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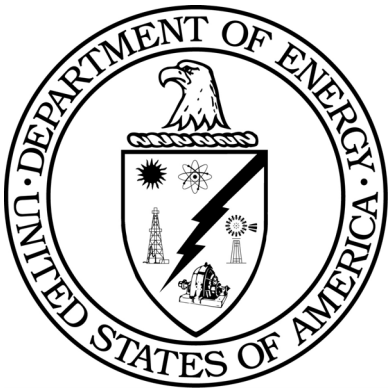
Primary Document

Removal Action Work Plan
C-746-A East End Smelter Decommissioning at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky



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Removal Action Work Plan
C-746-A East End Smelter Decommissioning at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

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Prepared for the
U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
PADUCAH REMEDIATION SERVICES, LLC
managing the
Environmental Remediation Activities at the
Paducah Gaseous Diffusion Plant
under contract DE-AC30-06EW05001

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ACRONYMS

ACM	asbestos-containing material
AM	Action Memorandum
ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
EES	East End Smelter
FFA	Federal Facility Agreement
HASP	Health and Safety Plan
ISMS	Integrated Safety Management System
KDEP	Kentucky Department for Environmental Protection
LLW	low-level waste
NTCRA	non-time-critical removal action
PCB	polychlorinated biphenyl
PGDP	Paducah Gaseous Diffusion Plant
RCRA	Resource Conservation and Recovery Act
RAWP	Removal Action Work Plan
SWMU	solid waste management unit
TBC	to be considered
WAC	Waste Acceptance Criteria

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EXECUTIVE SUMMARY

This Removal Action Work Plan (RAWP) describes the decommissioning (structural demolition) of the C-746-A East End Smelter (EES) at the Paducah Gaseous Diffusion Plant (PGDP) near Paducah, Kentucky. The primary emphasis of this RAWP is to provide details regarding project management, execution, and regulatory compliance measures related to the removal action.

The work will be performed as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) non-time-critical removal action (NTCRA) as part of the decontamination and decommissioning of the EES. This particular removal action will include demolition of the building structure to the slab, as well as the removal of nonprocess systems. The following documents have been prepared and approved for the removal action covered in this RAWP:

- *Engineering Evaluation/Cost Analysis for the C-340 Metals Reduction Plant Complex and the C-746-A East End Smelter at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0131&D2 (EE/CA) (DOE 2010a); and

- *Action Memorandum for the C-340 Metals Reduction Plant Complex and the C-746-A East End Smelter Non-Time-Critical Removal Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0290&D1 (AM) (DOE 2010b).

The C-746-A East End Smelter is undergoing deactivation under U.S. Department of Energy (DOE's) Atomic Energy Act authority, using accelerated funding from the American Recovery and Reinvestment Act. The project is being conducted in accordance with applicable DOE, state, and federal regulations. The deactivation will be followed by the decommissioning outlined in this document.

During the deactivation activities, all accessible interior asbestos-containing materials will be removed and chemical- and/or radionuclide-containing systems (e.g., process piping, equipment) will be emptied of residual material to the extent practicable. Additionally, certain wastes such as polychlorinated biphenyls (PCBs), capacitors, mercury switches, or manometers, etc., will have been removed. The building surfaces and remaining infrastructure that are designated to be removed during structural demolition (i.e., floors, walls, residual piping, and equipment) will be vacuumed and sealed to the extent practicable to contain and minimize airborne releases during the demolition process.

The CERCLA NTCRA decommissioning activities included in this RAWP will involve the structural demolition of the EES facility and the removal of nonprocess systems. Activities addressed by this RAWP include the structural demolition of the C-746-A EES and removal of certain low-hazard infrastructure (e.g., empty water, air, and nitrogen piping), and residual waste material. This removal action meets the following removal action objectives agreed upon among DOE, the U.S. Environmental Protection Agency (EPA), and the Kentucky Department for Environmental Protection (KDEP), as defined in the AM:

- Reduce the potential exposure to on-site personnel from hazardous substances due to the structural deterioration of these facilities; and

- Reduce risks of releases to the environment and exposure to future industrial workers that may result from uncontrolled releases of hazardous substances, including radiological contamination, from these facilities.

This removal action supports the long-term remediation of the PGDP. Demolishing the structure will remove

a source of a potential release to the environment thereby reducing the risk that would be posed by the structure were it to be left standing. Demolition also will satisfy the substantive Resource Conservation and Recovery Act closure requirements for any areas where hazardous waste is discovered during deactivation, as summarized in DOE's letter "American Recovery and Reinvestment Act Projects—Regulatory Process for Resource Conservation and Recovery Act Reporting and Closure of Areas Containing Newly Discovered Hazardous Waste," of October 6, 2009 (DOE 2009a), which was approved by Kentucky on October 20, 2009 (KDEP 2009a).

The major radiological contaminants of concern as documented in the EE/CA and AM, are uranium and the associated daughter products. Other materials that may be present at the EES include asbestos-containing materials; PCBs; beryllium; selenium, and heavy metals, such as lead, chromium, mercury, and cadmium.

Specific activities that will be performed during the decommissioning activities include characterization; demolition; segregation; packaging; and transportation and disposition of demolition debris, piping, and small quantities of hazardous materials. The project also will entail leaving the groundlevel slab, pits, and foundations in a protective state. The slab and underlying soil will be addressed as described within the AM.

Demolition debris generated from this removal action will be treated, if necessary, and disposed of at an approved on-site or off-site facility with possible reuse/recycle of equipment from the EES in accordance with state, EPA, and DOE policies and applicable or relevant and appropriate requirements.

The DOE's prime remediation services contractor will perform the work described in this RAWP, using subcontractors as necessary. The project will be implemented in accordance with Integrated Safety Management System practices and principles, including worker involvement. The Demolition Plan, the Demolition Removal Action Verification Plan, and the Health and Safety Plan are included as appendices to the RAWP.

1. INTRODUCTION AND PURPOSE

This Removal Action Work Plan (RAWP) addresses the structural demolition of the C-746-A East End Smelter (EES) as a non-time-critical removal action (NTCRA). The U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the Kentucky Department for Environmental Protection (KDEP) have agreed to address decommissioning activities under the existing Federal Facility Agreement (FFA) (EPA 1998) and in accordance with the joint EPA and DOE policy statement with respect to decommissioning of DOE facilities (DOE and EPA 1995). The regulatory approach for this project was approved by EPA by letter dated July 1, 2009 (EPA 2009), and by KDEP by letter dated September 25, 2009 (KDEP 2009b).

Deactivation activities including removal of the hazardous materials located within the facility, as well as the infrastructure that may contain such material, was initiated under DOE's Atomic Energy Act authority and is presently ongoing.

The approach in this removal action anticipates that some infrastructure will be left in place following deactivation to be decommissioned with the facility structure. After the deactivation is completed, it is anticipated that all accessible interior asbestos-containing materials (ACM) will have been removed in accordance with applicable regulations and DOE policy. Chemical and/or radionuclide containing systems (e.g., process piping) will have been emptied of residual material to the extent practicable. It is anticipated that beryllium contaminated components will be removed during deactivation activities.

Certain wastes, such as polychlorinated biphenyl (PCB) capacitors, mercury switches, manometers, etc., will have been removed. The building surfaces and remaining infrastructure that will be removed during structural demolition (i.e., floors, walls, residual piping, and equipment) will have been vacuumed and sealed to the extent practicable to contain and minimize airborne releases during the demolition process.

The structure and nonhazardous process systems that remain following the deactivation of the EES are expected to contain low-level waste (LLW), PCB bulk product waste, and/or ACM. Small quantities of hazardous substances, such as paint chips or vacuum dust, also may be generated during building demolition. These small quantities are not expected to make the demolition debris waste stream Resource Conservation and Recovery Act (RCRA)-hazardous waste.

Demolishing the EES structure will remove a source of a potential release to the environment, thereby reducing the risk that would be posed by the structure were it left standing. This removal action meets the removal action objectives defined in Section 2.2 and supports the long-term remediation of the Paducah Gaseous Diffusion Plant (PGDP).

This RAWP defines the demolition of the building structure to the slab, and removal of certain low-hazard infrastructure (e.g., empty water, air, and nitrogen piping, etc.) and residual waste material. The activities addressed by this RAWP include the characterization; structural demolition; segregation; on-site or off-site treatment (if necessary); packaging; disposal; transportation; disposition of demolition debris, piping, and small quantities of hazardous materials; and possible reuse/recycle of reusable equipment from the EES.

1.1 PURPOSE OF THE REMOVAL ACTION WORK PLAN

The purpose of this RAWP is to provide details on how the NTCRA will be executed in accordance with the Engineering Evaluation/Cost Analysis (EE/CA) and Action Memorandum (AM). The EE/CA describes the evaluation of alternatives that could be used to address the potential threats posed to human health and the environment from the release or potential release of hazardous substances from the EES. The AM documents the decision to proceed with structural demolition of the EES as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) NTCRA.

1.2 SCOPE OF THE REMOVAL ACTION WORK PLAN

This RAWP was prepared in accordance with requirements of CERCLA and the Paducah FFA.

This RAWP includes the following:

- Planning schedule for the decommissioning of the EES structure and for subsequent documents;
- Description of plans and objectives for the structural demolition removal action; and
- Strategy for waste characterization during demolition of the EES structure.

The primary emphasis of the RAWP is to supplement the AM information and to provide greater detail regarding project management, project execution, and applicable or relevant and appropriate requirement (ARAR) compliance measures.

The following solid waste management units (SWMUs) are associated with the C-746-A facility (see Table 1).

Table 1. SWMUs in the C-746-A East End Smelter

Description	SWMU No.
C-746-A Inactive PCB Transformer Area	137
C-746-A East End Smelter	463

2. PROJECT DESCRIPTION

2.1 FACILITY DESCRIPTION

The C-746-A EES is located in the northwest portion of PGDP in the east end of the C-746-A North Warehouse, as shown in Figure 1. Figure 2 is a photograph of the exterior of the facility. The C-746-A structure is divided into three sections:

(1) EES area
(2) West End Smelter area (demolished in 2008)
(3) Central waste, storage, and treatment area

The C-746-A North Warehouse is a one-floor, prefabricated steel building with a poured 8-inch wire-reinforced concrete floor area of approximately 72,000 ft^2 (6,690 m^2). It has a high bay area that houses the stacks for the calciner and the smelter furnace. The building is approximately 600-ft (183-m) long, 120-ft (36.6-m) wide, and 30-ft (9.1-m) high at the highest peak. The EES encompasses the following:

- Cement block building (29-ft long x 22-ft wide) that contains an office,
- Break room,
- Locker room,
- Gas-fired calciner,
- Calciner cooler,
- Two hydrogen fluoride/$CaCO_3$ reactors,
- Coreless electrical induction furnace, and
- Numerous material handling/transfer and support systems.

