



U.S. Department of Energy Office of Environmental Management

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

Subject: Removal Action Memorandum

Date: May 2018

1. PURPOSE

This Action Memorandum (AM) documents the U.S. Department of Energy's (DOE's) formal decision to conduct a non-time-critical removal action (NTCRA) to address demolition of the C-400 Cleaning Building in the C-400 Complex Operable Unit (OU). This AM was prepared in accordance with requirements under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). This AM follows guidance for action memoranda outlined in the U.S. Environmental Protection Agency's (EPA's) *Superfund Removal Guidance for Preparing Action Memoranda*, September 2009 (EPA 2009). This NTCRA is being performed pursuant to DOE's removal authority under Executive Order 12580 and in accordance with the *Federal Facility Agreement for the Paducah Gaseous Diffusion Plant*, DOE/OR/07-1707, (FFA) Section X.E, "Non-Time-Critical Removal Actions," (EPA 1998) and National Contingency Plan (NCP) regulations. This project also is in accordance with the signed *Memorandum of Agreement on the C-400 Complex under the Federal Facility Agreement for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (MOA) (DOE 2017).

Two alternatives for conducting this action were evaluated in the attachment to this document, *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 (EE/CA) (DOE 2018a). The selected alternative, which is described as Alternative 2 in the EE/CA, consists of demolition of the C-400 Cleaning Building abovegrade structure, slab stabilization, and waste management and disposition in order to reduce the potential for release of contaminants that could pose a risk to human health and the environment and to facilitate a comprehensive remedial investigation in support of remedy selection for the C-400 Complex as stated in the signed MOA (DOE 2017).

Prior to implementing the NTCRA described herein, infrastructure, loose materials, and stored wastes are expected to have been removed and properly dispositioned according to applicable regulations as part of the C-400 Cleaning Building stabilization and deactivation activities.

2. SITE CONDITIONS AND BACKGROUND

This section includes information about the Paducah Gaseous Diffusion Plant (PGDP) site and the C-400 Cleaning Building. This section includes the site description, other actions conducted to date, and state and local authorities' roles.

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U.S. Department of Energy Office of Environmental Management

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

2.1 SITE DESCRIPTION

This section contains a summary of the removal site evaluation for the C-400 Cleaning Building, the physical location of the Paducah Site, the site's characteristics, a description of the releases or threatened releases into the environment from the facility that are subject to this removal action and the National Priorities List (NPL) status of the Paducah site.

2.1.1 Removal Site Evaluation

This section contains a summary of the removal site evaluation that was presented in the document, 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 2018b).

The C-400 Cleaning Building has been the subject of a number of environmental investigations, treatability studies, feasibility studies, and remedial actions since the discovery of off-site groundwater contamination at PGDP in 1988, all of which provide an extensive administrative record (AR) file supporting the removal action. Each of the investigations and activities resulted in generation of data that documented presence of contamination associated with the C-400 Cleaning Building. This contamination includes, for example, polychlorinated biphenyls (PCBs), radionuclides, specific volatile organic compounds such as trichloroethene and trichloroethane, and specific heavy metals such as uranium and lead. The building also has asbestos-containing materials in its structure. The AR includes reports of environmental contamination that is known to be associated with the building and provides a portion of the basis supporting this removal action to demolish the C-400 Cleaning Building. The AR includes the reports shown in Table 1.

Table 1. Reports Included in the C-400 Administrative Record

Table with 2 columns: Year and Title. Rows include reports from 1991 to 1999 regarding site investigations, process reviews, and remediation studies at the Paducah Gaseous Diffusion Plant.

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U.S. Department of Energy Office of Environmental Management

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

Table 1. Reports Included in the C-400 Administrative Record (Continued)

