.83 *** CONCRETE SAMPLE** - The exterior surface material of the Plant 1 Concrete Silos are constructed of concrete. Site Media Sampling will extract three cores of the surface material for analysis from silos #9 & #12.

1.2.84 The extraction of core samples (concrete - exterior surface) from the Plant 1 Concrete silos will be performed as per Site Media Sampling Extraction Methodology #EM-EXM-90-005, (see attachment #IV) Environmental Monitoring Extraction Methodology for Using a Milwaukee Rotary Hammer and a Tungsten Carbide Tipped Coring Bit.

1.2.85 Core samples of the concrete silos will be obtained from the sides of the individual concrete silos selected, utilizing a manlift to be operated by FEMP Operations Maintenance.

1.2.86 FEMP Operations Maintenance, and SMS personnel will load all required equipment into the manlift bucket.

1.2.87 Transport of equipment and personnel to the exterior concrete silo sampling location will require all personnel to wear the appropriate PPE, including safety belts and lanyards attached to the manlift bucket. **(The core extraction will be performed from the manlift bucket).**

1.2.88 The SMS technician, while attached by safety belt and lanyard to the bucket of the manlift, shall obtain a core of the concrete surface approximately 24" from the top of the silo, by advancing the rotary drill and bit sufficiently into the exterior sidewall of the individual silo until a core can be obtained. **(A minimum of three cores shall be extracted per silo to comprise the requested sample).**

(POWER SUPPLY TO THE ROTARY HAMMER SHALL BE FROM THE NEAREST ELECTRICAL OUTLET OR FROM A PORTABLE WINCO® MODEL HP4500H ELECTRICAL GENERATOR) SMS OPERATIONAL METHODOLOGY EM-OPM-91-015

1.2.89 Deposit all extracted cores in a stainless steel bucket and move to the next selected silo.

1.2.90 Repeat 1.2.84 thru 1.2.89

1.2.91 After all required cores have been obtained from each of the individual silos, FEMP Operations Maintenance Personnel shall

lower the manlift to the ground along with all equipment and extracted cores.

1.2.92 FEMP Operations Maintenance shall immediately repair any fracture remaining in the exterior wall of the individual silos by applying a permanent concrete patch to the location of the extracted cores. This will insure that any remaining residual material inside the individual silo will be permanently contained.

1.2.93 SMS technicians will remove all cores to the sample preparation area located inside the established control zone and feed the extracted cores into a laboratory type jaw crusher.

1.2.94 Deposit all crushed material in a stainless steel pan.

1.2.95 Obtain a clean stainless steel scoop, and deposit material into the proper container (glass jar) filled to septum, apply a teflon lined closure to the container, seal with an approved custody tape, and label sample accordingly (sample should be identified as (CS-CORE), Concrete Silo Plant 1 - Core.

1.2.96 Repeat 1.2.95 until all required samples containers have been filled.

1.2.97 Log completed sample onto the SMS chain of custody/analytical sample request form and onto the field logbook.

1.2.98 Place the requested sample in a cooler, cooled to 4°C. (Blue ice shall be utilized as a cooling media).

NOTE: After the sampling of the exterior surfaces of the (Concrete Silos) - Plant 1 Ore Silos, all remaining residual material will be doubled bagged, sealed with a utility tape, and deposited into a 55 gallon drum for later disposition, in accordance with the FEMP Waste Analysis and Waste Determination Plan.

1.2.99 *** TILE SAMPLE** - The exterior surface material of the Plant 1 Tile Silos are constructed of a tile, which may contain asbestos, and concrete. Site Media Sampling will extract three cores of the surface material for analysis from silos #3 & #4.

1.2.100 The extraction of core samples (tile - exterior surface) from the Plant 1 Tile silos will be performed as per Site Media Sampling Extraction Methodology #EM-EXM-90-005, (see attachment #IV) Environmental Monitoring Extraction Methodology for Using a Milwaukee Rotary Hammer and a Tungsten Carbide Tipped Coring Bit.

1.2.101 Core samples of the Tile silos will be obtained from the exterior surfaces of the individual Tile silos selected, utilizing a manlift, to be operated by FEMP Operations Maintenance.

1.2.102 FEMP Operations Maintenance, and SMS personnel will load all required equipment into the manlift bucket.

1.2.103 Transport of equipment and personnel to the exterior Tile silo sampling location will require all personnel to wear the appropriate PPE, including safety belts and lanyards attached to the manlift bucket. **(The core extraction will be performed from the manlift bucket).**

1.2.104 The SMS technician, while attached by safety belt and lanyard to the bucket of the manlift, shall obtain a core of the Tile surface approximately 24" from the top of the silo, by advancing the rotary drill and bit sufficiently into the exterior sidewall of the individual silo until a core can be obtained. **(A minimum of three cores shall be extracted per silo to comprise the requested sample).**

(POWER SUPPLY TO THE ROTARY HAMMER SHALL BE FROM THE NEAREST ELECTRICAL OUTLET OR FROM A PORTABLE WINCO[R] MODEL HP4500H ELECTRICAL GENERATOR) **SMS OPERATIONAL METHODOLOGY EM-OPM-91-015**

1.2.105 Deposit all extracted cores in a stainless steel bucket and move to the next selected silo.

1.2.106 Repeat 1.2.100 thru 1.2.105.

1.2.107 After all required cores have been obtained from each of the individual silos, FEMP Operations Maintenance Personnel shall lower the manlift to the ground where all equipment and extracted cores shall be removed.

1.2.108 FEMP Operations Maintenance shall immediately repair any fracture remaining in the exterior wall of the individual silos by applying a permanent concrete patch to the location of the extracted cores. This will insure that any remaining residual material inside the individual silo will be permanently contained.

1.2.109 SMS technicians will remove all cores to an area inside the established control zone, and feed extracted cores into a laboratory jaw crusher.

1.2.110 Deposit all resulting crushed material in a stainless steel pan.

1.2.111 Obtain a clean stainless steel scoop, and deposit material into the proper container (glass jar) filled to septum, apply a teflon lined closure to the container, seal with an approved custody tape, and label sample accordingly (sample should be identified as (TS-CORE), Tile Silo Plant 1 - Core..

1.2.112 Repeat 1.2.111 until all required samples containers have been filled.

1.2.113 Log completed sample onto the SMS chain of custody/analytical sample request form and onto the field logbook.

1.2.114 Place the requested sample in a cooler, cooled to 4°C. (Blue ice shall be utilized as a cooling media).

NOTE: After the sampling of the exterior surfaces of the (Tile Silos) - Plant 1 Ore Silos, all remaining residual material will be doubled bagged, sealed with a utility tape, and deposited into a 55 gallon drum for later disposition, in accordance with the FEMP Waste Analysis and Waste Determination Plan.

1.2.115 *** SOIL SAMPLING** - In conjunction with the sampling of equipment (eg. conveyor systems, process flow lines, valve assemblies, motors, pumps, etc.) associated with the Plant 1 Tile and Concrete Silos, SMS will conduct soil sampling directly south of the silos, approximately 5 feet south of the concrete/asphalt pad which supports the physical structure maintaining the Plant 1 Silos in a vertical position, and

directly to the west across A street, approximately 5 ft. west of the road, from the corner of 2nd and A streets, extending in a northern direction, to the north west corner of building 67.

1.2.116 SMS will extract one soil sample per every linear 20'in an east to west direction to the south of the asphalt/concrete pad of the Plant 1 Ore Silos, and one sample per every linear 20' across A street to the west.

1.2.117 The extraction of in-situ soils at each selected soil sampling point, will include a surface sample (0" to 6"), and, in a location 1" contiguous to the surface sample extraction, a one foot soil sample (0" to 12").

1.2.118 All soil samples to be extracted in the support of this project will be as per SMS internal procedure EM-CS-001, Environmental Monitoring On - Site Media Sampling, and the following extraction methodologies, EM-EXM-90-001.

1.2.119 Remove ex-situ soil from the sampling apparatus (stainless steel bucket auger) using a stainless steel scoop or spatula, and deposit material into the appropriate sample containers, apply the correct closure (teflon), seal with an approved custody tape, and label accordingly. All soil samples will be identified as SOIL-SMPL-SP-XXXX.

1.2.120 Place all samples into a cooler, cooled to 4°C. (Blue ice shall be utilized as the cooling media).

1.2.121 Log all extracted samples onto the field logbook and onto the SMS chain of custody/analytical request form.

1.2.122 Submit all samples to the FEMP analytical Laboratory for requested analysis.

1.2.123 After all soil sampling has been completed SMS will immediately fill all excavations with a mixture of bentonite clay and deionized water, to a level slightly above the bore hole excavation. This will promote runoff of rainwater, reduce puddling, and prevent any further entry of contaminants into the borehole.

(*1) Composite sampling shall be accomplished as follows: SMS technicians shall obtain four stainless steel pans numbered 1 thru 4. Using a stainless steel scoop, the SMS technician shall deposit an equal amount of suspect material into each of the individual steel pans. Thoroughly mix material in each pan using a stainless steel scoop. After thoroughly mixing the material in each of the pans, the SMS technician shall transfer the material in pan #1 to pan #2, and material from pan #3 to pan #4. Thoroughly mix the material in pan #2 and pan #4. After mixing is completed, transfer the material in pan #2 to pan #4. Again, thoroughly mix all material in pan #4. After mixing the material in pan #4, transfer material to the proper sample containers.

Two composite samples representing the Plant 1 Concrete Silos Component System identified as (CS1-SYS-COMP), and the Plant 1 Tile Silos Component System identified as (TS1-SYS-COMP) shall be submitted for Hazardous Substance List (HSL) analysis in accordance with 40 Code of Federal Regulations (CFR). This sample will consist of the remaining residual materials from the individual locations, excluding soil samples associated with both the Concrete and Tile Silos - Plant 1 Ore Silos Complex.

1.3 SAMPLE LOCATION/IDENTIFICATION & TOTAL NUMBER OF SAMPLES

As outlined in section 1.0 SAMPLING AND ANALYSIS PLAN, ATTACHMENT #III, SMS will extract a total of 12 composite samples representing the component equipment systems of the Plant 1 Tile and Concrete Silos. All suspect materials remaining after the composite samples have been extracted will be reserved to submit two composite samples representing locations #1,#2,#5,#7, and #9 (TS-SYS-COMP), and locations #3,#4,#6,#8, and #10 (CS-SYS-COMP) will be submitted for HSL background analysis. The list of sample locations and specific identifications are as follows:

* COMP. = (COMPOSITE)

SAMPLE LOCATION	SMS LABEL IDENTIFICATION
#1. Process Feed and/or Withdrawal Flow Lines	TS1-PFLW-COMP (Tile Silos)

#2	Process Feed and/or Withdrawal Flow Lines	TS1-PWDRWL-COMP (Tile Silos)
#3.	Process Feed and/or Withdrawal Flow Lines	CS1-PFLW-COMP (Concrete Silos)
#4.	Process Feed and/or Withdrawal Flow Lines	CS1-PWDRL-COMP (Concrete Silos)
#5.	Conveyor System	IPTS-COMP (Tile Silos)
#6.	Conveyor System	IPCS-COMP (Concrete Silos)
#7.	Valves, Pumps and Motors	VPMTS-COMP (Tile Silos)
#8	Valves, Pumps and Motors	VPMCS-COMP (Concrete Silos)
#9.	Drumming Stations	DS-COMP-TS (Tile Silos)
#10.	Drumming Stations	DS-COMP-CS (Concrete Silos)
#11.	Tile Silo Core	TS-CORE (Tile Silos)
#12.	Concrete Silo Core	CS-CORE (Concrete Silos)
#13.	Tile Silo Systems	(TS-SYS-COMP) - to be submitted for HSL anlysis
#14.	Concrete Silo Systems	(CS-SYS-COMP) - to be submitted for HSL analysis
#15.	Soil Samples	(SOIL-SMPL-SP-XXXX)

A total number of _____ soil samples will also be submitted in the completion of this project both pre and post construction.

1.4 REQUIRED ANALYTICAL PARAMETERS

In order to determine the chemical - hazardous(RCRA)/radiological constituents necessary for the final disposition of equipment associated with the Plant 1 Silos in accordance with SMS request #SMS-REQ-104, and based on the approval of OU/3 Compliance, SMS will submit all extracted samples for the following analysis:

Locations #1 thru #12 identified above, will be submitted for Full Spectrum TCLP as outlined in 40 CFR 261, and Total Radiological analysis as listed in the QAPjP, and as will be outlined in this section. Locations #13, & #14 will be submitted for Full HSL analysis to determine the presence of HSL background constituents. All initial soil samples will be submitted for the following analysis, Total Metals, Total Volatiles, Semi Volatiles, Total Pest/Herb, and Total Radiological Parameters (TRP).

