Department of Energy

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AUG 16 2018

Mr. Brian Begley
Federal Facility Agreement Manager
Division of Waste Management
Kentucky Department for Environmental Protection
300 Sower Boulevard, 2nd Floor
Frankfort, Kentucky 40601

PPPO-02-5070866-18

Ms. Julie Corkran
Federal Facility Agreement Manager
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street
Atlanta, Georgia 30303

Dear Mr. Begley and Ms. Corkran:

TRANSMITTAL OF REMOVAL ACTION WORK PLAN FOR DEMOLITION OF THE C-400 CLEANING BUILDING IN THE C-400 COMPLEX OPERABLE UNIT AT THE PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY (DOE/LX/07-2432&D1)

Please find enclosed the *Removal Action Work Plan for Demolition of the C-400 Cleaning Building in the C-400 Complex Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-2432&D1 (RAWP). This RAWP was developed consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); Federal Facility Agreement (FFA) for the Paducah Gaseous Diffusion Plant; and the Memorandum of Agreement concerning the C-400 Complex, dated August 8, 2017.

This RAWP is written to reflect that precursor CERCLA removal action documents (e.g., the Engineering Evaluation/Cost Analysis and Action Memorandum for the C-400 Cleaning Building) will be finalized and approved prior to the approval of the RAWP.

In accordance with Section XX.G and Appendix F of the FFA, the Kentucky Department for Environmental Protection and the U.S. Environmental Protection Agency have a 30-day review and comment period.

If you have any questions or require additional information, please contact April Ladd at (270) 441-6843.

Sincerely,

Tracey Duncan
Federal Facility Agreement Manager
Portsmouth/Paducah Project Office

Enclosures:
1. Certification Page
2. RAWP for Demolition of the C-400 Cleaning Building, DOE/LX/07-2432&D1

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CERTIFICATION

Document Identification: ***Removal Action Work Plan for Demolition of the C-400 Cleaning Building in the C-400 Complex Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,*** **DOE/LX/07-2432&D1, dated August 2018**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Four Rivers Nuclear Partnership, LLC

Myrna E. Redfield, Deputy Program Manager
Four Rivers Nuclear Partnership, LLC

8/16/18
Date Signed

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

U.S. Department of Energy

Jennifer Woodard, Paducah Site Lead
Portsmouth/Paducah Project Office
U.S. Department of Energy

8/16/18
Date Signed

DOE/LX/07-2432&D1
Primary Document

Removal Action Work Plan for Demolition of the C-400 Cleaning Building in the C-400 Complex Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

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DOE/LX/07-2432&D1
Primary Document

Removal Action Work Plan for Demolition of the C-400 Cleaning Building in the C-400 Complex Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

Date Issued—August 2018

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
FOUR RIVERS NUCLEAR PARTNERSHIP, LLC,
managing the
Deactivation and Remediation Project at the
Paducah Gaseous Diffusion Plant
under contract DE-EM0004895

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FIGURES

TABLES

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ACRONYMS

ACM	asbestos-containing material
AM	action memorandum
AOC	area of contamination
ARAR	applicable or relevant and appropriate requirement
BMP	best management practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DQO	data quality objective
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
HASP	health and safety plan
IH	industrial hygiene
HP	health physics
ISMS	Integrated Safety Management System
JHA	job hazard analysis
KPDES	Kentucky Pollutant Discharge Elimination System
LLW	low-level waste
MOA	memorandum of agreement
NNSS	Nevada National Security Site
NTCRA	non-time-critical removal action
PGDP	Paducah Gaseous Diffusion Plant
RAO	removal action objective
RCRA	Resource Conservation and Recovery Act
RAWP	removal action work plan
SME	subject matter expert
SMP	Site Management Plan
SWMU	solid waste management unit
TSCA	Toxic Substances Control Act
WAC	waste acceptance criteria

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EXECUTIVE SUMMARY

This Removal Action Work Plan (RAWP) describes the demolition of the C-400 Cleaning Building in the C-400 Complex 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) (EPA 1993). The following documents have been prepared for the removal action covered in this RAWP:

- *Removal Notification for Demolition of the C-400 Cleaning Building in the C-400 Complex Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/LX/07-2420&D2 (DOE 2018a);

- *Engineering Evaluation/Cost Analysis for Demolition of the C-400 Cleaning Building in the C-400 Complex Operable Unit at the Paducah Gaseous Diffusion Plant,* DOE/LX/07-2425&D1 (EE/CA) (DOE 2018b); and

- *Action Memorandum for the C-400 Cleaning Building Non-Time-Critical Removal Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/LX/07-2427&D1 (AM) (DOE 2018c).

The C-400 Cleaning Building is undergoing deactivation under U.S. Department of Energy (DOE) Atomic Energy Act authority. The project is being conducted in accordance with applicable DOE, state, and other federal regulations. The deactivation will be followed by the demolition described in this RAWP.

After deactivation, all chemical-and/or radionuclide-containing systems (e.g., process piping, equipment) will be emptied of residual material in accordance with applicable requirements. The interior building surfaces and remaining infrastructure (e.g., floors, walls, residual piping, transite siding, and equipment) will be cleaned and/or sealed to the extent practicable to contain and minimize contaminant releases during the NTCRA.

This RAWP addresses demolition, down to the slab of all components in the C-400 Cleaning Building that remain after deactivation. This NTCRA meets the following removal action objectives agreed to by DOE, the U.S. Environmental Protection Agency (EPA), and the Kentucky Department for Environmental Protection, as defined in the AM (DOE 2018c):

1. Eliminate, reduce, or otherwise mitigate the potential for releases of hazardous substances from structural deterioration of the C-400 Cleaning Building;

2. Minimize potential threats to human health and the environment that may result from uncontrolled releases from the C-400 Cleaning Building; and

3. Facilitate a comprehensive remedial investigation in support of remedy selection.

This removal action supports long-term remediation of PGDP. Demolishing the C-400 Cleaning Building will remove a source of a potential release to the environment, thereby reducing the risk that would be posed if the building were left standing.

Hazardous substances, as documented in the EE/CA and AM, include the following:

- Asbestos-containing material,
- Polychlorinated biphenyls,
- Radionuclides,
- Uranium,
- Lead,
- Trichloroethene, and
- Trichloroethane.

Specific activities that will be performed during the NTCRA include characterization, demolition, and management and disposition of demolition related waste. At the conclusion of the NTCRA, all C-400 Cleaning Building components above the slab/foundation will have been removed; a sealant will have been applied to the remaining slab/foundation; all openings in the slab/foundation will have been plugged or sealed; the sealed surface slab/foundation will be free of visible contaminants (e.g., grease, oil, or paint chips) and removable radiological contamination; the slab/foundation will have been properly posted, if needed, with respect to radiological conditions; and all waste generated during the NTCRA will have been dispositioned properly. The slabs, subsurface structures, and underlying soil will be addressed by the C-400 Complex Remedial Action.

Demolition debris generated from this removal action will be treated, if necessary, and disposed of in accordance with applicable or relevant and appropriate requirements for on-site activities and applicable requirements for off-site activities.

DOE's deactivation and remediation contractor will perform the work described in this RAWP, using subcontractors as necessary. The Demolition Plan, the Removal Action Verification Plan, the Health and Safety Plan, and a list of procedures are included as appendices to the RAWP.

1. INTRODUCTION AND PURPOSE

This Removal Action Work Plan (RAWP) addresses the structural demolition of the C-400 Cleaning Building as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 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 have agreed to address demolition activities under the existing Federal Facility Agreement (FFA) (EPA 1998) and in accordance with the joint EPA and DOE policy statement with respect to demolition of DOE facilities (DOE and EPA 1995).

Under the terms of a Memorandum of Agreement (MOA) signed in August 2017, building deactivation will occur outside of the FFA and prior to the NTCRA (DOE 2017). The MOA specifies that decommissioning and demolition activities will be addressed by a CERCLA NTCRA (EPA 1993).

Deactivation activities, including removal of much of the hazardous materials located within the facility and infrastructure that may contain such material, initiated under DOE's Atomic Energy Act authority, presently are ongoing and will be completed prior to the NTCRA.

The approach in this removal action anticipates that some infrastructure will be left in place to be decommissioned and demolished with the facility structure. After the deactivation is completed, it is anticipated that all accessible interior chemical and/or radionuclide containing systems (e.g., process piping) will have been emptied of residual material to the extent practicable. The building surfaces and remaining infrastructure that will be removed during structural demolition (e.g., walls, residual piping, transite siding, and equipment) will have been sealed to the extent practicable to contain and minimize airborne releases during the demolition process.

The superstructure and nonhazardous process systems of the C-400 Cleaning Building that remain following deactivation of the C-400 Cleaning Building are expected to contain sanitary waste, low-level waste (LLW), polychlorinated biphenyl (PCB) bulk product waste, and/or asbestos-containing material (ACM). Some components of the building that contain potentially hazardous substances (e.g., lead associated with couplers in roof drains and roof flashing) will remain in the building after deactivation and be demolished with the building; these potentially hazardous components will be segregated from nonhazardous building debris during waste loadout and managed appropriately. Small quantities of potentially hazardous substances such as paint chips also may be generated during building demolition. These small quantities are not expected to make the remaining demolition debris waste stream characteristic Resource Conservation and Recovery Act (RCRA)-hazardous waste.

Demolishing the C-400 Cleaning Building will remove a source of a potential release to the environment, thereby reducing the risk that would be posed by the structure if it were left standing. This removal action meets the removal action objectives (RAOs) defined in Section 2.2 and supports the long-term remediation of the Paducah Gaseous Diffusion Plant (PGDP).

Activities that will be performed during the NTCRA can be grouped into one of the following eight categories:

- Characterization in support of waste disposition
- Mobilization for demolition
- Asbestos abatement
- Air monitoring
- Superstructure removal

- Management and disposition of waste
- Site restoration
- Demobilization

The project will leave the ground level slabs, pits, and foundations in a protective state. Some potentially hazardous items, such as lead couplings associated with piping that are not readily accessible, that could impact structural integrity, if removed, also will be left in place. The slabs, subsurface structures, and underlying soil will be addressed by the C-400 Complex Remedial Action.

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 C-400 Cleaning Building (DOE 2018d). The AM documents the decision to proceed with structural demolition of the C-400 Cleaning Building as a CERCLA NTCRA (DOE 2018c).

1.2 SCOPE OF THE REMOVAL ACTION WORK PLAN

This RAWP was prepared in accordance with requirements of CERCLA (EPA 1993) and the Paducah FFA (EPA 1998).

This RAWP includes the following:

- Project schedule for demolition of the C-400 Cleaning Building;
- Description of plans and objectives for the structural demolition removal action; and
- Strategy for waste characterization prior to demolition of the C-400 Cleaning Building.

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.

2. PROJECT DESCRIPTION

2.1 FACILITY DESCRIPTION

The C-400 Cleaning Building is located inside the Limited Area, near the center of the industrial section of the Paducah Site. The building is between 10th and 11th Streets to the west and east, respectively, and between Virginia and Tennessee Avenues to the north and south, respectively. An inset depicting the location of the C-400 Cleaning Building in relation to the plant site can be found in Figure 1. Figure 2 is a photograph of the exterior of the facility looking to the northwest.

The C-400 Cleaning Building is a rectangular structure (roughly 200 ft by 520 ft, plus appurtenances that are incidental and not included in these dimensions) with a footprint of approximately 116,000 ft^2. The C-400 Cleaning Building floor space is approximately 134,000 ft^2. The large east basement floor is approximately 18,000 ft^2 (approximately 60 ft by 300 ft). The depth of this basement varies with an approximate maximum depth of 18.5 ft. The east side of the building, as well as the central and southern portions of the west half of the building, housed disassembly and part cleaning equipment. The northwest section encompassed the former laundry area.

The C-400 Cleaning Building is constructed of approximately 12-inch-thick concrete exterior walls for approximately the first 8 ft of height. Above the concrete portion, the walls consist of windows and corrugated transite panels on steel framing. The building is divided into two sections by a north-south interior wall that runs the entire length of the building (approximately 520 ft). Similar to the exterior wall, the lower 8 ft of the interior wall is constructed of concrete (though only approximately 8-inches thick) with transite panels secured to steel framing above. The east side of the building elevation is approximately 47-ft high, while the west side building elevation is approximately 37-ft high.

The functions of the C-400 Cleaning Building, which operated from 1952 to 2014, included cleaning, metal etching and plating, radioactive materials stabilization and recovery, metals recovery, uranium hexafluoride (UF_6) cylinder washing, uranium trioxide production, diffusion process equipment testing, and uranium tetrafluoride (green salt) pulverization. The building and adjacent structures have been used in a wide variety of functions to support operations at the plant, including cleaning and maintenance of equipment from the uranium enrichment process buildings and some from outside contractual work.

2.2 REMOVAL ACTION SCOPE AND OBJECTIVES

The NTCRA at the C-400 Cleaning Building will entail demolishing and packaging the building structures, including any infrastructure that remains after deactivation. It also includes removing the corrugated asbestos transite siding on the structures and packaging it for disposition. Wastes generated will be packaged and dispositioned in accordance with ARARs. The NTCRA will not involve removal of the ground level slabs, subsurface structures, or underlying soils; sumps and pits will be backfilled with flowable fill or similar material during deactivation; and, as part of deactivation, slabs also will be decontaminated, as needed, and a fixative will be applied.

The following are the RAOs for this project:

1. Eliminate, reduce, or otherwise mitigate the potential for releases of hazardous substances from structural deterioration of the C-400 Cleaning Building;

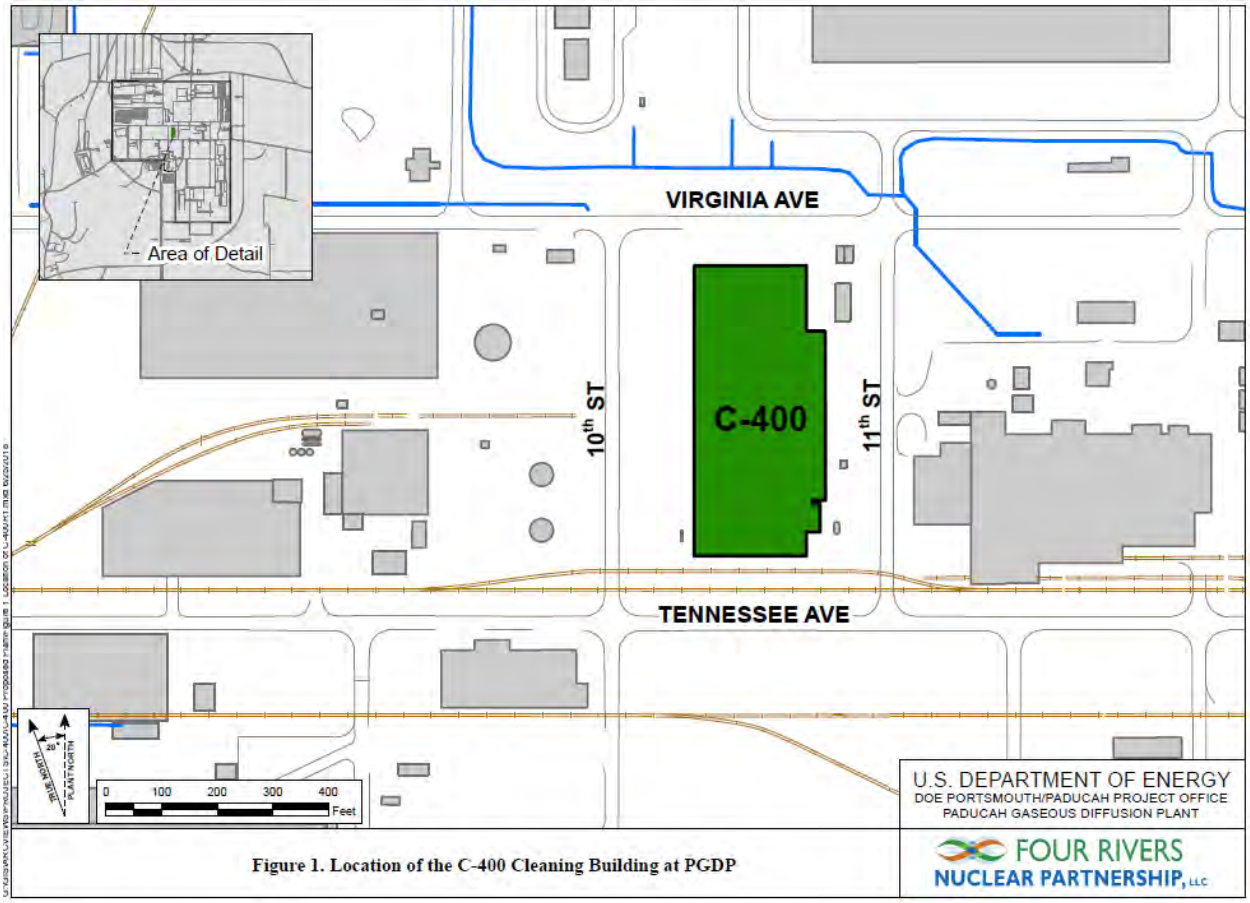

Figure 1. Location of the C-400 Cleaning Building at PGDP

Figure 2. Exterior of the C-400 Cleaning Building Looking to the Northwest

2. Minimize potential threats to human health and the environment that may result from uncontrolled releases from the C-400 Cleaning Building; and

3. Facilitate a comprehensive remedial investigation in support of remedy selection.

Solid waste management units (SWMUs) associated with the C-400 Cleaning Building are listed in the fiscal year 2018 Site Management Plan (SMP) (DOE 2018d); any potential environmental releases from these SWMU will be evaluated and addressed as part of the remedial investigation/action following demolition.

2.3 REMOVAL ACTION APPROACH

Information in this section of the RAWP is supplemented by the Demolition Plan included in Appendix A.

The demolition of the C-400 Cleaning Building will be compliant with ARARs. 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.

Prior to the NTCRA, deactivation activities at the C-400 Cleaning Building will have removed the contaminated loose materials. The process infrastructure and asbestos insulation inside the buildings will have been removed prior to initiation of the demolition activities described in this RAWP. The exterior transite wall panels will be removed manually as part of the demolition activities.

Chemical- and/or radionuclide-containing systems (e.g., process piping) will have been emptied of residual material. The structural support systems and remaining infrastructure designated for structural demolition (e.g., walls, residual piping, equipment, and transite siding) will have been sealed with a fixative to minimize contaminant releases during the demolition process.

Small volumes of hazardous waste may be generated during building demolition, and to the extent practicable, these waste streams will be segregated from the building debris and managed in accordance with ARARs. The contaminants that may remain after deactivation are expected to include radiological contamination, PCBs in paint, lead in pipe couplers and transite panel fasteners, and dust that potentially contains lead. Any hazardous materials that may remain 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 characteristic RCRA hazardous waste. Contaminated debris and environmental media no longer are considered to contain hazardous waste: (1) when they no longer exhibit a characteristic of hazardous waste, and (2) when concentrations of the listed hazardous constituents are below health-based levels. Kentucky Division of Waste Management and EPA Region 4 previously have approved site-specific, health-based levels for making no longer contained-in/contaminated-with determinations for environmental media and debris at PGDP with respect to trichloroethene and 1,1,1-trichloroethane. The health-based levels that will be used to conduct contained-in determinations were approved by Kentucky Division of Waste Management in the 2003 Agreed Order. Health-based levels originally were approved by EPA in correspondence dated March 5, 2009, and May 19, 2009, and in the *Remedial Action Work Plan for the Interim Remedial Action for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-0004&D2/R2/A1 (DOE 2010). The structure and infrastructure that remain after deactivation is completed will be characterized and are expected to consist of various types of waste such as ACM, LLW, PCB bulk product waste, and solid waste.