The EES contains one coreless electrical induction furnace and a gas-fired calciner. The furnace and calciner ceased operations in 1985. The 3-inch natural gas supply line to C-746-A has been disconnected and the electric power supply has been de-energized at the power panel in C-746-A.

The EES was used to recover metal from various pieces of equipment. The smelting furnace remains in the EES area. The east smelter area is approximately 160 ft (48.8m) x 120 ft (36.6m). Presently, EES is used to store excess equipment such as empty drums and depressurized gas cylinders. It contains various stored waste from other operations at PGDP ("loose materials"). The smelter is locked when not in use.

The equipment in C-746-A EES is contaminated with uranium resulting from smelting equipment that had radiological contamination on its surfaces prior to smelting. There also are likely to be RCRA characteristically hazardous wastes, such as mercury switches and electrical equipment, inside the building. Beryllium also is known to be on the surfaces of the interior of the building. Because of the age of the building, it may contain hydraulic fluids containing PCBs and lead-based paints.

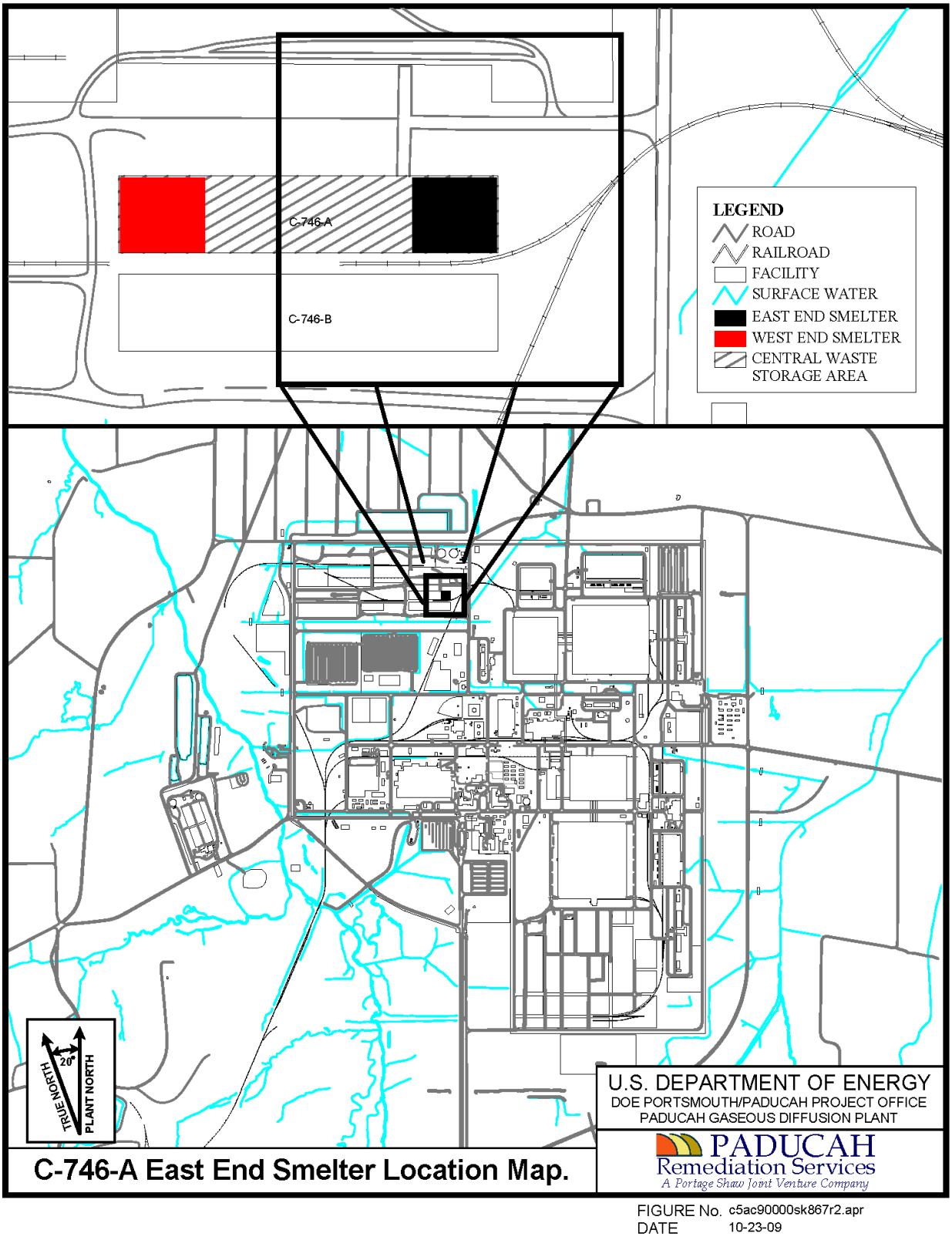

Figure 1. Location of the C-746-A East End Smelter

Figure 2. Exterior of the C-746-A East End Smelter

The small amounts of contaminants that may remain after deactivation are expected to include radiological contamination from uranium, PCBs in paint, small amounts of hazardous substances, and dust potentially containing beryllium or lead.

The EES contains beryllium contamination and currently is regulated as a beryllium area under a beryllium control program. To the maximum extent practicable, materials that are contaminated with beryllium will be removed during the deactivation activities. Additionally, the building will be cleaned and fixative applied to mitigate any remaining beryllium; however, it is expected that some beryllium will remain fixed to certain structural elements. As a result, a beryllium control plan will remain in place during the structural demolition for the EES.

2.2 REMOVAL ACTION SCOPE AND OBJECTIVES

Decommissioning of C-746-A EES will entail removing the siding on C-746-A EES and packaging it for disposition. It also includes demolishing and packaging the building structure, including any remaining piping and equipment. The demolition of EES will not involve removal of the groundlevel slab and/or foundations. Sumps and pits will be backfilled with flowable fill or similar material and slab will be decontaminated or a fixative will be applied. Wastes generated will be packaged and dispositioned in accordance with ARARs.

The following are the removal action objectives for this project:

- Reduce the potential exposure to on-site personnel from hazardous substances due to the structural deterioration of these facilities; and

- Reduce risks of releases to the environment and exposure to future industrial workers that may result from uncontrolled releases of hazardous substances, including radiological contamination, from these facilities.

2.3 REMOVAL ACTION APPROACH

The decontamination and decommissioning (D&D) of EES will be compliant with ARARs and environment, safety, and health requirements. The DOE Integrated Safety Management System (ISMS) process will be executed for the entire project. Decommissioning activities will be performed using work control documents, proper waste characterization, and appropriate management and disposition of waste to meet ARARs and Waste Acceptance Criteria (WAC) of the disposition facility.

The ongoing deactivation activities at EES will have removed the contaminated loose materials and infrastructure prior to the initiation of the decommissioning activity described in this RAWP. It is anticipated that all accessible interior ACM will have been removed and dispositioned in accordance with applicable regulations and DOE policy.

Chemical- and/or radionuclide-containing systems (e.g., process piping) will have been emptied of residual material. Additionally, certain wastes, such as PCB capacitors, mercury switches, manometers, etc., will have been removed. The structural support systems and remaining infrastructure designated for structural demolition (i.e., floors, walls, residual piping, and equipment) will have been vacuumed and sealed to contain and minimize airborne releases during the demolition process.

The small amounts of contaminants that may remain after deactivation are expected to include radiological contamination from uranium, PCBs in paint, small amounts of hazardous substances that may remain after deactivation, and dust potentially containing beryllium or lead. Any hazardous materials that may be present in nonprocess systems and become commingled with the demolition debris are expected to be in sufficiently low quantities that they would not require the building debris to be regulated as RCRA hazardous waste. The demolition debris will be characterized and is expected to consist of various types of waste such as LLW, PCB bulk product waste, and solid waste.

The decommissioning phase of this project, including the demolition of the building and remaining equipment and piping, will be accomplished in a manner consistent with ARARs. Sumps and pits will be backfilled with flowable fill or similar material, and slab will be decontaminated or a fixative will be applied. Wastes generated during the decommissioning activities will be packaged and dispositioned.

To accomplish the project on schedule, the following activities will be performed:

- Planning
- Hazard Analysis
- Hazard Mitigation/Controls
- Characterization
- Demolition
- Waste Material Disposition
- Demobilization

2.3.1 Planning

The decommissioning of EES will require a highly integrated approach to ensure compliance with all technical, environmental, and safety requirements. Planning for decommissioning of EES will incorporate the ISMS process.

2.3.2 Hazard Analysis

Structural components will be evaluated to identify and assess any hazards related to the demolition process. Material and equipment will be inspected and sampled, as necessary, to determine whether any potential physical hazards exist prior to initiating the decommissioning process. Process knowledge relating to the physical condition of the equipment and structure will be obtained from available personnel who worked in the EES and others who may have direct knowledge of the EES operations. The hazard analysis will include identification of each potential hazard related to securing, dismantling, and removing of each component. Disconnection and deactivation of all hazardous energy sources, such as power connections and steam lines, will be verified prior to dismantlement of the facility.

2.3.3 Hazard Mitigation And Controls

DOE has implemented IhSMS that incorporates five core functions and is based on eight guiding principles. The objective of ISMS is to integrate safety and environmental protection into the planning and execution of all work activities. The term safety encompasses nuclear safety, industrial safety, industrial hygiene, occupational health, health physics, and environmental compliance. ISMS requirements flow down to DOE's prime contractor and their subcontractors and are included in the Health and Safety Plan (HASP) (Appendix C).