Year	Title
1999	<i>Bench Scale In-Situ Chemical Oxidation Studies of Trichloroethene in Waste Area Grouping 6 at the Paducah Gaseous Diffusion Plant Paducah, Kentucky (DOE/OR/07-1788&D1)</i>
2001	<i>Feasibility Study for the Groundwater Operable Unit at Paducah Gaseous Diffusion Plant Paducah, Kentucky (DOE/OR/07-1857&D2)</i>
2005	<i>Record of Decision for Interim Remedial Action for the Groundwater Operable Unit for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant Paducah, Kentucky (DOE/OR/07-2150&D2/R2)</i>
2008	<i>Remedial Design Report, Certified for Construction Design Drawings and Technical Specifications Package, for the Groundwater Operable Unit for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-0005&D2/R1)</i>
2008	<i>Land Use Control Implementation Plan: Interim Remedial Action for the Groundwater Operable Unit for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/OR/07-2151&D2/R2)</i>
2010	<i>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/LX/07-0004&D2/R2/A1)</i>
2012	<i>Remedial Design Report, Certified for Construction Design Drawings and Technical Specifications Package, for the Groundwater Operable Unit for the Phase IIa Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-1272&D2)</i>
2013	<i>Remedial Action Work Plan for Phase IIa of 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/LX/1271&D2/R3)</i>
2016	<i>Treatability Study Report for the C-400 Interim Remedial Action Phase IIb Steam Injection Treatability Study at Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-2202&D2)</i>
2017	<i>Solid Waste Management Unit Assessment Report for Solid Waste Management Unit 51 (DOE/LX/07-24127D1)</i>
2017	<i>C-400 Vapor Intrusion Study Work Plan to Support the Additional Actions for the CERCLA Five-Year Review at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-2403&D2/R1)</i>
2018	<i>Remedial Action Completion Report for the Interim Remedial Action for the Groundwater Operable Unit for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-2417&D1)</i>

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U.S. Department of Energy Office of Environmental Management

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

Table 1. Reports Included in the C-400 Administrative Record (Continued)

Table with 2 columns: Year, Title. Row 1: 2018, Five-Year Review for Remedial Actions at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/LX/07-1289&D2/R1/A3, U.S. Department of Energy, Paducah, KY, May, Appendix D, "C-400 Vapor Intrusion Additional Actions"

The C-400 Cleaning Building removal action is being performed consistent with Section X, "Removal Actions," of the FFA, which provides that, "Removal actions shall, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action with respect to the release concerned." Furthermore, the removal action notification is being made consistent with the Terms and Conditions Section of the Memorandum of Agreement on the C-400 Complex under the Federal Facility Agreement for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, signed August 8, 2017, which indicates the, "C-400 Building Decommissioning and Demolition will be addressed by a CERCLA Non-Time Critical Removal Action under the PGDP FFA."

The C-400 Cleaning Building is located inside the plant 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.

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 ft². The C-400 Cleaning Building floor space is approximately 134,000 ft². The large east basement floor is approximately 18,000 ft² (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 parts 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 walls, the walls consist of windows and corrugated transite panels on steel framing.

The C-400 Cleaning Building was operational from 1952 until 2014, although the plant laundry remained in the building until July 2016 before it was moved to the C-720 complex. The primary function of the C-400 Cleaning Building included cleaning, metal etching and plating, radioactive materials stabilization and recovery, metals recovery, uranium hexafluoride (UF6) 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, primarily cleaning and maintenance of equipment from the uranium enrichment process buildings,

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U.S. Department of Energy Office of Environmental Management