The NTCRA, including removal of transite, remaining equipment, and piping, and the demolition of the building will be accomplished in a manner consistent with ARARs. Subgrade areas (e.g., basements, pits, and sumps) will be backfilled with flowable fill or similar material during deactivation, and slabs will be decontaminated and/or an epoxy-type fixative will be applied. The initial application of fixative would occur as a deactivation activity; additional applications may be required as part of maintenance during the NTCRA.

To accomplish the project safely and 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 demolition of the C-400 Cleaning Building will require an integrated approach to ensure compliance with all technical, environmental, and safety requirements throughout all phases of the NTCRA. Planning for demolition will incorporate the ISMS process. The Demolition Plan is included in this RAWP as Appendix A. The Removal Action Verification Plan is included in this RAWP as Appendix B. The Health and Safety Plan is included in this RAWP as Appendix C. Section 4 of this RAWP includes a project schedule.

2.3.2 Hazard Analysis

Every task executed during the demolition program will be subjected to a job hazard analysis (JHA) to ensure the safety of the operating personnel, the public, and the environment. Task-specific JHAs and work packages are prepared for each activity. These work packages and JHAs are reviewed and approved by the appropriate technical managers; industrial hygiene (IH) professionals; health physics (HP) professionals; Environment, Safety, and Health professionals; subject matter experts (SMEs); and work force peers before any work is performed. These procedures have been, and continue to be, modified as new and improved methods of assessment and response are identified and new situations arise during demolition activities. Prior to initiating each task, the field team will walk down the area to define and assess the hazards involved in performing the specific activity.

Structural components will be evaluated to assess hazards related to the demolition process. Prior to initiating the demolition process, material and equipment will be inspected to identify physical hazards. Process knowledge relating to the physical condition of the equipment and structure will be obtained from available personnel who worked in the C-400 Cleaning Building. The hazard analysis will include identification of each potential hazard related to securing, dismantling, and removing each component. Hazardous energy sources, such as power connections and associated supply sources, will be verified de-energized prior to dismantlement of the facility.

If hazards are identified, they will be assessed and included in the JHAs and work packages for the task. These documents definitively establish the procedures that must be used for each task, the hazards involved, and detailed methods for accomplishment. Each of the parties involved in the walkdown and subsequent assessment will review the work package prior to initiation of the work.

If additional characterization data are required to complete the hazard assessment, support from the characterization group and field sampling group will be requested. Task-specific procedures and protocols have been developed and used in previous NTCRA activities for collection, management, and analysis of samples. The results of this characterization will be integrated into the JHA/work package development.

2.3.3 Hazard Mitigation and Controls

DOE has implemented an ISMS 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, IH, occupational health, HP, and environmental compliance. ISMS requirements 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 wearing 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 minimize an additional waste stream.

Cross-contamination will be controlled through a combination of methods, including, but not limited to, fixing agents, physical barriers, and other contamination control measures. Barriers will be installed as the demolition progresses and may include plastic screens, temporary walls, isolation of areas using existing doors, etc. Fixative sprayed on the interior surfaces will minimize release of contaminants.

Decontamination is required for equipment that contacts contaminated material. Cleaning and decontamination of all equipment typically occur at the permanent C-752-C decontamination pad; however, a temporary decontamination pad may be established within the C-400 Complex. Decontamination water may be treated before discharge, as needed, to meet discharge limits specified in Table A.2 of the EE/CA; it will be discharged through an existing Kentucky Pollutant Discharge Elimination System (KPDES)-permitted outfall or a CERCLA outfall or managed at a commercial wastewater treatment facility. ARARs for both on-site discharge options are included in Table A.2 of the EE/CA (e.g., Treatment of wastewater in a wastewater treatment unit may be required to meet ARARs prior to discharge). Disassembly of equipment may be required for areas that are inaccessible (i.e., tracks, pumps, etc.). Decontamination shall be accomplished using brushes or pressure washers with appropriate

solvents or tap water and soap, if necessary, to remove particulate matter and surface films. The component shall be rinsed with tap water prior to relocation to an appropriate storage area. All equipment will be surveyed by radiation control personnel prior to free release from the plant. Prior to their removal from the site, equipment and material must be decontaminated and verified to be free of radiological contamination in accordance with ARARs.

Air monitoring in the areas around the structures will allow for identification and mitigation of airborne contamination. Asbestos-control procedures will be instituted during building demolition. These procedures will be implemented in compliance with ARARs. ACM will be managed in accordance with the ARARs from demolition until they are appropriately disposed of in the PGDP C-746-U Landfill or an approved commercial landfill.

Contaminants that may be monitored during C-400 NTCRA activities are the following:

- Lead dust from paint;
- Additional metals, such as cadmium, silver, and beryllium, as needed;
- Asbestos; and
- Radionuclides.

These constituents will be monitored in the work area using the appropriate type of sampling equipment.

Erosion control structures will be erected to control surface drainage around the facility to minimize sediments in receiving streams. Storm-water best management practices (BMPs) will be implemented, where necessary. Figure 3 illustrates the general configuration of storm-water sewers in the vicinity of the C-400 Cleaning Building. The storm-water inlets will be protected by the installation of materials to remove contaminants physically and chemically from storm-water runoff (e.g., straw bales, silt fencing, apatite or steel wool beds). Other sediment barriers and/or temporary storm-water control structures such as berms, absorbent socks, and diversion ditches will be installed, as needed, to minimize excessive erosion and resulting sediment entering the receiving stream. Another project-specific BMP will be application of fixative to the interior surfaces of the C-400 Cleaning Building to minimize storm-water contact with potentially contaminated surfaces after the surfaces no longer are under the roof. Demolition debris will be loaded into conveyances as soon as possible to minimize its exposure to the elements. Floor drains in the C-400 Cleaning Building will be plugged. Roof drains will be plugged at grade. These controls will supplement the sitewide BMPs described in the *Best Management Practices Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, PAD-REG-1006/FR2 (FRNP 2018).

Demolishing the building will include manual removal of transite panels to reduce the probability of airborne asbestos contamination. The panels will be removed by detaching the fasteners from the building. The weatherproof lead components that were used on these fasteners where they were exposed to the elements will be collected as they are removed and packaged for disposal in appropriately labeled containers. Manual removal will be performed by crews working in man lifts; workers will be protected fully from exposure to asbestos fibers by wearing appropriate personal protective equipment.

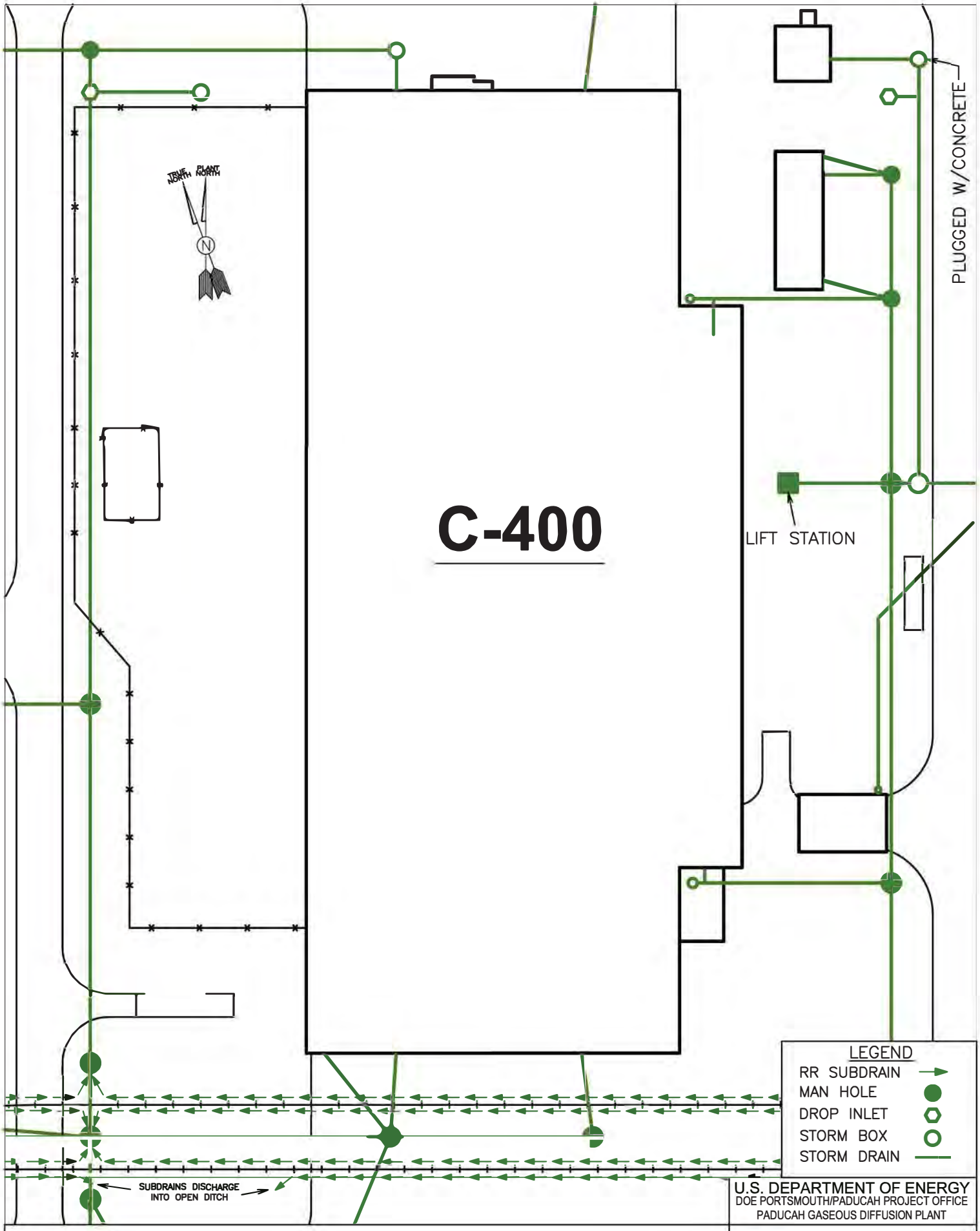

Figure 3. Storm-water Drainage System in the Vicinity of the C-400 Cleaning Building

Asbestos Controls. The only ACM expected to remain after the deactivation activities will be transite panels. The hazards associated with removal of transite include fugitive ACM emissions from possible breakage of the transite panels and the lead associated with the fasteners. All transite panels shall be removed intact or in large sections and shall be lowered carefully to the ground using a crane or a specially equipped man lift.

The panels will be removed by detaching the fasteners from the building. The lead associated with the fasteners will be collected and packaged for disposal in appropriately labeled containers. Plastic sheeting placed on the ground beneath the work area will prevent the loss of any lead into the soils.

Transite siding will be bundled (e.g., placed on two 4-inch × 4-inch × 12-ft long wood posts and stacked approximately 2-ft high) and double wrapped with 6-mil thick plastic sheeting and one layer of absorbent material for disposition. Misting with water will be utilized during the transite removal process to minimize airborne contamination. Care will be taken not to break or crush the transite panels during removal.

Hazardous Energy. All hazardous energy sources such as steam and electrical power will have been addressed (e.g., de-energized, air gapped, and marked) during the deactivation process. NTCRA 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. Lockout/tagout of temporary energy sources installed to support the demolition activities will be managed in the same manner as permanent sources.

Water. Demolition activities are not expected to generate significant wastewater discharge volumes. Contaminated wastewater (i.e., decontamination water) may be treated before discharge, as needed, to meet discharge limits specified in the ARARs. Wastewater will be discharged through an existing KPDES-permitted outfall or a CERCLA outfall or managed at a commercial wastewater treatment facility. ARARs for both discharge options are included in Table A.2 of the EE/CA, which is appended to the AM. Treatment of wastewater in a wastewater treatment unit may be required to meet ARARs prior to discharge to ensure protection of human health and the environment. Water used to decontaminate equipment and personnel will be containerized, transported, and treated, if necessary, prior to disposition either through an existing KPDES outfall or acceptable commercial facility in accordance with the CERCLA Off-Site Rule (40 *CFR* § 300.440). Shower water for personnel will be treated in the PGDP Sanitary Wastewater Collection Treatment System. Water used for dust control will be minimized.

Air. C-400 Cleaning Building demolition may generate airborne particulates that may be radiologically and/or chemically contaminated. The migration pathway for airborne emissions includes 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. Transite siding containing asbestos will be manually removed and managed in accordance with ARARs. The systems left in place, following deactivation, may contain small quantities of hazardous substances, but the levels are not expected to result in the building debris being characterized as a RCRA hazardous or Toxic Substances Control Act (TSCA)-regulated waste. Some components of the building that contain potentially hazardous substances (e.g., lead associated with couplers in roof drains and roof flashing) will remain in the building after deactivation and be demolished with the building; these potentially hazardous components will be segregated from nonhazardous building debris during waste loadout and managed appropriately. Small quantities of potentially hazardous substances such as paint chips, also may be generated during building demolition. These small quantities are not expected to make the remaining demolition debris waste stream characteristic RCRA hazardous waste.

2.3.4 Characterization

Characterization is necessary to ensure a safe working environment and to determine the proper disposition of waste materials from the project. The waste streams generated during the decommissioning process will have been 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 obtained during the deactivation activities, development and application of process knowledge, and historic data research as identified through the data quality objective (DQO) approach. The need to fill any identified data gaps will be determined on a case-by-case basis based on DQOs. Where necessary, sampling will be utilized to verify historical data and/or process knowledge.

Where applicable, waste material will be dispositioned in compliance with the ARARs and the WAC of the designated disposal facility. Treatment of some waste material may be required prior to disposal. Characterization data will facilitate segregation of the waste material in accordance with the compliance WACs of the disposition facilities.

Samples collected during the course of this project that must be shipped off-site will be shipped in accordance with U.S. Department of Transportation (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.

2.3.5 Demolition

Demolition of the C-400 Cleaning Building will be performed in accordance with the approach described in the Demolition Plan (Appendix A). Standard construction equipment will be used during demolition. Debris generated from demolition will reduced in size to fit conveyances. A listing of typical equipment that may be used on the project is included in Table 1. Contractor-developed procedures for work controls and implementation methods that are anticipated to be used frequently during this NTCRA are listed in Appendix D.

Specific task instructions addressing the hands-on demolition, waste packaging, and other support activities will be developed, reviewed, and approved by SMEs and experienced personnel. These work instructions will be developed in accordance with the work control procedures listed in Appendix D.

Demolition will remove the abovegrade C-400 Cleaning Building structure; all that will remain of the C-400 Cleaning Building will be the concrete slab, including subgrade areas (e.g., basements, pits, and sumps); curbing; column supports; and any other concrete components of the slab. Also remaining after demolition will be items embedded in the slab components, such as anchor bolts and piping; all such embedded items will be cut flush with the concrete surface. Piping that is cut flush with the concrete will be sealed. The C-400 Cleaning Building NTCRA will not involve removal of the ground level slabs, subsurface structures, or underlying soil. Subgrade areas, such as basements, pits, and sumps will be backfilled during deactivation to prevent accumulation of water and eliminate hazards to on-site personnel. The slab will be inspected, and the presence and characteristics of the cracks or breakage in the slab will be noted and placed in project files for future investigations. The slab will be decontaminated, as appropriate, and sealed or covered to minimize the possibility of spreading contamination. It is anticipated that after decontamination, a fixative/stabilizer coating or an earthen cover will be applied to the slab.

Table 1. Description and Evaluation of Typical 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 that create 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 and could result in additional worker hazards.
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.	Cost of purchase is relatively high.	Capable of cutting most material in the building (e.g., structural beams, large pipe, plate steel, dip tanks).
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.	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 coatings that contain PCBs or lead.
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 coatings that contain PCBs or lead.

Loose and scaling paint will be removed from the foundation and other hard surfaces to the extent that the substrate forms a surface that will bond well with the fixative/stabilizer. Figure 4 depicts the slab floors of the C-400 Cleaning Building.

2.3.6 Waste Material Disposition

Wastes expected to be generated during the removal action include TSCA PCB waste (including PCB bulk product wastes and PCB remediation wastes); RCRA hazardous waste debris; asbestos waste; radioactive wastes (anticipated to be LLW); solid wastes, including the building structural components that are not considered to be any of the aforementioned waste types. Solid waste, including ACM, may be disposed of in the C-746-U Landfill in accordance with ARARs and the applicable WAC. Other waste types listed above will be disposed of at a commercial disposal facility or at the Nevada National Security Site (NNSS).

Debris generated during this action will be packaged and loaded in the area of contamination (AOC). Staging also will occur in the AOC to the extent possible; however, staging areas such as the C-759 Scrap Metal Staging Area or the C-760 North-South Diversion Ditch Laydown Gravel Pad, may be used for storage of loaded containers prior to placing them onto conveyances (railcars or trucks) for shipment. Existing waste storage facilities may be used, as appropriate, for staging and storage of packaged waste (e.g., hazardous or PCB waste) prior to shipment for disposal. Water generated from the decontamination materials and equipment will be properly managed. All waste storage locations will be located inside the Limited Area. All waste storage will adhere to the substantive waste storage requirements established in the ARARs that are listed in the EE/CA, which is appended to the AM.

Waste management activities, such as sorting, segregating, size reducing, packaging, and staging for disposal will be conducted in accordance with ARARs. Waste material shipped off-site will be shipped in accordance with DOT requirements. ACM will be managed in accordance with ARARs and disposed of in the C-746-U Landfill or an approved commercial landfill in accordance with applicable WAC.

2.3.6.1 Waste material segregation and treatment

Waste materials will be separated into waste streams that conform to the WAC of the receiving disposal facility. The majority of this waste is expected to be LLW and ACM (from transite panels); however, small volumes of contaminated material, such as paint chips or vacuum dust potentially containing lead, and/or PCB bulk product waste, may be generated during building demolition. When feasible, these materials will be segregated from the building debris and managed in accordance with ARARs.

Where necessary, some components may be size reduced to meet transportation or disposal criteria. Debris generated during this action will be loaded, packaged, and staged in accordance with ARARs.

Materials removed from the C-400 Cleaning Building may require on-site or off-site treatment in order to comply with environmental regulatory requirements prior to disposal. On-site treatment will be performed in accordance with ARARs. Off-site treatment activities will be in accordance with applicable regulations.

During segregation, sizing, and packaging of demolition debris, dust suppression methods, chiefly mists, will be utilized, as needed, to prevent generation of fugitive dusts. Use of enclosures and dust collection systems is not anticipated.