Full Spectrum TCLP	Full HSL
TCLP Metals	Inorganic (METALS)
TCLP Volatiles	Organic (Volatiles)
TCLP Semi-Volatiles	Organic (Semi-Volatiles
TCLP Pest/Herb	Pest/PCB

Full Radiological (TRP)	TCLP - Totals (soil samples only)
Gross Alpha	Total Metals
Gross Beta	Total Volatiles
Radium^{226}	Total Semi-Volatiles
Radium^{228}	Total Pest/Herb
Strontium^{90}	
Technetium^{99}	
Cesium^{137}, Gamma Spec	
Ruthenium^{106}	
Plutonium, Isotopic	
Neptunium^{237}	
Thorium, Total	
Thorium, Isotopic	
Uranium, Total	
Uranium Isotopic	

1.5 REQUIRED SAMPLE VOLUME/PRESERVATIVE/HOLDING TIMES

The media to be extracted per this project is expected to be of a solid matrix. The following requirements are reflective of those necessary to comply with recommended analytical weighted volumes suggested by the FEMP analytical laboratory for a solid media.

. Sample Locations #1 thru #12 (solid Matrix)
. Containers (P= Plastic, G = Glass, AG = Amber Glass
. Total Radiological Parameters (TRP)

Parameter	Container	VOLUME Required	Preservative	Maximum Holding Times
TCLP Metals	P,G	1 Pint	none required	6 mos (28 days Hg)
TCLP Semi-VOAs	G	1 Pint	cool to 4°C	14 days
TCLP VOAS	G	3 - 4 oz.	cool to 4°C	14 days
TCLP Pest/Herb	G	1 Pint	cool to 4°c	14 days
TRP				
Gross Alpha	P,G	1 - 4 oz.	none required	3 mos
Gross Beta	P,G	1 - 4 oz.	none required	3 mos.
Radium^{226}	P,G	1 - 4 oz.	none required	3 mos.
Radium^{228}	P,G	1 - 4 oz.	none required	3 mos
Strontium^{90}	P,G	1 - 4 oz.	none required	3 mos.
Technetium^{99}	P,G	1 - 4 oz.	none required	3 mos.
Cesium^{137}, (Gamma Spec)	P,G	1 - 4 oz.	none required	3 mos.
Ruthenium^{106}	P,G	1 - 4 oz.	none required	3 mos.
Plutonium, (Isotopic)	P,G	1 - 4 oz.	none required	3 mos.
Neptunium^{237}	P,G	1 - 4 oz.	none required	3 mos.
Thorium, Total	P,G	1 - 4 oz.	none required	3 mos.
Thorium, Isotopic	P,G	1 - 4 oz.	none required	3 mos.
Uranium, Total	P,G	1 - 4 oz.	none required	3 mos.
Uranium Isotopic	P,G	1 - 4 oz.	none required	3 mos.

The above listed requirements are applicable to locations #1 thru #12 and are individual for each listed location, and sample to be extracted. **(FOR ALL SAMPLES SUBMITTED A 4 oz. CONTAINER FOR GROSS ALPHA, BETA ANALYSIS IS REQUIRED. A TOTAL OF 12 SCREENING SAMPLES ARE REQUIRED FOR LOCATIONS #1 THRU 12).**

. Sample Locations #13 thru #14 (solid Matrix)
. Containers (P= Plastic, G = Glass, AG = Amber Glass
. Total Radiological Parameters (TRP)

Locations #13, & #14 will be individual samples submitted for Full HSL analysis to determine the presence of HSL background constituents.

Parameter	Container	VOLUME Required	Preservative	Maximum Holding Times
Full HSL				
Inorganics (METALS)	P,G	500 gm	cool 4°C	Indefinite
Organics (Volatiles)	G	40 gm	cool 4°C	Indefinite
Organics (Semi-Volatiles	G	400 gm	cool 4°C	10 days until extraction/ 40 days after extraction
Pest/PCB	G	400 gm	cool 4°C	5 days until extraction/ 40 days after extraction
TRP				
Gross Alpha	P,G	1 - 4 oz.	none required	3 mos
Gross Beta	P,G	1 - 4 oz.	none required	3 mos.
Radium^{226}	P,G	1 - 4 oz.	none required	3 mos.
Radium^{228}	P,G	1 - 4 oz.	none required	3 mos
Strontium^{90}	P,G	1 - 4 oz.	none required	3 mos.
Technetium^{99}	P,G	1 - 4 oz.	none required	3 mos.
Cesium^{137}, (Gamma Spec)	P,G	1 - 4 oz.	none required	3 mos.
Ruthenium^{106}	P,G	1 - 4 oz.	none required	3 mos.
Plutonium, (Isotopic)	P,G	1 - 4 oz.	none required	3 mos.
Neptunium^{237}	P,G	1 - 4 oz.	none required	3 mos.
Thorium, Total	P,G	1 - 4 oz.	none required	3 mos.
Thorium, Isotopic	P,G	1 - 4 oz.	none required	3 mos.
Uranium, Total	P,G	1 - 4 oz.	none required	3 mos.
Uranium Isotopic	P,G	1 - 4 oz.	none required	3 mos.

The above listed requirements are applicable to locations #1 thru #12 and are individual for each listed location, and sample to be extracted. **(FOR ALL SAMPLES SUBMITTED A 4 oz. CONTAINER FOR GROSS ALPHA, BETA ANALYSIS IS REQUIRED. A TOTAL OF 2 SCREENING SAMPLES ARE REQUIRED FOR LOCATIONS #13, and #14).**

SMS will extract and submit a total of _____ soil samples representative of this project. Requested analysis are as follows:

Parameter	Container	VOLUME Required	Preservative	Maximum Holding Times
TCLP				
Total Metals	P,G	1 pint	none required	6 mos. (28 days for HG)
Total Semi-VOAs	G	1 pint	cool to 4°C	14 days
Total VOAs	G	3 - 4 oz.	cool to 4°C	14 days
Total Pest/Herb	G	1 pint	cool to 4°C	14 days
TRP				
Gross Alpha	P,G	1 - 4 oz.	none required	3 mos
Gross Beta	P,G	1 - 4 oz.	none required	3 mos.
$Radium^{226}$	P,G	1 - 4 oz.	none required	3 mos.
$Radium^{228}$	P,G	1 - 4 oz.	none required	3 mos
$Strontium^{90}$	P,G	1 - 4 oz.	none required	3 mos.
$Technetium^{99}$	P,G	1 - 4 oz.	none required	3 mos.
$Cesium^{137}$, (Gamma Spec)	P,G	1 - 4 oz.	none required	3 mos.
$Ruthenium^{106}$	P,G	1 - 4 oz.	none required	3 mos.
Plutonium, (Isotopic)	P,G	1 - 4 oz.	none required	3 mos.
$Neptunium^{237}$	P,G	1 - 4 oz.	none required	3 mos.
Thorium, Total	P,G	1 - 4 oz.	none required	3 mos.
Thorium, Isotopic	P,G	1 - 4 oz.	none required	3 mos.
Uranium, Total	P,G	1 - 4 oz.	none required	3 mos.
Uranium Isotopic	P,G	1 - 4 oz.	none required	3 mos.

The above listed requirements are applicable to all soil sample locations and are individual for each listed location, and sample to be extracted. **(FOR ALL SOIL SAMPLES SUBMITTED WHICH REQUIRE OFFSITE ANALYSIS A 4 oz. CONTAINER FOR GROSS ALPHA, BETA ANALYSIS IS REQUIRED. A TOTAL OF ____ SCREENING SAMPLES WILL BE REQUIRED FOR LOCATIONS #___, THRU #____).**

In accordance with internal EM/SMS QA/QC protocol, SMS will submit the following samples, Trip Blank Sample, Field Blank Sample, and Equipment Rinsate Samples on a frequency of ____ daily/weekly. All blank sample matrices will consist of deionized water in the appropriate containers, with Teflon Lined Closures. Volume requirements for the following blank samples are as follows:

Parameter	Container	VOLUME Required	Preservative	Maximum Holding Times
TCLP				
TCLP Metals	P,G	1 liter	none required	6 mos (28 days Hg)

Parameter	Container	VOLUME Required	Preservative	Maximum Holding Times
TCLP Semi-VOAs	G	1 gallon	cool to 4°C	14 days
TCLP VOAS	G	3 - 40 ml	cool to 4°C	14 days
TCLP Pest/Herb	G	1 gallon	cool to 4°c	14 days
TCLP				
Total Metals	P,G	1 liter	none required	6 mos. (28 days for HG)
Total Semi-VOAs	G	1 gallon	cool to 4°C	14 days
Total VOAs	G	3 - 40 ml	cool to 4°C	14 days
Total Pest/Herb	G	1 gallon	cool to 4°C	14 days
Full HSL				
Inorganics (METALS)	P,G	3 gallons	cool 4°C	Indefinite
Organics (Volatiles)	G	40 gm	cool 4°C	Indefinite
Organics (Semi-Volatiles	G	400 gm	cool 4°C	10 days until extraction/ 40 days after extraction
Pest/PCB	G	1 gallon	cool 4°C	5 days until extraction/ 40 days after extraction
TRP				
Gross Alpha	P,G	1 - 4 oz.	none required	3 mos
Gross Beta	P,G	1 - 4 oz.	none required	3 mos.
$Radium^{226}$	P,G	1 - 4 oz.	none required	3 mos.
$Radium^{228}$	P,G	1 - 4 oz.	none required	3 mos
$Strontium^{90}$	P,G	1 - 4 oz.	none required	3 mos.
$Technetium^{99}$	P,G	1 - 4 oz.	none required	3 mos.
$Cesium^{137}$, (Gamma Spec)	P,G	1 - 4 oz.	none required	3 mos.
$Ruthenium^{106}$	P,G	1 - 4 oz.	none required	3 mos.
Plutonium, (Isotopic)	P,G	1 - 4 oz.	none required	3 mos.
$Neptunium^{237}$	P,G	1 - 4 oz.	none required	3 mos.
Thorium, Total	P,G	1 - 4 oz.	none required	3 mos.
Thorium, Isotopic	P,G	1 - 4 oz.	none required	3 mos.
Uranium, Total	P,G	1 - 4 oz.	none required	3 mos.
Uranium Isotopic	P,G	1 - 4 oz.	none required	3 mos.

1.6 ANALYTICAL TEST METHODS

Analytical test methods based on SW-846 are as follows:

METALS: - SW-846 Methods 6010, 7060, and 7740

VOALITILES: - SW-846 Method 8240

SEMI VOALITILES: - SW-846 Method 8270

PESTICIDES: - SW-846 Method 8080

HERBICIDES: - SW-846 Method 8150

RADIOLOGICAL: - SW-846 Method

1.7 DEPARTMENT OF TRANSPORTATION (DOT) PACKAGING, MARKING/LABELING REQUIREMENTS

As specified in 49 CFR 173.421, the following criteria will be evaluated to determine the appropriate DOT packaging/marking/labeling requirements for all samples to be shipped offsite for the performance of requested analysis

1.7.1 If the package does not contain more than 15 grams of Uranium - 235, or the radiation level at any point of the external surface does not exceed 0.5 millirem per hour, then use the following :

1.7.2 PROPER SHIPPING NAME FOR LIQUIDS OR SOLIDS

Radioactive Material, limited quantity, n.o.s.
(Laboratory specimen for analyses)

1.7.3 HAZARD CLASS

Radioactive Material

1.7.4 IDENTIFICATION NUMBER

UN 2910

1.7.5 LABELING/MARKING

The word "Radioactive" shall be on each bottle.

Each container shall have, Radioactive Material, Limited Quantity, and Danger, Cargo Aircraft Only.

1.7.6 PACKAGING

The materials shall be packaged in strong, tight packages that will not leak any of the radioactive materials during conditions normally incident to transportation.

1.7.7 If the package contains more than 15 grams of Uranium - 235, or the radiation level at any point on the external surface of the package exceeds 0.5 millirem per hour use:

1.7.8 PROPER SHIPPING NAME FOR LIQUIDS AND SOLIDS

Radioactive material, LSA n.o.s.
(Laboratory specimen for analysis).