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

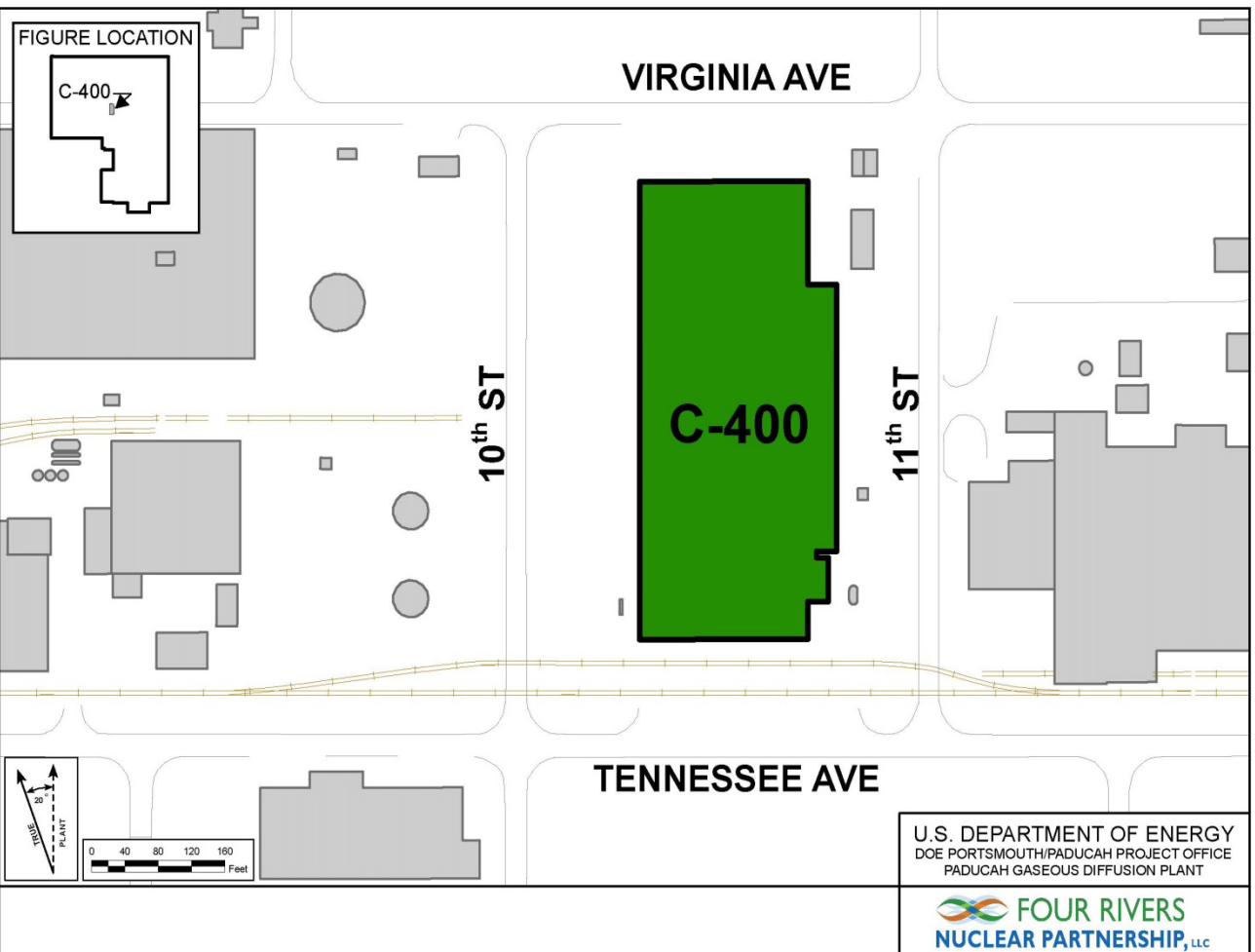


Figure 1. Location of C-400 Cleaning Building

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U.S. Department of Energy Office of Environmental Management

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

including some from outside contractual work. The building also housed other processes, including the plant laundry, which processed respirators, clothing issued for general use and special clothing such as anti-contamination clothing. The test-loop provided for an area where cascade-type equipment was tested online using gaseous UF₆ to simulate potential cascade conditions, and the pulverizer that transformed existing uranium tetrafluoride into a finely divided powder (MMES 1995).

Following discontinued use of the C-400 Cleaning Building, the C-400 Cleaning Building facility is undergoing deactivation. After deactivation, the remaining portions of the C-400 Cleaning Building will contain hazardous substances that are present in the construction materials and from use during operation of the facility.

Appendix 4 of the FY 2018 Site Management Plan (SMP) provides a list of solid waste management units (SWMUs) located within the C-400 Complex OU and their regulatory status (DOE 2018d). The SWMUs listed in the C-400 Complex OU require further evaluation as part of the C-400 Complex OU Remedial Investigation/Feasibility Study. Other SWMUs associated within the C-400 Cleaning Building have been designated as no further action and will be documented in the Record of Decision for the C-400 Complex OU. The NTCRA at the C-400 Cleaning Building will address all of the building structure located above the concrete floor slab. This removal action will occur above ground level and will not impact any SWMU.

The scope of the NTCRA does not address environmental media. Environmental media associated with the southern end of the C-400 Cleaning Building has been the subject of an Interim Remedial Action and will be the subject of a future final remedial action as part of the C-400 Complex OU (DOE 2017).

Post-deactivation radiological contamination of the C-400 Cleaning Building is comprised of surface contamination from the historical processes performed in the facility. The activity associated with uranium radionuclides constitutes the majority of the radiological inventory present in the facility. Various radionuclides are present as surface contamination. Some recycled uranium or reactor returns were processed at the Paducah Site in the 1960s and 1970s, resulting in the potential for the presence of fission and activation products. Beta-gamma contamination that may be present consists of uranium daughter products and technetium-99. Alpha contamination that may be present includes, for example, uranium and thorium and transuranic elements (i.e., plutonium isotopes, americium-241, and neptunium-237).