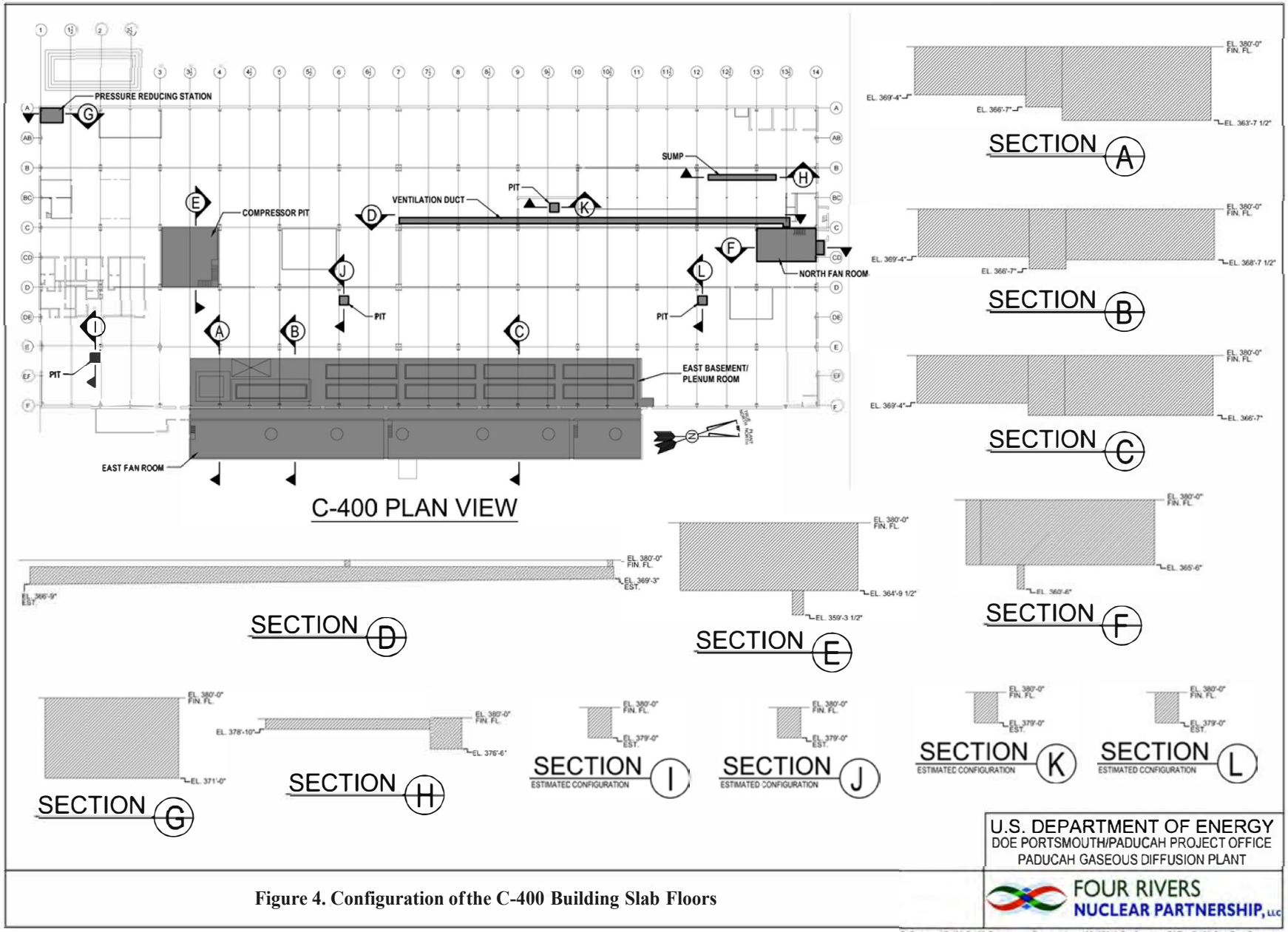

Figure 4. Configuration of the C-400 Building Slab Floors

2.3.6.2 Waste packaging

The waste generated during demolition 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 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 (also known as 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
- Asbestos
- Solid Waste

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

2.3.6.3 Waste shipping

Wastes may be transported by a variety of methods depending upon the characteristics of the waste and the disposal facility. Transportation to disposal facilities will comply with DOT regulations.

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 C-746-U Landfill will be transported in roll-off bins, in tandem dump trucks, or other approved conveyances.

Processed material destined for off-site shipment will be packaged in accordance with applicable DOT regulations and placed in a temporary staging area pending transportation to the final treatment/disposal site. Transportation of waste material to the C-746-U Landfill 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 demolition of the C-400 Cleaning Building are limited by the presence of radioisotopes at levels that exceed most industrial/sanitary landfill's radioisotope limits. There are three primary disposal options for the debris generated from the demolition activities. These include NNSS, commercial disposal facilities, and the C-746-U Landfill. Waste disposed of at the C-746-U Landfill will include nonhazardous solid waste that meets its WAC. In the event that these facilities cannot accept certain wastes, other facilities may be evaluated.

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 and the RAOs have been met. The Removal Action Verification Plan, Appendix B, provides additional details regarding the verification and completion of the RAOs. Support equipment and materials (e.g., storm-water control features, construction fencing, break trailers) not being retained for use in the C-400 Complex Remedial Investigation will be removed from the Paducah Site at the conclusion of the NTCRA. These materials must be decontaminated and verified to be free of radiological contamination, in accordance with ARARs. Equipment and material that is not suitable for reuse (e.g., is spent or can't be decontaminated) will be considered waste and will be dispositioned as described in Section 2.3.6.

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 the C-400 Cleaning Building and to ensure compliance with the AM and ARARs.

3.1 DEMOLITION PLAN

The Demolition Plan (Appendix A) includes the details of demolishing the C-400 Cleaning Building 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 ground-level slabs and foundations have been left in a protective state that will prevent the migration of contaminants from the facility slab after the facility structures have been demolished.

3.3 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 demolishing the C-400 Cleaning Building. During implementation of the removal action, specific work instruction and hazard controls will be developed at the activity level for use by the personnel performing the work. The ISMS process will be used in preparation of these work instructions.

3.4 WASTE MANAGEMENT PLAN

Waste Management activities will be performed in accordance with approved ARARs and the applicable revision of the *Four Rivers Nuclear Partnership, LLC, Paducah Deactivation and Remediation Project Waste Management Plan*, CP2-WM-0001. Project specific requirements will be established in a project-specific waste management plan as part of mobilization. Work instructions and procedures that incorporate and flow down the requirements of ARARs either are in place or will be developed for field personnel to utilize when performing day-to-day operations.

3.5 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.

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4. PROJECT SCHEDULE

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 NTCRA or this document. The enforceable milestones for performance of activities included as part of the removal action are set forth in the SMP (DOE 2018d). 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 2 provides key schedule elements and projected implementation dates for the demolition of the C-400 Cleaning Building.

Table 2. Project Schedule for Demolition of the C-400 Cleaning Building

Activity	Planning Date[1]
Issue D1 Removal Action Work Plan to Kentucky/EPA	8/17/18
Removal Action Field Start	11/27/18
Issue D1 Removal Action Report to Kentucky/EPA	9/29/19

[1] Note that these are general planning dates. 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 SMP 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 guidance as set forth in the AM when conducting this removal action. The ARARs for this NTCRA are identified in the approved EE/CA, which is appended to the AM (DOE 2018c).

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6. REFERENCES

DOE (U.S. Department of Energy) and EPA (U.S. Environmental Protection Agency) 1995. *Policy on Decommissioning of Department of Energy Facilities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*, U.S. Department of Energy and U.S. Environmental Protection Agency, Washington, DC, (based on EPA, DOE, DOD "Guidance on Accelerating CERCLA Environmental Restoration at Federal Facilities," August 22, 1994) May.

DOE 2010. *Removal Action Work Plan for the C-340 Complex Decommissioning at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/0344&D2, Primary Document, U.S. Department of Energy, Paducah, KY, October.

DOE 2017. *Memorandum of Agreement on the C-400 Complex under the Federal Facility Agreement for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, U.S. Department of Energy, Paducah, KY, August.

DOE 2018a. *Removal Notification for Demolition of the C-400 Cleaning Building in the C-400 Complex Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/LX/07-2420&D2, U.S. Department of Energy, Paducah, KY, March.

DOE 2018b. *Engineering Evaluation/Cost Analysis for Demolition of the C-400 Cleaning Building in the C-400 Complex Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/LX/07-2425&D1, U.S. Department of Energy, Paducah, KY, March.

DOE 2018c. *Action Memorandum for the C-400 Cleaning Building Non-Time-Critical Removal Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/LX/07-2427&D1, Primary Document, U.S. Department of Energy, Paducah, KY, June.

DOE 2018d. *Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Annual Revision—FY 2018*, DOE/LX/07-2418&D2, U.S. Department of Energy, Paducah, KY, April.

EPA (U.S. Environmental Protection Agency) 1993. *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA*, EPA/540-R-93-057, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, DC, August.

EPA 1998. *Federal Facility Agreement for the Paducah Gaseous Diffusion Plant*, U.S. Environmental Protection Agency, Atlanta, GA, February 13.

FRNP (Four Rivers Nuclear Partnership, LLC) 2018. *Best Management Practices Plan*, *Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, PAD-REG-1006/FR2, Four Rivers Nuclear Partnership, LLC, Kevil, KY, May.

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APPENDIX A

DEMOLITION PLAN FOR THE C-400 CLEANING BUILDING

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CONTENTS

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FIGURES

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ACRONYMS

ACM	asbestos-containing material
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
EE/CA	engineering evaluation/cost analysis
LLW	low-level waste
MOA	memorandum of agreement
NTCRA	non-time-critical removal action

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A.1. DEMOLITION PLAN FOR THE C-400 CLEANING BUILDING

A.1.1 GENERAL

This Demolition Plan for the C-400 Cleaning Building project defines the detailed activities required to achieve the remedial action objectives, as established in the approved Engineering Evaluation/Cost Analysis (EE/CA).

A.1.2 FACILITY DESCRIPTION

The primary function of the C-400 Cleaning Building, which operated from 1952 to 2014, included cleaning, metal etching and plating, radioactive materials stabilization and recovery, metals recovery, uranium hexafluoride cylinder washing, uranium trioxide production, diffusion process equipment testing, and uranium tetrafluoride (green salt) pulverization. The building and adjacent structures were used in a wide variety of functions to support operations at the plant, basically cleaning and maintenance of equipment from the uranium enrichment process buildings, including some from outside contractual work.

The C-400 Cleaning Building is located inside the central part of the Limited Area of the Paducah Gaseous Diffusion Plant near Paducah, Kentucky (Figure A.1). Figure A.2 is a photograph of the exterior of the facility looking to the northwest. The floor space of approximately 134,000 ft^2, takes into account the ground floor, basement floor, and the mezzanine floor. The C-400 Cleaning Building is constructed of approximately 12-inch thick concrete exterior walls for approximately the first 8 ft of height. Above the concrete walls, the walls consist of windows and corrugated asbestos transite panels on steel framing. The building is divided into two sections, east and west, by an interior wall that runs the length of the entire building, approximately 520 ft. The interior wall has asbestos transite panels secured to steel framing with lead head fasteners above an 8-inch thick concrete wall for the first 8 ft of height. The east side building elevation is approximately 47-ft high, while the west side building elevation is approximately 37-ft high.

The C-400 Cleaning Building includes North and South Penthouses that contained the electrical transformers and switchgear for power distribution in the facility. The penthouses are located at the northern and southern ends of the facility. Prior to beginning demolition, the electrical power to the equipment will be isolated, and components that could render the demolition debris as hazardous waste will be removed.

Under the terms of a Memorandum of Agreement (MOA) signed in August 2017, building deactivation will occur outside of the Federal Facility Agreement and prior to the non-time-critical removal action (NTCRA). The MOA specifies that decommissioning and demolition activities will be addressed by a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) NTCRA (EPA 1993).

Deactivation activities, including removal of much of the hazardous materials located within the facility and infrastructure that may contain such material, was initiated under the U.S. Department of Energy Atomic Energy Act authority, presently is ongoing and will be completed prior to the NTCRA. Complete deactivation will leave the C-400 Cleaning Building in a demolition-ready state, which includes, but is not limited to, the following:

- Building structure intact, including exterior and internal walls, windows, and roof;
- Interior of building structure coated with a fixative;

Figure A.1. Location Map of the C-400 Cleaning Building

Figure A.2. Exterior of the C-400 Cleaning Building Looking to the Northwest

- Floor and foundations (at grade and below grade) intact;
- Basement/subgrade areas filled;
- Dip tanks removed;
- Utility systems isolated;
- Sources of PCB liquids removed;
- Concrete slab inspected and staining documented; and
- Concrete slab sealed with fixative.

Where feasible, asbestos-containing material (ACM), other than transite panels, will have been removed during deactivation; any systems (e.g., process piping, equipment) that had contained chemicals and/or radionuclides will have been emptied of residual material, in accordance with applicable requirements.

Demolition will be accomplished in a manner consistent with applicable or relevant and appropriate requirements (ARARs). The building, transite siding, and infrastructure will be removed, size reduced, packaged, and transported to a designated disposal location. The slab will be cleaned and resealed with fixative as needed.

Small amounts of contaminants may remain after deactivation. This contamination includes polychlorinated biphenyls, radionuclides, specific volatile organic compounds such as trichloroethene and trichloroethane and specific heavy metals such as uranium and lead. The building also has ACM in its structure. Potentially hazardous items will be segregated from nonhazardous building debris during waste loadout and managed appropriately. Any remaining hazardous materials that become commingled with demolition debris are expected to be in sufficiently low quantities that such material would not require demolition debris to be regulated as characteristic 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 (LLW), mixed LLW/Toxic Substances Control Act, regulated asbestos, sanitary/industrial, and universal. In the event that interior asbestos insulation is discovered after demolition begins and cannot be removed safely, the exposed regulated ACM and any asbestos-contaminated debris will be treated as asbestos-containing waste material and will be kept

adequately wet at all times until it is dispositioned. Further, asbestos material that is commingled with other types of debris during demolition will be disposed of as asbestos-contaminated waste.

A.1.3 FACILITY DEMOLITION DESCRIPTION

Demolition activities can be grouped into one of the following nine categories:

- Characterization in support of waste disposition
- Mobilization for demolition
- Asbestos abatement
- Air monitoring
- Superstructure removal
- Management and disposition of waste
- Site restoration
- Demobilization
- Verification

Characterization will be performed to evaluate the radiological and chemical properties of the C-400 Cleaning Building structure in order to support transportation and waste disposition at a waste disposal facility. Characterization, primarily utilizing process knowledge and data collected during deactivation activities, will be used to determine waste classification, and support disposal of the building structure, including exterior and interior walls, windows, ceilings, and roofs. Limited sampling and analysis performed as a part of waste characterization procedures will be utilized for characterization if process knowledge or existing data are not available (e.g., for decontamination fluids).

Items will be characterized properly to determine potential sorting and segregation activities during demolition. Characterization will utilize process knowledge along with analytical data to classify the waste and to confirm/develop site waste generator profiles in support of interim on-site storage, transportation and final disposition. The characterization data set also will be used to verify compliance with the waste acceptance criteria of the C-746-U Landfill, or commercial treatment, storage, and disposal facilities.

Mobilization for demolition will include all training, work package development, setup of heavy equipment, and tools to demonstrate readiness to commence work. Radiological surveys will be performed on incoming equipment. Maintenance and hotwork areas will be established with spill control features. Temporary signage and fencing will be installed for worker protection during the course of construction and demolition at a contractor-approved location. An excavation permit will be completed for excavations greater than 6 inches, and earthwork will be performed in accordance with 29 *CFR* Part 1926, Subpart P, Excavations, outside of the C-400 Cleaning Building. Radiological control personnel will be required to monitor this task when excavation is being performed. During mobilization, generators for providing temporary power will be set up, or connections to existing power distribution system will be made, to energize office trailers, break trailers, and hand tools. A water source for demolition activities (e.g., dust suppression and decontamination) from the plant water system will be established in this phase of the NTCRA. Materials will be installed to remove contaminants physically and chemically from storm-water runoff (e.g., straw bales, silt fencing, apatite, or steel wool beds) before it exits the C-400 Complex via the drainage system depicted in Figure A.3. Closure of roads near the C-400 Cleaning Building is expected to be implemented for safety of personnel. Examples of activities that may require road closure include transite removal (e.g., on the north side of facility) and building demolition and waste sizing and load out (e.g., to provide adequate stand off distances from shearing

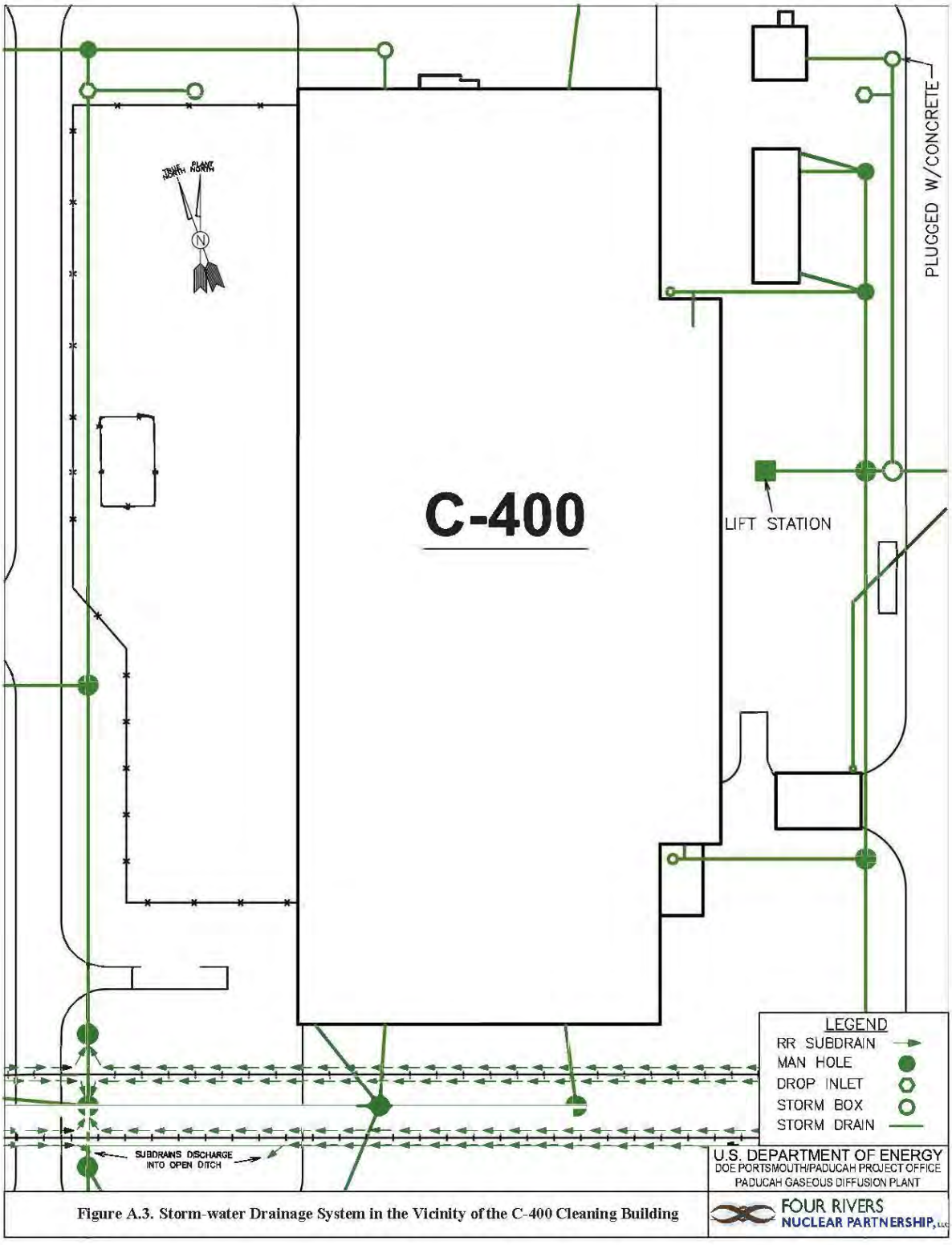

Figure A.3. Storm-water Drainage System in the Vicinity of the C-400 Cleaning Building

operations or for container or equipment movement). Road closures will be planned and implemented via work control and procedures processes.

Asbestos Abatement will include manual removal of corrugated asbestos transite siding from the building exterior. The hazards associated with removal of transite include fugitive ACM emissions from possible breakage of the transite panels. All transite panels shall be removed intact or in large sections and shall be lowered carefully to the ground using a crane or a specially equipped man lift. Transite siding will be bundled (e.g., placed on two 4-inch x 4-inch x 12-ft long wood posts and stacked approximately 2-ft high) and double wrapped with thick plastic sheeting (e.g., 6-mil) and one layer of absorbent material for disposition. Care will be taken not to break or crush the transite panels during removal. The panels will be removed by detaching the lead head fasteners from the building. The lead associated with the fasteners will be collected as the panels are removed and packaged for disposal in appropriately labeled containers. Plastic sheeting placed on the ground beneath the work area will prevent the loss of any lead into the soils.