1.7.9 HAZARD CLASS

Radioactive Material

1.7.10 IDENTIFICATION NUMBER

UN 2912

1.7.11 LABELING/MARKING

Radioactive Yellow II or Radioactive Yellow III label (determined by radiation monitoring levels at a distance of one meter from the surface of the outer container) and Danger, Cargo Aircraft only.

1.7.12 PACKAGING

DOT 7A, Type A packaging must be used. The exterior of each package shall be marked "USA DOT 7A Type A" and "Radioactive".transportation.

ATTACHMENT IV

HEALTH AND SAFETY PLAN

ATTACHMENT V

SMS EXTRACTION METHODOLOGIES

EXTRACTION METHODOLOGY EM-EXM-90-001, "ENVIRONMENTAL MEDIA SAMPLING EXTRACTION METHODOLOGY FOR USING A STAINLESS STEEL AUGER AND A STAINLESS STEEL SCOOP"

EXTRACTION METHODOLOGY EM-EXM-90-005, "ENVIRONMENTAL MEDIA SAMPLING EXTRACTION METHODOLOGY FOR USING A MILWAUKEE ROTARY HAMMER AND A TUNGSTEN CARBIDE TIPPED CORING BIT"

EXTRACTION METHODOLOGY EM-EXM-91-013, "ENVIRONMENTAL MEDIA SAMPLING EXTRACTION METHODOLOGY FOR USING A STAINLESS STEEL SCOOP"

OPERATIONAL METHODOLOGY EM-OPM-91-015, "OPERATIONAL METHODOLOGY FOR USING A WINCO® MODEL HP4500H ELECTRICAL GENERATOR"

SMS-WRKPLN-REQ-91-104
REV - 0

TASK SPECIFIC HEALTH AND SAFETY PLAN

INSPECTION/SAMPLING PLANT 1 ORE SILOS COMPONENT PARTS

December 13, 1991

Prepared By:

Lawrence Love Jr.

Lawrence Love Jr., Technologist, Ext. 6727
Environmental Monitoring/Site Media Sampling

Concurrences:

_____
Radiological Safety

_____
Safety Engineering/Fire Services

_____
Industrial Hygiene

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1.0 DESCRIPTION OF THE PROJECT/MEDIA SAMPLING TASK AND JOB/TASK ANALYSIS

1.1 The work to be performed for the (SMS Sampling request #SMS-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos, involves a visual inspection/ sampling effort of the total Silos component systems (Process Feed and/or Withdrawal Flow Lines, Conveyor Systems, Valves, Pumps, Motors, Drumming Stations, External Tile Silos Surface Core, and the External Concrete Silos Surface Core) that make up the Plant 1 Ore Silos Complex.

1.2 The reason(s) for the (Inspection/Sampling of the Plant 1 Ore Silos Component Systems, is to ascertain samples of the enclosed residual materials. Finalized data will be utilized to comprehensively characterize the remaining materials as to its (chemical) hazardous/radiological constituency.

1.3 The work to be performed will take place in the follwoing areas: The Plant 1 Ore Silos are located in the western sector of the FEMP Complex, north of Second Street, and due east of A Street. All work pertinent to the inspection/sampling of the Plant 1 Ore Silos will be confined to a control/entrance/exit zone that will be established by FEMP Radiological Safety around the perimeter of the Plant 1 Ore Silos Complex.

1.4 The work to be performed will take place during the following period(s) of time: December 1991 through March 1992

1.5 The specific standard operating procedure(s), including special Environmental Media Sampling Procedures, that shall be used are: Site Media Sampling Work Plan #SMS-WRKPLN-REQ-91-104, Inspection/Sampling of Residual Materials, Plant 1 Ore Silos, Process Feed and/or Withdrawal Flow Lines, Conveyor Systems Valves, Pumps, Motors, Drumming Stations, External Tile Silo Surface Core, and the External Concrete Silo Surface Core, and in accordance with EM/SMS procedures and internal sample extraction methodologies. Copies of all SMS procedures and sample extraction methodologies are maintained by Environmental Monitoring/Site Media Sampling.

2.0 SITE HISTORY

2.1 Historical Overview of Buildings, Equipment, and Site Area

A wide variety of chemical and metallurgical process steps were utilized to support the production of uranium metal products. The initial mission of the facility was to produce uranium metal from

a wide variety of feed materials. The focus is now placed on waste management and environmental remediation and restoration. A detailed description is found in the FEMP Site Health and Safety Plan and in Section 4.0 of the Environmental Media Sampling Program Health and Safety Plan.

2.2 The buildings and/or areas (both on-site and off-site) which will be used/entered for the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems Project, is building site identification 1A, located to the north of the Silos Complex.

2.3 Pertinent historical aspects of the buildings/areas noted above that relate to health and safety considerations for the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems Project, are as follows: The primary function of the Plant 1 facility during FEMP production years was to obtain representative samples of the large quantities of incoming ore concentrates, and to provide for the storage of this material prior to the FEMP intended manufacturing processes. Other facilities in close proximity to the Plant 1 Ore Silos are building #67, #71, and #72 which have been used for the storage of uranium and thorium residues. Located directly to the south of the Plant 1 Ore Silos are several NFS storage tanks, site identification #2E.

3.0 PROJECT/TASK SPECIFIC HAZARD ASSESSMENT

3.1 All work to be performed for the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems Project) will be analyzed for safety and health hazards prior to the initiation of the work activity. The requirements and methods of the analysis of safety and health hazards are contained in the WEMCO Site Policies and Procedures (FEMP-2054), in the FEMP Site Health and Safety Plan and Project Specific Health and Safety Plans, in the Work Plans associated with the Environmental Media Sampling Program Projects/Tasks with project specific hazard assessments, and in associated manuals.

3.2 All Environmental Media Sampling personnel assigned to (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) shall review all associated Material Safety Data Sheets. All MSDS are maintained by FEMP Industrial Hygiene and can be reviewed upon request by SMS personnel.

3.3 Known and potential health and safety hazards specific to the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) Work Plan or Scope of Work which may be encountered by Environmental Media Sampling personnel must be identified and communicated to the project/Media Sampling task team members.

3.3.1 List and explain the following hazards that apply to the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project). If no hazard(s) exist in a category, write NA in the space provided.

Energized Equipment: NA

Overhead Utilities: NA

Underground Utilities: NA

Confined Spaces: NA

Radiation Hazards: "Grab samples of residual material that have previously been taken from inside the tile silos resulted in the following findings. The contact dose rates ranged from <0.5 to 7.5 mrem/hr. with the greatest reading being at the base of the northwest silo, Silo #1. At 3 ft. from the silos, the highest dose rate was 2 mrem/hr. from the southeast silo, Silo #5. The smear samples ranged from non-detectable to 12,101 dpm alpha /100cm^2 and to 4,574 dpm beta + gamma/100cm^2 on the floor underneath the northwest silo, Silo #1. The highest levels measured on the surfaces of the silos were 3,253 dpm alpha/100cm^2 and 1,002 dpm beta + gamma/100cm^2, found on Silo #1. The grab samples contained radium, thorium, and uranium".[1]

Chemical Hazards: "Asbestos, lead polychlorinated biphenyls, (PCBs), and crystalline silica were identified

[1]. "Plant 1 Silos of Operable Unit Number 3 Removal Action Work Plan", - Appendix B. , section 3.2 pg. 3-3, September 23, 1991, Parsons

during the industrial hygiene investigating survey conducted on March 27,1991. Possible asbestos containing materials are the tiles, tile mortar, electrical wire insulation, a storage shed (15 ft. x 20 ft. transite walls and roof), rain roof (20 ft. x 10 ft. transite panels), peaked rain roof (each) side 20 ft. by 20 ft. transite), rain roof (20 ft. x 40 ft. transite), and 100 ft. NFS asbestos insulated pipe. Later investigations showed no PCBs. Lead may exist in the paint on the steel support structures and in the contents of the residue in the silos. A list exhibiting primary hazard, exposure limits, and action levels for the chemicals and radionuclides that may be encountered during the Plant 1 Ore Silos Removal Action are listed on page IV - 12 and IV-13 of this Health and Safety Plan."[2]

Other Hazards: The inspection/sampling of locations that are freely suspended, such as piping, conveyor systems etc., will be accomplished from the bucket of a manlift. All operations to be performed from the bucket of the manlift will require that all personnel wear the appropriate PPE, to include hard hats, safety belts with associated lanyards attached to the bucket of the manlift at all times. The sampling of other associated systems located above the concrete and tile silos shall be accomplished in much the same manner in that all personnel and required equipment will be transported **(during transport all personnel will wear the appropriate PPE, to include hard hats, and safety belts with associated lanyards attached to the bucket of the manlift)** to the top of the individual silos via the manlift. At all times while atop the individual silos, all personnel will be required to wear the appropriate PPE, along with hard hats, safety belts, and lanyards attached to the structural steel. Access to other silos when at all possible will be accomplished through the utilization of the manlift. In those instances where transport via the manlift bucket is not possible, access to other silos will be via the structural steel catwalks. **Only those catwalks that are approved for use by FEMP Fire and Safety will be utilized.** When transit between the individual silos can be obtained via the catwalks SMS will employ the use of toeboards and railing to be supplied by FEMP Operations Maintenance, and to be inspected by FEMP Fire and Safety to insure their fitness for intended use.

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[2]. "Plant 1 Ore Silos of Operable Unit Number 3 Removal Action Work Plan", - Appendix B., section 3-3, pg. 3-5, 3-6, Parsons

3.3.1.1 The (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) will:

	YES	NO
Disturb Surface Soil/Vegetation/Produce	x	
Disturb Subsurface Soil	x	
Use Heavy Equipment	x	
Disturb Containerized Material		x
Require entry to a Confined Space		x
Involve Sampling in Surface Water		x
Involve Sampling of Lagoons/Waste Pits		x
Involve Sampling of Retention Basins		x

3.3.1.1 The (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) will:

	YES	NO
Use a Boat		x
Use a Vehicle	x	
Take Place in the FEMP Production or Process Area	x	
Involve exposure to Ionizing Radiation	x	
Require Special Training prior to work	x	
Routine Environmental Media Sampling		x
Soil Sampling in conjunction with approved SMS Sampling Plan and applicable procedures	x	
Other	x	

3.3.1.2 For every item above that is marked yes, a detailed explanation or reference to a source which describes the hazard and the action required to safe guard personnel from the hazard or potential hazard is required:

DISTURB SURFACE SOIL/VEGETATION/PRODUCE - Preliminary soil samples will be extracted to the south and west of the asphalt/concrete pad supporting the Plant 1 Ore Silos. This sampling will be conducted preliminarily to obtain data

and to establish a baseline as to the presence or extent of radiological/chemical contaminants prior to the implementation of the Silos Removal/Demolition Action. **Surface soil samples 0" to 6", and 1 ft. soil samples, 12" to 24"** will be obtained and submitted for analyses as outlined in the SMS Work Plan #SMS-WRKPLN-REQ-91-104. Soil sampling will continue during the actual removal/demolition of the Plant 1 Ore Silos to determine if radiological/hazardous contaminants that may be generated during the removal/demolition phase are being maintained by the physical and administrative controls to be instituted by the Project Engineer are sufficient to contain said material.

DISTURB SUBSURFACE SURFACE SOIL - **same as above**

USE HEAVY EQUIPMENT - Transport of SMS personnel and equipment to locations freely suspended or to inspection/sampling locations above the individual Silos, such as piping, conveying systems, etc., shall be accomplished through the use of a manlift. This apparatus will be operated by FEMP Operations Maintenance, and inspected by FEMP Fire and Safety prior to and during the inspection/sampling effort involving the Plant 1 Ore Silos.

USE A VEHICLE - A vehicle will be required by SMS in order to transport personnel, and required equipment to the project worksite. All SMS vehicles used for the transport of SMS personnel, equipment, sample containers, etc., at all times after the initial unloading will only park in clearly defined parking areas. If parking areas are not clearly defined FEMP Fire and Safety will establish an area were as the parking of vehicles can be safely accommodated.

TAKE PLACE IN THE FEMP PRODUCTION OR PROCESS AREA - The Plant 1 Ore Silos are located in the northweste sector of the FEMP Production area, north of 2nd Street and due east of A Street.

