

**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**



This document is approved for public release per review by:

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Paducah Classification and Control Office Date
Swift and Staley Team

**PADUCAH REMEDIATION SERVICES, LLC;
SCIENCE APPLICATIONS INTERNATIONAL CORPORATION;
and BECHTEL JACOBS COMPANY LLC**

contributed to the preparation of this document and should not
be considered an eligible contractor for its review.

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

Environmental Management Activities at the
Paducah Gaseous Diffusion Plant
Paducah, Kentucky 42001

managed by
Paducah Remediation Services, LLC

for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC30-06EW05001

PREFACE

This *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/R1, was prepared in accordance with the approved *Land Use Control Assurance Plan for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-1799&D2, dated January 2000. This implementation plan identifies the area that is under restriction, identifies each land use control objective for the area of volatile organic compound contamination at the C-400 Cleaning Building area, and identifies the specific controls and mechanisms required to achieve each identified objective.

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ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
E/P	excavation/penetration
EPA	U.S. Environmental Protection Agency
ERH	electrical resistance heating
FFA	Federal Facility Agreement
IRA	Interim Remedial Action
KDEP	Kentucky Department for Environmental Protection
KEPPC	Kentucky Environmental and Public Protection Cabinet
KRS	Kentucky Revised Statutes
LUC	land use control
LUCAP	land use control assurance plan
LUCIP	land use control implementation plan
MOA	Memorandum of Agreement
PGDP	Paducah Gaseous Diffusion Plant
ROD	record of decision
TCE	trichloroethene
VOC	volatile organic compound

1. INTRODUCTION

The *Record of Decision (ROD) for Interim Remedial Action (IRA) for the Groundwater Operable Unit for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant (PGDP), Paducah, Kentucky*, DOE/OR/07-2150&D2/R2, issued August 2005, incorporates land use controls (LUCs) as a component of the selected remedy (DOE 2005).

The selected remedy consists of the following primary elements:

- A remedial design investigation to further determine areal and vertical extent of the contamination in the C-400 Cleaning Building area to determine optimum placement of the remediation system;
- Removal and treatment of trichloroethene (TCE) and other volatile organic compounds (VOCs) from the contaminant source zone in the Upper Continental Recharge System and Regional Gravel Aquifer at the C-400 Cleaning Building area using Electrical Resistance Heating (ERH);
- Implementation, maintenance, and reporting of LUCs on the C-400 Cleaning Building area; and
- Continuation of groundwater monitoring of the source and dissolved-phase plumes, since contamination would remain in place following the interim remedial actions.

Further description of the full scope of the interim remedial action is presented in the ROD.

A Memorandum of Agreement (MOA) among the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the Commonwealth of Kentucky establishes and implements a *Land Use Control Assurance Plan (LUCAP) for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-1799&D2, (DOE 2000). The LUCAP is applicable when LUCs are selected as part of a remedial action being taken (EPA 2000). The PGDP LUCAP specifies that a unit-specific Land Use Control Implementation Plan (LUCIP) will be developed as a component of the post-ROD documentation for each waste unit that requires LUCs as part of the corrective measure/remedial action selected on or after the effective date of the MOA. This LUCIP is part of a Primary Document, the C-400 Remedial Design (90% Design) Report and will be appended to the LUCAP once approved by EPA and the Kentucky Environmental and Public Protection Cabinet (KEPPC).

2. PURPOSE

As stated in the LUCAP (DOE 2000), the specific purposes of this LUCIP are to accomplish the following:

- Identify the area that is under restriction (i.e., subject to LUCs);
- Identify each LUC objective; and
- Specify the specific controls and mechanisms required to achieve each identified objective.

The C-400 Cleaning Building area (C-400 Area) that is to be addressed by Property Record Notice, Deed Restrictions, Environmental Covenant, Access Controls, and the Excavation/Penetration Permits Program is depicted in Figure 1., LUC Boundary for the C-400 Area (as the hatched area). The LUC objectives are presented in Section 3 and the specific LUCs for the C-400 Area are described in Section 4 below.