The chemical hazards that are known to exist in the C-400 Cleaning Building include lead and/or other heavy metals such as uranium metal; asbestos-containing materials in the original building construction; PCBs; and volatile organic compounds.

Demolition of the C-400 Cleaning Building structure will generate a waste stream that may include solid waste such as construction/demolition debris, Toxic Substances Control Act waste, radiological waste,

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U.S. Department of Energy Office of Environmental Management

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

Resource Conservation and Recovery Act (RCRA) waste, and mixed waste. It also is expected that asbestos-containing materials will be generated.

2.1.2 Physical Location

PGDP is located approximately 10 miles west of Paducah, KY, and 3.5 miles south of the Ohio River in the western part of McCracken County (Figure 2). The plant is located on a 3,556-acre DOE-owned site that is comprised of the following: approximately 628 acres are within a fenced security area, approximately 809 acres are located outside the security fence, 133 acres are acquired easements, and the remaining 1,986 acres are licensed to the Commonwealth of Kentucky as part of the West Kentucky Wildlife Management Area (WKWMA).

2.1.3 Site Characteristics

2.1.3.1 Topography

PGDP and the surrounding area are flat, with elevations across the site ranging from about 350 ft to 390 ft above mean sea level. The ground surface slopes at a rate of about 27 ft/mile toward the Ohio River. Two main features dominate the landscape in the surrounding area: the loess-covered plains and the Ohio River floodplain, which is comprised mostly of alluvial sediments. The terrain is modified slightly by the dendritic drainage systems associated with the two principal streams in the area, Bayou Creek and Little Bayou Creek. These streams have eroded small valleys, which are about 20 ft below the adjacent plain.

The plant is situated on the divide between the drainage areas of Bayou Creek and Little Bayou Creek. Man-made drainages receive storm water runoff and effluent from PGDP. Shallow surface drainages parallel the west and east sides of the C-400 Cleaning Building. Most of the storm water from the C-400 Cleaning Building area flows to storm drain inlets around the building and discharges via the storm sewer on the south side of the building to Outfall 008 and then to Bayou Creek on the west side of the plant.

2.1.3.2 Population and Land Use

The C-400 Cleaning Building is in an area under the control of DOE. PGDP is surrounded by WKWMA and some sparsely populated agricultural lands. The closest communities to the plant are Heath, Grahamville, and Kevil, all of which are located within three miles of DOE Reservation boundaries. The closest municipalities are Paducah, KY (12 miles); Cape Girardeau, MO (41 miles); and the cities of Metropolis (5 miles) and Joppa (7 miles), IL (Figure 2).

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U.S. Department of Energy Office of Environmental Management