INVOLVE EXPOSURE TO IONIZING RADIATION - The component systems of the Plant 1 Ore Silos contain the residual materials of radiological constituents that have been processed through the Concrete and Tile Silos during the many years of uranium metal production such as Uranium, and Uranium daughter products, Thorium, and Thorium daughter products, etc. There will be some exposure to low levels of ionizing radiations. A Radiation Work Permit (RWP) will be issued prior to any sample extraction in support of this project. Continued support during this sampling effort is

expected from radiological safety. All activities are to be monitored including the entry into closed piping, motors, valves, pumps, and conveying systems to confirm that initial radiological stay times, and PPE are adequate. All PPE will be upgraded or downgraded based on the guidance of the RWP and the assigned Radiological Safety Technician. Only SMS and FEMP Operations Maintenance personnel who have reviewed the respective RWPs, and who have indicated said review by signature in the appropriate place will be allowed to perform activities relative to this project.

REQUIRE SPECIAL TRAINING PRIOR TO WORK - Prior to the start of the requested sample extractions the workplan/sampling plan relative to the Sampling of the Plant 1 Ore Silos Component Systems, along with this project specific Health and Safety Plan will be reviewed by all SMS, FEMP Operations Maintenance, and IRS&T personnel assigned to this project. In addition to the above, all permits issued (eg. Radiation Work Permit, FEMP Safety Work Permit) will also be reviewed. All employees will confirm that they have reviewed all permits by signing in the appropriate area of all permits applicable to this project. A copy of all permits issued in regards to worker safety and health will be posted at all times at the entrance to the control/entrance/exit zone. **Any SMS personnel as well as personnel from FEMP Operations Maintenance, and IRS&T who does not indicate a review of the applicable permits as in section 3.4, is prohibited from performing any work in relationship to the Inspection/Sampling of the Plant 1 Ore Silos Component Systems.**

SOIL SAMPLING IN CONJUNCTION WITH APPROVED EM/SMS SAMPLING PLANS AND APPLICABLE PROCEDURES AND SAMPLE EXTRACTION METHODOLOGIES - All work/sampling to be performed relative to the inspection/sampling of the Plant 1 Ore Silos shall be accomplished in accordance with SMS Workplan #SMS-WRKPLN-REQ-91-104, internal procedure EM-CS-001, Environmental Monitoring On Site Media Sampling, and internal SMS sample extraction methodologies, referenced in same workplan. A copy of the project workplan, project health and safety plan, along with all SMS procedures and extraction methodologies to be employed in this project will be maintained at the project site.

3.4 Summary of Industrial Hygiene and Radiological Safety review of the work site(s) for safety and health hazards: These permits will be issued prior to the beginning of requested sampling in support of this project . All issued permits will be updated as

needed (to be determined by Radiological Safety & Industrial Hygiene.

3.5 The following permits are required (attach copies of the permit(s) at the end of this section):

3.5.1 FEMP Safety Work Permit - Industrial Hygiene is to be contacted and a FEMP Safety Work Permit is to be updated or issued based on full time coverage and updated surveys to be performed by the IH technicians. (FEMP Safety Work Permit, see attachment A)

3.5.2 FEMP Radiation Work Permit - Radiological Safety is expected to provide full time coverage and to update or reissue RWPs based on changing conditions due to the exposure of enclosed residual materials inside opened component systems of the Plant 1 Ore Silos. (FEMP Radiation Work Permit, see attachment B)

4.0 MONITORING

4.1 Goals

It is the policy of the FEMP to maintain radiation exposures, and exposures to toxic substances and combustible gases As Low As Reasonably Achievable (ALARA). As appropriate, air monitoring shall be performed to ensure that contaminant concentrations in the breathing zone do not exceed the concentrations as specified by established exposure levels. The pertinent radiological action levels are listed in Section 11.3 of the Environmental Media Sampling Health and Safety Plan.

The air/working environment of Environmental Media Sampling Program personnel shall be monitored when appropriate in compliance with the radiation protection standards and to estimate the dose equivalents received from external and internal sources of radiation.

4.2 Air Monitoring, Frequency, Action Levels, and Equipment

4.2.1 Air Monitoring

4.2.1.1 Air Monitoring for the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) is required.

YES	NO
X	

4.2.1.2 If **YES**, provide the following information:

The air/environment at the work site(s) is required to be monitored for the following contaminants or deficiencies:

	YES	NO
Airborne Radioactive Materials	X	
Organic Vapors	X	
Combustible Gases		X
Oxygen Concentration		X
Other (Specify)		X

4.2.2 Frequency, Action Levels, and Equipment

For all areas marked "yes" above, provide detailed information about the monitoring in terms of specific type or kind of monitored contaminant; frequency of monitoring; action levels; type of equipment to be used; and individual(s) or section(s) who will be performing the monitoring:

Airborne Radioactivity - During the removal of any radiologically contaminated materials (residual materials shall be determined radiologically contaminated by employing the use of wipes to determine the amount of loose material that cam be removed per 100cm^2. In order to determine real time radiological activity, the use of hand held real time beta + gamma scintillation detectors will be employed. Initially, General Area (GA) air sampling shall be initiated prior to the actual implementation of the inspection/sampling of the Plant 1 Ore Silos. Initial data will generate a baseline as to the extent of existing radiological atmospheric conditions. GA air sampling will continue during the initiation of the inspection/sampling effort involving the specified component parts of the Plant 1 Ore Silos, Concrete & Tile, to determine if SMS activities relative to this project are giving rise to the suspension of (radiological) contaminants in the work area. In the event that the atmospheric suspension of radiological contaminants are detected all containments such as iso glove bags, HEPA Vacuums, etc., shall be evaluated and other alternative containment will be instituted. All SMS, and FEMP Operations Maintenance Personnel, and other FEMP personnel who perform work inside the control/entrance/exit area will be fitted with personal Breathing Zone Air

Samplers (BZ), and the proper respiratory protection as outlined in section **5.1 PERSONAL PROTECTIVE EQUIPMENT (PPE) CHECKLIST**. The radiological safety technician shall maintain the issuance of BZ air sampling and maintain an accurate assessment of each individuals airborne exposure. The location of the GA perimeter samplers shall be determined by the radiological safety technician. The ultimate responsibility for radiological air sampling required for this project shall be the sole responsibility of the radiological safety technician and will be downgraded or upgraded based on generated data.

CHEMICAL HAZARDS - Direct reading monitoring devices, eg. Photo Ionization Detectors (PID) shall be used to determine the presence of any gases or vapors at the time of the issuance of the work permit and at any time during the inspection/sampling of the Plant 1 Ore Silos Component Systems as specified in SMS-WRKPLN-REQ-91-104, and thereafter as advised by the assigned Industrial Hygiene Technician.

MEASUREMENT	LEVEL	ACTION
Alpha Probe	500 cpm	Note 1
Beta/Gamma	5000 cpm	Note 1
External Radiation	>2 Mr/hr	HP Review
Radon & WL Monitor (CAM)	>30 pci/L or >0.075 WL	Withdraw
	>1500 pci/L or 7.5 WL	Withdraw
Airborne Radioactivity (long lived) (Note 3)	25% DAC	Note 1 & 4
Th-230	7.5 E-11 uCi/ml	Withdraw, Note 5
Ra-226	7.5 E-10 uCi/ml	Withdraw, Note 5
U-238	5.0 E-10 uCi/mL	Withdraw, Note 5
HNu or OVM Meter	Detection to 10 ppm (Note 2)	Note 1
	10 - 25 ppm	Supplied Air Respirator (SAR)
Asbestos	See Note 6	
CGI	Lower Explosive 2 % of the LEL or greater (Note 7)	Withdraw

ACTION LEVELS FOR MEASURING AIRBORNE RADIONUCLIDES

Radionu-clide	1 DAC (uCi/mL)	10%DAC (uCi/mL)	25%DAC (uCi/mL)	Withdraw (uCi/mL)
Th-230	3 E-12	3 E-13	7.5 E-13	7.5 E-11
Ra-226	3 E-12	3 E-12	7.5 E-12	7.5 E-10
U-238	2 E-11	2 E-12	5 E-12	5.0 E-10
U-235	2 E-11	2 E-12	5 E-12	5.0 E-10
U-234	2 E-11	2 E-12	5 E-12	5.0 E-10

NOTES

1. Full - face air purifying respirators with combination HEPA filter and organic vapor, acid gas, fume cartridges.
2. 1 ppm above background
3. See Job Analysis for job specifics.
4. Derived Air Concentrations (DAC) for radionuclide of interest.
5. Alarm set points (for monitors) determined by assuming a respiratory protection factor of 50 and airborne concentrations necessary to give 0.5 DAC inside the facepiece. Concentrations above the alarm will require withdrawal of employees and initiation of **ALARA** procedures.
6. If asbestos insulation is disturbed, Level C protection is required.

4.3 Internal Radiation Hazard

Internal dose evaluation programs (including the routine bioassay program) shall be adequate to demonstrate compliance with radiation protection standards.

Any circumstance which could result in an intake of radioactive materials by inhalation, ingestion, or absorption shall immediately be reported to a supervisor. The supervisor shall immediately report the circumstances of possible radiative material intake to IRS&T Radiological Safety Section for evaluation. The involved employee (s) shall report to the Urinalysis Sampling Station at the end of the shift, to complete and Investigation Report (IR Form FEMP-ESH-1458), and submit and incident urine sample. The involved employee(s) shall also report at the start of their next shift to submit a follow up urine sample. Employees are responsible for complying with additional requirements as specified by the Radiological Safety Section

4.4 External Radiation Hazard

Personnel dosimetry programs shall be adequate to demonstrate compliance with the radiation protection standards and will be processed by Dosimetry Subsection personnel. Personnel dosimeters shall be routinely calibrated and maintained.

4.4.1 Dosimeters are to be worn for SMS-WRKPLN-REQ-91-104 (Inspection/Sampling of the Plant 1 Ore Silos Component Systems project)

YES	NO
X	

4.4.2 If **YES**, specify where dosimeters will be worn.

Dosimeters are to be worn at all times by Site Media Sampling personnel while performing work in the process area in conjunction with this project. Dosimeters are to be worn in the upper chest area of process clothing. Any condition that would warrant an upgrade to extremity dosimeters are Self Reading Pocket Dosimeters (SRPD) will be determined by Radiological Safety on the project specific Radiation Work Permit (RWP).

4.5 PHYSICAL HAZARD SURVEY

The SMS field crew lead and FEMP Operations Maintenance Supervisor, along with a representative of FEMP Fire and Safety shall review the work site for safety hazards. Some of the hazards to consider in the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) is the stability of the structural steel catwalks for use as a walk way from one silo to another. FEMP Fire and Safety will instruct SMS and FEMP Operations Maintenance Personnel of those catwalks that can or can not be utilized for the transport of personnel and equipment between individual silos. Based only on the recommendations of FEMP Fire and Safety SMS and FEMP Operations Maintenance personnel will utilize pick boards with railings on those catwalks that have been determined to be fit for use.

Transport of personnel and equipment between the individual silos as needed will be accomplished in most cases by the utilization of a manlift.

5.0 PERSONAL PROTECTIVE EQUIPMENT

Environmental Media Sampling activities shall be performed only in areas designated as Level B, C, or D. Protective clothing is tailored to the specific task being performed in order to provide the maximum protection against the suspected or known hazard. Level requirements are determined by IRS&T based on factors like the type of work performed, exposure potential, amount of time spent working in project area, etc. Comments and requirements are incorporated into the Radiation Work Permit (RWP).

5.1 PERSONAL PROTECTIVE EQUIPMENT (PPE) CHECKLIST

A. Place a check mark next to the appropriate PPE Level for the sampling/monitoring activity(ies) to be performed.

Level B: x **Level C**: _____ **Level D**: _____

B. All employees in the task exclusion area(s) designated for the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) shall wear the following PPE while performing the required task(s).

EQUIPMENT	YES	NO
Body Protection		
Process Coveralls	x	
Tyvek or Saranex Coveralls	x	
Chemical Resistant Suit		x
Safety Harness	x	
Hand Protection		
Inner Gloves	x	
Rubber/Nitrile Gloves	x	
Leather Palm Gloves	x	
Feet Protection		
Safety Shoes	x	
Rubber Boots		x
Latex Booties		x
Head and Eye Protection		
Hard Hat	x	
Safety Glasses	x	
Face Shield		x
Goggles		x
Hearing Protection		x

Respiratory Protection	x	
SCBA		
Supplied Air	x	
Full Face Air Purifying Cartridges (Specify) COMBINATION HEPA	x	
Half Mask Air Purifying Cartridges (Specify)_____		
Heat Protection	x	

* to be determined by IRS&T Prior to the initiation of the requested project sampling on the FEMP Safety Work Permit.