3. LAND USE CONTROL OBJECTIVES

The following LUC objectives are applicable to the interim remedial action:

- Maintain the integrity of any current or future remedial or monitoring system;
- Prohibit the development and use of the C-400 Cleaning Building area for residential housing, elementary and secondary schools, child care facilities, and playgrounds;
- Prevent exposure of current and future on-site industrial workers to groundwater/soils and prevent use of the groundwater at the C-400 Cleaning Building area through institutional controls (e.g., the current Excavation/Penetration, (E/P) Permits Program) and through Deed Restrictions; and
- Provide notice in property records regarding contamination and response actions at the C-400 Cleaning Building area.

4. LAND USE CONTROLS

The selected remedy for the VOC contamination at C-400 Area includes five LUCs: Property Record Notice, Deed Restrictions, Environmental Covenant, Excavation/Penetration Permits Program, and Access Controls. Table 1 contains a summary of these LUCs, including the purpose, duration, implementation, and affected areas. Figure 1 shows the C-400 Area (the hatched area) that is addressed by Property Record Notice, Deed Restrictions, Environmental Covenant, Access Controls and the E/P Permits Program. Figure 1 also shows the interpreted TCE groundwater plume in the vicinity of the C-400 Building. Note that the groundwater plume outside of the C-400 Area (i.e., outside hatched area in Figure 1) is beyond the scope of the interim remedial action and will be addressed in a future response action. Each of the controls is discussed in more detail in the following subsections.

4.1 PROPERTY RECORD NOTICE

The term “Property Record Notice,” as used in this LUCIP, refers to any nonenforceable, purely informational document recorded along with the original property acquisition records of DOE and its predecessor agencies that alerts anyone searching the records to important information about the contamination present at the C-400 Area, as depicted in Figure 1 (hatched area). A Property Record Notice (Notice) will be filed at the McCracken County Clerk’s Office, in accordance with state and federal law, within 120 days of regulatory approval of the LUCIP and will remain in effect until DOE, the KEPPC, and EPA approve a request to modify or delete it. The Notice will include the purpose of the Notice, a brief summary of the main contaminants of concern, a description of the CERCLA remedial action including LUCs, a description of the land/groundwater use restrictions for the C-400 Area, and a DOE program contact. The Property Record Notice will contain information regarding the groundwater plume sitewide. The Notice will inform the reader that an Environmental Covenant is to be recorded prior to any other interest being created in the DOE property subject to the interim action or before any actual transfers of such property. The Notice also will inform the reader that, upon title transfer of the C-400 Area (Figure 1, hatched area), the deed will include applicable land use restrictions and information required by CERCLA Section 120 (h) (3). The Notice also will include a survey plat, accomplished by a registered land surveyor (under the direction and approval of a DOE official and consistent with applicable security requirements), that depicts the contamination and the area subject to LUCs and describes the use restrictions that correspond to the hatched area on Figure 1. DOE will file both the Notice and survey plat in the register of deeds records (e.g., Real Estate Office) of the McCracken County Clerk. A copy of the Property Record Notice to be filed is included as Appendix A.