The five core functions of ISMS are as follows:

(1) Define scope of work
(2) Analyze hazards
(3) Develop and implement hazard controls
(4) Perform work within those controls
(5) Provide feedback for continuous improvement

Following are the eight guiding principles of ISMS:

(1) Line management responsibility for safety
(2) Clear roles and responsibilities
(3) Competence commensurate with responsibility
(4) Balanced priorities
(5) Identification of safety standards and requirements
(6) Hazard control tailored to work being performed
(7) Operations authorization
(8) Worker involvement

During implementation of this removal action, environmental impacts and worker safety will be controlled through various mechanisms including, but not limited to, work sequencing and work practices (such as proper personal protective equipment).

Fugitive dust emissions will be mitigated by misting surfaces with water prior to dismantlement and applying fixative to surfaces prior to demolition. Use of water will be controlled in an effort to eliminate an additional waste stream. Air monitoring in the areas around the structure will allow for identification and mitigation of airborne contamination.

Asbestos-control procedures will be instituted during the removal of the ACMs. These procedures will be implemented in compliance with ARARs. ACMs will be managed in accordance with the ARARs from time of removal until they are disposed of in C-746-U Landfill or an approved off-site landfill in accordance with applicable regulations.

Erosion control structures will be erected to control surface drainage around the facility to minimize sediments in receiving streams. Storm water containment structures will be constructed, where necessary, to prevent
off-site migration of potentially contaminated storm water.

Hazardous Energy. Hazardous energy sources, such as steam and electrical power, will be identified. Those sources will have been de-energized, air gapped, and marked during the deactivation process. Removal activities that could be affected by these sources will be initiated only after verifying that the energy sources have been isolated. Lockout/tagout procedures will be applied. All hazardous energy sources will be considered active until proven otherwise. Temporary energy sources installed to support decommissioning activities will be managed in the same manner as permanent sources.

Water. The decommissioning activities are not expected to generate significant wastewater volumes. The nature of the materials identified within the EES would preclude the use of water to decontaminate the wastes generated. Water used to decontaminate personnel will be containerized, transported, and treated, if necessary, prior to discharge through an existing Kentucky Pollution Discharge Elimination System-permitted outfall. All identified floor drains in EES will be plugged to eliminate the uncontrolled discharge of water from the building. Shower water for personnel will be treated in the PGDP Sanitary Wastewater Collection Treatment System. Water used for dust control will be minimized.

Air. EES decommissioning may generate airborne particulates that may be radiologically and/or chemically contaminated. The migration pathways for airborne emissions include vents, broken windows, wall penetrations, open doorways, and fugitive emissions when the structure is demolished. Mitigation measures will include, but are not limited to, water spray, vacuuming, and fixative application techniques for fugitive dust emissions.

Hazardous Materials. The systems left in place, following deactivation, may contain small quantities of hazardous substances. The levels are not expected to result in the building debris being characterized as a RCRA hazardous waste. Small volumes of hazardous waste such as paint chips or vacuum dust may be generated during building demolition. These waste streams will be segregated from the building debris and managed in accordance with ARARs. Most of the resulting waste from building demolition is expected to be LLW and/or PCB bulk product waste. ACM will be managed in accordance with ARARs.

2.3.4 Characterization

Characterization is necessary to ensure a safe working environment, as well as to determine the proper disposition of materials from the project. The waste materials that will be generated during the decommissioning process will be sampled/analyzed to (1) determine the potential exposures to the workers and environment, (2) establish the levels of personal protection required, (3) establish disposal requirements, and (4) develop appropriate documentation for shipment of the material.

Characterization activities include physical sampling, evaluation of analytical results developed during the deactivation activities, development of process knowledge, and historic data research. The need to collect samples will be determined on a case-by-case basis and will be based on the characteristics, hazards, and process knowledge of the facility components. Where necessary, sampling will be utilized to verify historical data and/or process knowledge.

Depending upon the characteristics of the waste material, it may be treated, as required, and dispositioned in compliance with ARARs, in addition to the WAC of the designated disposal facility. Characterization will be necessary to segregate the waste material in accordance with the compliance criteria of the disposition facilities. The activities will involve the application of process knowledge and/or sampling and analysis of the waste materials in accordance with sampling and analysis plans.

2.3.5 Demolition

Demolition of EES will be performed in accordance with the approach described in the Demolition Plan (Appendix A). During demolition of EES, standard construction equipment will be used. A listing of typical equipment that may be used on the project is included in Table 2.

EES demolition will not involve removal of the groundlevel slab, subslab penetrations, and/or foundations. The slab that will remain after structural demolition will be inspected visually, surveyed, decontaminated as appropriate, and sealed to minimize the possibility of spreading contamination. It is anticipated that the appropriate decontamination method will include the application of a fixative/stabilizer coating(s) (such as latex paints, gums, or epoxy). Subslab penetrations, such as basements, pits, and sumps will be backfilled to prevent accumulation of water and eliminate hazards to on-site personnel. Figure 3 depicts the slab design/construction of slab floor of the C-746-A EES facility following demolition.

2.3.6 Waste Material Disposition

Demolition of EES will generate different types of waste streams. The primary waste stream will be construction/demolition debris, which is expected to be categorized as LLW. This waste likely will be disposed of at an off-site commercial disposal facility or the Nevada Test Site. Solid waste will be disposed of on-site in C-746-U Landfill in accordance with the ARARs and the WAC.

Waste from NTCRA will be stored in CERCLA waste storage areas prior to disposal. Wastewater will be transferred to temporary storage pending characterization and treatment. All waste storage locations will be located inside the PGDP security fence. The waste storage will adhere to the substantive waste storage requirements established in ARARs.

Waste materials will be sorted and segregated on-site and crushed, dismantled, packaged, and staged for disposal in accordance with ARARs. Any required on-site treatment will be ARAR compliant. Waste material shipped off-site will be shipped in accordance with U.S. Department of Transportation (DOT) requirements. ACM will be managed as a separate waste stream in accordance with ARARs and disposed of in C-746-U Landfill or an approved off-site landfill in accordance with applicable regulations.

Table 2. Demolition Equipment

Technology	Description	Applicability	Limitations	Comments
Conventional disassembly	Hand-held tools and saws; used for hand removal of nuts and bolts.	May be applied to any area.	Labor intensive and slow; recommended for limited application. Vacuuming with high efficiency particulate air filtration will be used for activities creating large amounts of airborne particulate.	No additional worker training required; rotary saws, grinders, and other high-speed mechanical tools would produce airborne particulates and fines that may need to be collected.
Mobile hydraulic shear	Two-bladed cutter attached to excavator; typically uses hydraulic power from excavator.	Can cut 1/4-inch (0.6-cm) thick steel (large-diameter pipe, structural steel, tanks); up to 1-inch (2.5-cm) thick pipe can be cut with reduced blade life.	Pipe ends are pinched, requiring further processing before decontamination, treatment, or disposal; eliminates airborne contamination associated with thermal cutting processes.	Good for conduit and small piping.
Circular cutters	Self-propelled; cut as they move around a track on outside circumference.	Metal pipes from 1.25 inch (3.175 cm) 20 ft (6 m) diameter; wall thickness up to (6 inch) (15 cm), depending on type of circular cutter used.	4 inch (10-cm) to 21 inch (53 cm) clearance required, depending on type of circular cutter used; requires multiple passes for thickness greater than 0.75 inch (1.9 cm).	There are safety concerns, but these can be managed.
Plasma arc cutting devices	High voltage low current electricity combines with pressurized gas (air or nitrogen) to create a focused stream of high temperature ionized gas, melting away the metal.	Provides high speed cutting and gouging for most metals up to 2 inches (5.8 cm) in thickness. Metal thickness may restrict widespread applicability.	May ignite uranium; alloys uranium with the metal, however, generally does not affect cutting operation. Existing worker protection for uranium is adequate for alloying and subsequent segregation that would take place after using a torch.	Additional worker protection may be required if torch is used to cut metals that have PCB or lead-based coatings.
Oxy-fuel torch	Oxygen and a fuel gas mixed and ignited at the tip of a torch; the metal is heated and burned away.	Very effective in cutting carbon steel; depth of cut up to 4 to 6 inches (10 to 15 cm); cutting speed up to 30 inches/min (76 cm/min); common technique for structural carbon steel member disassembly.	May ignite uranium; alloys uranium with the metal, however, generally does not affect cutting operation. Existing worker protection for uranium is adequate for alloying and subsequent waste segregation that would take place after using a torch.	Gasoline will be the primary fuel source for most applications. Not recommended for aluminum or stainless steel due to formation of refractory oxides; additional worker protection may be required if torch is used to cut metals that have PCB or lead-based coatings.