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

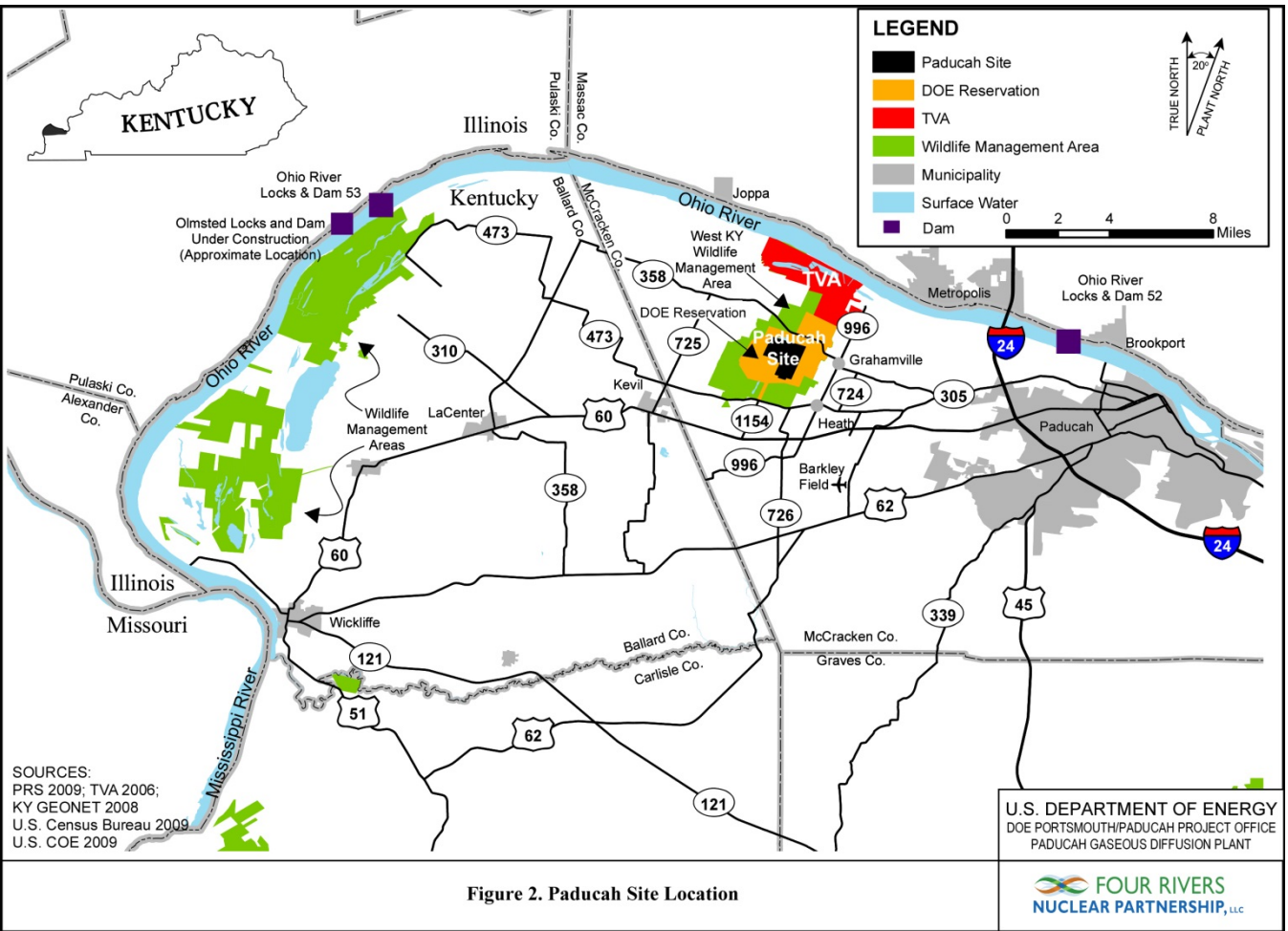


Figure 2. Paducah Site Location

Figure 2. Paducah Site Location

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U.S. Department of Energy Office of Environmental Management

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

Historically, the economy of western Kentucky has been based on agriculture. The population of McCracken County is estimated at approximately 65,000, with a population density of 263 persons per square mile. Neighboring Ballard County has an estimated population of approximately 8,000 with a population density of 33 persons per square mile, according to the 2010 U.S. Census, 2016 estimates (USCB 2017).

In addition to the residential population surrounding the plant, WKWMA draws thousands of visitors each year for recreational purposes. This area is used by visitors, primarily for hunting and fishing, but also for horseback riding, hiking, and bird watching. According to WKWMA management, an estimated 5,000 fishermen visit the area each year. The C-400 Cleaning Building is located within the Limited Access Area of PGDP, and recreational activities do not occur near the facility.

2.1.3.3 Climate/Meteorology

The 30-year average monthly temperature is 58°F; the coldest month is January, which has an average temperature of 35°F, and the warmest month is July, which has an average temperature of 79°F. The 30-year average monthly precipitation for the period 1981 through 2010 is 4.09 inches, varying from an average of 2.76 inches in August (the monthly average low) to an average of 4.94 inches in May (the monthly average high). Historically, stronger winds are recorded when the winds are from the southwest.

2.1.3.4 Hydrology and Storm Water

PGDP is located in the western portion of the Ohio River drainage basin. The plant is situated on the divide between the drainage areas of Bayou Creek and Little Bayou Creek. Man-made drainages receive storm water runoff and effluent from PGDP. Shallow surface drainages parallel the west and east sides of the C-400 Cleaning Building. Most of the storm water from the C-400 Cleaning Building area flows to storm drain inlets around the building and discharges via the storm sewer on the south side of the building to Outfall 008 and then to Bayou Creek on the west side of the plant.

2.1.4 Release or Threatened Release into the Environment of a Hazardous Substance, Pollutant, or Contaminant

The potential for a threat of release into the environment of a hazardous substance, pollutant, or contaminant is based on the presence of materials that remain in the facility from past operations. The C-400 Cleaning Building is contaminated with radioactive and nonradioactive hazardous substances.