Cold Weather Conditions

Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to exposed body surfaces, or result in profound generalized cooling, causing death. Areas of the body which have high surface area-to-volume ration such as fingers, toes, and ears, are the most susceptible. Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

Frost Nip or Incipient Frostbite - characterized by suddenly blanching or whitening of the skin.

Superficial Frostbite - the skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.

Deep Frostbite - tissues are cold, pale, and solid; extremely serious injury.

* SMS, and FEMP Operations Maintenance Personnel will alternate personnel and limit individual stay times in periods of extreme cold. Longer breaks are to be utilized as well as suitable clothing for protection under these conditions. IRS&T recommendations for work to be performed in extreme cold will be adhered to at all times by SMS, and FEMP Operations personnel. Adequate clothing will be addressed in the respective FEMP Safety Work Permit.

Other _____ _x_ ___

High Winds - in extreme cold conditions high winds or can create wind chill factors that are directly contributory to lowering temperatures. In the event that high winds create wind chill factors that could be dangerous to personnel, Industrial Hygiene will be contacted and all recommendations stated in the FEMP Safety Work Permit will be adhered to at all times.

A manlift will be utilized for the transport of SMS personnel and equipment to the top of, and in between the individual Silos, where access can not be obtained via the suspended metal catwalks. SMS and FEMP Operations Maintenance personnel will not operate or transport equipment or personnel in the manlift during periods of wind speeds equal to or greater than 20 mph.

6.0 SITE ACCESS

6.1 Access

Access to the FEMP is limited by WEMCO Security. All site personnel and visitors must register and be issued a pass to enter the DOE property.

Environmental Media Sampling Program work covers on-site areas only. Restricted areas in which Environmental Media Sampling Program personnel may require access will be organized into specific zones to further reduce the potential spread of chemical or radiological contamination.

7.0 EXPOSURE SYMPTOMS

7.1 Ionizing Radiation

7.1.1 Low Level Ionizing Radiation

Exposure to low levels of ionizing radiation may be encountered on the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project)

YES	NO
_x_	___

Exposure to low levels of radioactivity do not produce acute exposure symptoms. Such exposures may cause delayed effects

such as cancer. Since biological effects from radiation exposures are cumulative, exposures are to be kept As Low As Reasonably Achievable.

7.1.2 High Level Ionizing Radiation

Exposure to high levels of ionizing radiation may be encountered on the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project)

YES	NO
___	_X_

If **YES**, explain why and describe the exposure symptoms below:

_____
_____
_____
_____
_____
_____

7.2 Chemical Contaminants

Environmental Media Sampling Program personnel should be aware of the potentials of exposures to chemical contaminants and the associated symptoms which are listed on the Material Safety Data Sheets (MSDS) located throughout the work area(s). MSDSs for the FEMP are attached to the FEMP Site Health and Safety Plan. All MSDSs applicable to the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) are on file in the Industrial Hygiene department. The Industrial Hygiene Department can be contacted at ext. 8922 or 6207.

List all known or potential chemical contaminants related to (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) below. If there are none, write "N/A".

An Industrial Hygiene field survey conducted 3/27/91 identified the following hazardous materials as being present, and they are:

* Asbestos - (tiles, tile mortar, electrical wire insulation, transite walls and roofs)

* Lead - lead based paint covering the structural steel supports

7.3 Other Factors Which Could Cause Exposure

Other factors like heat, cold, and ultraviolet light, could cause harmful effects to Environmental Media Sampling team members.

	YES	NO
7.3.1 There are other factors which must be considered in the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project)	___	x

7.3.2 If YES, explain in detail what those factors are and describe the associated exposure symptoms below:

_____
_____
_____
_____
_____
_____

8.0 WORK SITE ENTRY PROCEDURES

8.1 Exclusion Zone

An exclusion zone is a previously established zone of high potential hazard due to physical or chemical dangers. Access to an exclusion zone is restricted to employees who are required to enter in order to perform their job functions. An exclusion zone will be marked with cones or other easily recognizable devices. Exclusion zones may be expanded if airborne hazards are detected. All areas requiring the use of respiratory protection are included in exclusion zones.

All personnel entering the exclusion zone(s) shall be trained and certified to perform their assigned task as defined by 29 CFR 1910.120.

Entrance to an exclusion zone(s) shall be controlled by the supervisor in charge at the work site. This may or may not be an Environmental Media Sampling Program member.

8.1.1 The following exclusion(s) zones has (have) been established for the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) - to be established by Radiological Safety.

8.1.2 The following break area(s) has (have) been established for the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project):

_____
_____
_____

8.2 Medical Surveillance

In accordance with 29 CFR 1910.120 OSHA requirements, all WEMCO and WEMCO subcontractor personnel are required to participate in a medical surveillance program which includes:

- A baseline medical examination
- Annual medical examination
- Medical examinations may be required after exposures
- WEMCO respirator fit (clearance) for respirator users

8.3 Training Requirements

All WEMCO and WEMCO subcontractor personnel assigned to the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) shall, as a minimum, meet the training requirements as outlined in Section 9.1 of the Environmental Media Sampling Program Health and Safety Plan.

8.4 Safety Meetings

Safety meetings are necessary to familiarize the team with specific hazards. A safety meeting, shall be conducted prior to the Project/Task start; weekly during work periods; and when there is a change in work activities or implementation of safety plan amendments.

8.4.1 Safety Documentation

All safety meetings will be documented on form FEMP-IRS&T-470, "Minutes of Safety Meeting" (Attachment D). Meetings will cover the applicable subjects as outlined in Section 9.2 of the Environmental Monitoring Program Health and Safety Plan. (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) meetings are to be attached at the end of this section.

8.4.2 Special Considerations and Checks

Special considerations and equipment or knowledge checks sometimes must be discussed at safety meetings. For example, alternate communications signal instructions, establishment of the "buddy system", or respirator check out and fit tests prior to use must be performed.

The following special consideration(s)/check(s) will be discussed at safety meetings: **NA**

9.0 DECONTAMINATION

9.1 Decontamination of Personnel and Equipment

When working in exclusion zones, equipment for decontamination of radiological or chemical hazards shall be available in the area surrounding the exclusion zone as determined necessary by IRS&T and/or Radiation Safety.

9.1.1 As necessary, Environmental Media Sampling personnel are required to decontaminate themselves and then confirm the effectiveness of the decontamination per IRS&T SP-P-35-017, Procedure for Personnel Decontamination. The effectiveness will be determined by frisking with a hand-held radiation monitor or with a hand and foot monitor as provided by IRS&T.

* All SMS technicians have been trained in accordance with EPA Course 165.5 Hazardous Materials Incident Response Operations and meet the requirements for U. S. Occupational Safety and Health Administrations 29 CFR 1910.120 If in the event that self decontamination fells, all SMS technicians are to contact the Radiological Safety Technicians' at ext. 6889 or radio 355 on FEMP frequency 2.

9.1.2 The following procedure(s) are used for decontamination of equipment: EM-CS-001 "ENVIRONMENTAL MONITORING ON - SITE MEDIA SAMPLING".

9.2 Location and Verification of Nearest Water

9.2.1 Location of the nearest water for decontamination and eye washing is located:

_____

_____

_____

9.2.2 Operability of water source and eye wash station was verified (prior to start of work) on 12/ /91 by Lawrence Love .

10.0 WASTES

10.1 Derived Wastes

Derived wastes are wastes generated in the performance of Environmental Media Sampling Program activities. The wastes for the (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project) Sampling Task) are as follows:

	YES	NO
Disposable PPE Specify _____	x	
Decontamination solutions/rinsate	x	
Excess materials such as soil or water Specify _____		x
Other Specify paper, plastic absorbent cloths	x	

10.2 Disposal Collection Location

All potentially contaminated waste materials resulting from site project monitoring activities shall be collected and placed in drums or other containers.

10.2.1 Protective Clothing

Protective clothing shall be placed in plastic bags and disposed of as compatible, potentially contaminated waste through Waste Management.

10.2.2 Decontamination Solutions

Decontamination solutions will be drummed in a 55 gallon bung type drum and submitted to a 90 day holding area to await finalized sample data, so that suspect material can be classified to its appropriate waste streams. However if suspect material is determined to be non hazardous waste, it may be drained to a "general sump" provided the sump and discharge are monitored and controlled in accordance with applicable regulatory and site requirements.

10.2.3 Other

Specify other items that require disposal. If there are none, write "N/A" in the space provided. NA

_____

_____

10.3 Final Disposal

Following the analysis of the wastes resulting from Environmental Media Sampling Program activities, WEMCO will be responsible for proper transport, shipment and/or disposal of these wastes.

11.0 CONTINGENCY PLANS

11.1 Injuries

According to the FEMP Site Health and Safety Plan in the event of injuries, site personnel will try to reduce or eliminate the consequences whenever possible. The process of determining what is appropriate requires that each situation be evaluated on a case-by-case basis.

11.1.1 Reporting Injuries

All injuries shall be reported immediately to WEMCO Medical for treatment/evaluation. The employee's supervisor shall be notified as soon as possible after reporting to WEMCO Medical.

11.1.2 Types of Injuries

The following emergencies and their responses are addressed in Section 18.0 of the Environmental Media Sampling Program Health and Safety Plan.

- Minor Injuries
- Serious Injuries
- Injuries Complicated by Contamination
- Fire, Explosion, or Medical Emergency
- Chemical/Radiological Releases
- Chemical Splashes to the Eyes and Skin

11.2 Additional Information

Additional Information such as Hospitals, Emergency Telephone Numbers, and Routes to the Hospitals are found in Section 18.0 of the Environmental Media Sampling Program Health and Safety Plan.

11.3 Offsite Contingency Specific Information and Check List

Offsite Contingency specific information and check list are addressed in Section 18.0 of the Environmental Media Sampling Program Health and Safety Plan.

12.0 APPROVAL AND COMPLIANCE STATEMENT

According to the FEMP Site Health and Safety Plan, an approval and compliance statement is required.

The following page is the Approval and Compliance Statement format which shall be used for the Environmental Media Sampling Program Project and any Project/Task Specific Health and Safety Plan. For each Environmental Media Sampling Program Project, an Approval and Compliance statement shall be completed and kept with the Environmental Media Sampling Program Health and Safety Plan and a copy of it shall be kept with this Health and Safety Plan.

APPROVAL AND COMPLIANCE STATEMENT

The Environmental Media Sampling Program Task Specific Health and Safety Plan was developed for the use of WEMCO employees and subcontractors. Its use is intended for Environmental Media Sampling Program activities who work on-site and off-site on WEMCO projects.

Project/Media Sampling Task: (SMS-WRKPLN-REQ-91-104, Inspection/Sampling of the Plant 1 Ore Silos Component Systems project)

The undersigned persons have read and understood the Environmental Media Sampling Health and Safety Program Plan and agree to follow its provisions (See Note 1):

Name (printed)	Signature	Date

The following individuals are not obligated, by contract, to follow these safety policies, but have read and understood the Environmental Media Sampling Health and Safety Program Plan:

Name (printed)	Signature	Date

Note 1: Compliance with the provisions of this Environmental Media Sampling Program Health and Safety Plan may be audited through announced or unannounced site visits. Be sure that you are implementing the provisions of the safety plan and documenting the reasons for field actions/changes when they are necessary. Site visits may be performed:

_____ By WEMCO

_____ By DOE

_____ By OSHAEM-CD-xxxx

SMS-WRKPLN-REQ-91-104
REV - 0

TASK SPECIFIC HEALTH AND SAFETY PLAN

INSPECTION/SAMPLING PLANT 1 ORE SILOS COMPONENT SYSTEMS

ATTACHMENT A FEMP SAFETY WORK PERMIT

16452 2563

FMPC WORK PERMIT

This work permit is to be completed in accordance with FMPC-516.