Air Monitoring in the work zone and in the area around the demolition will allow for identification of potential airborne contamination. Contaminants that may be monitored during demolition of the C-400 Cleaning Building may include lead dust from paint, asbestos, and uranium. These constituents will be monitored in the work area using the appropriate type of sampling pumps. The appropriate constituents will be monitored outside the work area by establishing monitoring stations based on wind patterns around the work area.

Superstructure Removal will include removal of the C-400 Cleaning Building frame and as well as all interior walls that remain after deactivation. Removal will be to slab on grade. Removal will conform to 29 *CFR* Part 1926, Subpart T. Demolition will occur from south to north and employ excavator-mounted hydraulic shears to dismantle the superstructure. Water misting will be utilized to minimize airborne contamination. Figure A.4 depicts a misting unit similar to the one to be used during this phase of work. Dismantled debris will be moved to the south end of the building by a front-end loader where it will be staged for sizing, segregating, and loading. Figures A.5 and A.6 depict equipment similar to that planned for use in this phase of work.

Figure A.4. Misting Unit Used for Dust Suppression during Demolition

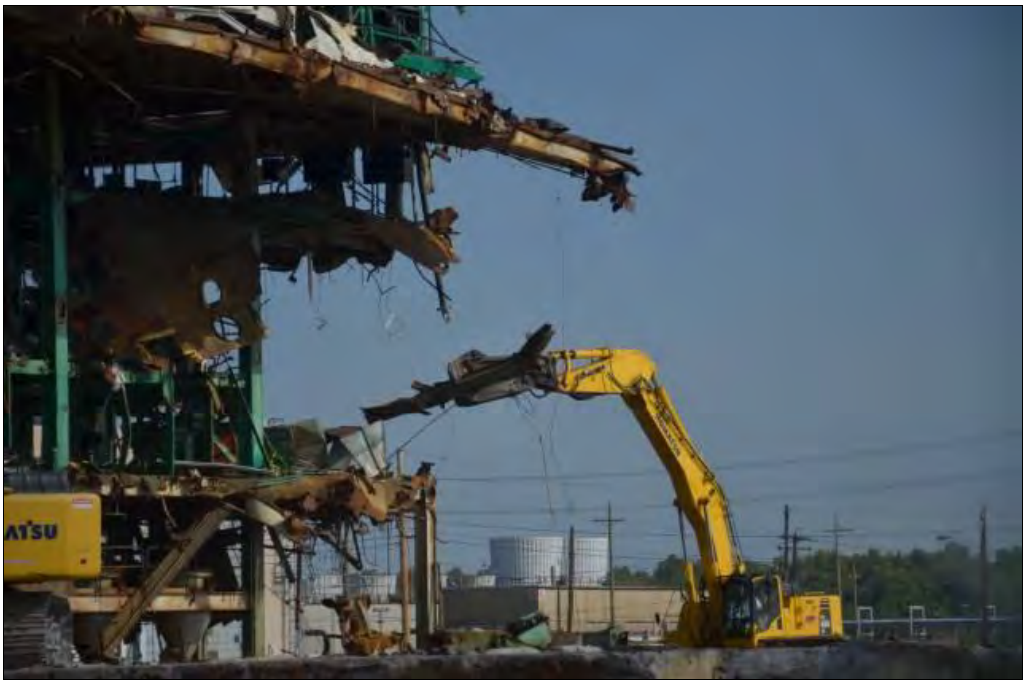

Figure A.5. Hydraulic Shears Mounted on an Excavator for Demolition Activities

Figure A.6 Front End Loader Used to Move Debris within the Demolition Site

This phase may include removal of special handled items demarcated for surgical removal with heavy machinery (e.g., lead-filled bell pipe couplers). These items will be marked with high visibility paint and

reviewed via field walkdown prior to start of demolition, and special instruction for their removal will be incorporated into the work package.

Additional features including the exterior crane rails will be removed during this phase of work to reduce potential safety/structural risks. The crane rails cannot be left in place without substantial engineering design and construction work to establish suitable supporting structures. The stacks and fan housings on the east side of the building also will be removed.

The exterior stacks and scrubbers on the west side of the C-400 Cleaning Building have been isolated from the building by air gapping the connecting piping, and these are not a part of this NTCRA. Additionally, the electrical transformers, waste heat system piping, and steam line on the west side of the facility will not be addressed by this NTCRA.

Management and disposition of waste will include segregating, size reducing, staging, loading, and transporting demolition debris. Debris will be segregated to minimize cross contamination. Debris will be size reduced to fit the conveyance in use (e.g., rail car gondola, dump truck, etc.). Size reduction will be accomplished using excavator-mounted hydraulic shears. To the extent possible, loading of debris will occur immediately after it has been sized properly to minimize staging time and exposure to the elements.

Front end loaders or excavator-mounted grapples will be utilized to load conveyances. Figures A.7 and A.8 depict equipment similar to that planned for use in this phase of work. Trucks will be used to transportation debris to the C-746-U Landfill; debris destined for Nevada National Security Site or commercial facilities will be transported by truck or rail. Decontamination water may be treated before discharge, as needed, to meet discharge limits specified in Table A.2 of EE/CA; it will be discharged through either an existing Kentucky Pollutant Discharge Elimination System-permitted outfall or a CERCLA outfall or managed at a commercial wastewater treatment facility. ARARs for both discharge options are included in Table A.2 of the EE/CA. Treatment of wastewater in a wastewater treatment unit may be required to meet ARARs prior to discharge.

Figure A.7. Hydraulic Shears Mounted on an Excavator for Size-reducing Demolition Debris

Figure A.8. Hydraulic Grapple Mounted on an Excavator for Loading Demolition Debris on to Conveyance

Site Restoration will include a final application of a sealant on the remaining slab. Residuals (e.g., paint chips, fine debris, and dust) on the slab will be removed in preparation for the final coat of sealant. Residuals removed from the slab will be characterized and dispositioned properly. Any PCB areas on the slab will be maintained, as necessary, in accordance with ARARs. Following application of the final sealant, radiological control surveys will be performed on the slab, and swipe samples will be collected and analyzed. The results of the survey and swipe samples will be used to post the slab according to the requirements of 10 *CFR* § 835. Site restoration also will include flowfill/backfill, as needed. Site restoration, as required, to facilitate the C-400 Complex Remedial Investigation will restore the area to the general pre-demolition condition.

Demobilization will include removing equipment and material brought to the Paducah Site for use in demolition of the C-400 Cleaning Building, but will not be needed during the C-400 Complex Remedial Investigation. Examples of NTCRA materials and equipment that may be used during the C-400 Complex Remedial Investigation include storm-water control features such as silt fences and support facilities such as break trailers.

Equipment and material will be removed from the Paducah Site at the conclusion of the NTCRA. They must be decontaminated and verified to be free of radiological contamination, in accordance with ARARs. Equipment and material that is not suitable for reuse (e.g., is spent, or can't be decontaminated) will be considered waste and will be dispositioned as described earlier in the "Management and disposition of waste" discussion above.

Verification that the removal action objectives have been met will occur following demobilization activities. The Demolition Removal Action Verification Plan is included in Appendix B of this RAWP.

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APPENDIX B

C-400 CLEANING BUILDING DEMOLITION REMOVAL ACTION VERIFICATION PLAN

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B.1. C-400 CLEANING BUILDING DEMOLITION REMOVAL ACTION VERIFICATION PLAN

This Demolition Removal Action Verification Plan identifies the steps required to ensure that the following removal action objectives, as established in the approved Engineering Evaluation/Cost Analysis, have been met:

1. Eliminate, reduce, or otherwise mitigate the potential for release of hazardous substances from structural deterioration of the C-400 Cleaning Building;

2. Minimize potential threats to human health and the environment that may result from uncontrolled releases from the C-400 Cleaning Building; and

3. Facilitate a comprehensive remedial investigation in support of remedy selection.

The following steps will be taken to ensure that the non-time-critical removal action (NTCRA) has been completed as planned and that the data quality objectives have been met:

- Verify through visual inspection that all C-400 Cleaning Building components above the slab/foundation have been removed;

- Verify through visual inspection that the remaining C-400 Cleaning Building slab/foundation sealant has been applied and is intact;

- Verify through visual inspection that all openings in the C-400 Cleaning Building slab/foundation have been plugged or sealed;

- Verify through visual inspection that the sealed surface of C-400 Cleaning Building slab/foundation is free of contaminants (e.g., grease, oil, or paint chips);

- Verify through radiological surveys (i.e., walkover and swipe sampling) that the sealant covering C-400 Cleaning Building slab/foundation is free of removable radiological contamination;

- Verify through visual inspection and review of radiological survey records that the C-400 Cleaning Building slab/foundation is posted properly, if needed, with respect to radiological conditions;

- Verify through visual inspection that materials and equipment used in support of the NTCRA and are not needed to support the C-400 Complex Remedial Investigation have been removed from the site;

- Verify through visual inspection and review of waste management records that all waste generated has been dispositioned properly, and

- Any polychlorinated biphenyl areas that were identified on the slab prior to demolition will be maintained, as necessary, in accordance with applicable or relevant and appropriate requirements.

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APPENDIX C

HEALTH AND SAFETY PLAN FOR THE C-400 CLEANING BUILDING AT THE PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY

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CONTENTS

ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
CFR	*Code of Federal Regulations*
CTR	contract technical representative
D&R	Deactivation and Remediation
DOE	U.S. Department of Energy
EMS	environmental management system
EPA	U.S. Environmental Protection Agency
ES&H	environment, safety, and health
FLM	front line manager
HASP	health and safety plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IH	industrial hygiene
ISMS	Integrated Safety Management System
JHA	job hazard analysis
LOTO	lockout/tagout
OSHA	U.S. Occupational Safety and Health Administration
PEL	permissible exposure limit
PGDP	Paducah Gaseous Diffusion Plant
PM	project manager
PPE	personal protective equipment
PVC	polychlorinated biphenyl
RADCON	radiological control
RWP	radiological work permit
SHS	safety and health specialist
TLV	threshold limit value
USEC	United States Enrichment Corporation

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C.1. HEALTH AND SAFETY PLAN FOR THE C-400 CLEANING BUILDING

C.1.1 PURPOSE

This project-specific Health and Safety Plan (HASP) has been prepared by the U.S. Department of Energy (DOE) Deactivation and Remediation (D&R) Contractor to help support the C-400 Cleaning Building Demolition Activities Project. The document scope is to identify potential hazards and outline proper control methods to protect the workers from potential harm in accordance with CP2-SM-1000, *Activity Level Work Planning and Control Program.*

C.1.2 INTEGRATED SAFETY MANAGEMENT/ENVIRONMENTAL MANAGEMENT

DOE's D&R Contractor is committed to implementing an Integrated Safety Management System (ISMS) and an Environmental Management System (EMS) that join together personnel and environmental safety 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 D&R Contractor-accepted environment, safety, and health (ES&H) practices.

C.1.2.1 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 manner. Each member of the project team will participate in discussions conducted to understand the scope and contribute to the planning of the work. The project team will meet with assigned project personnel to ensure that everyone understands the scope of work and the technical and safety issues involved. These meetings are conducted to ensure all parties are in agreement on the scope and approach to complete the work.

C.1.2.2 Analyze Hazards

In the course of planning the work, 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; conducting Hazard and Control Identification Checklists; and reviewing project plans, historical data, and past process knowledge. The hazard assessment process is described in procedure CP3-HS-2004, *Job Hazard Analysis.*

Once the hazards have been identified and assessed, measures will be identified to minimize risks to workers, the public, and the environment. These measures are described in the project-specific job hazard analysis (JHAs) or work instructions. These measures provide a control mechanism for all work activities. JHAs are detailed, activity-specific evaluations that address the hazards associated with the tasks and/or activities that will be performed. The JHA development process is 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, 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 team is responsible for the preparation, revision, and implementation of JHAs and hazard controls.

Applicable JHAs and hazard controls will be reviewed with assigned personnel who will perform the work. Participants in this review will sign and date the JHA or applicable work control to signify that they understand all hazards, controls, and requirements in the work control/JHAs. Copies of the work control documents/JHAs with appropriate signatures shall be maintained at the work site.

C.1.2.3 Develop/Implement Controls

Project-specific plans and technical procedures are the primary mechanisms used to flow down ISMS/EMS controls to the project team. 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
- Training
- Plan-of-the-day/pre-job briefings
- Work Instructions
- JHAs
- 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 emphasized that no employee will be directed or forced to perform any task that he/she believes is unsafe, puts his/her health at risk, or that could endanger the public or the environment. One of the key elements of ISMS/EMS is that all personnel have "stop work authority" and are encouraged to use this authority whenever they perceive the safety of workers, the public, or the environment to be at risk.

Employee involvement is emphasized in training sessions and in 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.1.2.4 Perform Work

After the project team has been given approval to proceed, the project-specific plans will be implemented. The D&R Contractor project team will verify that all applicable plans, forms, and work control is in place prior to execution. 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.1.2.5 Feedback/Improvement

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

D&R Contractor project management will encourage employees to freely submit suggestions that offer opportunities for improvement and constructive criticism on the program. Project management will

conduct periodic inspections in accordance with CP3-QA-1003, *Management and Self Assessments*, and meetings with project personnel at the work site to discuss safety/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, and
- Overall issues or concerns they may have regarding how the work was performed.

C.1.3 FLOWDOWN TO SUBCONTRACTORS

The D&R Contractor approach to ES&H ensures that personnel, including subcontractors, are aware of their roles, responsibilities, and authorities for worker/public safety and protection of the environment. D&R Contractor subcontractors will be responsible for compliance with the D&R Contractor Worker Safety and Health Program. Personnel will have the appropriate health and safety training required by OSHA 29 *CFR* § 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER),or request approval to be HAZWOPER Escorted, and 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 understood clearly. Documentation of personnel training and qualifications will be available for review prior to starting work. Contract technical representative (CTR) is responsible for contacting facility owner and verifying contractor training prior to allowing contractor building entry.

C.1.4 SUSPENDING/STOPPING WORK

In accordance with the D&R Contractor health, safety, and environmental management system descriptions for the Paducah Project, employees and subcontractors have suspend/stop-work authority. This process is defined and governed by procedure CP3-HS-2009, *Stop Suspend Work*. Individuals involved in any aspect of the project have the authority and responsibility to suspend or stop work for any perceived threat to the safety and health of the workers, other personnel, or to the environment. Concerns shall be brought to the attention of the front line manager (FLM) and safety and health specialist (SHS), 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, personnel shall halt activities immediately and instruct other affected workers to pull back from the hazardous area. The FLM and/or SHS shall be notified immediately, at which time D&R Contractor management and/or emergency responders will be notified.

C.1.5 HEALTH AND SAFETY BRIEFINGS

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 subcontractor, FLM, and/or SHS 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 work control documents, JHAs, and/or lessons learned as guidance.

Prior to performing work in the building, personnel shall be required to read, or be briefed, on the D&R Contractor Worker Safety and Health Program, this HASP, applicable JHAs, the work package, and other applicable work control and project related (such as the Remedial Action Work Plan, Construction Quality Control Plan, etc.) documents. This shall be documented on acknowledgement forms, briefing sheets, or as required reading. Visitors also will be oriented to the applicable plans and potential hazards that they may encounter.

C.1.6 SITE BACKGROUND

Paducah Gaseous Diffusion Plant (PGDP), located within the Jackson Purchase region of western Kentucky, was an active uranium enrichment facility. Most industrial activities are sited in an approximate 750-acre security area and buffer zone that are restricted from public access. PGDP was owned and managed, first by the Atomic Energy Commission and the Energy Research and Development Administration, DOE's predecessors; DOE then managed PGDP until 1993. On July 1, 1993, the United States Enrichment Corporation (USEC) assumed management and operation of PGDP enrichment facilities under a lease agreement with DOE. Until 2013, USEC enriched uranium at the Paducah Site to supply nuclear fuel to electric utilities worldwide. In 2014, USEC returned leased Paducah facilities to DOE control, and the DOE Deactivation Contractor began management of the facilities for DOE. DOE retains ownership of the enrichment complex, is responsible for environmental restoration activities associated with PGDP (CERCLIS# KY8-890-008-982), and serves as the lead agency for remedial actions at PGDP. EPA and the Kentucky Department for Environmental Protection serve as regulatory oversight agencies for the facility.

C.1.6.1 Project Site Background

The C-400 Cleaning Building was one of the first buildings constructed at PGDP. The building and adjacent structures have been used in a wide variety of functions to support operations at the plant and outside contractual work. The primary functions of C-400 Cleaning Building included cleaning, metal etching and plating, radioactive materials stabilization and recovery, metals recovery, uranium trioxide production, diffusion process equipment testing, and uranium tetra fluoride (green salt) pulverization. During these processes, large quantities of materials were discharged or otherwise removed from the building. The building also housed various other activities, including recovery of precious metals and treatment of radiological waste streams.

C.2. KEY PERSONNEL

C.2.1 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 D&R Contractor employees and among the D&R Contractor, subcontractors, and other organizations. 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. Individuals and responsibilities will be identified for the various project tasks in the applicable work packages/instructions and communicated to personnel prior to work.

The following section depicts the roles and responsibilities of key personnel associated with the implementation of the HASP. Each team member shares the responsibility of accomplishing the scope of

work; achieving required quality; participating in work planning and JHA development; and maintaining compliance with laws, regulations, and DOE Orders and Directives in a safe working environment. In general, it is the responsibility of every D&R Contractor employee and subcontractor to ensure that work performed is accomplished in a safe and professional manner.

C.2.1.1 Project Manager

The project manager (PM) provides demolition/waste related support. The PM has the following responsibilities:

- Ensures field operations are performed in compliance with regulations, DOE Orders, programs, and procedures;
- Ensures compliance with waste management standards and regulations;
- Implements work plans and procedures;
- Assists in development of work packages for compliance with the D&R Contractor Work Control Program;
- Provides support for field activities to ensure waste is properly characterized, stored, transported, and treated/recycled/disposed of in accordance with applicable regulations and procedures;
- Directs management of radioactive, Resource Conservation and Recovery Act, and Toxic Substances Control Act waste operations;
- Ensures compliance with waste management standards and regulations; and
- Completes quality documents and records as required by D&R Contractor plans and procedures.

C.2.1.2 Contract Technical Representative

The CTR performs demolition job functions as assigned by management.

Typical job responsibilities include assisting and supporting management in ensuring that all site operations are conducted in a manner that is safe, cost effective and fully compliant with demolition project procedures and all contractual, statutory, and regulatory requirements. The specific work assignment may include duties or activities that assist and support management in one or more of the following functional areas, in addition to other duties as assigned:

- Plans, schedules, and organizes the work to ensure utilization of employees and compliance with all contract requirements, quality standards and budgetary guidelines;
- Ensures staffing levels of supervised personnel are maintained in a manner which allows the effective execution of the assigned scope of work at all times;
- Interfaces with groups inside and outside the organization, senior management, and auditors;
- Responsible for providing direction, training and evaluation of demolition personnel;
- Assists with the development or review/update of various plans, policies or procedures as needed;

- Assists with maintaining positive employee relations;
- Responsible for group supervision and administration;
- Monitors administrative and financial controls activities to ensure compliance with the project's policies, procedures, goals and objectives;
- Manages office operations to ensure adequate operations services are provided;
- Supervises continuous maintenance of control systems employed to facilitate execution of client and project goals;
- Provides technical and/or functional support to the demolition team;
- Maintains knowledge of and demonstrates ability to perform work safely in accordance with all approved safety policies, procedures and applicable regulations and performs assigned duties in a safe manner. If supervising others, has responsibility for the safety of those being supervised and ensures they comply with established safety policies and procedures and practice safe work habits; and
- Participates actively in Safety Work Groups.