PCB = polychlorinated biphenyl

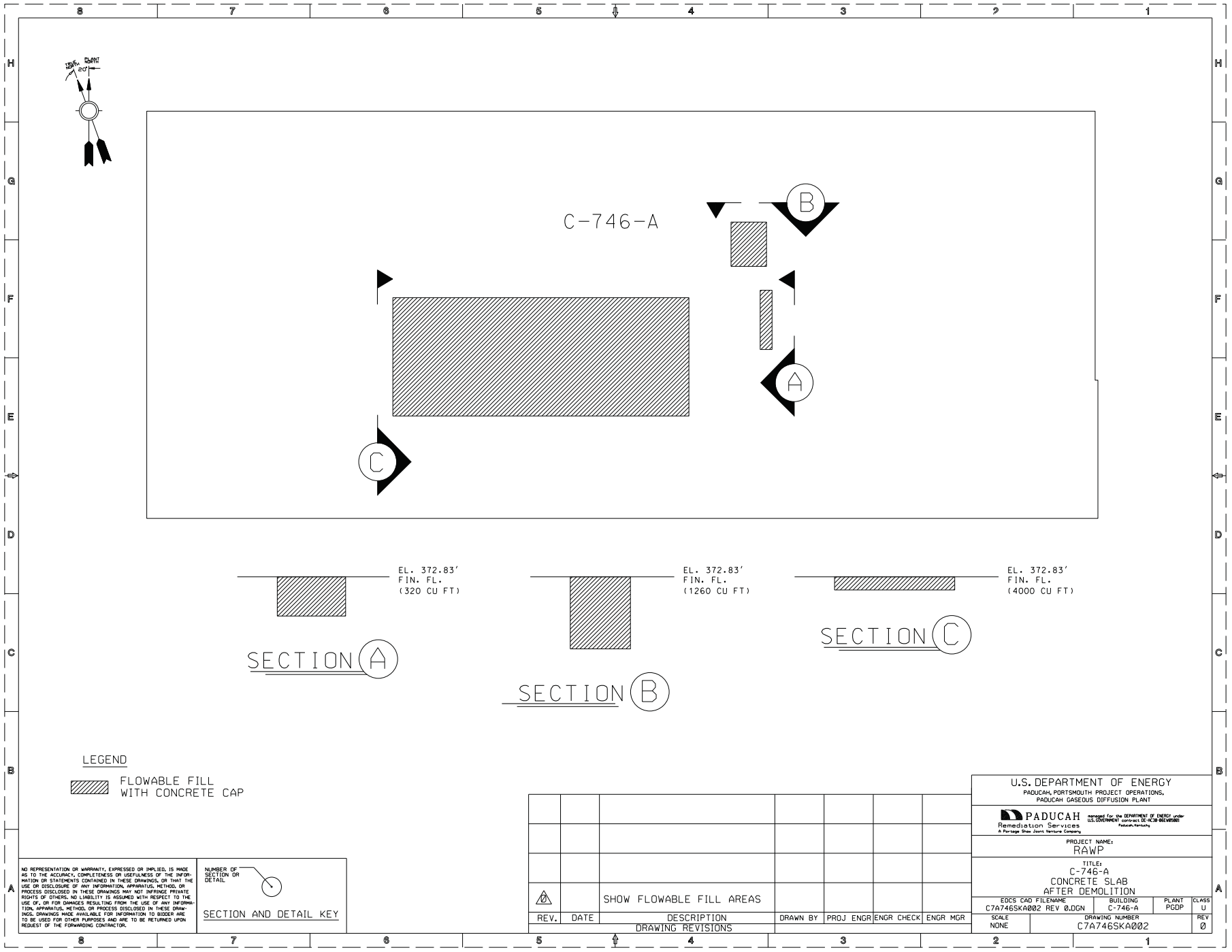

Figure 3. Configuration of the Slab of the C-746-A East End Smelter

2.3.6.1 Waste Material Segregation and Treatment

Waste materials will be separated into waste streams that conform to the WAC of the proposed disposal facility. The majority of this waste is expected to be LLW; however, small volumes of contaminated material, such as paint chips or vacuum dust potentially containing beryllium or lead, PCB bulk product waste, and residual quantities of ACMs, may be generated during building demolition. Where possible, these materials will be segregated from the building debris by vacuuming or other physical means and managed in accordance with ARARs.

Demolition debris will be staged at processing areas in preparation for disposal. Where appropriate, some components may be size reduced to meet transportation or disposal criteria.

Materials removed from EES may require on-site or off-site treatment in order to comply with environmental regulatory requirements prior to disposal. If needed, on-site treatment tasks may include dewatering, heavy metals stabilization, encapsulation of paint chips, etc. On-site treatment will be performed in accordance with ARARs. Off-site treatment activities will be in accordance with applicable regulations.

2.3.6.2 Waste Packaging

The waste generated during D&D will be packaged for transportation and disposal. The waste packaging methods will be dictated by the waste sizes and configurations and selected transportation and disposal options. Waste volumes will be minimized by utilizing methods for component disassembly and size reduction. A variety of containers are available that would be appropriate for the various waste streams generated. Some examples of appropriate transportation packages include Sealand containers, intermodal containers, ST-90 boxes (B-25), steel drums, polyethylene drums, and railcar gondolas. All wastes generated during this project will be packaged in accordance with ARARs.

The waste streams may be described with one of the following DOT proper shipping names:

- Low Specific Activity
- Surface Contaminated Objects
- Hazardous Waste
- Solid/Liquid PCBs
- Solid/Liquid Asbestos
- Solid Waste

Wastes not meeting the above classifications will be evaluated on a case-by-case basis for proper classification and packaging.

2.3.6.3 Waste Shipping

Wastes generated from this decommissioning activity may be transported by a variety of methods depending upon the characteristics of the waste and the disposal facility. Typically, the wastes designated for off-site disposal will be shipped in one of these:

- Intermodal containers on over-the-road trucks
- Intermodal containers on flatbed railcars
- Gondola railcars
- Semi dump trailers

Materials designated for disposal in the on-site landfill will be transported in roll-off bins, in tandem dump trucks or similar conveyances.

Processed material destined for off-site shipment will be packaged in accordance with applicable DOT regulations and placed in a staging area pending transportation to the final treatment/disposal site. Transportation of waste material to the on-site landfill will be conducted in accordance with PGDP and DOE procedures.

Samples collected during the course of this project that must be shipped off-site will be shipped in accordance with applicable DOT regulations if transported by ground. Samples shipped by air are governed by applicable International Air Transport Association/International Civil Aviation Organization and DOT regulations. On-site transportation of samples will be conducted in accordance with PGDP and DOE procedures.

2.3.6.4 Waste Disposal

Disposal options that will be considered for the wastes generated during D&D of EES are limited by the presence of radioisotopes at levels that exceed most industrial/sanitary landfills radioisotope limits. Three disposal alternatives are being evaluated as primary disposal options for the waste generated from the D&D activities. These include Nevada Test Site, an off-site commercial disposal facility, and on-site disposal of nonhazardous solid waste at the on-site C-746-U Landfill. Disposal at the on-site landfill will be consistent with WAC developed through an authorized limits evaluation and performance evaluation for the landfill. In the event that these facilities cannot accept certain wastes, other facilities may be evaluated.

2.3.6.5 Equipment Recycle/Reuse

The recycle and/or reuse of materials from decommissioning EES will be consistent with DOE policy and applicable federal and state requirements. Currently, DOE has suspended the unrestricted release for recycling of scrap metals from radiation areas within DOE facilities.

Certain equipment in EES facilities could have application within the current PGDP operations or other DOE sites. The reuse of equipment from EES will be designated for locations within DOE- and/or Nuclear Regulatory Commission-approved facilities. If such equipment has radiological contamination at such levels as to allow use within in the DOE system, it will be segregated, containerized, and staged for transportation to the destination handling facility. Should the new location be an off-site facility, the equipment will be packaged and prepared for transport in accordance with ARARs.

2.3.7 Demobilization

Project demobilization includes completing assessments and documentation verifying that the activities described in this RAWP have been performed in a satisfactory manner, dismantlement of all site support equipment and materials, removal of all support equipment, and site restoration.

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3. PLANS AND WORK CONTROL DOCUMENTS

The following project-specific plans either have been or will be developed to ensure the proper execution of decommissioning EES and to ensure compliance with the AM and ARARs.

3.1 DEMOLITION PLAN

The Demolition Plan (Appendix A) includes the details of demolishing C-746-A EES and is intended to serve as the design report.

3.2 DEMOLITION REMOVAL ACTION VERIFICATION PLANS

The Demolition Removal Action Verification Plan (Appendix B) identifies sampling and/or monitoring necessary to confirm that the groundlevel slab and foundations have been left in a protective state that will prevent the migration of contaminants from the facility slab after the facility structure has been demolished.

3.3 SAMPLING AND ANAYLIS PLANS

Sampling and Analysis Plans for C-746-A EES will be developed for sampling and analyses of waste streams generated by the decommissioning of EES. The plans will enable contaminants of concern to be identified, sampled, and analyzed for critical components. The plans will define the process for establishing sampling requirements for each task and subtask, selection of the proper sampling protocols, and communication of sampling for use in future activities.

3.4 PROJECT HEALTH AND SAFETY PLAN

A HASP outlining the necessary controls and requirements to protect worker health and safety has been prepared and is included in Appendix C. The HASP is consistent with the requirements of 29 *CFR* § 1910.120 and addresses the safety and health concerns for decommissioning EES. During implementation of the removal action, specific work instruction and hazard controls will be developed at the task level for use by the personnel performing the work. The ISMS process will be used in preparation of these work instructions.

3.5 WASTE MANAGEMENT PLAN

The FFA does not have a specific requirement for the inclusion of a WMP in an RAWP, though it is not precluded. Due to the prescriptive nature of the ARARs relative to the waste management activities expected during implementation of this removal action and the well-defined waste stream volume and characteristics expected to be generated for this project, waste management activities will be performed in accordance with the approved ARARs. Specific work instructions and procedures that incorporate and flow down the requirements of ARARs either are in place or will be developed for the field personnel to utilize when performing day-to-day operations.

3.6 QUALITY ASSURANCE PROJECT PLAN

The programmatic Quality Assurance Project Plan (PRS 2009) documents the processes and procedures that will be used to ensure that the analytical data of acceptable quality are used to make waste disposition decisions. It also explains other aspects of the Quality Assurance Program that are applicable to this project.

3.7 SPECIFIC WORK DOCUMENTS AND PLANS

Additional special condition documents including, but not limited to, work control documents, activity hazard analyses, and work permits also will be developed, as appropriate.

3.8 OTHER PLANS AND DOCUMENTS

It may be necessary to develop other plans and documents in addition to those identified previously. These may include, but are not limited to, the following:

- Security Plan
- Transportation Plan
- Procurement documents

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4. PROJECT SCHEDULE

Table 3 provides key schedule elements and projected implementation dates for the decommissioning of EES. This schedule is based on present budget projections and continued funding by the American Recovery and Reinvestment Act.

Project schedules for completion of activities set forth herein are estimates provided for informational purposes only and are not considered to be enforceable elements of the removal action or this document. The enforceable milestones for performance of activities included as part of the removal action are set forth in the Site Management Plan (DOE 2009b). Any additional milestones, timetables, or deadlines for activities included as part of the removal action will be identified and established independent of this RAWP, in accordance with existing FFA protocols.

Table 3. Project Schedule for D&D of the C-746-A EES

Activity	Milestone[1]
Issue D1 AM to KY/EPA	March 2010
Issue D1 RAWP to KY/EPA	March 2010
Removal Action (Demolition) Start	July 2010
Complete Demolition	September 2010

[1] These are general planning dates for submittal of the CERCLA decision documents. Any extensions for reviewing documents, submitting comments, or responding to comments will impact the schedule. This schedule is included in this document for information purposes only and is not intended to establish enforceable schedules or milestones. Enforceable milestones, if any, will be established in the FFA or Site Management Plan and will be updated in accordance with Sections XXIX and/or XXXIX of the FFA.