Work Permit Number: _____

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

A. MAINTENANCE REQUEST NO	B. STARTING DATE & TIME DATE: TIME:	C. EXPIRATION DATE & TIME DATE: TIME:
D. EXACT LOCATION	E. EQUIPMENT	

F. EXACT DESCRIPTION OF WORK TO BE CONDUCTED

G. EMPLOYEE(S) ASSIGNED TO JOB. BADGE NO.

H. SUPERVISOR(S)/WMCO PROJECT ENGINEER

SECTION B - TYPES OF PERMITS REQUIRED *(Checked by supervisor-in-charge)*

- ☐ ASBESTOS (Copy to be attched)
- ☐ RADIATION (Copy to be attached)
- ☐ CHEMICAL/HAZARDOUS MATERIAL
- ☐ CONFINED SPACE ENTRY
- ☐ OPEN FLAME/WELDING

SECTION C - GENERAL PRECAUTIONS

ITEM	YES	NO
1. Equipment cleaned and purged		
2. Nuclear Safety checks completed		
3. Lock & Tag Procedures required and followed		
4. Water in space has been collected and sampled		
5. Complete isolation of process lines to space has been completed		
6. All mechanical equipment to the space have been tagged, disconnected and/or blocked		
7. Electrical isolation complete for Lock & Tag Procedure		
8. All lines within space have been cleaned and purged		

Equipment is safe and ready for work **(FACILITY OWNER'S SIGNATURE)**:

BADGE NO.: DATE: TIME:

SECTION D - PERSONAL PROTECTIVE EQUIPMENT REQUIRED

EQUIPMENT	YES	NO	SPECIFY
Face Shield			
Hearing Protection			
Eye Protection			
Acid Splash Suit			
Gloves			
Respiratory Protection *(consult with IH rep.)*			
Flame Retardent Clothing			
Disposable Hood, Coveralls and Shoe Covers worn over Company-Issued Clothing			

OTHER PROTECTION REQUIREMENTS:

SUPERVISOR-IN-CHARGE SIGNATURE: BADGE NO.: DATE:

SECTION E - CHEMICAL/HAZARDOUS MATERIAL PERMIT

TYPE OF MATERIAL: NAME OF MATERIAL(S):

PRECAUTION TAKEN	YES	NO	DNA
1. Equipment and/or lines have been drained, flushed, purged, or neutralized			
2. Valves have been closed and locked (when feasible) and danger tagged			
3. Area isolated			
4. Safety shower is operable close to worksite			
5. Special clothing or other protective equipment required			

6. Special precautions:

FACILITY OWNER'S SIGNATURE: BADGE NO.: DATE:

NO.	DISTRIBUTION OF COPIES
1	POST AT JOB
2	SUPERVISOR-IN-CHARGE
3	IH&S *(RECORD COPY)*

SECTION F - CONFINED SPACE ENTRY PERMIT *(Valid for no more than 12 hours)*

ATMOSPHERIC GAS TESTING RESULTS

OXYGEN CONTENT		COMBUSTIBLE GAS		TOXICITY	
TIME	READINGS	TIME	READINGS	TIME	READINGS

PRECAUTIONS TAKEN/NEEDED	YES	NO	DNA
1. Forced ventilation required			
2. Work requires staging or ladder			
3. Ground Fault Interupting protection required			
4. Adequate/proper illumination required			
5. Standby notified what action to take			
6. Safety line and harness required			
7. Nonsparking tools required			
8. Periodic gas testing required			

STANDBY-WORKER COMMUNICATION:

SPECIAL INSTRUCTIONS:

TYPE OF CONFINED SPACE: ☐ CLASS A ☐ CLASS B ☐ CLASS C

IH&S REPRESENTATIVE SIGNATURE: BADGE NO.:

PERMIT ISSUED DATE: TIME:

SECTION G - OPEN FLAME/WELDING PERMIT

PRECAUTIONS VERIFIED *(within 35 feet of work)*	YES	NO	DNA
1. Combustibles, magnesium and uranium have been removed, covered or shielded.			
2. Flammable liquids have been removed or isolated.			
3. Wall and floor openings are covered or protected.			
4. A flame retardent tarp has been suspended underneath work.			
5. A combustible gas check has been made.			
6. (work on walls/ceilings) All combustibles have been removed from opposite sides.			
7. A Fire Watch will be required and will remain posted during breaks and for 30 minutes after work is completed.			
8. Fire Watch is supplied with an extinguisher and know-how to activate the nearest fire alarm.			
9. Fire & Safety Inspector shall be present during the burning operation.			
10. Fire & Safety Inspector shall be present to monitor when the system is initially opened.			

COMBUSTIBLE GAS TESTING RESULTS:

EQUIPMENT/AREA CHECKED: 413

SPECIAL INSTRUCTIONS/PRECAUTIONS:

FIRE & SAFETY INSPECTOR SIGNATURE: BADGE NO.:

PERMIT ISSUED DATE: TIME:

SECTION H - WORK AUTHORIZATION REVIEWED AND FOUND ACCEPTABLE FOR USE

SUPERVISOR-IN-CHARGE SIGNATURE: BADGE NO.: DATE:

SMS-WRKPLN-REQ-91-104
REV - 0

TASK SPECIFIC HEALTH AND SAFETY PLAN

INSPECTION/SAMPLING PLANT 1 ORE SILOS COMPONENT SYSTEMS

ATTACHMENT B FEMP RADIATION WORK PERMIT

2563

RADIATION WORK PERMIT

No.: _____

SECTION I: *TO BE COMPLETED BY THE JOB SUPERVISOR*

(1) JOB LOCATION:	(2) ISSUE DATE:	(3) SHIFT:	(4) EXPIRATION DATE:*
BUILDING: DATE:			

JOB DESCRIPTION:

GRID LOCATION: | REQUESTING SUPERVISOR'S SIGNATURE:

* *Maximum 7 days from issuance.*

SECTION II: *TO BE COMPLETED BY ERMT*

(5) RADIATION LOCATION	INSTRUMENT READING (6) OPEN WINDOW (OW) mRad/hr	(7) CLOSED WINDOW (CW) mRad/hr	EXTREMETIES (8) OPEN WINDOW mRad/hr
1.			
2.			
3.			
4.			

(9) STAY TIME CALCULATIONS		
BETA+GAMMA DOSE RATE	SKIN	EXTREMITY
CORRECTION FACTOR (OW-CW)•F − CW = mrem/hr		
	WHOLE BODY	TIME LIMIT
CP Ion Chamber F = 3 mrem/hr		

INSTRUMENT TYPE	SERIAL NUMBER	CALIBRATION DATE

(10) AMBIENT BACKGROUND β/γ mRad/hr

(11) RADIOLOGICAL SURVEY FORM ATTACHED ☐ YES ☐ NO

(12) SURVEY MAP ATTACHED ☐ YES ☐ NO

(13) MONITORING REQUIREMENTS

- ☐ At start of job
- ☐ Intermittent
- ☐ Continuous
- ☐ On completion of job
- ☐ Not required
- ☐ Personnel survey at completion
- ☐ Air monitoring

(14) DOSIMETRY REQUIREMENTS**

- ☐ Direct reading dosimeter
- ☐ Wrist dosimeter
- ☐ Ring dosimeter
- ☐ Other _____

** *TLD required for all radiation work*

(15) PROTECTIVE EQUIPMENT

WHOLE BODY
- ☐ None
- ☐ Cloth coveralls
- ☐ Disposable coveralls
- ☐ Lab coat
- ☐ Tape openings
- ☐ Other _____

BREATHING REQUIREMENTS
- ☐ Half face respirator
- ☐ Full face respirator
- ☐ Airline respirator
- ☐ Airline hood
- ☐ Combination canister
- ☐ SCBA
- ☐ Other _____

HEAD
- ☐ Safety glasses
- ☐ Goggles
- ☐ Face shield
- ☐ Cap
- ☐ Hood
- ☐ Hard hat

HANDS (GLOVES)
- ☐ Cotton
- ☐ Rubberized
- ☐ Surgical
- ☐ Gauntlet
- ☐ Other _____

SHIELDING
- ☐ Rubber Mat
- ☐ Aluminum
- ☐ Plywood
- ☐ Other _____

FEET AND LEGS
- ☐ Latex shoe covers
- ☐ Disposable shoe covers
- ☐ Safety shoes
- ☐ Safety boots
- ☐ Other _____

(16) SPECIAL HEALTH PHYSICS INSTRUCTIONS AND REQUIREMENTS

RST SIGNATURE: DATE: TIME ISSUED:

SECTION III: *APPROVAL SIGNATURES (as required)*

	DISTRIBUTION OF COPIES
1	Posting
2	RS Supervisor
3	Radiological Engineer

SECTION IV: *TO BE COMPLETED BY EMPLOYEES* ***

(17) NAME(S) OF EMPLOYEE(S) *(SIGNATURE)*	(18) BADGE NUMBER	(19) RESPIRATOR FIT TEST	(20) RADIATION WORKER TRAINING
1.		☐ YES ☐ NO	☐ YES ☐ NO
2.		☐ YES ☐ NO	☐ YES ☐ NO
3.		☐ YES ☐ NO	☐ YES ☐ NO
4.		☐ YES ☐ NO	☐ YES ☐ NO
5.		☐ YES ☐ NO	☐ YES ☐ NO
6.		☐ YES ☐ NO	☐ YES ☐ NO

415

*** *Signature indicates employee has read this RWP.*

APC-IRS&T-1372 (REV. 4/23/90)

SMS-WRKPLN-REQ-91-104
REV - 0

TASK SPECIFIC HEALTH AND SAFETY PLAN

INSPECTION/SAMPLING PLANT 1 ORE SILOS COMPONENT SYSTEMS

ATTACHMENT C INVESTIGATION REPORT (IR FORM FEMP-ESH-1458)

SMS-WRKPLN-REQ-91-104
REV - 0

TASK SPECIFIC HEALTH AND SAFETY PLAN

INSPECTION/SAMPLING PLANT 1 ORE SILOS COMPONENT SYSTEMS

ATTACHMENT D SAFETY MEETING FORM IRS&T 470

EM-EXM-90-001
REV - 2
REVISIONS SHADED

ENVIRONMENTAL MEDIA SAMPLING EXTRACTION METHODOLOGY

FOR USING A STAINLESS STEEL AUGER AND A STAINLESS STEEL SCOOP

PREPARED BY Lawrence Love Jr. (TECHNOLOGIST) DATE Sept. 28, 1990

REVISED BY Doug Henderson (ENGINEER) DATE Feb. 26, 1991

REVIEWED BY [illegible] (SR. TECHNICIAN) DATE 2/26/91

APPROVED BY B D Vandeel (MANAGER) DATE 3/21/91

1.0 PURPOSE

To establish a methodology for extracting samples of specified media at the Feed Materials Production Center (FMPC) using a stainless steel auger and a stainless steel scoop.

2.0 DEFINITIONS

2.1 EMS - Environmental Media Sampling.

2.2 EMT - Environmental Monitoring Technician.

2.3 Sample Location - An area designated as a location to obtain a sample of specified media, measuring approximately 12 inches by 12 inches. Each sample location may have varying sample depths according to project requirements.

2.4 Sample Point - An area designated within a sample location where a sample of specified media will be extracted.

2.5 Surface Sample - Shall be that amount of specified media collected from a depth of 0 inches to a depth of 6 inches at any sample location. It shall be described in any written reference as depth 0.

2.6 One Foot Sample - Shall be that amount of specified media collected from an area contiguous to the surface material sample extraction point at a sample location. It will be collected from a depth of 0" to a depth of 12" and shall be described in any written reference as depth 1.

2.7 Two Foot Sample - Shall be that amount of specified media collected from a depth of 12" to a depth of 24" at the same sample point as the one foot sample (see 2.6). It shall be described in any written reference as depth 2.

2.8 Three Foot Sample - Shall be that amount of specified media collected from a depth of 24" to a depth of 36" at the same sample point as the two foot sample (see 2.7). It shall be described in any written reference as depth 3.

3.0 METHODOLOGY

3.1 In accordance with site policy and procedure FMPC-720 the EMT Senior Technician and cognizant project engineer shall locate and perform a walkdown and visual inspection of equipment to be used and the area to be sampled.

3.2 The cognizant project engineer will notify Industrial Hygiene, Safety, and Radiological Safety so that appropriate surveys may be performed involving the area to be sampled.

3.3 Prior to sampling the EMT Senior Technician and EMTs will perform a walkdown and visual inspection of the area to be sampled.

3.4 Before any sample extraction is performed the EMT shall prepare the area to be sampled in accordance with procedure EM-CS-001.

3.5 The EMT as a minimum is required to wear company issued clothing. Additional personal protective equipment needed will be addressed in required permits and in accordance with the specific Media Characterization and Surveillance Health and Safety Plan.