C.2.1.3 Facility Manager/Lockout/Tagout Coordinator

The facility manager has the following C-400 Cleaning Building demolition-related responsibilities:

- Works with the C-400 Cleaning Building PM to assist, as necessary, with facility related aspects of the project;
- Has overall responsibility for the C-400 Facility; and
- Initiates lockout/tagout (LOTO) permits and maintains overall coordination and control of LOTO for C-400 Cleaning Building.

C.2.1.4 Front Line Manager

The FLM reports directly to the PM. Typical job responsibilities include assisting and supporting management in ensuring that all day-to-day field activities are conducted in a manner that is safe, cost-effective, and compliant with D&R Contractor procedures and contractual, statutory, and regulatory requirements. The specific work assignment may include duties or activities that assist and support management in one or more of the following functional areas, in addition to other duties as assigned:

- Plans, schedules and organizes the work to ensure utilization of employees and compliance with all contract requirements, quality standards and budgetary guidelines;
- Instructs employees on the work methods and performance expectations;
- Provides leadership and motivation to subordinate personnel;
- Maintains close working relationship with senior management and/or operational management in ensuring operations services are being properly executed and needs of the company are met;

- Interfaces with groups inside and outside the organization, senior management, other locations, auditors and client representatives;

- Develops or reviews/updates various plans, policies or procedures as needed;

- Provides technical and/or functional support to the operations team;

- Maintains knowledge of and demonstrates ability to perform work safely in accordance with approved safety policies, procedures and applicable regulations and performs assigned duties in a safe manner. If supervising others, has responsibility for the safety of those being supervised and ensures they comply with established safety policies and procedures and practice safe work habits; and

- Participates actively in safety work groups.

C.2.1.5 Safety and Health Specialist

The SHS is a representative from the industrial safety or industrial hygiene (IH) groups and is responsible for the following:

- Establishes standards and provides oversight to safety and health compliance, training, and safety and health performance;

- Provides independent oversight for ES&H;

- Assists the FLM and operations manager in verification of employee suitability for work based on the employee's training and physician's recommendation;

- Advises personnel of potential exposures and consequences;

- Assists in hazard analysis and ensuring that JHAs are developed and maintained properly;

- Conducts inspections, as necessary, to verify proper implementation of the Worker Safety and Health Program;

- Notifies the plant shift superintendent, C-400 PM, and ES&H personnel as required in the Worker Safety and Health Program, D&R Contractor procedures, and this HASP;

- Completes all ES&H documents and records as required by D&R Contractor plans and procedures; and

- Participates in accident/incident investigations.

C.2.1.6 Radiological Protection

Radiological control (RADCON) works with management and the field team to accomplish the following:

- Provides support and oversight for field activities to ensure compliance with the RWPs and applicable procedures;

- Performs radiological surveys, field support, and dosimetry issuance and associated documentation, as specified in the RWPs;

- Assists in the hazard review process and PPE selection and recommendation;

- Performs responsibilities as the decontamination station officer to ensure that appropriate decontamination of all personnel, equipment and samples are completed, as well as assisting in the disposal of contaminated clothing and material; and

- Participates in accident/incident investigations, as necessary.

C.2.1.7 Craft Personnel

Craft personnel—Operators, maintenance mechanics, electricians, heavy equipment operators, and truck drivers report to their respective FLM. Each has the following responsibilities:

- Performs work as specified in procedures and work packages and as directed by the FLM;

- Participates in the preparation of the project Worker Safety and Health Program and project work controls/JHAs;

- Adheres to all requirements of the Worker Safety and Health Program, HASP, RWPs, project plans, procedures, and JHAs;

- Participates in the identification of the hazards and development of the work controls to be utilized during the work;

- Stops or suspends work, as needed, and helps with accident/incident reporting;

- Assures workers are properly trained to perform assigned responsibilities;

- Participates in pre-job and post-job briefings; and

- Participates in accident/incident investigations, as necessary.

C.2.1.8 Subcontractors

Specialty subcontractors and maintenance/construction subcontractors will provide equipment and expertise during the NTCRA. Each has the following responsibilities:

- Provides input into designs, plans, procedures, and work control documents;

- Performs work as specified in plans, procedures and work packages;

- Adheres to all requirements of the HASP, RWPs, subcontract requirements, project plans, procedures, and JHAs;

- Assures proper training to perform assigned responsibilities;

- Participates in the identification of the hazards and development of the work controls to be utilized during the work;

- Notifies supervision of events or conditions that may adversely affect personal safety, quality, or the environment, and

- Participates in accident/incident investigation, as necessary.

C.3. HAZARD ANALYSIS

This section outlines the potential general, chemical, radiological, and physical hazards to which workers may be exposed during field activities. The assessment of chemical and physical hazards in this section is based on the information provided from project documents. The associated tasks may have the potential to expose workers to certain contaminants. The following section summarizes those hazards. Specific hazards and controls will be identified in the task-specific JHAs or implemented in work control documents.

C.3.1 GENERAL SITE HAZARDS

C.3.1.1 Operation of Project Vehicles

All field personnel operating vehicles shall have a valid operator's license or authorization for the type of vehicle being operated, drive responsibly, and comply with posted speed limits. All vehicle occupants shall use seat belts while project vehicles are in operation and drivers also shall comply with project-specific training requirements. The use of cellular phones or other potentially distracting activities while driving on company business is prohibited. Operators shall walk around the vehicle and check for obstacles and material prior to backing up. Use of a spotter is recommended when backing vehicles as well.

Large vehicles and heavy equipment, such as excavators, cranes, and forklifts, have blind spots and the potential for pinch and crush hazards. Heavy equipment shall have a functioning backup alarm or a spotter will be required when the vehicle is backing up in congested areas. The spotter shall not stand directly behind the equipment while backing.

Equipment operations will be in accordance with procedure CP3-SM-2006, *Construction Equipment Inspection and Maintenance.*

C.3.1.2 Tools and Equipment

Tools and equipment shall be inspected visually prior to each use to ensure that the devices are in good working order. All guards and safety devices (e.g., power tools) shall be in place when the equipment is in use. The individual conducting an inspection should look for signs of wearing (e.g., frayed power cords, loose parts), missing components (e.g., lock pins, guards), and any indication of a potentially unsafe condition. Deficiencies affecting safe operation of project equipment shall cause the equipment to be taken out of service until properly repaired. D&R Contractor field equipment and tools shall be operated only by knowledgeable personnel with appropriate work experience and awareness of the hazards and safe operating procedures of the devices. This determination is to be made by the FLM, SHS, or his/her designee.

C.3.1.3 Material and Drum Handling

Material handling will be accomplished using safe lifting procedures. Mechanical lifts and/or carts will be used whenever possible. Whenever moving or lifting objects, travel paths and actions should be considered prior to initiating the work. Drum-handling activities include the general handling, transport, and opening and closing of drums along with the storage of wastes within the drums. These activities shall be performed in accordance with CP3-WM-1017, *Safe Handling and Opening of Sealed Containers*, and only by individuals who are knowledgeable in the use of appropriate techniques, drum-handling equipment, and safety devices. Drums/containers will be handled as to avoid spills or releases, such as using spotters when using forklifts to pick-up or move containers and place containers with liquids in/on secondary containment when not in transit.

Drums containing wastes or material could become pressurized and must be inspected prior to handling or opening. If the container/drum appears to have a swollen lid, side, or bottom and/or emits a hissing sound, consider the container to be pressurized. Do not touch, move, or disturb the container and report it to the FLM and/or SHS immediately for appropriate actions. Empty drums also must be inspected prior to opening, since they may be pressurized if subjected to changing temperatures. Drum webs or other restraining device should be used when opening any container suspected of containing pressure to prevent injury from flying lids and or closure rings.

C.3.1.4 Electrical Service

D&R Contractor personnel using portable generators shall ensure that the units are grounded, as required, prior to use. To provide additional worker protection, ground-fault circuit interrupters will be used at the primary power distribution location whenever portable electrical equipment powered by 120-volt alternating current is used. Whenever possible, electrical cords will be routed out of traffic areas or adequately shielded. As with other field equipment, all cords should be inspected before use, and any damaged equipment shall be removed from service and a defective equipment tag attached until replaced or repaired. Personnel will adhere to requirements set forth by National Fire Protection Association 70E and CP2-SM-0019, *Electrical Safety Guidelines*.

C.3.1.5 Fire Safety

Refueling equipment can present a significant fire/explosion hazard if subjected to sparks, static electricity, or other ignition sources. Containers transferring flammable liquids to another container shall be bonded appropriately prior to use. Only safety containers approved by the Factory Mutual Research, Underwriters Laboratories, or the U.S. Department of Transportation will be used to transport and store these liquids. Site personnel are to ensure that the equipment used to transfer the liquids is approved for the material being handled and personnel should take precautions to prevent overfilling and spill/drips. Safety cans shall be labeled as to their contents and properly secured during transport. When applicable, equipment should be given adequate time to cool down before refueling. During refueling operations, a 20-B:C rated fire extinguisher will be within 50 ft of the operation

Smoking is not allowed in the work area or radiological controlled areas. Smoking will be allowed in designated areas and cigarette butts properly discarded as not to create litter or pose a fire risk.

C.3.1.6 Housekeeping

Good housekeeping, including routine site cleanup and waste management, shall be practiced at all times to improve the general safety of the site activities. Housekeeping efforts may include eliminating or minimizing slip, trip, and fall hazards. Sanitary trash shall be containerized and disposed of periodically.

Supplies, materials, and ancillary equipment should be properly stowed when not in use, and walk areas shall be kept free of obstructions.

C.3.1.7 Slips, Trips, and Falls

The work locations, especially excavations, rough terrain, as well as surface obstructions, may pose hazards causing slips, trips, and/or falls. Care should be taken when working around uneven terrain, and obstructions should be kept out of walkways. Slipping hazards, such as grease, oil, water, or other liquids, shall be cleaned up immediately or eliminated in work areas and packaged appropriately after cleanup.

C.3.1.8 Head, Eye, Hand, and Foot Hazards

Work activities have potential hazards that may result in injuries to the head, eyes, hands, or feet. The use of engineering controls (such as ensuring that appropriate machine guarding is in place) or administrative controls (such as restricting personnel from encroaching in machine operating areas) have limited applications for these hazards. The use of PPE will be necessary to adequately address these hazards. Where these hazards exist, the task-specific JHA, work instruction, and/or RWP will specify the use of appropriate PPE, including American National Standards Institute-approved hard hats, safety eye protection, and safety-toed footwear.

C.3.2 SUSPECTED CHEMICAL AND RADIOLOGICAL HAZARDS

Uranium-234, -235 and -238. Uranium-234, -235 and -238 (collectively) may be the most abundant radionuclides at PGDP and are the chemical of primary concern. They pose a potential for worker exposure when performing invasive work and in radiological controlled areas. Uranium isotopes undergo radioactive decay by emission of an alpha particle and gamma radiation. Workers may be exposed to uranium by inhaling contaminated dust in the air, ingesting contaminated water and food, or if not properly protected through cuts in the skin. Uranium may be harmful to people as a chemical toxin, as well as radioactive substance, and once inside the body is linked to cancer and especially kidney damage.

TCE. Trichloroethene (TCE) is a volatile organic compound detected in both subsurface soil and groundwater around the C-400 Cleaning Building. This contaminant is a halogenated organic compound used by industry in the past for a variety of purposes. It mainly was used as a degreasing agent at the C-400 Cleaning Building. EPA has set the maximum contaminant level for drinking water at 5 ppb and the American Conference of Governmental Industrial Hygienists (ACGIH) has the 8-hour time weighted average at 10 ppm. TCE is a nonflammable, oily, colorless liquid that has a sweet odor and a sweet, burning taste. Historically, TCE was used as a solvent to clean equipment. It is heavier than water and has low solubility (up to one part TCE per thousand parts of water at room temperature). TCE in high concentrations may take on a liquid form commonly referred to as dense nonaqueous-phase liquid, and, in the presence of water, forms a separate phase from the water. These qualities make TCE a difficult contaminant to remediate. When present in groundwater, TCE tends to settle into a layer at the bottom of the aquifer and then continuously dissolves into the groundwater. This has resulted in varying levels of TCE in the aquifer for years after the release of TCE at PGDP. TCE currently is not used at PGDP.

Breathing small amounts of TCE may cause headaches, lung irritation, dizziness, poor coordination, and difficulty concentrating. Breathing large amounts of TCE may cause impaired heart function, unconsciousness, and death. Breathing it for long periods may cause nerve, kidney, and liver damage. Drinking large amounts of TCE may cause nausea, liver damage, unconsciousness, impaired heart function, or death. Drinking small amounts of TCE for long periods may cause liver and kidney damage, impaired immune system function, and impaired fetal development in pregnant women, although the

extent of some of these effects is not yet clear. Skin contact with TCE for short periods may cause skin rashes. In its 11th Report on Carcinogens, the National Toxicology Program determined that TCE is "reasonably anticipated to be a human carcinogen." The International Agency for Research on Cancer has determined that trichloroethylene is a "probable (Group 2A) human carcinogen."

1,2-Dichloroethene, *cis*- and *trans*-. 1,2-Dichloroethene (DCE) exists in two isomeric forms, *cis*-1,2-DCE and *trans*-1,2-DCE. Although not utilized extensively in industry, 1,2-DCE is used both in the production of other chlorinated solvents and as a solvent. Humans can be exposed to 1,2-DCE primarily by inhalation, but potential exposure also can occur by oral and dermal routes. Information on the toxicity of 1,2-DCE in humans and animals is limited. Studies suggest that the liver is the primary target organ. EPA does not classify 1,2-DCE as a human carcinogen.

Vinyl Chloride. Vinyl chloride (VC) is a degradation product of TCE. It is also a halogenated organic compound and is used in industry as an intermediary of polyvinyl chloride (PVC) and other chlorinated compounds. VC has not been used in the PGDP manufacturing processes. Exposure to VC has been associated with narcosis and anesthesia (at very high concentrations), liver damage, skin disorders, vascular and blood disorders, and abnormalities in central nervous system and lung function. Liver cancer is the most common type of cancer linked with VC, a known human carcinogen. Other cancers related to exposure include those of the lung, brain, blood, and digestive tract.

1,1-DCE. 1,1-DCE is used primarily in the production of PVC copolymers and as an intermediate for synthesis of organic chemicals. Acute exposure to 1,1-DCE has been associated with central nervous system depression, which may progress to unconsciousness. Exposure to 1,1-DCE is irritating to the skin, and prolonged contact can cause first-degree burns. Direct contact with the eyes may cause conjunctivitis and transient corneal injury. EPA has classified 1,1-DCE as a possible human carcinogen.

PCB. Polychlorinated biphenyls (PCBs) are synthetic organic chemicals comprising 209 individual chlorinated biphenyl compounds (known as congeners). Exposure to each of these compounds is associated with different levels of risk for harmful effects. The potential for overexposure to PCBs are believed to be low for the field activities because the expected amount of PCBs that may be present in the soil and/or water samples is, for the most part, well defined and the routes of entry are limited for personnel exposure. If PCB levels are unknown and/or expected to be elevated above action limits of $0.25 mg/m^3$, personnel will be notified and proper controls put in place in the JHA/work control to protect personnel.

Asbestos. A group of naturally occurring minerals that are resistant to heat and corrosion. Asbestos has been used in products, such as insulation for pipes (steam lines for example), floor tiles, building materials, and in vehicle brakes and clutches. Asbestos includes the mineral fibers chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite. Asbestos is well recognized as a health hazard and its use is now highly regulated by both OSHA and EPA. Asbestos fibers associated with these health risks are too small to be seen with the naked eye. Breathing asbestos fibers can cause a buildup of scar-like tissue in the lungs called asbestosis and result in loss of lung function that often progresses to disability and death. Asbestos also causes cancer of the lung and other diseases such as mesothelioma of the pleura, which is a fatal malignant tumor of the membrane lining the cavity of the lung or stomach.

Lead is a naturally occurring element found in small amounts in the earth's crust. While it has some beneficial uses, it can be toxic to humans and animals causing adverse health effects. Exposure to lead can cause cardiovascular effects, increased blood pressure and incidence of hypertension, Decreased kidney function, Reproductive problems (in both men and women). Lead can accumulate in our bodies over time, where it is stored in bones along with calcium. During pregnancy, lead is released from bones as maternal calcium and is used to help form the bones of the fetus. This is particularly true if a woman

does not have enough dietary calcium. Lead can also cross the placental barrier exposing the fetus the lead.

Transuranic. An artificially made, radioactive element that has an atomic number higher than uranium in the periodic table of elements such as neptunium, plutonium, americium, and others. Defined by the Waste Isolation Pilot Plant Land Withdrawal Act as "waste containing more than 100 nano-curies of alpha-emitting transuranic isotopes per gram of waste with half-lives greater than 20 years, except for (A) high-level radioactive waste. Affects the respiratory system, digestive system, and a majority of the body's organs."

Tc-99. Technetium-99 (Tc-99) is a fission product and is a long-lived, low-energy beta-emitting radionuclide and is one of the major contaminants of concern, especially in the groundwater plume. Tc-99 is a light element that is very mobile and bonds to protein and usually cannot be easily removed, especially from hair. Like most radionuclides, it is harmful if taken internally although the beta particles it emits are very weak. The potential for personnel exposure is limited and controls are implemented through the procedures, work instructions, RWPs and JHAs.

C.4. TRAINING

As a requirement for work on this project, all workers entering and working in any work zones within the C-400 Building will be required to take appropriate HAZWOPER training associated with the tasks and ongoing activities unless approved to be HAZWOPER escorted. This training must cover the requirements in 29 *CFR* § 1910.120. In addition, workers must receive annual 8-hour refresher training (if applicable) and 3-day on-site supervision under a trained, experienced supervisor. Supervisory personnel shall receive additional 8-hour training in hazardous waste operations supervision. Workers entering radiological posted work areas will be required to complete Radiological Worker Training in accordance with CP3-RP-1104, *Radiological Area Entry Control*, and comply with requirements of work control documents.

Specific training requirements will be identified by the Facility Manager for each role.

C.5. PERSONAL PROTECTIVE EQUIPMENT

The use of appropriate PPE is required for personnel involved in operations where exposure to hazardous conditions exist and cannot be eliminated by engineering controls or where such equipment is needed to reduce hazards. PPE will be selected and used in accordance with OSHA standards and the requirements of D&R Contractor procedures. PPE selection will be determined by ES&H and RADCON to ensure protection of the workers from site-specific hazards posed by the task and work location.

PPE will be utilized as follows:

- It is not possible and/or feasible to implement engineering controls and work practices that will unequivocally ensure the safety and health of workers;

- It is necessary to reduce and maintain employee exposure less than the applicable permissible exposure limits (PELs) in 29 *CFR* § 1910, Subparts G and Z, and/or less than the applicable reduction zone threshold limit values (TLVs) established by the ACGIH, or in the absence of PELs or TLVs,

less than the applicable recommended exposure limits published by the National Institute for Occupational Safety and Health;

- Radiological materials/contamination may be present in excess of levels established by site RADCON criteria; and

- Workers may be exposed to chemical contamination through skin absorption.

Existing or potential physical hazards may pose a threat to worker safety and health. Because potential hazards will vary with individual field activities, PPE may be modified for specific tasks. The PPE for each task will be listed on applicable JHAs, work instructions and/or RWPs.

Initial entry to work areas will include PPE appropriate for the predicted hazards in the work area based on preliminary data. The PPE requirement for subsequent entries into a specific zone will be based upon the information gathered during the initial entries.