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5. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

In accordance with 40 *CFR* § 300.415(j), on-site removal actions conducted under CERCLA are required to meet ARARs to the extent practicable considering the urgency of the situation and the scope of the removal. DOE will comply with ARARs and to-be-considered (TBC) guidance as set forth in the EE/CA when conducting this removal action. The ARARs and TBC guidance are included in the AM for the C-340 and C-746-A Facilities and are incorporated in this RAWP by reference.

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6. REFERENCES

DOE and EPA 1995. *Policy on Decommissioning of Department of Energy Facilities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*, Washington, DC, May.

DOE 2009a. "American Recovery and Reinvestment Act Projects—Regulatory Process for Resource Conservation and Recovery Act Reporting and Closure of Areas Containing Newly Discovered Hazardous Waste," correspondence from Reinhard Knerr, U.S. Department of Energy Paducah Site Lead, to Anthony R. Hatton, Director, Division of Waste Management, October 6.

DOE 2009b. *Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, Annual Revision-FY 2009, DOE/LX/07-0185&D2/R1, U.S. Department of Energy, Paducah, KY, March 26.

DOE 2010a. *Engineering Evaluation/Cost Analysis for the C-340 Metals Reduction Plant Complex and the C-746-A East End Smelter at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0131&D2.

DOE 2010b. *Action Memorandum for the C-340 Metals Reduction Plant Complex and the C-746-A East End Smelter Non-Time-Critical Removal Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/LX/07-0290&D1.

EPA 1998. *Federal Facility Agreement for the Paducah Gaseous Diffusion Plant*, DOE/OR/07-1707, U.S. Environmental Protection Agency, Atlanta, GA, February.

EPA 2009. "Response to Proposed Regulatory Path for Projects Under the American Recovery and Reinvestment Act at the Paducah Gaseous Diffusion Plant," U.S. Environmental Protection Agency, Atlanta, GA, correspondence from Franklin E. Hill, Director, Superfund Division, to William Murphie, Director, U.S. Department of Energy, Portsmouth/Paducah Project Office, Lexington, KY, July 1.

KDEP (Kentucky Department for Environmental Protection) 2009a "Approval of the American Recovery and Reinvestment Act Projects—Regulatory Process for RCRA Reporting and Closure Areas Containing Newly Discovered Hazardous Waste," correspondence from April J. Webb, Manager, Hazardous Waste Branch, to Reinhard Knerr, U.S. Department of Energy Paducah Site lead, October, 20.

KDEP 2009b. "Regulatory Framework for ARRA Work for C-340, C-410, and C-746-A EES," correspondence from April J. Webb, Manager of the Division of Waste Management, Kentucky Department for Environmental Protection, Frankfort, KY, to Reinhard Knerr, U.S. Department of Energy Site Lead, Paducah, KY, September 25.

PRS (Paducah Remediation Services, LLC) 2009. *Quality Assurance Program Plan for the Paducah Environmental Remediation Project, Paducah, Kentucky*, PRS-CDL-0058/R4.

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APPENDIX A

DEMOLITION PLAN FOR THE C-746-A EAST END SMELTER

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C-746-A EAST END SMELTER DEMOLITION PLAN

DEMOLITION ACTIVITIES

The Demolition Plan defines the detailed activities required to remove the structure of the East End Smelter (EES) to the slab and to decontaminate/stabilize the slab and subsurface pits, trenches, and sumps for subsequent actions under the post-gaseous diffusion plant Soils and Slabs Operable Unit activities.

The C-746-A EES Building is made of a steel frame with supporting interior floors made of concrete slab, steel grating, or steel deck plates. Exterior walls and roof are corrugated steel with steel sash windows.

It is anticipated that all accessible interior asbestos-containing materials (ACM) will have been removed and any systems (e.g., process piping, equipment) containing chemical and/or radionuclides will have been emptied of residual material, to the extent practicable, during the deactivation activities. Additionally, certain wastes, such as polychlorinated biphenyl (PCB) capacitors, mercury switches, or manometers, etc., will have been removed. During the deactivation process the building surfaces and infrastructure (i.e., floors, walls, residual piping, and equipment) will be vacuumed and sealed to contain and minimize airborne releases. Prior to initiating activities that could result in the spread of contamination to the adjacent center section of C-746-A and surrounding soils, barriers such as plastic screens, temporary walls, isolation of areas by using existing doors, etc., will be installed to minimize cross-contamination during decommissioning.

The decommissioning phase of this project will be accomplished in a manner consistent with applicable or relevant and appropriate requirements. The buildings and remaining infrastructure will be removed, size reduced, packaged, and transported to a designated disposal location. The slab will be cleaned and coated with fixative. The subsurface pits, trenches, and sumps will be backfilled.

The small amounts of contaminants that may remain after deactivation are expected to include radiological contamination from uranium, PCBs in paint, and small amounts of hazardous substances that cannot be accessed for removal and dust potentially containing beryllium or lead. Any hazardous materials that may be present in nonprocess systems and become commingled with the demolition debris are expected to be in sufficiently low quantities that they would not require the building debris to be regulated as Resource Conservation and Recovery Act hazardous waste. The demolition debris will be characterized and is expected to consist of various types of waste such as low-level waste, PCB bulk product waste, and solid waste.

Block Building Demolition

This work involves the removal of the office located at the northeast corner of C-746-A EES. The office is made of concrete block outer walls with metal windows and doors. The following activities will be performed during the demolition of the block building.

(1) Establish a safety barricade inside the building around the office area.

(2) Construct silt fence and install runoff control, as required.

(3) Remove the office windows and doors.

(4) Remove conduit, wiring, and piping in the office area.

(5) Remove the overhead fluorescent lights and fixtures.

(6) Dismantle the metal deck ceiling and concrete block walls of the office. Remove all concrete blocks and mortar to floor level. Spray amended water mist on the debris during this activity to mitigate the generation of dust.

(7) Decontaminate slab, as appropriate, and apply fixative.

(8) Package waste for shipment.

Roof, Wall and Support Structure Demolition

The following activities will be performed during the demolition of the roof, walls, and support structure of EES.

(1) Establish a safety barricade around the building perimeter.

(2) Construct silt fence; install runoff controls, as required. Use amended water to control fugitive dust.

(3) Remove overhead doors and man doors from the north, south, and east walls.

(4) Remove the corrugated sheet metal roof panels.

(5) Remove the corrugated sheet metal wall panels on the north and south walls.

(6) Remove purlins, girders, and girts; lower to the floor and downsize as required for containerization.

(7) Remove the roof and wall panels.

(8) Tie or band bundles of roof or wall panels together and place in a roll-off bin or intermodal container for disposal.

(9) Remove the roof purlins and girts then lower the purlins to the floor and downsize, as required for containerization.

(10) Position crane or excavator and shear, necessary hoisting and rigging equipment, and stabilize and remove the roof trusses from the columns.

(11) Lower the trusses to the floor and downsize, as required for containerization.

(12) Remove the building columns, with the exception of column line 23 and stabilize, as necessary, by cutting the base of the column or the studs holding the base of the column to the concrete floor. After the base is loose from the floor, slowly lower the column to the floor and downsize, as required for containerization. Repeat this step until all columns have been removed. Column line 23 is adjacent to the west wall of EES. It must be left in place to support the roof of the central waste storage and treatment area.

(13) Cut bolts fastening the column to the concrete slab flush with the top of the slab.

(14) Cut the drain line near the north-south center of the east edge of the slab at groundlevel and fill with grout.

Finish Work

The following tasks will be associated with restoration of the site to conditions that allow for future use.

(1) Demolish all remaining exterior walls.

(2) Cut all anchor bolts and steel flush with concrete surface.

(3) Demolish vent stacks and towers.

(4) Sort, size, and package debris as directed by waste generator technicians and/or waste certification official.

(5) Repair flowable fill surface, decontaminate slab, and apply final fixative coating to surface.

(6) Install personnel safety fencing and post warning signs.

(7) Decontaminate rental equipment.

(8) Repair or remove access roads.

(9) Grade and seed, as needed.

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APPENDIX B

DEMOLITION REMOVAL ACTION VERIFICATION PLAN FOR THE C-746-A EAST END SMELTER AT THE PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY

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C-746-A EAST END SMELTER
DEMOLITION REMOVAL ACTION VERIFICATION PLAN

This Demolition Removal Action Verification Plan identifies sampling and/or monitoring necessary to confirm that the groundlevel slab of East End Smelter (EES) has been placed in a protective state that will prevent migration of contaminants from the slab after the buildings have been demolished. During removal action implementation, fugitive emissions and cross-contamination will be controlled through a combination of methods including, but not limited to, negative air machines, fixing agents, physical barriers (e.g., plastic sheeting), and other contamination control measures.

The criteria for determining success of the removal action include the removal of the physical structure to slab and removal of the associated residual contaminants, which include radionuclides, polychlorinated biphenyls (PCBs), asbestos-containing materials, and components containing residual heavy metals contamination. Tables B.1-B.4 illustrate the analytical parameters and U.S. Environmental Protection Agency (EPA) test method for each of the types of samples that may be obtained during the decommissioning activities.