Due to the location of the facility, industrial workers are the most likely receptors that may be exposed to these chemicals or radionuclides of potential concern (COPCs). Under current physical and administrative access restrictions, risks to workers from exposure to these COPCs are minimal, but without the physical

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U.S. Department of Energy Office of Environmental Management

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

and administrative access restrictions, industrial exposure could cause risks to workers to exceed generally acceptable risk levels.¹

Building degradation over time could result in potential structural failure and contaminant release and migration. This degradation, including roof and wall deterioration, could allow rainwater to infiltrate the building. Infiltration of rainwater could wash transferable or soluble contaminants out of the building through cracks in the floor or walls impacting underlying groundwater. Furthermore, there is an increased potential for site personnel involved with surveillance and maintenance activities to be exposed to hazardous substances, including radiological contamination, associated with structural components. There is a potential risk from hazardous substances, including radiological contamination and exposure to vapors from historical VOC releases; however, a recent vapor intrusion study concluded that cumulative risks for the building as a whole currently are within or below acceptable levels (DOE 2018c). There is potential for contamination to be released to the environment if the structural elements of the building that contain the contamination were to fail. Demolition and appropriate disposal of the resulting wastes will reduce the risk of exposure to workers located near this facility.

2.1.5 NPL Status

On May 31, 1994, the Paducah Site was placed on the EPA NPL, which is a list of sites across the nation designated by EPA as having the highest priority for site remediation.

2.2 OTHER ACTIONS TO DATE

2.2.1 Previous Actions

Prior to beginning this CERCLA removal action, the C-400 Cleaning Building will have been deactivated. During deactivation, certain activities will be performed as a non-CERCLA, action consistent with applicable state and federal regulations. At the completion of deactivation, the C-400 Cleaning Building will be left 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;
- Floor and foundations intact; and
- Utility systems isolated.

¹EPA's generally acceptable risk range for an individual under reasonable maximum exposure conditions for current or reasonably anticipated future land use is 1E-04 to 1E-06 for cumulative excess cancer risk. Under the same assumptions, a non-carcinogenic hazard index of 1 or less is acceptable (EPA 1999).

CLEARED FOR PUBLIC RELEASE



U.S. Department of Energy Office of Environmental Management

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

2.2.2 Current Actions

The current action (the scope recommended in this AM) is to demolish the C-400 Cleaning Building structure to slab. The following are the key activities of the recommended removal action.

- Abovegrade structure will be demolished to slab (e.g., concrete floor slabs and foundations will be left in place).
- Controls will be used to minimize fugitive dust during demolition, and monitoring will be conducted to evaluate effectiveness.
- Material and waste streams will be segregated into appropriate categories, as necessary.
- Wastes will be dispositioned at a waste disposition facility that is approved to receive the waste.
- Remaining floor slabs will be stabilized to control spread of contaminants.

2.3 STATE AND LOCAL AUTHORITIES' ROLES

2.3.1 State and Local Actions to Date

Section 102 of CERCLA requires federal facilities on the NPL to enter into an FFA with the appropriate regulatory agencies. The FFA, which was signed February 13, 1998, established a decision making process for remediation of the Paducah Site and coordinates CERCLA response action requirements with RCRA corrective action requirements. Involvement of Kentucky Department for Environmental Protection, and that of EPA, is through the PGDP FFA.

2.3.2 Potential for Continued State/Local Response

This project will not require response actions by local agencies, such as county or city response organizations. Continued involvement of Kentucky and EPA is expected and provided for through the PGDP FFA. Documentation required by the FFA following project completion is reviewed by both agencies.

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U.S. Department of Energy Office of Environmental Management

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

3. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES

3.1 THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

Hazardous materials associated with the C-400 Cleaning Building structure will remain following deactivation. These include transite paneling, radioactively contaminated steel structures, and paint containing PCBs and/or lead. These materials present a potential threat to human health and the environment. As the C-400 Cleaning Building deteriorates, the probability increases for future contaminant release to the environment. The controlled demolition of the facility is consistent with the intent of CERCLA—to mitigate a release or threat of release. Controlled demolition, using engineered safety measures, is both safe and cost-effective.

3.2 STATUTORY AND REGULATORY AUTHORITIES

Because the removal action will be performed and funded by DOE, it is not subject to the fund-financed cost limitations of 12 months and \$2 million prescribed in 40 *CFR* § 300.415(b)(5).

4. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from the C-400 Cleaning Building may present an imminent and substantial endangerment to public health or to the environment.

5. PROPOSED ACTIONS AND ESTIMATED COSTS

5.1 PROPOSED ACTIONS

5.1.1 Proposed Action Description

This CERCLA action will be attained by demolishing the C-400 Cleaning Building. Key activities of demolition are listed in Section 2.2.2.

This removal action does not include demolition of the floor slabs, belowgrade structures (e.g., basement, valve pits), or remediation of contaminated soils and other environmental media. Remediation of contaminated soils, other environmental media, and the slab and subgrade structures will be addressed as

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U.S. Department of Energy Office of Environmental Management

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

part of the C-400 Complex OU in separate CERCLA actions, as discussed in the C-400 MOA (DOE 2017) and *Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Annual Revision—FY 2018*, DOE/LX/07-2418&D2 (DOE 2018d).

5.1.2 Contribution to Remedial Performance

The removal action recommended in this document is consistent with and contributes to the long-term cleanup plans for PGDP. Those plans are described in the SMP, which describes the overall strategic approach to site cleanup of PGDP (DOE 2018d). The removal action recommended in this document is in accordance with the C-400 MOA and facilitates final remedial efforts for the C-400 Complex OU (DOE 2017).

5.1.3 EE/CA

The following are the removal action objectives (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;
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 two removal action alternatives were developed and evaluated in the EE/CA for effectiveness, implementability, and cost:

1. No Action; and
2. Demolition of the C-400 Cleaning Building to slab.

Table 2 is a comparison of the alternatives evaluated in the EE/CA.

Based upon the evaluations of the effectiveness, implementability, and cost of each proposed alternative, the preferred alternative identified for this removal action is demolition of the C-400 Cleaning Building to slab. This alternative meets all the RAOs and is consistent with the overall site cleanup strategy as described in the SMP (DOE 2018d). The recommended removal action alternative also is consistent with the C-400 MOA (DOE 2017).

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U.S. Department of Energy Office of Environmental Management

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

Table 2. Comparative Analysis Summary

Alternative 1 No Action	Alternative 2 Demolition of the C-400 Cleaning Building to Slab
Effectiveness	
<ul style="list-style-type: none"> • Not effective in meeting RAOs • Does not reduce the risk or potential for exposure • Does not comply with applicable or relevant and appropriate requirements (ARARs) • Does not facilitate final remedial action for the C-400 Complex OU 	<ul style="list-style-type: none"> • Effective in meeting RAOs • Reduces potential hazards • Complies with ARARs • Facilitates future remedial action for the C-400 Complex OU
Implementability	
<ul style="list-style-type: none"> • Implementable and feasible 	<ul style="list-style-type: none"> • Implementable and feasible • Conventional demolition methods currently available • Availability of services and materials needed now
Cost	
<ul style="list-style-type: none"> • No costs for this alternative 	<ul style="list-style-type: none"> • Total alternative cost: \$36.4M

5.1.4 ARARs

The ARARs, including to be considered (TBC) information, for this NTCRA are included in the EE/CA (Attachment). In accordance with 40 *CFR* § 300.415(j), on-site removal actions conducted under the CERCLA are required to meet ARARs to the extent practicable, considering the urgency of the situation and the scope of the removal action. DOE expects to comply with ARARs and TBC guidance, as set forth in the EE/CA, when conducting this removal action.

5.1.5 Project Schedule

The following is the project schedule for the C-400 Cleaning Building NTCRA, consistent with the C-400 MOA, dated August 8, 2017 (DOE 2017) (see Table 3).

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U.S. Department of Energy Office of Environmental Management

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

Table 3. C-400 Cleaning Building NTCRA Project Schedule

Documents/Activity	Planning Schedule*
Issued D2 Removal Notification to EPA/KY	March 8, 2018 (actual)
Issued D1 EE/CA to EPA/KY	May 2, 2018 (actual)
EE/CA Public Comment Period	TBD
D1 Removal Action Work Plan	August 17, 2018
Field Start Date	November 27, 2018

*This schedule is included in this document for information purposes only and is not intended to establish enforceable schedules or milestones. Enforcement milestones will be established in the FY 2018 SMP (DOE 2018d). The dates are consistent with the C-400 MOA (DOE 2017). Per the C-400 MOA, the C-400 dates are based on streamlined assumptions (no extensions and no disputes). If extension(s) or dispute(s) occurs, then future milestones and planning dates may be adjusted pursuant to the FFA.