Selection of the most appropriate level of protection and combinations of respiratory protection is based on the following:

- Level of knowledge of on-site chemical, biological, and radiological hazards;

- Properties, such as toxicity, radioactivity, route of exposure, and matrix of the contaminants known or suspected of being present;

- Type and measured concentrations of the contaminants that are known or suspected of being present;

- Potential for exposure to contaminants in air, liquids, soils, or by direct contact with hazardous materials;

- Physical hazards; and

- Temperature extremes.

Personnel entering the work zone are required to undergo training for the use of PPE. For routine work, Level D PPE or modified Level D is required. Where the scope of work requires a higher level of PPE, specific training will be provided.

PPE requirements will be identified in the JHA/RWP(s) and/or work instructions and discussed with site workers prior to the start of work. Employees will be trained and approved following baseline medical examinations for the use of prescribed PPE. Radiological PPE requirements will be integrated with those established for potential nonradiological contaminants to ensure compatibility prior to the start of work. Sequential steps to facilitate the selection of PPE for hazardous waste site operations are as follows:

- Identify work area and job-specific hazard potential (e.g., chemical, radiological, physical, mechanical);

- Determine type of exposure for the work areas and specific work activities;

- Determine level of respiratory protection for the work areas and specific work activities, including cartridge selection, if appropriate;

- Evaluate the chemical resistant characteristics needed for the potential exposures and select clothing with the appropriate protection factor, evaluate potential physical hazards associated with the work areas and specific work activities (e.g., walking/working surfaces, electrical installations/lines, noise exposure), and select PPE to mitigate identified hazards;

- Consider climatic conditions and select PPE to accommodate the conditions (e.g., cooling units, insulated clothing/footwear);

- Evaluate potential biological hazards (e.g., snakes, insects) and select PPE to mitigate identified hazards;

- Evaluate type and level of work (e.g., heavy, moderate, light) and select PPE for the work; and

- Evaluate PPE for both chemical and radiological hazards when mixed waste is involved.

The specific levels of PPE and necessary components for each level are divided into four categories according to the degree of protection afforded. General guidelines for use are these:

Level A: Worn when the highest level of respiratory, skin, and eye protection is needed.

Level B: Worn when the highest level of respiratory protection is needed, but a lesser level of skin protection is needed

Level C: Worn when the criteria for using air-purifying respirators are met, but a lesser level of skin protection is needed, and oxygen concentrations are between 19.5% and 23%.

Level D: Refers to work conducted without respiratory protection. This level should be used only when the atmosphere contains no known or suspected airborne chemical or radiological contaminants and oxygen concentrations are between 19.5% and 23%.

Health and Safety Supplies and Equipment. A sufficient quantity of drinking water or replacement fluids shall be maintained at the site. In addition, a hand-wash area will be made available and all personnel are encouraged to wash their hands prior to eating, drinking, tobacco use, and at the conclusion of each day's work activities.

Eyewash stations will be available as necessary and will operate in accordance with manufacturer specifications. An eyewash solution with an antimicrobial agent will be used in accordance with the schedule specified by the manufacturer of the agent. The water in the station will be replaced weekly if no antimicrobial agent is added.

All safety equipment shall be inspected for serviceability by D&R Contractor project personnel, initially at the start of the project and periodically thereafter. Any defective equipment will be immediately taken out of service, tagged, and replaced. In addition to periodic inspections, the presence of compliant, operable extinguishers shall be verified by field personnel prior to the start of work. Safety equipment inspections shall be documented on equipment tags or in the project records.

C.6. MEDICAL SURVEILLANCE

The medical surveillance program provides for baseline, annual, and termination medical examinations for site employees in accordance with 29 *CFR* § 1910.120, *Hazardous Waste Operations and Emergency Response,* and D&R Contractor procedure CP2-HS-4002, *Occupational Medicine Program.*

Personnel performing HAZWOPER activities on this project must complete an annual HAZWOPER physical. The examining physician will document the worker's fitness for work and ability to wear a respirator.

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. Detailed explanation of the radiation worker requirements are described in CP2-RP-0001, *Radiation Protection Program.*

C.7. EXPOSURE MONITORING

C.7.1 EMPLOYEE NONRADIOLOGICAL EXPOSURE MONITORING

Depending on the work activities being performed, real-time and/or integrated personal exposure sampling will be performed where there is a potential for employees to be over exposed. Exposure action levels for contaminants to which employees may reasonably be exposed shall be established. These action levels shall be developed based on regulatory drivers, industry standards, and sound IH practice. Exposure monitoring data may be used to evaluate the effectiveness of engineering and administrative controls as well as to upgrade or downgrade PPE requirements.

The monitoring frequency and coverage may be increased should monitoring data indicate the potential for exposure to higher concentrations of chemicals than initially anticipated or if changes in the scope of work involve potential exposure to particularly toxic chemicals.

C.7.2 ENVIRONMENTAL AIR MONITORING

The expectation of significant contaminants becoming airborne and potentially dispersing is minimal. IH may initiate project boundary or perimeter monitoring as necessary to ensure protection of the public and the environment. The goal of such monitoring will be to determine whether any airborne contaminants are dispersing off the designated work area and to obtain data that would identify the need for corrective action in the work area.

C.8. SITE CONTROL

C.8.1 BACKGROUND

The site control program at hazardous waste sites is used to control the activities and movement of people and equipment in order to minimize the potential for worker exposure to hazardous substances. The provisions of 29 *CFR* § 1910.120(d) require that an appropriate site control program be developed prior to the implementation of cleanup operations.

Site control for field activities will be determined by the FLM, SHS, and RADCON and communicated to the workers through pre-job briefings. Site control may be modified as new information becomes available based on the types of hazards that are found.

The overall objective of the site control component of this HASP is to specify procedures to minimize employee exposure and protect the public from hazardous substances and to prevent unauthorized access to the site.

C.8.2 VISITORS

Visitors to C-400 shall make a request to facility manager and receive approval before entry to building. They must wear appropriate PPE prior to entry into the work area. Visitors are non-workers who are on the site only occasionally, for a specific or limited task such as observing work activities. Visitors also must have received the required training for the tasks being performed and entry must be approved by the Facility Manager, FLM, ES&H, Nuclear Facility Manager, and/or RADCON.

C.8.3 USING THE BUDDY SYSTEM

When performing activities in remote areas, workers must use the "buddy system" to ensure that rapid assistance can be provided in the event of an emergency. The buddy system is an approach used to organize work groups so that each worker is observed by at least one other worker. All personnel are responsible for ensuring that the buddy system is incorporated.

As part of the buddy system, workers should remain in close proximity and maintain visual contact with each other to provide assistance in the event of an emergency. The responsibilities of workers utilizing the buddy system include the following:

- Providing his/her partner with assistance,
- Observing his or her partner for signs of chemical or heat exposure,
- Periodically checking the integrity of his or her partner's PPE, and
- Notifying the frontline supervisor or other site personnel if emergency assistance is needed.

C.8.4 COMMUNICATION NETWORK

Communication systems shall be established for both internal and external communication. Internal communication refers to communication among workers operating within the individual work areas of the site. Routine checks to verify proper operation should be addressed.

External communication refers to communication between on-site and off-site personnel. The primary means of external communication are cellular telephone and radio. An external communication system should be maintained in order to accomplish the following:

- Coordinate emergency response efforts with off-site responders,
- Report progress or problems to management, and
- Maintain contact with essential off-site personnel.

C.8.5 WORKER SAFETY PROCEDURES

As part of site control, procedures have been established to ensure worker safety. Safe work practices are incorporated into standard operating procedures and work control documents, such as work packages, work instructions, and JHAs. Engineering controls and safe work practices will be implemented to attempt to reduce and maintain employee exposure levels at or below the PELs and published exposure limits for those hazardous substances at the site. PPE will be used to protect employees against possible exposure to hazardous substances when engineering controls and safe work practices are insufficient to maintain worker exposure at levels below established action levels.

C.9. EMERGENCY RESPONSE

See Attachment C1 (CP5-EP-0400, *Emergency Action Plan for C-400*).

C.10. TEMPERATURE EXTREMES

Typically one of the most common types of stress that affect field personnel is from heat and cold. Heat stress and cold stress are serious hazards to workers at waste sites. Personnel will be familiarized on the symptoms of heat and cold stress during training or in the plan-of-the-day/pre-job briefing. Activities related to heat and cold stress and work rest activities will be in accordance with D&R Contractor procedure CP3-HS-2000, *Temperature Extremes*.

Cool water and disposable drinking cups or bottled water will be provided in a rest area and/or break trailer. Workers shall use safe work practices, including drinking plenty of fluids, such as water, taking rest breaks as necessary, and using the "buddy system" to monitor each other and watch for heat or cold stress symptoms.

C.10.1 HEAT STRESS

Heat stress is a condition that arises from a variety of factors, among the most important of these is ambient temperature, the relative humidity, the level of effort required by the job, and the clothing being worn by an exposed individual. An individual who is experiencing heat stress will tend to exhibit an array of measurable symptoms that can include an increased pulse rate, a greater rate of perspiration (except for heat stroke), and an increase in the individual's body temperature.

Heat-related disorders generally are classified in four basic categories:

(1) Heat Rash—Caused by continuous exposure to heat or humid air and can be recognized by the occurrence of small red pimples on the skin. Typically found in sensitive areas of the body where the potential for rubbing can occur (e.g., underarm, groin area).

(2) Heat Cramps—Caused by heavy sweating and inadequate electrolyte replacement. Signs to look for include muscle spasms and pain in the extremities, such as hands and feet, and in the abdomen.

(3) Heat Exhaustion—Caused by increased stress on various parts of the body, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs to look for include these:

- Pale, cool, moist skin
- Heavy sweating
- Dizziness
- Nausea
- Fainting

(4) Heat Stroke—This is the most serious of all temperature related disorders or conditions since temperature regulation fails and the body temperature rises to critical levels. Immediate action should be taken to cool the body before serious injury or death occurs. Competent medical help should be obtained. Signs to look for include these:

- Red, hot, usually dry skin
- Lack of or reduced perspiration
- Nausea
- Dizziness and confusion
- Coma, in extreme situations

A number of steps can be taken to minimize the potential for heat stress disorders.

- Acclimate employees to working conditions by increasing workloads slowly over extended periods of time. Do not initiate site work activities with tasks having the most demanding physical expenditures.

- As practicable, conduct strenuous activities during cooler portions of the day, such as early morning or early evening.

- Provide employees with lots of tempered water and encourage them to drink it throughout the work shift; discourage the use of alcohol and caffeine during nonworking hours as these contribute to dehydration. It is essential that fluids lost through perspiration be replenished. Total water consumption should equal one to two gal/day.

- During hot periods, rotate employees wearing impervious clothing.

- Provide cooling devices, as appropriate. Mobile showers and/or hose-down facilities, powered air purifying respirators, and ice vests all have proven effective in helping prevent heat stress.

C.10.2 COLD STRESS

Persons working outdoors in low temperatures, especially at or below freezing, are subject to cold stress disorders. Exposure to extreme cold for even a short period of time can cause severe injury to the body surfaces and/or profound cooling, which can lead to death. Areas of the body that have high surface area-to-volume ratios, such as fingers, toes, and ears, are the most susceptible. Two basic types of cold disorders exist: localized (e.g., frostbite) and generalized (e.g., hypothermia). The descriptions for frostbite and hypothermia are provided below.

Frostbite can occur, in absence of hypothermia, when the extremities do not receive sufficient heat from central body stores. This can occur because of inadequate circulation and/or insulation. Frostbite occurs when there is freezing of fluids around the cells of the body tissues due to extremely low temperatures. Damage may result, including loss of tissue around the areas of the nose, cheeks, ears, fingers, and toes. This damage can be serious enough to require amputation or result in permanent loss of movement.

Hypothermia is described as when the temperature of the body drops. The first symptoms of this condition are uncontrollable shivering and the sensation of cold, irregular heartbeat, weakened pulse, and change in blood pressure. Severe shaking of rigid muscles may be caused by a burst of body energy and changes in the body's chemistry. Vague or slow, slurred speech, memory lapses, incoherence, and drowsiness are some of the additional symptoms. Symptoms noticed before complete collapse are cool skin, slow and irregular breathing, low blood pressure, apparent exhaustion, and fatigue even after rest. As the core body temperature drops, the victim may become listless and confused, and may make little or no attempt to keep warm. Pain in the extremities can be the first warning of dangerous exposure to cold. If the body core temperature drops to about 85°F, a significant and dangerous drop in the blood pressure, pulse rate, and respiration can occur. In extreme cases, death will occur. A number of steps can be taken to minimize the potential for cold stress.

- Individuals can achieve a certain degree of acclimation when working in cold environments as they can for warm environments. The body will undergo some changes that increase the body's comfort and reduce the risk of cold injury.

- Working in cold environments causes significant water losses through the skin and the lungs as a result of the dryness of the air. Increased fluid intake is essential to prevent dehydration, which affects the flow of blood to the extremities and increases the risk of cold injury.

- The skin should NOT be exposed continuously to subzero temperatures.

C.11. 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 these:

- To determine and implement the decontamination methods for personnel and equipment that is effective for the specific hazardous/radioactive substance(s) present;

- To ensure the decontamination procedure itself does not pose any additional safety or health hazards;

- To provide pertinent information on the locations and layouts of decontamination stations and equipment;

- To establish procedures for the collection, storage, and disposal of clothing and equipment that has not been completely decontaminated; and

- To provide for periodic evaluation of the effectiveness of decontamination methods.

C.11.1 GENERAL CONSIDERATION

It is assumed that most of contamination concerns from the field activities will be radiological in nature. 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, ES&H 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 this waste is handled, treated, stored, and disposed of properly. Handling and disposal of fissile waste will be in accordance with CP3-WM-1036, *Nuclear Criticality Safety Implementation Requirements for Handling and Storage of Fissile and Potentially Fissile Waste.*

C.11.2 PERSONNEL DECONTAMINATION METHODS

Personnel decontamination will be conducted in accordance with procedure CP4-RP-1103, *Personnel and Personal Effects Decontamination*. In the event of a chemical exposure, decontamination will be performed according to the available Safety Data Sheet or as directed by ES&H industrial safety. After the initial field decontamination, the potentially exposed employee will be transported to the appropriate medical facility for exposure assessment, if deemed necessary by ES&H.

C.11.3 COLLECTION, STORAGE, AND DISPOSAL PROCEDURES

All items (including clothing, equipment, liquids) that cannot be completely decontaminated shall be considered radioactive, hazardous, or mixed waste, as appropriate. Clothing and equipment shall be collected, treated, stored, and disposed of based on the type and level of contamination according to applicable federal, state, and local regulations. Drainage and/or collection systems for contaminated liquids shall be established and approved containers shall be used. Wash water shall be collected for proper disposal.

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ATTACHMENT

CP5-EP-0400, EMERGENCY ACTION PLAN FOR C-400

Note: This Emergency Action Plan currently is written for C-400 Cleaning Building deactivation workers, and it will be revised prior to implementing the C-400 NTCRA.

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CP5-EP-0400 FRev. 1	TITLE: C-400, C-400-T2, C-409, C-410K, C-410D, & C-350 Emergency Action Plan	Page 1 of 24

DOCUMENT CATEGORY:	☒ Administrative	☐ Technical	
LEVEL OF USE:	☒ Information Level	☐ Reference Level	☐ Continuous Use

FUNCTIONAL AREA: Emergency Management **SUBJECT MATTER AREA:** Emergency Management	**SUBJECT MATTER EXPERT:** Krystal Pierce Emergency Management Supervisor
NUCLEAR SAFETY REVIEW DOCUMENTATION: N/A- per CP3-OP-0207	**APPROVED BY/DATE** (Signature on file): April Tilford, Emergency Management Program Manager/ 12/12/2017
REQUIRED REVIEW DATE (or expiration date for temporary change): 12/12/2020	**EFFECTIVE DATE:** 12/19/2017

REVISION/CHANGE LOG			
Revision/Change Letter	Description of Changes	Pages Affected	Date of Revision/Change
FR0	Bluesheet	All	09/22/17
FR1	Revision to remove bluesheet.	All	12/12/17

C-400, C-400-T2, C-409, C-410K, C-410D, &C-350 EMERGENCY ACTION PLAN

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This Emergency Action Plan (EAP) provides occupants with specific directions to follow in the event of an emergency. The plan was developed in accordance with 29 *CFR* § 1910.38, *Emergency Action Plans*, and to supplement direction provided in CP2-EP-1000, *Paducah Site Emergency Management Plan*, and site emergency response procedures.

2.0 SCOPE

This EAP is applicable for C-400, C-400-T2, C-409, C-410K, C-410D & C-350.

3.0 GENERAL REQUIREMENTS

NOTE:

A radio is required upon entry to facility areas **NOT** covered by a public address (PA) system in order to receive emergency announcements.

4.0 RESPONSIBILITIES

4.1 Emergency Management Program Management

Ensures the EAP is reviewed periodically and updated as necessary.

4.2 Local Emergency Director

- Identify himself/herself as the LED to facility occupants.
- Assign an Alternate LED.
- Assign Wardens.
- Ensure copies of the EAP are available to facility occupants and visitors for review.
- Ensure facility personnel are familiar with the EAP and any changes to the plan.
- Ensure evacuation routes and evacuation points, as appropriate, are posted at strategic locations.
- Conduct required emergency drills or reviews for the facilities covered in the EAP.
- Assist with the evacuation of work locations and assigned facilities.
- Ensure any facility alarms have been reported to the PSS.
- Assist personnel and management with accountability reporting.
- If no communications are available, then send a runner to C-300 or the Command Post to report information.
- Instruct all personnel to remain at the Evacuation Assembly Point or Take Cover Area until otherwise directed.

- Act as point of contact for emergency information regarding facility response actions.
- Report to the Command Post and brief the IC on his/her facility

4.3 Alternate LED

- Act as the LED when the LED is unavailable.
- Assist the LED and Warden in implementing and using the EAP during an emergency.

4.4 Warden

- Assist the LED in implementing and using the EAP during an emergency.

For Handicapped Employee(s):

- Ensure necessary assistance is available for prompt evacuation.
- Assist by using a buddy system with alternate "buddies" to ensure the handicapped person always has the necessary assistance regardless of buddies' illnesses, holidays, travel, etc.

For Un-cleared Visitor Escorts:

- Question un-cleared persons to determine if they have been separated from their escort.
- If necessary, then assign an escort to comply with the escort-to-visitor ratio

5.0 EMERGENCY RESPONSE

Reporting emergencies and response actions for the LED, wardens, and personnel are outlined for various emergency events in the Appendices. It is important to note that reporting emergencies may be different based on the emergency event (e.g., for bomb threats or suspicious packages, radios and cell phones are **NOT** used because they may detonate an explosive device). Also, **NOT** all protective actions are the same. The Appendices outline the proper reporting and response actions for each type of emergency event.

The primary and alternate assembly point maps, shelter-in-place location maps, take-cover location maps, and the telephone bomb threat guidance are found in the attachments.