3.6 When the sample location(s) have been identified as per procedure EM-CS-001, the EMT, wearing two sets of clean disposable latex gloves under cotton or leather palm work gloves, shall clear the sample location of all vegetation by hand pulling of the plants to expose the media surface.

3.7 Using a stainless steel scoop with a 6 inch blade, the EMT, after donning two sets of clean latex gloves, will mix the media in-situ from a depth of 0 inches to a depth of 6 inches, in an area sufficiently great so as to provide the sample volume as specified in the sampling plan.

3.8 The EMT will then extract a composite of the sample, using the stainless steel scoop, and place in the appropriate size and type of container. Containers used will be those specified in SW-846, Required Containers, Preservation Techniques, and Holding Times. Polyvinyl bags with wire closures will not be used. The container shall be closed, labeled, and sealed as per procedure EM-CS-001. Any remaining media material shall be placed in a plastic bag until all sample points have been extracted.

3.9 When the surface sample has been extracted, the EMT shall move to a location contiguous to the surface sample extraction. At this point the EMT, wearing two sets of clean disposable latex gloves, will advance a clean stainless steel auger into the media to a depth of 12" (one foot). All media collected at this depth shall be deposited in a clean stainless steel pan.

3.10 The EMT will then extract a composite of the sample, using the stainless steel scoop, and place in the appropriate size and type of container. Containers used will be those specified in SW-846, Required Containers, Preservation Techniques, and Holding Times. Polyvinyl bags with wire closures will not be used. The container shall be closed, labeled, and sealed as per procedure EM-CS-001. The material collected at this depth will represent the one foot depth sample. Any remaining media material shall be placed in a plastic bag until all sample points have been extracted.

3.11 At the same sample point as the one foot extraction, the EMT, wearing two sets of clean disposable latex gloves, will advance a clean stainless steel auger into the media to a depth of 24" (two feet). All media collected at this depth shall be deposited in a clean stainless steel pan.

3.12 The EMT will then extract a composite of the sample, using the stainless steel scoop, and place in the appropriate size and type of container. Containers used will be those specified in SW-846, Required Containers, Preservation Techniques, and Holding Times. Polyvinyl bags with wire closures will not be used. The container shall be closed, labeled, and sealed as per procedure EM-CS-001. The material collected at this depth will represent the two foot depth sample. Any remaining media material shall be placed in a plastic bag until all sample points have been extracted.

3.13 At the same sample point as the two foot extraction, the EMT, wearing two sets of clean disposable latex gloves, will advance a clean stainless steel auger into the media to a depth of 36" (three feet). All media collected at this depth shall be deposited in a clean stainless steel pan.

3.14 The EMT will then extract a composite of the sample, using the stainless steel scoop, and place in the appropriate size and type of container. Containers used will be those specified in SW-846, Required Containers, Preservation Techniques, and Holding Times. Polyvinyl bags with wire closures will not be used. The container shall be closed, labeled, and sealed as per procedure EM-CS-001. The material collected at this depth will represent the three foot depth sample. Any remaining media material shall be placed in a plastic bag until all sample points have been extracted.

3.15 The EMT shall record sample information in the permanent field logbook and on the chain of custody form as each sample point is completed.

3.16 Any hole or depression remaining as a result of sampling activities shall be filled with bentonite to a level slightly above the surrounding level to promote surface water runoff, then saturated with deionized water so as to seal the hole as much as is practical.

3.17 All equipment used shall be decontaminated as per procedure **EM-CS-001**.

3.18 Repeat steps 3.6 through 3.18 until all required samples have been extracted.

3.19 As per the **Environmental Media Characterization Program Plan**, EMTs shall contain all used water and detergent solution in poly drums at each sampling location. At the end of each sampling project or day, whichever occurs first, EMTs shall transfer this solution to a 55 gallon bung-type drum, labeled as deionized water, detergent, and residual material, at a specified satellite accumulation area. Concurrently, all remaining residual media, plastic, paper, and other solid wastes will be transferred to a 55 gallon ring-type drum, which will be labeled as solid waste residual material, at the same satellite accumulation area.

3.20 Environmental Monitoring QA/QC sampling requirements will be those specified as per procedure **EM-CS-001**. Exceptions may be specified by the cognizant project engineer as specific to his/her project.

3.21 If samples are to be submitted for analysis at this time, complete analytical request form as specified in **EM-CS-001**, assuring that all completed analysis data is sent to the cognizant project engineer, Waste Technology, and the EM Technologist responsible for retaining files as per the specified project.

3.22 Submit sample(s) to site analytical for analysis if requested at this time or archive for future analysis.

EM-EXM-90-005
REV - 2
REVISIONS SHADED

ENVIRONMENTAL MEDIA SAMPLING EXTRACTION METHODOLOGY FOR USING A MILWAUKEE® ROTARY HAMMER AND A TUNGSTEN CARBIDE TIPPED CORING BIT

PREPARED BY Lawrence Love Jr. (TECHNOLOGIST) DATE 10/18/90

REVISED BY Greg Henderson (ENGINEER) DATE March 4, 1991

REVIEWED BY [illegible] (SR. TECHNICIAN) DATE 3/14/91

APPROVED BY B D Vandeel (MANAGER) DATE 3/21/91

1.0 PURPOSE

To establish a methodology for extracting samples of asphalt or concrete at the Feed Materials Production Center (FMPC) using a rotary hammer drill equipped with a tungsten carbide tipped coring bit.

2.0 DEFINITIONS

2.1 EMS - Environmental Media Sampling.

2.2 EMT - Environmental Monitoring Technician.

2.3 EM - Environmental Monitoring.

2.4 Sample Location - An area designated as a location to obtain a sample of concrete or asphalt, as per the specific project sampling plan.

3.0 METHODOLOGY

3.1 In accordance with site policy and procedure FMPC-720 the EMT Senior Technician and cognizant project engineer shall locate and perform a walkdown and visual inspection of the area to be sampled.

3.2 The cognizant project engineer will notify Industrial Hygiene, Safety, and Radiological Safety so that appropriate surveys may be performed involving the area to be sampled.

3.3 Prior to sampling the EMT Senior Technician and EMTs will perform a walkdown and visual inspection of the area to be sampled.

3.4 Before any sample extraction is performed the EMT shall prepare the area to be sampled in accordance with procedure EM-CS-001.

3.5 The EMT as a minimum is required to wear company issued clothing. Additional personal protective equipment needed will be addressed in required permits and in accordance with the specific Media Characterization and Surveillance Health and Safety Plan.

3.6 Clean plastic sheeting shall be placed immediately adjacent to the sample location. The EMT should exercise care at all times while walking on plastic sheeting to reduce the possibility of injury resulting from a fall due to inherent reduced traction of the plastic material. Plastic sheeting will provide protection to other media where the possibility of cross contamination from media being sampled exists, and will allow for easier clean-up.

3.7 At the designated sample location, the EMT will locate a power source of the correct voltage and of sufficient capacity to supply power to the Milwaukee® hammer drill and to the Nilfisk® vacuum.

3.8 If a power source is not available, a generator, located in the EMT field sampling vehicle, will be utilized.

3.9 Extension power cords, if utilized, must meet manufacturers recommendations as to wire size per specified length and must be approved by WMCO - FMPC Fire & Safety Department.

3.10 A portable negative pressure dust containment unit utilizing a Nilfisk® vacuum as a suction device shall be placed at the sample location.

3.11 The EMT, while wearing two sets of clean, disposable latex gloves under clean cotton or leather palm work gloves, shall insert the center guide pin into the coring bit and shall then insert the shaft of the coring bit into the bottom of the dust containment unit and through the hole in the plexiglass cover. The EMT shall then place this assembly over the sample location.

3.12 The EMT shall then attach the Milwaukee® rotary hammer to the shaft of the coring bit and shall attach the hose of the Nilfisk® vacuum unit to the air outlet of the dust containment unit. The EMT shall insure that the power cords of the Milwaukee® rotary hammer and the Nilfisk® vacuum unit are connected to their appropriate power supplies.

3.13 After switching on the Nilfisk® vacuum unit and insuring that it is operating, the EMT shall advance the coring bit into the sample location to a depth of 1/8". The EMT shall then remove the center guide pin and continue advancing the coring bit until a core can be obtained, of sufficient weight as per the project sampling plan. In the event that the coring bit advancement is halted before a sufficient amount of sample has been collected, the EMT shall move the coring bit to a location contiguous to the original hole per each sample location and continue advancing the coring bit. Coring shall continue, with periodic halting to remove the core, until sufficient sample weight is obtained, and/or the concrete or asphalt is breached.

3.14 Concrete or asphalt cores shall be prepared for packaging, as per laboratory requirements, on the clean plastic sheeting, as per 3.5 above, and placed in the appropriate volume of glass jar, as per the project sampling plan. The jar will be closed, sealed, and labeled as per procedure EM-CS-001. Any remaining media material shall be placed in a plastic bag until all sample points have been extracted.

3.15 The EMT shall record sample information in the permanent field logbook and on the Analysis Request/Custody Record form as each sample point is completed.

3.16 After all samples have been extracted from a sample location, any hole(s) remaining shall be filled with bentonite to within four inches of the surface. The bentonite shall be saturated with distilled water. When the bentonite is fully expanded, the uppermost four inches of the hole shall be filled with patching concrete and protected from damage until cured.

3.17 All equipment used shall be decontaminated as per procedure EM-CS-001 prior to proceeding to the next sampling location.

3.18 Repeat steps 3.6 through 3.17 until all required samples have been extracted.

3.19 As per the Environmental Media Characterization Program Plan, EMTs shall contain all used water and detergent solution in poly drums at each sampling location. At the end of each sampling project or day, whichever occurs first, EMTs shall transfer this solution to a 55 gallon bung-type drum, labeled as deionized water, detergent, and residual material, at a specified satellite accumulation area. Concurrently, all remaining residual media, plastic, paper, and other solid wastes will be transferred to a 55 gallon ring-type drum, which will be labeled as solid waste residual material, at the same satellite accumulation area.

3.20 Environmental Monitoring QA/QC sampling requirements will be those specified as per procedure EM-CS-001. Exceptions may be specified by the cognizant project engineer as specific to his/her project.

3.21 If samples are to be submitted for analysis at this time, complete Analysis Request/Custody Record form as specified in EM-CS-001, assuring that all completed analysis data is sent to the cognizant project engineer, Waste Technology, and the EM Technologist responsible for retaining files as per the specified project.

3.22 Submit sample(s) to site analytical for analysis if requested at this time or archive for future analysis.

EM-EXM-91-013
REV - 1
REVISIONS SHADED

ENVIRONMENTAL MEDIA SAMPLING EXTRACTION METHODOLOGY

FOR USING A STAINLESS STEEL SCOOP

REVISED BY Greg Henderson (ENGINEER/TECHNOLOGIST) DATE April 3, 1991

REVIEWED BY Lawrence Love Jr. (ENGINEER/TECHNOLOGIST) DATE April 3, 1991

REVIEWED BY [illegible] (SR. TECHNICIAN) DATE 4/3/91

APPROVED BY Arthur E. Murphy (MANAGER) DATE 4/29/91

1.0 PURPOSE

To establish a methodology for extracting samples of solid media at the Feed Materials Production Center (FMPC) using a stainless steel scoop.

2.0 DEFINITIONS

2.1 EMS - Environmental Media Sampling.

2.2 EMT - Environmental Monitoring Technician.

2.3 Sample Location - An area designated as a location to obtain a sample of specified media, measuring approximately 12 inches by 12 inches. Each sample location may have varying sample surface areas and depths according to project requirements.

2.4 Sample Point - An area designated within a sample location where a sample of specified media will be extracted.

2.5 Surface Sample - Shall be that amount of specified media collected from a depth of 0 inches to a depth of 6 inches at any sample location. It shall be described in any written reference as depth 0.

3.0 METHODOLOGY

3.1 In accordance with site policy and procedure FMPC-720 the EMT Senior Technician and cognizant project engineer shall locate and perform a walkdown and visual inspection of equipment to be used and the area to be sampled.

3.2 The cognizant project engineer will notify Industrial Hygiene, Safety, and Radiological Safety so that appropriate surveys may be performed involving the area or equipment to be sampled.

3.3 Prior to sampling the EM Senior Technician and EMTs will perform a walkdown and visual inspection of the area or equipment to be sampled.