Table B.1. Paint Sampling Parameters and Test Methods

Analytical Parameter	Test Method
PCBs	EPA SW-846-8082

Table B.2. Hexane Wipe Sampling Parameters and Test Methods

Analytical Parameter	Test Method
PCB Wipe analysis	EPA SW-846-8082

Table B.3. Oil and Lubricant or Water Sampling Parameters and Test Methods

Analytical Parameter	Test Method
pH	EPA SW-846-9045
Total Metals (RCRA 8 plus Zn, Tl)	EPA SW-846-6020 EPA SW-846-6010
Total Metals—Mercury	EPA SW-846-7470/7471
PCBs	EPA SW-846-8082
Total U, U-234, U-238, Th-228, Th-230, Th-232, Pu-238, Pu-239, Pu-240, Np-237, Am-241, Mass of U-235, Activity of U-235, Weight Percent of U-235	Alpha Spectroscopy/Inductively Coupled Plasma Mass Spectrometry
Cs-134, Cs-137, Co-60, Th-234, K-40	Gamma Spectroscopy
Tc-99, Sr-90	Liquid Scintillation
VOAs	EPA-SW-846-8260
SVOAs	EPA-SW-846-8270 (includes Halogens)

Total metals include arsenic, barium, cadmium, chromium, lead, selenium, silver, beryllium, antimony, nickel and zinc.
pH = hydrogen-ion concentration
PCB = polychlorinated biphenyl
RCRA = Resource Conservation and Recovery Act
SVOA = semivolatile organic analytes
VOA = volatile organic analytes

Table B.4. Asbestos Sampling Parameters and Test Methods

Analytical Parameter	Test Method
TCLP Metals (except Mercury) plus Zn	EPA SW-846-6010
TCLP Metals—Mercury	EPA SW-846-7470
Total U, U-234, U-238, Th-228, Th-230, Th-232, Pu-238, Pu-239, Pu-240, Np-237, Am-241, Mass of U-235, Activity of U-235, Weight Percent of U-235	Alpha Spectroscopy/Inductively Coupled Plasma Mass Spectrometry
Cs-134, Cs-137, Co-60, Th-234, K-40	Gamma Spectroscopy
Tc-99	Liquid Scintillation
Sr-90	Gas Proportional
Asbestos	NIOSH-9002

TCLP = toxicity characteristic leaching procedure

Surfaces around the perimeter of the removal action will be protected from cross-contamination by paint chips and other debris through the use of physical barriers. Such barriers, which will be installed prior to activities that could result in the spread of contamination to the adjacent center section of C-746-A and surrounding soils, include plastic screens, temporary walls, isolation of areas by using existing doors, etc. The slab that will remain after structural demolition will be inspected, visually, surveyed, decontaminated, as appropriate, and sealed to minimize the possibility of spreading contamination. Loose and scaling paint will be removed from the foundation and other hard surfaces to the extent the U.S. Department of Energy deems practicable using available equipment and techniques. Successful removal of paint chips will be verified by visual inspection of the foundation.

Fixatives may be applied to prevent scaling paint and fugitive dust, which may contain contaminated materials, from being released to the environment. Loose material such as paint chips will be segregated from the primary waste streams to the extent possible via vacuuming and other physical means. The slab will be sampled and analyzed for the presence of beryllium.

There are no known unremediated PCB spills that will remain in C-746-A EES following deactivation.

Following demolition, the slab will be surveyed in accordance with the criteria of 10 *CFR* § 835, Appendix D, and posted accordingly. The slab surface will be decontaminated by washing, scabbling, or other physical means prior to applying a fixative when the removable contamination levels on the slab surface exceed the levels specified in 10 *CFR* § 835, Appendix D.

APPENDIX C

HEALTH AND SAFETY PLAN FOR THE C-746-A EAST END SMELTER AT THE PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY

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CONTENTS

ACRONYMS

ACGIH	American Conference of Government Industrial Hygienists
AHA	Activity Hazard Assessment
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
CAAS	Critically Accident Alarm System
CFR	Code of Federal Regulation
CRZ	contamination reduction zone
DOE	U.S. Department of Energy
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
EES	East End Smelter
ES&H	Environmental, Safety, and Health
EZ	exclusion zone
FS	field superintendent
H&S	health and safety
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSR	health and safety representative
ISMS	Integrated Safety Management System
NIOSH	National Institute for Occupational Safety and Health
OSHA	U.S. Occupational Safety and Health Administration
PEL	permissible exposure limit
PGDP	Paducah Gaseous Diffusion Plant
PM	project manager
PPE	personal protective equipment
PSS	plant shift superintendent
RADCON	radiological control
RCT	radiological control technician
RWP	radiological work permit
SZ	support zone

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C.1 PURPOSE

This Health and Safety Plan (HASP) has been developed to delineate the general health and safety requirements associated with C-746-A East End Smelter (EES) Removal Action Work Plan and discuss the process of identifying potential hazards. Site-specific hazards and controls will be established for each task and location prior to performing work. These hazards and controls will be documented in the form of Activity Hazard Assessments (AHAs), work packages, and procedures. Personnel assigned to this project will be familiar with the details of these work control documents prior to performing work in the affected areas.

C.2 INTEGRATED SAFETY MANAGEMENT

The EES removal action will utilize the Paducah Remediation Services, LLC, corporate Integrated Safety Management System (ISMS), which integrates the Safety Management System, the Environmental Management System (EMS), and Quality Management System to ensure personnel and environmental safety and quality are integrated into management and work practices at all levels so that missions are accomplished while protecting the public, the workers, and the environment. The concepts of the ISMS/EMS will be utilized to provide a formal, organized process to ensure the safe performance of work. The ISMS/EMS Plan identifies the methodologies that will be used to address previously recognized hazards and how the hazards are mitigated using contractor-accepted Environmental, Safety, and Health (ES&H) practices.

The core functions and guiding principles of ISMS/EMS will be implemented by incorporating the requirements of programs, policies, technical specifications, and procedures from the U.S. Department of Energy (DOE), U.S. Occupational Safety and Health Administration (OSHA), and the U.S. Environmental Protection Agency (EPA). Brief descriptions of the five ISMS/EMS core functions are defined in subsequent sections.

C.2.1 DEFINE SCOPE OF WORK

Defining and understanding the scope of work is the first critical step in successfully performing any specific activity in a safe and compliant manner. In accordance with ISMS protocols, at a minimum, key personnel from the project team will participate in the development of the approach to each task. The task managers will ensure that each team member understands the scope of work and the technical and safety issues involved and that all parties are in agreement on the scope and approach to complete the work.

C.2.2 ANALYZE HAZARDS

In the course of planning the work, key personnel from the project team will identify hazards including personnel safety and environmental risks associated with the performance of the work. Hazards may be identified and assessed by performing a site visit, reviewing lessons learned, and reviewing project plans or historical data. The hazard assessment process will be prescribed by the DOE prime contractor's procedures and policies.

Once the hazards have been identified and assessed, measures will be identified to minimize risks to workers, the public, and the environment. These measures will be described in the project-specific AHAs, which serve to provide a control mechanism for all work activities. AHAs are detailed, activity-specific evaluations that address each step of the task and/or activity that will be performed. The AHA development process entails a detailed evaluation of each task to identify specific activities or operations required to successfully complete the scope of work and define the potential chemical, environmental, physical, radiological, and/or biological hazards that may be encountered; the media and manner in which they may occur; and how they are to be recognized, mitigated, and controlled. Appropriate hazard controls may include engineering controls, administrative controls, and the use of personal protective equipment (PPE). The project health and safety personnel are responsible for the preparation, revision, and implementation of AHAs.

Applicable AHAs will be reviewed with the personnel who will perform the work. Participants in this review will sign and date the AHA to signify that they understand all hazards, controls, and requirements in the AHAs. Copies of the AHAs with appropriate signatures shall be maintained at the work location.

C.2.3 DEVELOP/IMPLEMENT CONTROLS

The primary mechanisms used to flowdown ISMS/EMS controls to the project team are project-specific plans and technical procedures. Other mechanisms include program/project management systems, employee training, communication, work site inspections, independent assessments, and audits. These mechanisms are communicated in the following:

- Pre-job meetings
- Orientations
- Training
- Plan-of-the-day/pre-job briefings
- AHAs
- Radiological work permits (RWP)

The plan of the day/pre-job briefing incorporates the principles of ISMS/EMS. The specific steps within ISMS/EMS are emphasized to each employee. It is stressed that no employee will be directed or forced to perform any task that he/she believes is unsafe, puts health at risk, or that could endanger the public or the environment. One of the key elements of ISMS/EMS is that all personnel are permitted to stop work or decline to perform an assigned task because of a reasonable belief that the task poses an imminent risk of death, serious physical harm, or other serious hazard to workers or the environment.

Employee involvement is emphasized in all training sessions, beginning with initial orientation training, and is periodically reinforced in refresher training, as applicable, and in ES&H briefings/meetings. Employees are encouraged to participate in the selection, development, and presentation of training/meeting topics and their full and constructive input is encouraged in all communication sessions.

C.2.4 PERFORM WORK

Upon approval to proceed, the project-specific plans will be implemented. The field superintendent will verify that all applicable plans, forms, and records are contained in the project files and accessible by approved personnel. Actions that will be taken during the performance of the work to incorporate ISMS/EMS principles include the following:

- Plan of the day/pre-job briefings
- Monthly project safety meetings
- ES&H oversight/inspections
- Safety inspections
- Equipment inspection
- Stop work authority

C.2.5 FEEDBACK/IMPROVEMENT

Feedback and improvement are accomplished through several channels, including ISMS/EMS audits, self-assessments, employee suggestions, lessons learned, and post-job briefings.

Project management will encourage employees to submit freely any suggestions that offer opportunities for improvement and constructive criticism on the program. Project management will conduct periodic inspections and meetings with project personnel at the work site to discuss safety issues, environmental issues, and/or concerns, as well as other relevant topics.

During field activities, meetings and briefings will provide opportunities for project personnel to communicate the following:

- Lessons learned and any other topics relevant to the work performed
- How work steps/procedures could be modified to promote a safer working environment
- How communications could be improved within the project team
- Overall issues or concerns they may have regarding how the work was performed

C.3 FLOWDOWN TO SUBCONTRACTORS

The ISMS/EMS approach to ES&H ensures that project team members, including subcontractors, are aware of their roles, responsibilities, and authorities for worker/public safety and protection of the environment. All organizations will be responsible for compliance with the prime contractor's Worker Safety and Health Program, ISMS/EMS Program, Radiation Protection Program, and Quality Assurance Program. In addition, subcontract requirements will flow down to lower-tier subcontractors, as applicable. Project personnel will have the appropriate health and safety (H&S) training required in accordance with 29 *CFR* § 1910 and DOE standards, but they also will undergo site-specific pre-job training, including safety and environmental, to ensure that ES&H issues related to the activities to be performed or specific to the work site are clearly understood. Documentation of training will be available for review prior to starting work.

C.4 SUSPENDING/STOPPING WORK

In accordance with 10 *CFR* § 851.20 and the DOE prime contractor's Worker Safety and Health Program and procedures, employees and subcontractors have suspend/stop-work authority. Individuals involved in any aspect of the project have the authority and responsibility to suspend or stop work if they believe that a task poses an imminent risk to the H&S of the workers, the public, or to the environment. Concerns shall be

brought to the attention of the field superintendent (FS) and health and safety representative (HSR), they will be evaluated by project management personnel, and actions will be taken to rectify or control the situation. In the case of imminent danger or emergency situations, team members should halt activities immediately and instruct other affected workers to pull back from the hazardous area. The FS and/or HSR should be notified immediately; at that time, Management and/or emergency responders will be notified.