- Appendix A – *Fire or Explosion*
- Appendix B – *Tornado/Severe Weather*
- Appendix C – *Earthquake*
- Appendix D – *Chemical Spill/Release*
- Appendix E – *Bomb Threat*
- Appendix F – *Suspect Device or Package*
- Appendix G – *Suspicious Activity/Intruder/Active Shooter*
- Appendix H – *Nuclear Criticality/Radiological Emergency*
- Appendix I – *CAAS Evacuation and Assembly Points*
- Appendix J – *Evacuation Assembly Point, Shelter-In-Place, and Take-Cover Maps*
- Appendix K – *Telephone Bomb Threat Guidance*

Appendix A – Fire or Explosion

How to Report the Emergency	• Fire Alarm Pull Box – **If not in danger, stay in area to notify responders.** • Call the PSS Emergency Phone Numbers - 333 (Bell) or 555 (PAX) • Radio - Turn knob to position 16; Call for Alpha 1, state "Emergency Traffic, Emergency Traffic." • Call the PSS Office at extension - 6211 and state "This is an emergency." • Call the PSS Office from a cell phone - (270) 441-6333 • Notify facility manager, LED, or Warden
How You are Notified/Alerted	• Facility Evacuation Alarm - Continuous blast on plant horns • Hi-Lo Tones • PA Announcement • Radio • Other personnel, LED, Assistant LED, or Warden
Personnel Actions	Proceed immediately to the designated Evacuation Assembly Point through the nearest exit.
LED/Warden Actions	• Evacuate the facility by the nearest safe exit and report to the designated Evacuation Assembly Point. • Assist with local evacuation and ensure location is clear of all personnel. • Assist personnel and management with accountability reporting. • Report to the PSS/Incident Commander (IC) at the Command Post, if the fire or explosion was in your facility. • Report injuries and request medical assistance from PSS/IC • If evacuating from a facility with a visitor log, take the visitor log to the Command Post.
Cautions	A radio is required upon entry to the facility for areas not covered by a PA. Stay upwind and clear of any fire.

Primary and Secondary Evacuation Assembly Points

C-400 & C-400-T2	Primary	Assembly Point #6, C-635-1 Pump house
C-400 & C-400-T2	Secondary	Assembly Point #2, C-200 (Northwest corner)
C-409	Primary	Assembly Point #2, C-200 (Northwest corner)
C-409	Secondary	Assembly Point #6, C-635-1 Pump house
C-410K/D	Primary	Assembly Point #6, C-635-1 Pump house
C-410K/D	Secondary	Assembly Point #2, C-200 (Northwest corner)
C-350	Primary	Assembly Point #6, C-635-1 Pump house
C-350	Secondary	Assembly Point #2, C-200 (Northwest corner)

Appendix B — Tornado/Severe Weather

How to Report the Emergency	• Call the PSS Emergency Phone Numbers - 333 (Bell) or 555 (PAX) • Radio - Turn knob to position 16; Call for Alpha 1, state "Emergency Traffic, Emergency Traffic." • Call the PSS Office at extension - 6211 and state "This is an emergency." • Call the PSS from a cell phone - (270) 441-6333 • Notify facility manager, LED, or Warden
How You are Notified/Alerted	• PA Announcement to Take Cover • Radio • Hi-Lo Tones • Take Cover Horns - Intermittent 2-second blast on plant horns • Other personnel, LED, Assistant LED, or Warden
Personnel Actions	Proceed immediately to nearest designated Take Cover areas. • C-400: Hallway on the East side. • C-409: Men's and women's change house. • C-410K/D and C-350: Relocate to C-400 Hallway on the East side or C-335 ACR. Do NOT enter any rooms with windows.
LED/Warden Actions	Thunderstorm Warning: • Direct personnel working in mobile office trailers and persons outdoors to relocate to permanent facilities until the warning period is terminated. Tornado Warning: • Direct personnel to designated Take Cover Area. • Assist personnel and management with accountability reporting. • Report injuries to the PSS/IC and request medical assistance. • Report to the PSS/IC at the Command Post, if requested, and it is safe to do so after the tornado warning has been lifted. After severe weather or tornado strike impacts your facility: • Evacuate the facility and assist personnel and management with accountability reporting. • Check for injured personnel, fires or fire hazards, chemical releases, loose electrical wires, damaged structures, and broken gas lines. • Ensure nonessential electrical equipment is de-energized. • Ensure no smoking or using flame producing devices. • Report emergency actions and accountability status to the PSS. • Report to the PSS/IC at the Command Post, if requested, and it is safe to do so after the severe weather/tornado warning has been lifted.
Cautions	If outdoors and unable to find shelter, then lie flat in the nearest ditch or depression. Stay out of mobile structures. If outside, then avoid walls, power poles, downed power, spills, fires, lines and any other hazards.

Appendix C – Earthquake

How to Report the Emergency	There is no need to report a substantial earthquake to the PSS. • Slight ground shaking should be reported to C-300 for further investigation. • Call the PSS Emergency Phone Numbers - 333 (Bell) or 555 (PAX) • Radio - Turn knob to position 16; Call for Alpha 1 • State "Emergency Traffic, Emergency Traffic." • Call the PSS Office at extension - 6211 and state "This is an emergency." • Call the PSS from a cell phone - (270) 441-6333 • Notify facility manager, LED, or Warden
How You are Notified/Alerted	• Ground shaking • Hi-Lo Tones • PA Announcement • Radio • Other personnel, LED, Assistant LED, or Warden
Personnel Actions	If indoors: • Watch for falling objects such as light fixtures, stacked items, bookcases, • Get under a desk or table in a corner away from windows, or stand in doorway or go to a small interior space such as a restroom or break room. • After the earthquake, report to designated Evacuation Assembly Point and follow instructions of emergency response personnel. • Stay out of the facility until directed to return by emergency response personnel. If outdoors: • Avoid walls, power poles, downed power lines, and any other hazards. • Proceed to designated Evacuation Assembly Point, and follow instructions of emergency response personnel. • Stay out of the facility until directed to return by emergency response personnel.
LED/Warden Actions	After the earthquake, evacuate the facility. • If evacuating from a facility with a visitor log, then take the visitor log to the Command Post. • Check for injured personnel, fires or fire hazard, damaged utility lines and equipment damage. • Report injuries and request medical assistance from the PSS/IC. • Assist personnel and management with accountability reporting. • Report to the PSS/IC at the Command Post, if requested, if is safe to do so.
Cautions	If outdoors or when exiting a facility, then avoid walls, power poles, downed power lines, and any other hazards.

Appendix C – Earthquake (Continued)

Primary and Secondary Evacuation Assembly Points

C-400 & C-400-T2	Primary	Assembly Point #6, C-635-1 Pump house
C-400 & C-400-T2	Secondary	Assembly Point #2, C-200 (Northwest corner)
C-409	Primary	Assembly Point #2, C-200 (Northwest corner)
C-409	Secondary	Assembly Point #6, C-635-1 Pump house
C-410K/D	Primary	Assembly Point #6, C-635-1 Pump house
C-410K/D	Secondary	Assembly Point #2, C-200 (Northwest corner)
C-350	Primary	Assembly Point #6, C-635-1 Pump house
C-350	Secondary	Assembly Point #2, C-200 (Northwest corner)

Appendix D – Chemical Spill/Release

How to Report the Emergency	• Call the PSS Emergency Phone Numbers - 333 (Bell) or 555 (PAX) • Radio - Turn knob to position 16; Call for Alpha 1, state "Emergency Traffic, Emergency Traffic." • Call the PSS Office at extension - 6211 and state "This is an emergency." • Call the PSS Office from a cell phone - (270) 441-6333 • Notify facility manager, LED, or Warden
How You are Notified/Alerted	• Building Evacuation Alarm • Hi-Lo Tones • PA Announcement with Protective Action to Shelter-in-Place or Evacuate • Radio • Other personnel, LED, Assistant LED, or Warden • Direct observation of the spill or release
Personnel Actions	If directed to evacuate, then: • Evacuate immediately to the Evacuation Assembly Point per the directions given in PA announcement. • The PA announcement may identify the Evacuation Assembly Point depending on the location of the release and wind direction. • If no directions are given, then evacuate at a 90-degree angle to the plume path. If directed to shelter-in-place, then: • Go indoors. • Close all exterior windows and doors. • If qualified, then turn off sources of ventilation. • Remain indoors until shelter-in-place is lifted.
LED/Warden Actions	If evacuation, then: • Determine upwind Evacuation Assembly Point. • Assist personnel with evacuation from nearest safe exit to the Evacuation Assembly Point. • If evacuating from a facility with a visitor log, then take the visitor log to the Command Post. • Assist personnel and management with accountability reporting. • Report injuries and request medical assistance from the PSS/IC as soon as possible. • Report to the PSS/IC at the Command Post if the chemical spill or release was in your facility, if safe to do so. If Shelter-In-Place, then: • Assist personnel with sheltering-in-place. • Ensure exterior windows and doors are closed. • Ensure all outside sources of ventilation are turned off. • Assist personnel and management with accountability reporting. • Contact the PSS/IC via phone or radio if the chemical spill or release was in your facility and provide a status. • Remain indoors until released by the PSS/IC.
Cautions	Do not use a fire alarm pull box to report a hazmat release in a facility. This could place responders in harm's way by entering a facility to respond to a fire alarm. If evacuating, avoid any chemical spills or releases. Stay upwind of chemical spills or release. If sheltering-in-place, then remain indoors until released by the PSS/IC.

Appendix D – Chemical Spill/Release (Continued)

Sources of Ventilation

C-400, C-400-T2 & C-409	Upon receiving an order to shelter-in-place, go inside, close all doors and windows, shut off all sources of outside ventilation including heating/air conditioning units, and remain inside until the shelter-in-place order is lifted.

Appendix E – Bomb Threat

How to Report the Emergency	**DO NOT USE CELL PHONE, RADIO, OR FIRE ALARM PULL BOXES** • Call the PSS Emergency Phone Numbers - 333 (Bell) or 555 (PAX) • Call the PSS Office at extension - 6211 and state "This is an emergency." • Notify the LED, Warden, or Facility Manager
How You are Notified/Alerted	• Receipt of a telephone or written bomb threat • PA Announcement to Evacuate • Radio • Hi-Lo Tone • Other personnel, LED, Assistant LED, or Warden
Personnel Actions	If Telephone Bomb Threat, then: • Obtain information about threat utilizing the Telephone Bomb Threat Guidance (Appendix M). • Keep caller talking and remain on line. **Do not** hang up even if caller does. • Listen carefully. Be polite and show interest. • Keep caller talking to learn more information. • Copy the phone number and letters on the display. • Write a note to a coworker to call the PSS, or when caller hangs up, notify the PSS immediately from a different phone. Do not hang up and follow instructions. • If bomb threat was recorded on a voicemail, then save the voicemail and notify the PSS. If written bomb threat, then: • Protect and preserve the written communication. • Handle the communication as little as possible. • Contact the PSS immediately and follow instructions. If E-mail bomb threat, then: • Save the e-mail. • Contact the PSS immediately.
LED/Warden Actions	Assist personnel with evacuation from nearest safe exit to the Evacuation Assembly Point. • If evacuating from a facility with a visitor log, then take the visitor log to the Command Post. • Assist personnel and management with accountability reporting. • Report to the PSS/IC at the Command Post if the threat was in your facility.
Cautions	Do not use cell phones or radios since they may detonate the device. Do not open or approach suspect devices or packages. Warn others to stay away from the device/package.

Appendix F – Suspect Device or Package

How to Report the Emergency	**DO NOT USE CELL PHONE, RADIO, OR FIRE ALARM PULL BOXES** • Call the PSS Emergency Phone Numbers - 333 (Bell) or 555 (PAX) • Call the PSS Office at extension - 6211 and state "This is an emergency." • Notify the LED, Warden, or Facility Manager
How You are Notified/Alerted	• Visually observe the suspect device or package • PA Announcement to evacuate • Hi-Lo Tone • Other personnel, LED, Assistant LED or Warden
Personnel Actions	Receipt of suspicious letter or package: • Leave sealed, treat as suspect, and leave it undisturbed. • Avoid cell phone usage near the package. • Warn others to stay away from the device/package. • Notify the PSS immediately and follow instructions. Suspicious letter or package characteristics: • No return address • Poorly handwritten • Excessive postage • Misspelled words • Stains • Strange odor or sounds • Distorted handwriting • Homemade labels or cut-and-paste lettering • Incorrect titles • Foreign postage • Restrictive notes such as "personal" or "private" • Unexpected delivery • Rigid, uneven, or lopsided packaging
LED/Warden Actions	• Assist personnel with evacuation from nearest safe exit to the Evacuation Assembly Point. • If evacuating from a facility with a visitor log, then take the visitor log to the Command Post. • Assist personnel and management with accountability reporting. • Report to the PSS/IC at the Command Post if the suspect device or package was in your facility. • Comply with local responding law enforcement authorities. They may direct evacuated personnel to relocate to another Evacuation Assembly Point further away from the facility.
Cautions	Do not use cell phones or radios in the vicinity of the package. Do not open or approach suspect devices or packages.

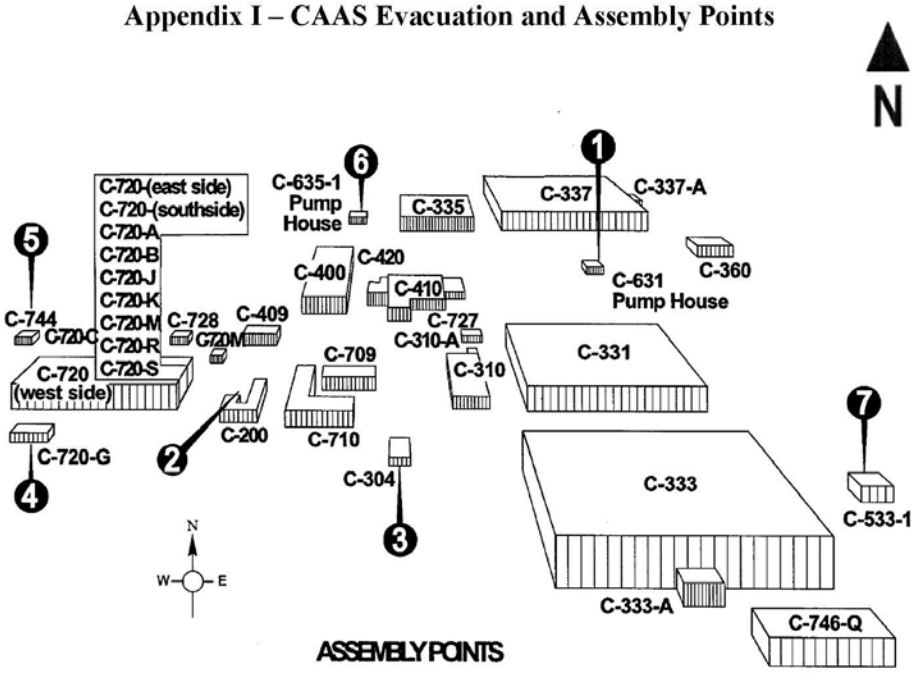
Appendix G – Suspicious Activity/Intruder/Active Shooter

How to Report Emergency	• • When it becomes safe to do so, contact the PSS by using the following: • Call the PSS Emergency Phone Numbers - 333 (Bell) or 555 (PAX) • Radio - Turn knob to position 16; Call for Alpha 1, state "Emergency Traffic, Emergency Traffic." • Call the PSS Office at extension – 6211 and state "This is an emergency." • Call the PSS Office from a cell phone - (270) 441-6333
How You are Notified/ Alerted	At the onset of an active shooter event or violent altercation it is improtant to understand that you and your colleagues are the first repsonders. As a result, each employee should maintain an awareness of their surroundings and be mentally and physically prepared to react to the situation until help arrives.
Personnel Actions	• <u>Run</u> • Have an escape route and plan in mind • Leave your belongings behind. • Evacuate regardless of whether others agree to follow • Remember that moving individuals are harder targets to accurately engage • When exiting the building, keep your hands visible at all times <u>Hide</u> • If you are unable to run, hide in an area where you can't be seen by the shooter • Lock the door(s) and/or block the entry into the room. Attempt to select a location with a robust door (no glass) if possible and time permits • Hide behind furniture (the more robust the better) • Silence your cell phone • Remain quiet <u>Fight</u> • If confronted directly by the shooter and you feel our life is in imminent danger, violently attack the shooter • Use all means necessary to incapacitate the shooter • Act with physical aggression (throw items at the shooter) • Fully commit to your own survival •
Cautions	Responding security or law enforcement may not know who you are, so expect to be treated as a possible threat and obey all commands (e.g., hands up or on head as you approach them).

Appendix H – Nuclear Criticality/Radiological Emergency

How to Report Emergency	There are alarms in C-300 that will alert the PSS to a nuclear criticality event • Call the PSS Emergency Phone Numbers - 333 (Bell) or 555 (PAX) • Red-Handled Phone • Radio - Turn knob to position 16; Call for Alpha 1 • State "Emergency Traffic, Emergency Traffic" • Call the PSS Office at extension - 6211 and state "This is an emergency." • Call the PSS Office from a cell phone - (270) 441-6333 • Notify facility manager, LED or Warden
How You are Notified/Alerted	• Alarming dosimeter(s) • Criticality alarms — Continuous blast on high pitched air whistle or electronic horn • Flashing red beacon lights on exterior of alarmed facility • PA Announcement • Radio • Hi-Lo Tones • Other personnel, LED, Assistant LED, or Warden
Personnel Actions	• Evacuate immediately to designated Criticality Accident Alarm System • (CAAS) Evacuation Assembly Point through nearest safe exit. • If exiting radiological areas, then ignore instruction to stop and perform frisking. • Move away from the facility as far as possible. • Avoid delays when walking alongside fences. • If evacuated from radiological areas, then segregate self from other evacuees.
LED Actions	• Evacuate personnel to the designated CAAS Evacuation Assembly Point. • If evacuating from a facility with a visitor log, then take the visitor log to the Command Post. • Assist personnel and management with accountability reporting. • Direct evacuees to segregate themselves when existing from radiological areas. • Identify yourself as the LED and move to front of line for monitoring by responders. • Report injuries and request medical assistance from PSS as soon as possible. • Report to the IC at the Command Post.
Cautions	Remain at least 200 feet from a facility displaying actuated red beacon lights. If evacuated from radiological area, then precautions shall be taken to prevent the spread of contamination such as personnel segregating themselves at the Evacuation Assembly Point and frisking as soon as is practical during the response. To lessen the effects of any possible uptake, evacuees shall refrain from eating, drinking, chewing gum or tobacco products, and smoking while en route to or stationed at the CAAS Evacuation Assembly Point.