3.4 Before any sample extraction is performed the EMT shall prepare the area to be sampled in accordance with procedure EM-CS-001.

3.5 When the sample location(s) have been identified as per procedure EM-CS-001, the EMT, wearing two sets of clean disposable latex gloves under cotton or leather palm work gloves, shall clear the sample location of all vegetation, if present and applicable, by hand pulling of the plants to expose the media surface.

3.6 Using a stainless steel scoop with a 6 inch blade, the EMT, after donning two sets of clean disposable latex gloves, will mix the specified media in-situ from a depth of 0 inches to a depth of 6 inches, if applicable, in an area sufficiently great so as to provide the sample volume as specified in the sampling plan.

3.7 The EMT will then extract a composite of the sample, using the stainless steel scoop, and place in the appropriate size and type of container. Containers used will be those specified in SW-846, Required Containers, Preservation Techniques, and Holding Times. Polyvinyl bags with wire closures will not be used. The container shall be closed, labelled, and sealed as per procedure EM-CS-001. Any remaining media material shall be placed in a plastic bag until all sample points have been extracted.

3.8 The EMT shall record sample information in the permanent field logbook and on the chain of custody form as each sample point is completed.

3.9 Any hole or depression remaining as a result of soil sampling activities shall be filled with bentonite to a level slightly above the surrounding level to promote surface water runoff, then saturated with deionized water so as to seal the hole as much as is practical.

3.10 All equipment used shall be decontaminated as per procedure **EM-CS-001**.

3.11 Repeat steps 3.5 through 3.10 until all required samples have been extracted.

3.12 As per the **Environmental Media Characterization Program Plan**, EMTs shall contain all used water and detergent solution in poly drums at each sampling location. At the end of each sampling project or day, whichever occurs first, EMTs shall transfer this solution to a 55 gallon bung-type drum, labeled as deionized water, detergent, and residual material, at a specified satellite accumulation area. Concurrently, all remaining residual media, plastic, paper, and other solid wastes will be transferred to a 55 gallon ring-type drum, which will be labeled as solid waste residual material, at the same satellite accumulation area.

3.13 Environmental Monitoring QA/QC sampling requirements will be those specified as per procedure **EM-CS-001**. Exceptions may be specified by the cognizant project engineer as specific to his/her project.

3.14 If samples are to be submitted for analysis at this time, complete analytical request form as specified in **EM-CS-001**, assuring that all completed analysis data is sent to the cognizant project engineer, Waste Technology, and the EM Technologist responsible for retaining files as per the specified project.

3.15 Submit sample(s) to site analytical for analysis if requested at this time or archive for future analysis.

EM-EXM-91-015
REV - 1

OPERATIONAL METHODOLOGY

FOR USING A WINCO® MODEL HP4500H ELECTRICAL GENERATOR

PREPARED BY: Greg Henderson (ENGINEER/TECHNOLOGIST) DATE: April 9, 1991

REVIEWED BY: Lawrence Love Jr. (ENGINEER/TECHNOLOGIST) DATE: April 26, 1991

REVIEWED BY: [illegible] (SR. TECHNICIAN) DATE: 4/25/91

APPROVED BY: Arthur E Murphy (MANAGER) DATE: 4/29/91

1.0 PURPOSE

To establish a methodology for the use and maintenance of the Winco® Model HP4500H electrical generator at the Feed Materials Production Center (FMPC).

2.0 DEFINITIONS

2.1 EMT - Environmental Monitoring Technician

3.0 GENERAL

3.1 All EMTs and other personnel who will use the generator will read the owners manual and this methodology. Signature on the last page of this methodology indicates compliance with this item.

3.2 The generator will be used inside of a vehicle with no occupants or outside of a vehicle while the generator is on pavement or solid ground. When operated in an enclosed vehicle, the generator shall be established such that the muffler is at the edge of the vehicle, at an open door, pointing outward (this will reduce the risk of hot metal exhaust particles from coming in contact with combustible items within the vehicle or small windblown items from getting near the hot exhaust system). The generator unit must have a minimum of six inches of all around clearance between it and other materials to provide for proper cooling.

3.3 Care should be taken when working near an operating generator or one which has been recently operated to avoid burns resulting from contact between hot engine and generator parts, including the engine muffler and crankcase, the generator casing, and other parts, and bare skin.

3.4 Extension cords and fuel storage containers, when used, must be approved by the WMCO Safety and Fire Services Section of the Industrial, Radiological Safety, and Training Department.

3.5 EMTs working within a ten (10) foot radius of this generator will wear hearing protection when the generator is operating.

4.0 OPERATION

4.1 The EMTs shall check and fill to full all fluids before each time the generator engine is to be started.

4.1.1 Gasoline will be added to the generator engine fuel tank outside of the conveying vehicle only. Make sure engine is cool.

4.1.2 Storage of gasoline shall only be in FM or UL listed safety containers. These shall be labeled as to contents.

4.2 Use fresh unleaded regular gasoline and 10W-40 weight oil, grade SF, SE, SD, or SE only. Wipe up any spilled fluids immediately. Dispose of any soiled wipers as per the EM Characterization Program Plan, on file in the Environmental Monitoring section.

4.3 Visually check the generator unit for loose parts; if found, take generator unit to FMPC Operations, Maintenance Section for adjustment.

4.4 Turn on the fuel supply (Fig.1). If the engine is cold, close the choke lever (Fig.2). If the engine is warm, leave choke open. Move throttle lever slightly to the left (Fig.3).

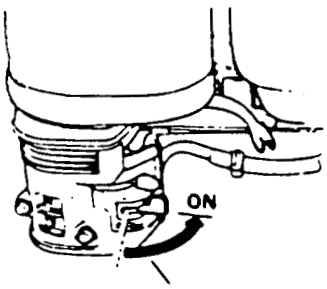

Fig.1

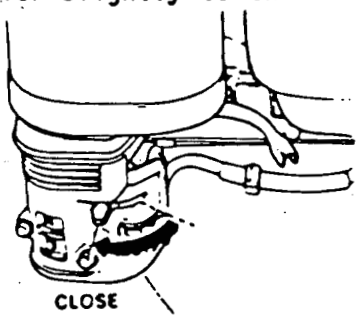

Fig.2

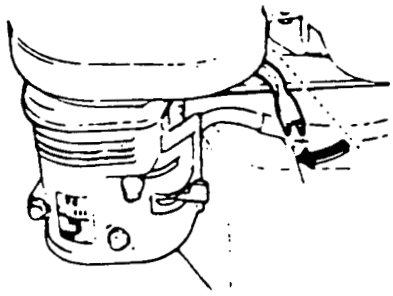

Fig.3

4.5 Move ON-OFF switch to the ON position (FIG.4). Grasp starter grip and pull slowly until starter engages, then pull cord rapidly to overcome compression, prevent kickback, and start the engine (Fig.5). Repeat 4.5 until engine starts.

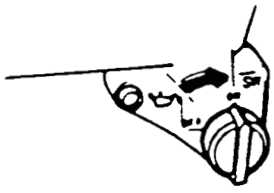

Fig.4

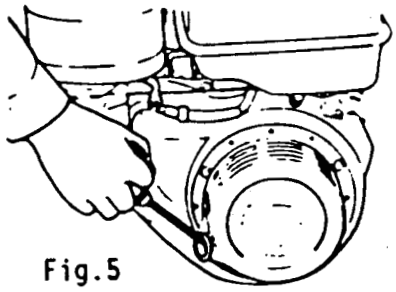

Fig.5

4.6 When the engine starts, open the choke gradually until the engine runs smoothly, if the choke was used (Fig.6).

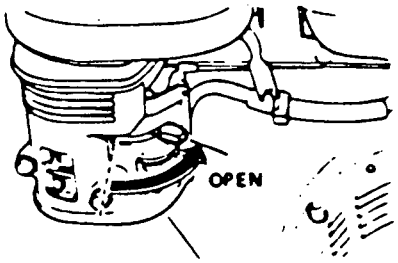

Fig.6

4.7 Move Electronic Conserver switch (Fig.7) to AUTO. Position throttle lever completely to the left (Fig.8).

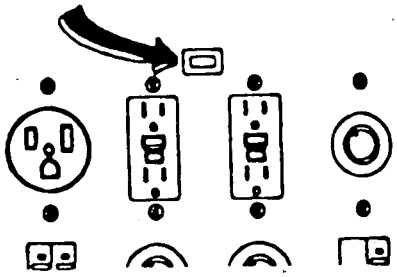

Fig.7

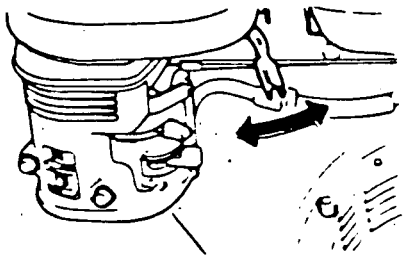

Fig.8

4.8 Plug electric tool to be used into the generator outlet and switch on. With tool running, press TEST button on outlet (Fig.9). Tool should stop running. If tool continues to run, shut down generator engine and take generator unit to FMPC Operations, Maintenance Section for repair. If tool stops running when TEST button is pushed, push RESET button on outlet and commence electric tool usage.

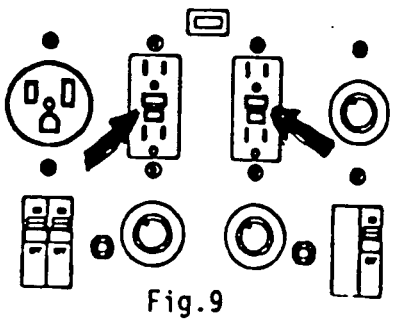

Fig.9

4.9 4.1 through 4.8 shall be followed each time the generator engine is started.

4.10 The generator engine is equipped with a low oil level shutdown system. In the event that the engine crankcase oil level falls below a level sufficient to properly lubricate engine internal parts, the engine will shut down. Attempting to start the engine in this condition will cause a light on the engine shroud near the recoil starter (Fig.10) to blink on and off. Adding the proper type of engine oil to the full mark in the engine oil filler opening will disable the low engine oil level shutdown system, turn off the blinking indicator light, and allow the engine to start.

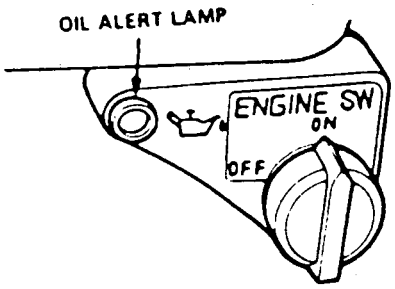

Fig.10

4.11 When finished using generator, move the throttle lever completely to the right (Fig.11), turn the engine switch to the OFF position (Fig.12), and turn the fuel valve to the OFF position (Fig.13)

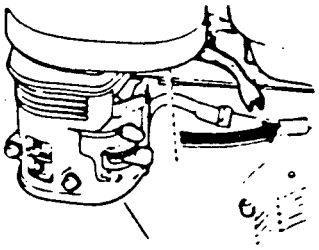

Fig.11

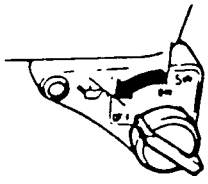

Fig.12

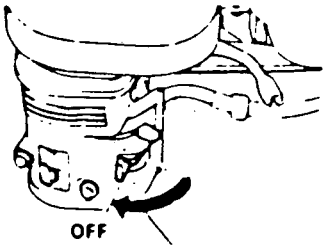

Fig.13

4.12 Unplug and store all tools and extension cords.

5.0 MAINTENANCE

5.1 All maintenance on the generator unit will be performed by FMPC Operations Department, Maintenance Section. Timely performance of maintenance is the responsibility of the Senior Technician or his/her designee.

5.2 The following maintenance intervals will be observed:

5.2.1 Engine oil - change after the initial 5 hours of use, then every 25 hours thereafter.

5.2.2 Air Cleaner Element - clean every 25 hours of use; replace after every 100 hours of use or annually, whichever comes first.

5.2.3 Spark Plug - clean and reset gap after every 100 hours of use or annually, whichever comes first. Replace when cleaning spark plug and resetting gap fails to restore smooth operation.

5.3.4 Engine Blower Housing - remove annually and clean chaff and dirt from engine cooling fins and flywheel.

5.2.5 Engine Muffler Spark Arrestor - remove every 50 hours for cleaning and examination. Replace if damaged.