C.5 ISMS/EMS BRIEFINGS AND ORIENTATIONS

Plan of the day/pre-job briefings detailing the specific hazards of the work to be performed and safety precautions and procedures specific for the job shall be conducted by the FS and/or HSR at the beginning of each shift. During these briefings, work tasks and the associated hazards (personnel safety and environmental risks) and mitigating controls will be discussed using task-specific AHAs, project documents, and/or lessons learned.

Prior to performing work on the site, personnel shall be required to read, or be briefed, on the DOE prime contractor's Worker Safety and Health Program, applicable AHAs, the work package, and other applicable documents. This shall be documented as required reading, using acknowledgement forms or briefing sheets. Visitors also will be oriented to the applicable plans and potential hazards that they may encounter.

C.6 KEY PROJECT PERSONNEL AND RESPONSIBILITIES

One of the primary underlying principles of a successful project organization is the establishment of clearly defined roles and responsibilities and effective lines of communication among employees and the Prime Contractor, subcontractors, and other organizations involved in the project. Ensuring that personnel fully understand their roles and responsibilities and that they have a thorough understanding of the scope of work and other project requirements will provide the foundation for successful and safe completion of the project.

The roles and responsibilities of key field team members are briefly described as follows:

- The project manager (PM) oversees the implementation of the project plans and provides the resources for the project. The PM oversees the project plans and work activities while ensuring that operations are conducted in accordance with the DOE prime contractor's procedures, regulatory requirements, and Worker Safety and Health Program. He/she is responsible for coordinating and assigning resources needed for the project. The PM also performs management audits and inspections.

- The FS coordinates field activities and logistics and provides communication between the project team and other support groups. The FS also ensures that on-site personnel comply with the Worker Safety and Health Program, work packages, and applicable procedures

- The quality assurance specialist provides support and oversight to the project to ensure that work is performed in accordance with the work package and other applicable plans and procedures. The quality assurance specialist performs audits, surveillance, and assessments. He/she participates or takes the lead in accident/incident prevention investigations.

- The HSR provides H&S support and oversight to the project to ensure that work is being performed

safely and in accordance with the AHAs, Worker Safety and Health Program, applicable regulations, 10 *CFR* § 851, DOE directives, and applicable plans and procedures. The HSR participates in the development of AHAs.

- The radiological control (RADCON) group provides support and guidance to the project and assists the FS and HSR with implementation of RADCONs and as low as reasonably achievable (ALARA) principles. The RADCON technician (RCT) observes the work area before/during activities for radiological hazard and authorizes entry into and exit from the radiological work area.

- Environmental compliance organization provides environmental support and oversight to the project to ensure that the planning and fieldwork is being performed properly and in accordance with all applicable regulations, DOE directives, and relevant plans and procedures.

- The waste management coordinator provides waste management support to the project to coordinate waste containers and removal of waste from the worksite, while complying with the Worker Safety and Health Program, as well as ES&H and work control requirements.

- Field Technical Staff/Subcontractors–Heavy equipment operators, maintenance mechanics, waste operators, and electricians perform work as specified in work packages, adhering to the Worker Safety and Health Program, HASP, RWPs, project procedures, and AHAs. Key field personnel also participate in the identification of the hazards and development of the work controls to be utilized during the work.

C.7 SITE CONTROL

C.7.1 Work Site Control Zones

Work zones will be utilized to control access. These areas will be controlled by the FS, HSR, and/or RCT to minimize the number of individuals potentially exposed to site hazards and to ensure that individuals who enter follow the required procedures. The following is a description of the different types of zones that may be established at the site.

C.7.2 Exclusion Zone

The exclusion zone (EZ) is the immediate area around the removal action activity where there is potential for personal exposure to hazardous materials. The exclusion zone will be marked and entry and exit points will be established to regulate movement of personnel and equipment to reduce the potential of the spread of contamination. This is the zone that encompasses the areas where demolition activities occur. It also includes the areas where the demolition debris is segregated, size reduced, and packaged for transport to disposal.

C.7.3 Contamination Reduction Zone

The contamination reduction zone (CRZ) is the transition area between the EZ and construction zone or support zone. This area will provide a buffer area to reduce the probability that contamination will leave the EZ. The CRZ is designed for the following activities:

- Decontamination of equipment and workers;
- Staging of emergency response equipment and supplies (e.g., first-aid, fire equipment);

- Waste characterization, segregation, packaging and preparation; and
- Worker rest area.

The CRZ is designed to reduce the possibility of the clean area becoming contaminated by site hazards. The degree of contamination in the CRZ decreases as the distance from the contaminants increases.

C.7.4 CONSTRUCTION ZONE

The construction zone is the area outside of potential contamination, but still encompassing work activities and possible hazards associated with fieldwork activities. Entry into this area is controlled and the area clearly marked with barrier tape, rope, or flagging.

C.7.5 SUPPORT ZONE

The support zone (SZ) is the outermost area of the site. This area is uncontaminated where workers provide operational and administrative support. The SZ is clean and will not be entered by contaminated equipment or personnel, unless properly controlled or except under emergency or evacuation conditions.

C.7.6 SITE COMMUNICATIONS

Paducah Gaseous Diffusion Plant (PGDP) plant radios, plant phones, and cell phones will be used for on-site and off-site communication. Project personnel will be trained in the use of plant radios and emergency numbers. Hand signals also may be utilized; these will be covered with project personnel if necessary.

C.7.7 AUTHORIZATION TO ENTER

Personnel shall adhere to site entry and control procedures identified in the RWP, AHAs, and this HASP; personnel must wear the appropriate PPE and enter the work area only after receiving permission of the FS, HSR, and/or RCT. The FS (or designee) will verify that the appropriate training and briefing requirements are met prior to entry.

As a requirement for work on this project, workers entering the EZ or CRZ will be required to take the appropriate level of Hazardous Waste Operations and Emergency Response (HAZWOPER) training. This training must cover the requirements in 29 *CFR* § 1910.120, HAZWOPER. As applicable, workers must receive annual 8-hour refresher training and 1- or 3-day on-site supervision under a trained, experienced supervisor. The FS shall receive additional 8-hour training in hazardous waste operations supervision. Workers and visitors entering the EZ or CRZ will be briefed in the provisions of this HASP and will be required to sign the HASP Acknowledgment Form. Workers entering radiological posted work areas also will be required to complete Radworker II training.

C.7.8 VISITORS

Site visitors (persons not involved in routine site work activities) shall abide by the following:

- Visitors shall be instructed to stay outside of the EZ and CRZ and remain within the SZ during the extent of their stay.

- Visitors requesting to observe work conducted in the EZ must wear appropriate PPE prior to entry into that zone.

- Visitors who request to enter the EZ must produce evidence that they have medical clearance and appropriate HAZWOPER training that is up-to-date.

- Visitors also must have received the required training for the tasks being performed and entry must be approved by the FS, HSR and/or RCT.

C.8 PERSONAL PROTECTIVE EQUIPMENT

When engineering controls are not feasible, when the administrative controls in place are not adequate, or when otherwise indicated (such as for ALARA), PPE will be specified by the AHA and/or RWP. At a minimum, personnel performing work in work zones may be required to wear the following standard safety apparel:

- Hard hats meeting the requirements of American National Standards Institute (ANSI) Z89.1, as prescribed in 29 *CFR* § 1910.135, *Head Protection*. Hard hats will be worn with the suspension properly installed. Hard hats will not be damaged, painted, or deformed.

- Safety glasses with firm side shields will meet the requirements of ANSI Z87.1, as prescribed in 29 *CFR* § 1910.133, *Eye and Face Protection*. Prescription glasses also will meet the ANSI standard and be provided with fixed or firm clip-on side shields. Cover glasses used over prescription glasses will be permitted. Safety glasses will be worn in any area where construction activities are taking place. Face shields will not be worn in lieu of safety glasses.

- Sturdy safety toed work shoes or boots meeting the requirements of ANSI Z41, as prescribed in 29 *CFR* § 1910.136, *Foot Protection*, shall be worn.

C.8.1 TASK-SPECIFIC LEVELS OF PROTECTION

The levels of personal PPE will be determined by an assessment of the potential hazards posed by the task to be performed and will be identified in the task specific AHAs and RWPs. Typically, the highest hazard levels are to be expected in the EZ; therefore, the level of PPE designated for work in the EZ would be expected to be the highest level designated for a task. Work conducted in the CRZ may vary. Generally the level of PPE used in the CRZ is one level below that designated for the EZ.

C.8.2 RESPIRATORY PROTECTION

Respiratory protection requirements will be determined by air monitoring and survey results. Personnel required to wear respiratory protection will be trained and quantitatively fit-tested prior to use of the respirator, as prescribed in accordance with DOE prime contractor procedure. Personnel required to wear respirators will inspect their respirators before and after each use and any deficiencies will be reported to the FS or HSR immediately. Respirators will be properly stored in a bag in a clean, dry environment and routinely cleaned. Damaged respirators shall not be used.

C.9 MEDICAL SURVEILLANCE

The medical surveillance program provides for baseline, annual, and termination medical examinations for employees in accordance with 29 *CFR* § 1910.120, HAZWOPER. Employees who may be exposed to hazardous conditions may be required to be trained and fitted for respiratory protection in accordance with 29 *CFR* § 1910.134. Each employee who is or may be exposed to hazardous substances or health hazards at or above the permissible exposure limit (PEL) for 30 days or more per year and each employee who wears a respirator for 30 days or more per year will receive a medical examination before assignment, approximately 12 months later, and at termination of employment or at reassignment. Employees who develop signs or symptoms indicating overexposure or are injured or exposed above the PEL in an emergency situation will be examined medically as soon as possible following the incident

Personnel performing HAZWOPER activities on this project must complete an annual HAZWOPER physical. The examining physician will document each worker's fitness for work. In addition, the physician will ensure personnel are capable of wearing a respirator through medical examination and conducting a pulmonary function test.

Radiation workers, working under an RWP, may be required to submit a baseline bioassay, periodic bioassay during the project, and exit bioassay at the end of the project.

C.9.1 EXPOSURE MONITORING

Air monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection needed on-site.

C.9.2 ROUTINE AIR MONITORING REQUIREMENTS

Air monitoring will be performed during the following activities:

- Intrusive activities such as building demolition and utility removal;
- Activities where there is a potential for exposure to heavy metals, asbestos-containing materials, silica dust; and
- Personnel filling, handling and transporting waste containers that contain potentially contaminated material.