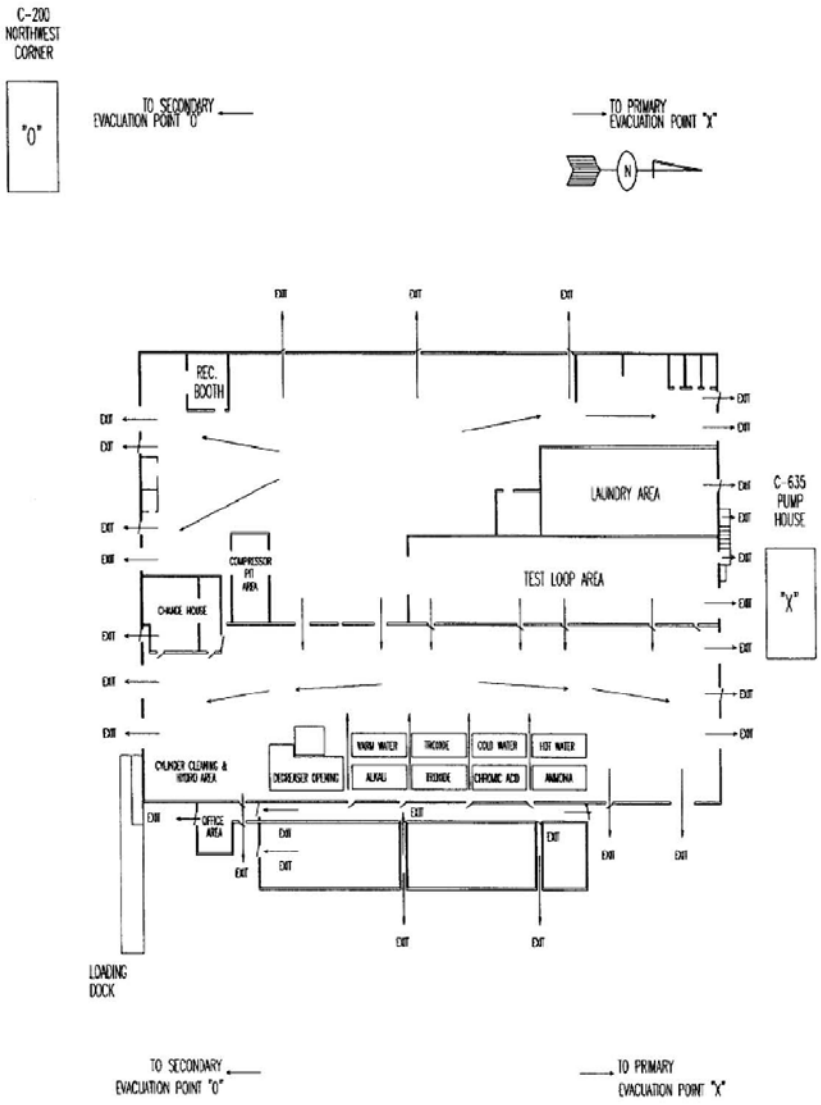
Appendix I – CAAS Evacuation and Assembly Points



C-400 & C-400-T2	Assembly Point #6
C-409	Assembly Point #2 (Northwest corner)
C-410K/D	Assembly Point #6
C-350	Assembly Point #6

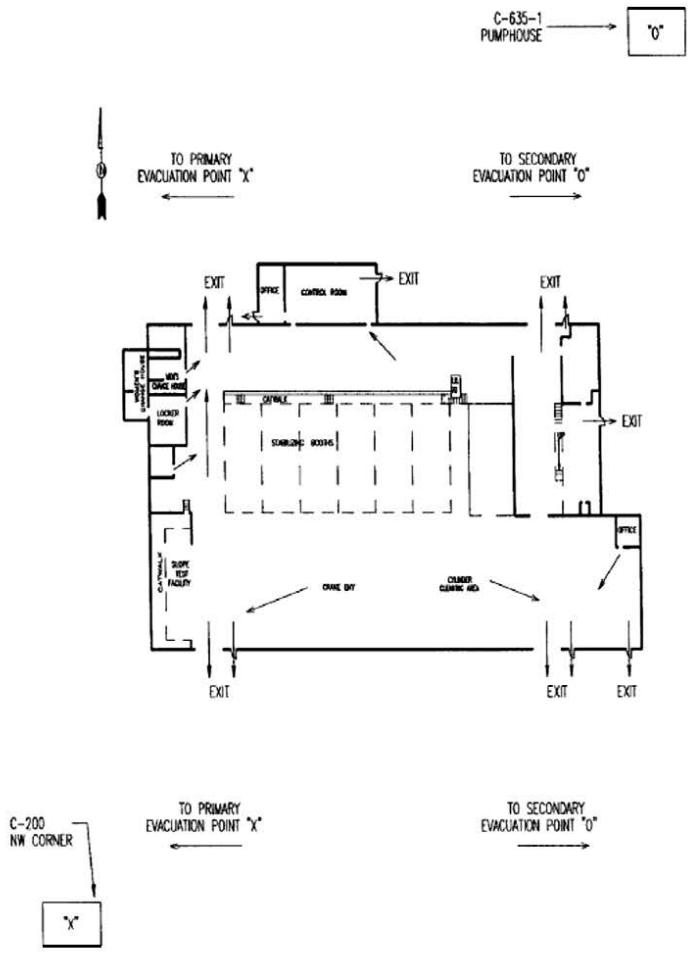
Appendix J – Evacuation Assembly Point, Shelter-In-Place, and Take-Cover Maps

C-400 Emergency Egress Routes



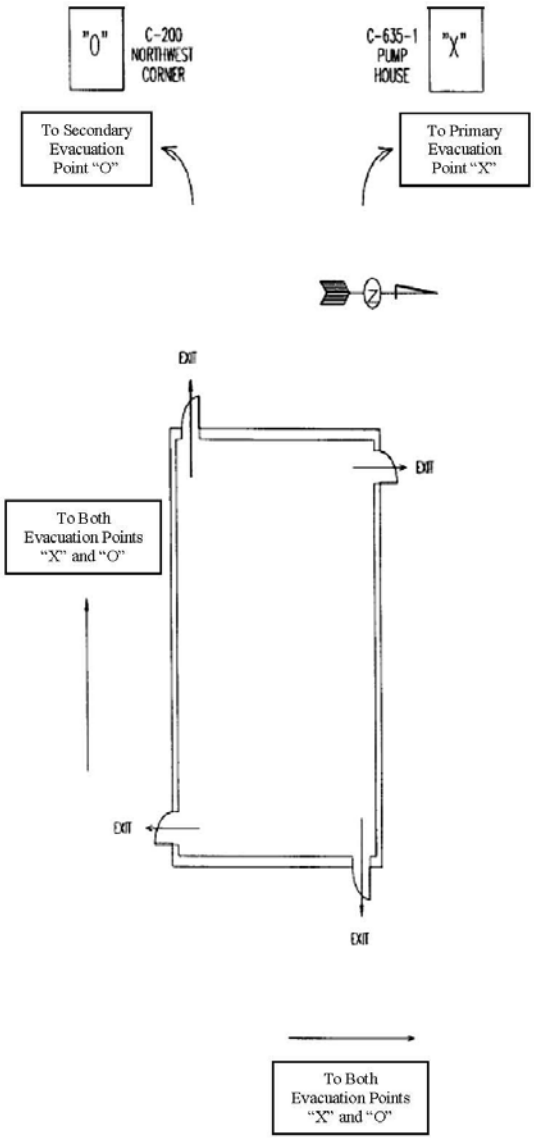
Appendix J – Evacuation Assembly Point, Shelter-In-Place, and Take-Cover Maps (Continued)

C-409 Emergency Egress Routes



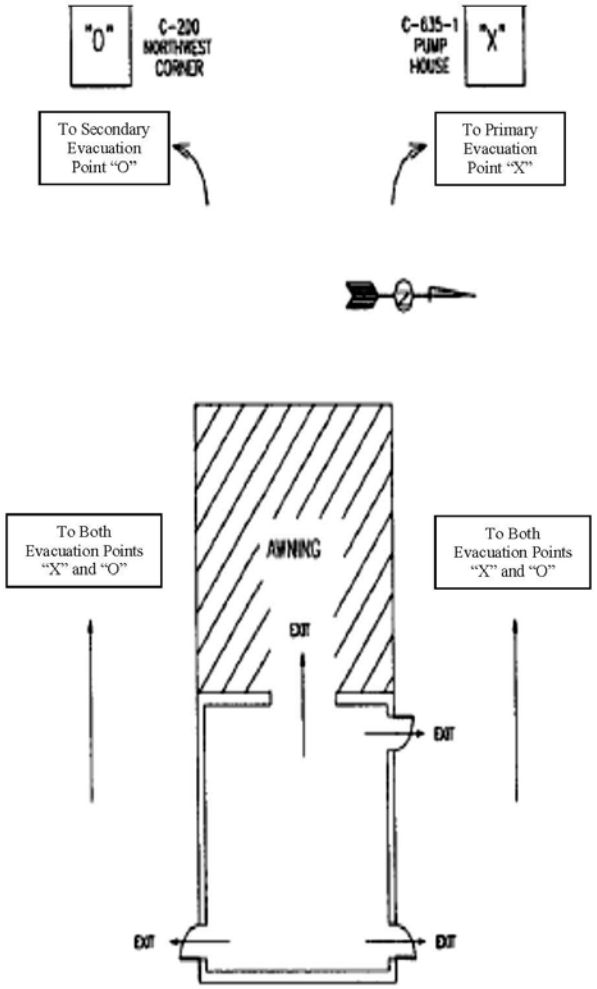
Appendix J – Evacuation Assembly Point, Shelter-In-Place, and Take-Cover Maps (Continued)

C-410D Emergency Egress Routes

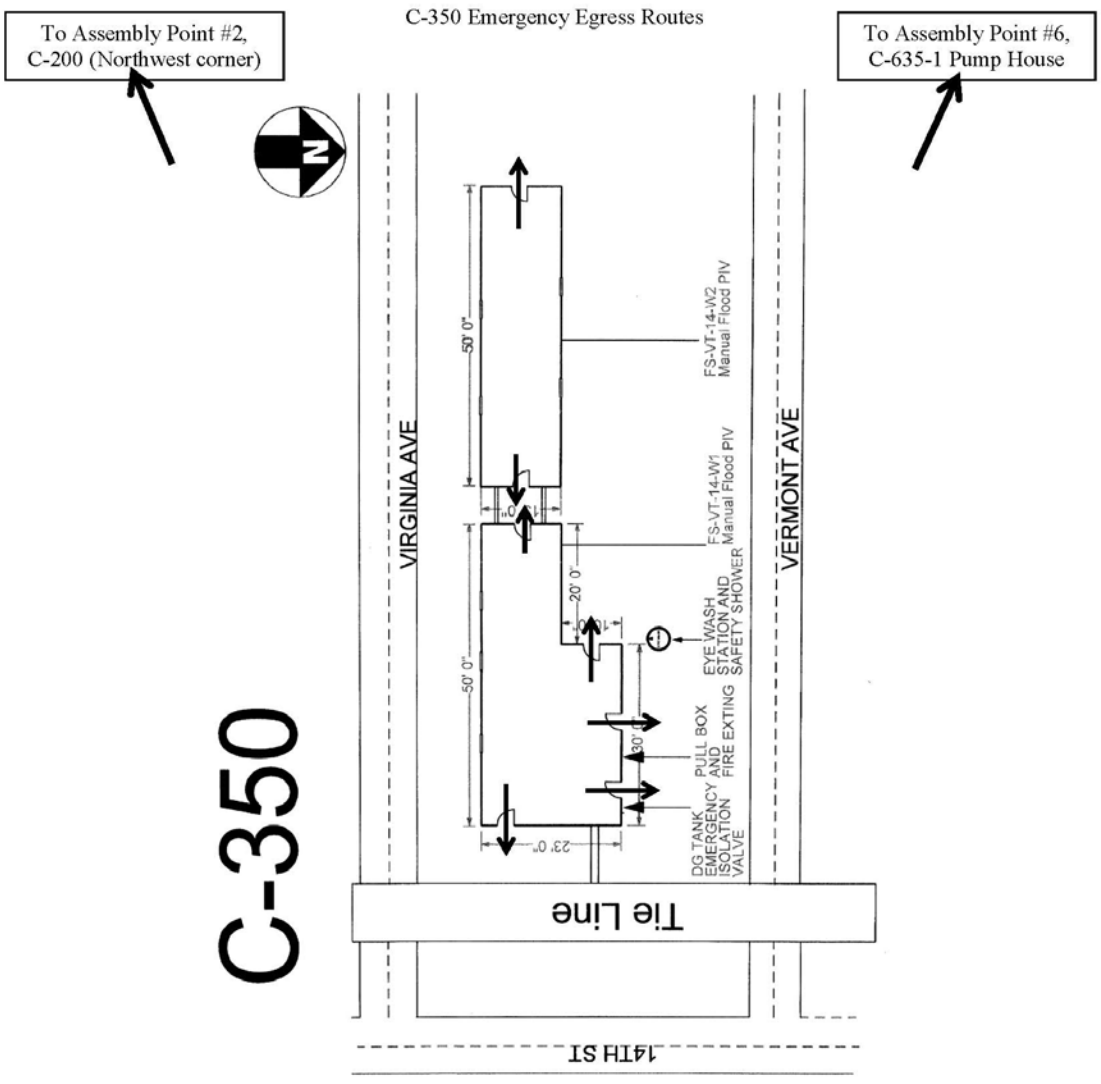


Appendix J – Evacuation Assembly Point, Shelter-In-Place, and Take-Cover Maps (Continued)

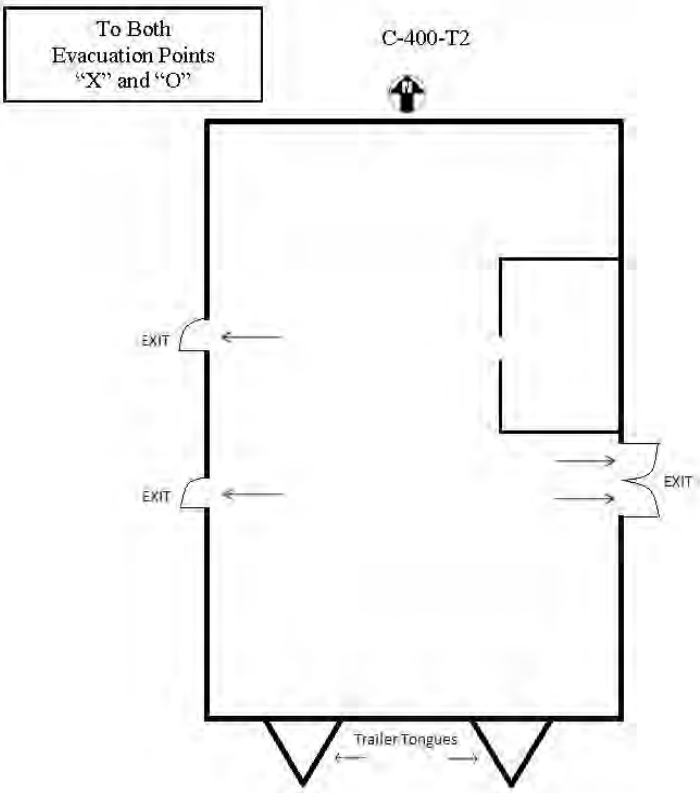
C-410K Emergency Egress Routes



Appendix J – Evacuation Assembly Point, Shelter-In-Place, and Take-Cover Maps (Continued)



Appendix J – Evacuation Assembly Point, Shelter-In-Place, and Take-Cover Maps (Continued)



Appendix K – Telephone Bomb Threat Guidance

INSTRUCTIONS: Be calm; be courteous; listen; do not interrupt the caller. If possible, notify supervisor by prearranged signal while caller is on the line. Save all voicemails.

YOUR NAME: _____ **TIME:**_____ **DATE:**_____

CALLER'S IDENTITY

Sex: Male_____ Female_____ Adult_____ Juvenile_____ Approximate Age:_____ Years

ORIGIN OF CALL

Phone number where call received: _____

Caller ID number: _____

Local _____ Long Distance_____ PAX (From within facility?)_____

Circle the appropriate information

Voice Characteristics			**Speech**			**Language**	
Loud	Soft		Rapid	Slow		Well Spoken	
High Pitch	Deep		Distinct	Distorted		Good	Poor
Raspy	Pleasant		Stutter	Nasal		Profane	
Cracking	Normal		Slurred	Lisp		Other	
Intoxicated	Ragged		Other				
Coughing/Clearing Throat							
Deep Breathing							
Other							
Accent			**Manner**			**Background Noises**	
Local	Not Local		Calm	Angry		Quiet Conversation	
Foreign	Region		Rational	Irrational		House	Kitchen
Race	Disguised		Coherent	Incoherent		Music	Party
			Deliberate	Emotional		Office	PA System
			Excited	Righteous		Factory	Trains
			Laughing	Crying		Machines	Motors
			Message read			Airplanes	Animals
			Taped			Clear	Static
			Other			Street Traffic/Cars	
						Other	

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APPENDIX D

LIST OF PROCEDURES

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LIST OF PROCEDURES

This appendix includes a nonexhaustive list of U.S. Department of Energy contractor procedures that is provided as an example of the types of procedures that may be used in the demolition process. This list of procedures was developed based on experience with other demolition activities at Paducah by including procedures used in performing those activities. Additionally, activities that will be performed during the C-400 demolition were evaluated, and existing procedures that address performance of those activities were included in the list. Other Paducah Gaseous Diffusion Plant procedures may be used, or new procedures or work documents may be generated if needed. Development of these procedures included input from various DOE contractor functional groups (e.g., Safety and Health, Engineering, Quality Assurance, Project Management, Facility Management, Radiological Control, Work Controls, Training, Environmental Compliance, Waste Certification Officials, Transportation, Compliance, Nuclear Safety, Waste Disposition, and members of the craft). These procedures may be revised or deleted without update to this appendix and are identified for information. They are not being provided for regulator review and approval.

- CP2-HS-1000, *Integrated Safety Management System Description*
- CP2-HS-2000, *Worker Safety and Health Program*
- CP2-HS-4002, *Occupational Medicine Program*
- CP2-RP-0001, *Radiation Protection Program*
- CP2-RP-0001, *Radiation Protection Program*
- CP2-SM-1000, *Activity Level Work Planning and Control Program*
- CP3-EP-1007, *Oil and Hazardous Material Spills and Release*
- CP3-FP-2005 FR1, *Welding, Burning, and Hotwork*
- CP3-HS-2004, *Job Hazard Analysis*
- CP3-HS-2009, *Stop Suspend Work*
- CP3-HS-2010, *Instructions for Lockout/Tagout*
- CP3-HS-2015 FR1, *Scaffolds*
- CP3-HS-2034 FR1, *Lead and Inorganic Arsenic*
- CP3-HS-2036 FR1, *Aerial Devices*
- CP3-QA-2501 FR1, *Waste Certification*
- CP3-SD-0001 FR0, *Air-Gap Identification*
- CP3-SM-0051 FR1, *Hoisting and Rigging*

- CP3-SM-0054 FR1, *Mobile Construction Equipment*
- CP3-SM-0458 FR1, *Respirator Issuance and Control*
- CP3-SM-1101 FR2A, *Activity Level Work Request Planning Scheduling and Release*
- CP3-SM-1102 FR1, *Activity Level Work Execution and Closeout*
- CP3-SM-2006, *Construction Equipment Inspection and Maintenance*
- CP3-SM-2026 FR1, *Asbestos Control*
- CP3-SP-0018 FR0, *Subcontractor Oversight*
- CP3-SP-0019 FR0, *Subcontractor Work Planning Execution*
- CP3-WM-0022 FR1, *Waste Water Accumulation, Storage, and Disposal*
- CP3-WM-0437 FR1, *Waste Characterization and Profiling*
- CP3-WM-0618 FR,1 *Paducah Railcar Operation*
- CP3-WM-0707 FR1, *NNSS Specific Waste Characterization Profiling Packaging, and Shipping*
- CP3-WM-1036, *Nuclear Criticality Safety Implementation Requirements for Handling and Storage of Fissile and Potentially Fissile Waste*
- CP3-WM-1037 FR1, *Generation and Temporary Storage of Waste Materials*
- CP3-WM-2110 FR1A, *Waste Container Handling Overpacking and Transportation*
- CP3-WM-3015 FR1, *Waste Packaging*
- CP3-WM-3025 FR1, *Preparation and Processing of Paducah Landfill Packages Waste Sampling*
- CP3-WM-3028 FR1, *Off-Site Shipping*
- CP3-WM-3030 FR1, *Commercial Motor Vehicle Operations*
- CP4-ES-0036 FR1, *Asbestos*
- CP4-ES-0037 FR1, *Paint Chip Sampling*
- CP4-ES-2002 FR1, *Sampling of Structural Elements and Miscellaneous Surfaces*
- CP4-OP-0316 FR1A, *Conduct of Pre and Post Job Briefings*
- CP4-OP-2119 FR2A, *Lead and Mold Decontamination Work*
- CP4-RP-1103, *Personnel and Personal Effects Decontamination*

- CP4-RP-1112 FR0, *Air Sample Collection, Analysis, and Documentation*
- CP4-WM-0019, *On-Site Transfer and Movement of Waste Containers and Other Support Equipment*
- CP5-EP-0400, *Emergency Action Plan for C-400*

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