5.2 ESTIMATED COSTS

The total estimated cost for the selected alternative, Alternative 2¾ Demolition of the C-400 Cleaning Building to slab, is \$36.4M. A breakdown of the estimated total cost elements is shown in Table 4.

Table 4. Cost Elements for Demolition of the C-400 Cleaning Building

Activity	Approximate Cost
Planning, Documentation, and Field Activities <ul style="list-style-type: none"> · Project Management Support · C-400 Cleaning Building Demolition and Waste Loading · Building Characterization · Removal Action Report 	\$8.9M
Waste Management <ul style="list-style-type: none"> · Waste Management, Containerization, Transportation, and Disposition 	\$27.5M
Total	\$36.4M

6. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delaying or not taking the action will increase the potential risks to workers and the environment. The potential for release to the environment of hazardous substances would increase as the facility deteriorates. There is a potential risk to human health and the environment posed by the C-400 Cleaning Building structure if this action is not taken. These risks could include releases of hazardous substances, including, but are not limited to, radionuclides; PCBs; and lead in paint from the structural steel, should a

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U.S. Department of Energy Office of Environmental Management

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

breach occur in the walls, windows, or roof. If demolition is delayed, the potential threat of release from a breach or an uncontrolled collapse would continue to be present.

7. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues associated with the CERCLA NTCRA.

8. ENFORCEMENT

Because the removal action recommended herein is funded by DOE, the owner of the land upon which the facility that is subject to the action is located, an enforcement strategy is not applicable, as defined in the document, *Superfund Removal Guidance for Preparing Action Memoranda* (EPA 2009).

9. RECOMMENDATION

The removal action as described in this AM meets the NCP criteria contained in 40 *CFR* § 300.415(b)(2) and is consistent with the joint DOE and EPA policy for conducting decommissioning activities under CERCLA and provides long-term protectiveness (DOE and EPA 1995). This decision document represents the selected removal action for the C-400 Cleaning Building. It is developed in accordance with CERCLA, as amended, and is consistent with the NCP. This decision is based on information contained in the AR for the project. This AM is appropriate and will be implemented in accordance with CERCLA, as amended.

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U.S. Department of Energy Office of Environmental Management

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

Approval

Robert E. Edwards III, Manager
Portsmouth/Paducah Project Office

Date

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U.S. Department of Energy Office of Environmental Management

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

The following document is attached to this Action Memorandum.

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

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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
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10. 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)*, Washington, DC, May.
- 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. *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 2018b. *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 2018c. *Five-Year Review for Remedial Actions at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-1289&D2/R1/A3, U.S. Department of Energy, Paducah, KY, May, Appendix D, "C-400 Vapor Intrusion Additional Actions."
- DOE 2018d. *Site Management Plan Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Annual Revision—2018*, DOE/LX/07-2418&D2, U.S. Department of Energy, Paducah, KY, January.
- EPA (U.S. Environmental Protection Agency) 1998. *Federal Facility Agreement for the Paducah Gaseous Diffusion Plant*, DOE/OR/07-1707, U.S. Environmental Protection Agency, Atlanta, GA, February.
- EPA 1999. *Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, EPA 540-R-98-031, OSWER 9200.1-23P, U.S. Environmental Protection Agency, Washington, DC, July.
- EPA 2009. *Superfund Removal Guidance for Preparing Action Memoranda*, U.S. Environmental Protection Agency, final, September.
- MMES (Martin Marietta Energy Systems, Inc.) 1995. *C-400 Processes and Structure Review*, KY/ERWM 38, Martin Marietta Energy Systems, Inc., Kevil, KY, May.

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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

USCB (United States Census Bureau) 2017. ACS Demographic and Housing Estimates, 2012–2016 American Community Survey 5-Year Estimates: <https://factfinder.census.gov/bkmk/table/1.0/en/PEP/2016/PEPANNRES/0400000US21.05000>, accessed December.

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U.S. Department of Energy Office of Environmental Management

*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*

ATTACHMENT

***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***

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U.S. Department of Energy Office of Environmental Management

*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
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U.S. Department of Energy Office of Environmental Management

*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*

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U.S. Department of Energy Office of Environmental Management

*Action Memorandum for the C-400 Cleaning Building Non-Time-Critical Removal Action
at the Paducah Gaseous Diffusion Plant,
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