C.9.3 INDUSTRIAL HYGIENE MONITORING

Industrial hygiene monitoring and sampling will be performed by assigned project H&S support personnel. Monitoring will use direct-reading instruments, air-sampling equipment, environmental-monitoring equipment, and assessment techniques, as determined appropriate by the H&S group based on professional judgment and in accordance with OSHA, National Institute for Occupational Safety and Health (NIOSH), and American Conference of Government Industrial Hygienists (ACGIH).

Personnel sampling will be conducted to assess the potential exposure to individual employees and to ensure that the proper level of PPE has been selected for the assigned task(s). Samples will be collected in the

employee's breathing zone using personnel sampling pumps and the appropriate collection media. For tasks with the potential for exposure to significantly elevated chemical concentration, it is expected that the sampling frequency will increase.

If direct reading instruments indicate levels of vapors or particulates that exceed the action level for over 15 minutes in the work area, then personnel sampling will be initiated immediately. Sampling will be conducted, at a minimum, on the worker with the highest expected exposure. Monitoring will continue until levels recorded by direct reading instruments return below the action level.

Once initiated, sampling will always continue for a period long enough to collect a volume of air sufficient to allow the laboratory to achieve an analytical detection limit no greater than one-half the OSHA PEL or ACGIH threshold limit value, whichever is the more stringent of the two. The samples will be collected in accordance with the approved NIOSH or OSHA methodology and analyzed for the appropriate contaminant(s) of concern. All personnel exposure samples shall be analyzed by a laboratory accredited by American Industrial Hygiene Association in accordance with the appropriate NIOSH or OSHA methodology.

C.9.4 RADIOLOGICAL MONITORING

RADCON will perform personnel air monitoring during work in contamination areas and potentially at the boundary. Scanning of equipment and personnel will also be performed to minimize the possibility of the spread of contamination. Personnel working on the project will also be monitored through Dosimetry and required to wear a dosimeter when working in radiological zones and submit bioassays as required.

C.10 EMERGENCY RESPONSE

C.10.1 RESPONSIBILITIES

The PM, FS, and HSR are responsible for the project emergency management program and ensuring that the appropriate emergency response equipment is readily available at the work site and in proper working order.

In the event of an emergency, all site personnel shall follow the requirements and provisions of the PGDP Emergency Management Plan. Emergency response shall be provided by the PGDP emergency response organization. The HSR will be in charge of personnel accountability during emergency activities. All personnel working on-site will be trained to recognize and report emergencies to the HSR or the FS. The HSR or FS will be responsible for notifying the PGDP emergency response organization.

The PGDP emergency response organization will be contacted for emergency response to all medical emergencies, fires, spills, or other emergencies. The plant shift superintendent (PSS) will coordinate 24-hour emergency response coverage. The requirements of this section will be communicated to site workers. Any new hazards or changes in the plan also will be communicated to site workers.

The DOE on-scene coordinator will provide oversight on an ongoing basis for emergency management/recovery activities.

C.10.2 REPORTING AN EMERGENCY

C.10.2.1 Discovery

The person who discovers an emergency shall immediately report it to the FS & HSR. If properly trained, he/she may attempt to establish control. Designated project personnel shall maintain a radio, telephone, or other reliable means of notifying emergency response personnel and the PSS.

C.10.2.2 Emergency Contacts

- **Fire:** Fire alarm pull box, plant telephone Bell System 333, or plant radio channel 16
- **Medical:** Plant telephone Bell System 333 or plant radio channel 16
- **Security:** Plant telephone Bell System 6246 or plant radio channel 16
- **PSS:** Plant telephone Bell System 6211 or plant radio channel 16.

If using a cell phone: 270-441-6333 for emergency, for NON-emergency use 270-441-6211.

C.10.3 INITIAL EMERGENCY RESPONSE

When an emergency occurs, the HSR or FS will assume responsibility for the management of the scene and the protection of the personnel. Personnel are to be evacuated from the immediate danger area, as appropriate. Depending on the degree of emergency, RADCON controls may need to be adhered to during the emergency. For personnel injury or illness, there will be at least one person with current training in first aid and cardiopulmonary resuscitation present on-site during all field activities. This individual will provide minor first aid until other emergency personnel arrive and assume emergency response duties or it is determined to transport the injured to the hospital or medical provider.

C.10.4 PADUCAH GASEOUS DIFFUSION PLANT ALARMS

The alarms can be heard by calling 6161 on a Bell phone. These include the following:

Radiation Emergency/Criticality Accident Alarm System (CAAS):	Continuous blast on a high-pitched air whistle or electronic horn **ACTION**: Evacuate area immediately and stay away from effected building, Report to an assigned plant assembly point.
Attack Warning/Tornado Warning:	Intermittent 2-second blast on plant horns **ACTION:** Take cover.
Evacuate Signal:	Continuous blast on plant horns **ACTION:** Evacuate building.
Plant Emergency:	Hi-Lo Tones **ACTION:** Listen to plant public address system/radio for instructions.
Cascade Buildings:	Three blasts on building horns or howlers **ACTION:** Call area control room.

Other Buildings: One 10-second blast on building horns or sirens
ACTION: Follow local emergency procedures.

During field activities all personnel must participate in all PGDP accountability/assembly drills. For accountability, all on-site project personnel must report to the appropriate assembly station, as directed within the AHAs. The FS, HSR, or designee will be responsible for accounting for all field personnel (including sub-tier subcontractor personnel) and reporting any unaccounted-for personnel to the emergency coordinator.

C.10.5 REPORTING A SPILL

When a spill is discovered, personnel will the report the occurrence to the FS or HSR, who will immediately contact the PSS, environmental compliance, and the PM and convey as much information as possible (e.g., material involved, estimated quantity spilled/affected, location, affected personnel, other hazardous conditions).

C.10.6 PROTECTIVE ACTIONS FOR SPILL

An effort will be made to stop the release and contain the spill using materials in the on-site spill response kit, only if it is safe to do so and if no unprotected exposures occur. A telephone contact list containing emergency notification phone numbers will be located at the job site.

In the event that personnel are exposed to hazardous chemicals or radioactive materials, appropriate emergency response action will be taken to remove the contaminated clothing. An emergency shower and eyewash station will be used to flush exposed skin and eyes, respectively. This emergency equipment will be maintained in a readily accessible location adjacent to the active work area.

If an acute exposure to airborne chemicals occurs or is suspected and the affected personnel are unable to escape the work zone, the FS or HSR immediately will contact the PSS for assistance. Rescue operations will not be performed unless the rescuers are dressed in the appropriate protective equipment.

Project management will be responsible for ensuring all spills of hazardous materials are cleaned up properly and disposed of, including any material generated from the spill, unless otherwise directed.

The FS or HSR has the following responsibilities:

- Ensure that spill containment is performed safely;
- Provide all known information to the PSS to ensure proper response;
- Ensure that decontamination measures for exposed personnel are conducted safely and promptly;
- Ensure that, if personnel are exposed to airborne chemicals and are unable to escape the work zone, rescue is not attempted unless rescue personnel are dressed in the appropriate protective equipment; and
- Notify environmental compliance for spill reporting and cleanup requirements.

C.11. TEMPERATURE EXTREMES

Ambient temperatures may pose a threat to project personnel; however, the combination of PPE worn in the work zone and ventilation conditions may indicate the need for monitoring personnel for heat or cold tolerance and signs of heat or cold stress. Workers will be evaluated prior to beginning operations and assessed as conditions warrant during and after work in PPE. Personnel who are not required to wear PPE are not immune to the potential hazards of heat- or cold-related disorders or conditions and, therefore, may be included in the monitoring program.

C.12. DECONTAMINATION

Contamination of personnel, equipment, and/or material can occur from contact with radiological and/or hazardous material. When decontamination is required, appropriate procedures shall be followed to ensure effective decontamination is achieved and to minimize generation of mixed waste.

The overall objectives of decontamination are as follows:

- Determine and implement the decontamination methods for personnel and equipment that are effective for the specific hazardous/radioactive substance(s) present;
- Ensure the decontamination procedure itself does not pose any additional safety or health hazard;
- Provide pertinent information on the locations and layouts of decontamination stations and equipment; and
- Establish procedures for the collection, storage, and disposal of clothing and equipment that have not been decontaminated completely.

It is assumed that the majority of contamination concerns from the C-746-A EES will be radiological. Disposable PPE and one-time use items may undergo radiological surveys prior to release for disposal as nonradioactive waste. Reusable equipment may be required to undergo a radiological survey prior to release from a radiological area. If hazardous waste is encountered, IS and RADCON will assist project management in determining additional methods of decontamination. If clothing or equipment is contaminated with both radiological and hazardous material, mixed waste may be generated. Special precautions shall be taken to ensure that waste is handled, treated, stored, and disposed of properly. In an effort to reduce waste, consideration shall be given during the planning process on effective ways or methods to minimize the production of trash, PPE waste, etc.

C.13. TRAINING MATRIX

Employees assigned to the C-746-EES project must be trained according to contract and HASP requirements. The minimum training requirements listed in Table C.1 apply to all personnel who perform work in the C-746-A EES.

Table C.1. Training Matrix for the C-746-A East End Smelter D&D Project

REQUIRED TRAINING FOR ENTRY INTO C-746-A EES
GET
RAD Worker II
C-746-A East End Smelter Health and Safety Plan Required Reading
Asbestos Awareness, for workers not performing abatement
Asbestos Worker with current 8 hr refresher for workers performing abatement
Asbestos Contractor/Supervisor and current 8 hr refresher for abatement supervisors
Beryllium Awareness
Lead Awareness
Baseline Bioassay
Hearing Conservation
HAZWOPER 40 hour
HAZWOPER 8 hour Supervisor, for Supervisors and Managers
Current HAZWOPER 8 hour refresher
Current HAZWOPER medical physical examination
Respirator Training/Medical Certification

During the progression of work planning, training needs may be identified that are over and above the minimum requirements. If this is the case, the appropriate training will be provided prior to initiating the work task.

The front line supervisor shall verify employee training status prior to the start of work.

Subcontractors must submit documentation of training to the training manager prior to entering the work site. If an individual is delinquent in any of the required training, entry into the C-746-A EES will not be permitted.

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