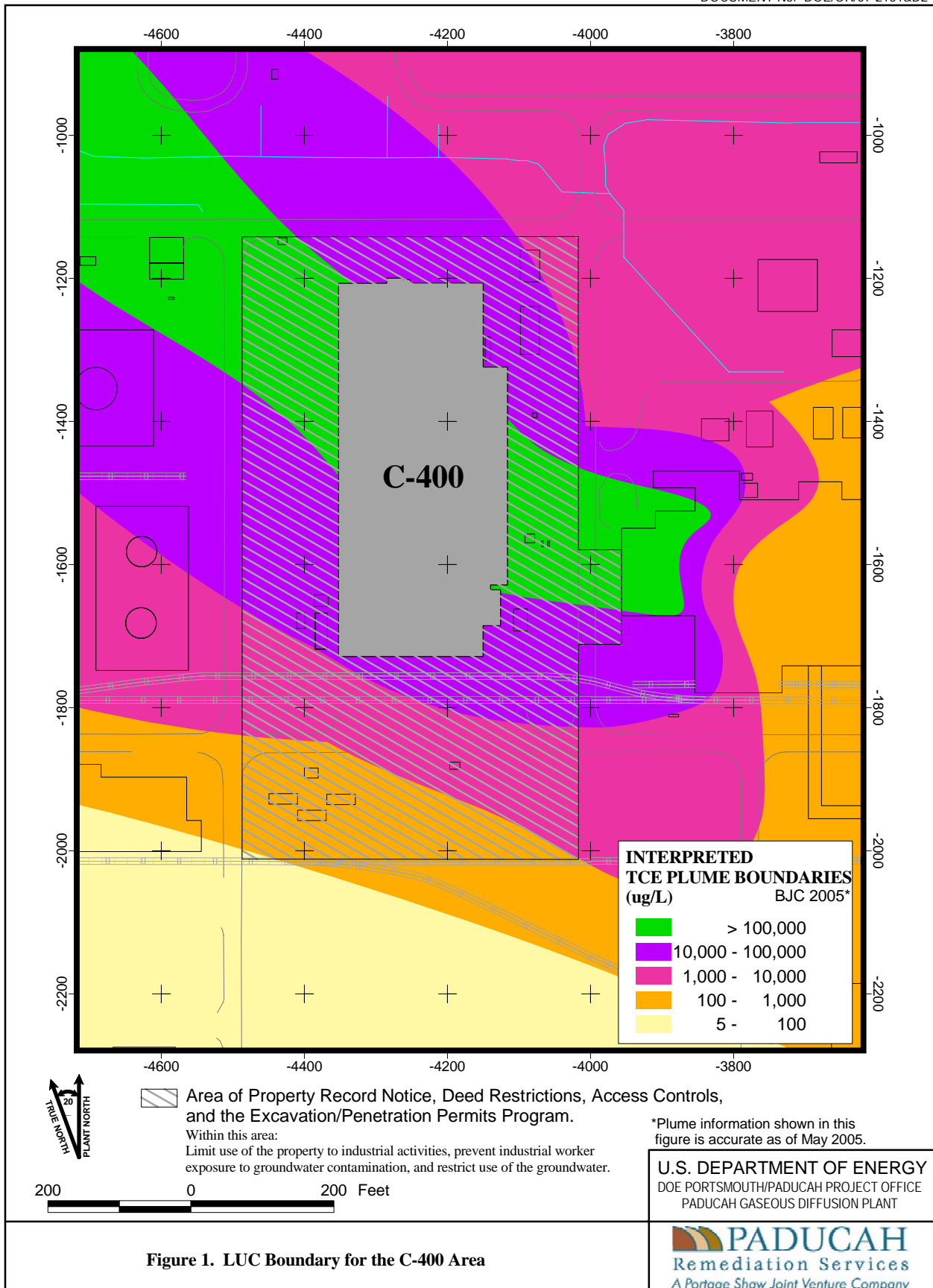


Figure 1. LUC Boundary for the C-400 Area

Table 1. Summary of LUCs for the area of VOC contamination at C-400 at PGDP

Type of control	Purposes of control	Duration	Implementation	Affected areas
Property Record Notice ^a	Provide notice to anyone searching records about the existence and location of contaminated areas, the CERCLA remedy including LUCs, the land/groundwater use restrictions to be included in property transfer documents, and requirement to execute an Environmental Covenant.	LUCs will be maintained until the concentrations of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and unlimited exposure. The LUC will remain in place until Kentucky/EPA approve a DOE request to modify/delete the LUCs.	Notice recorded by DOE in accordance with state law and federal law at the McCracken County Clerk’s Office within 120 days of regulatory approval of the LUCIP.	C-400 Area (Located within the PGDP security fence.)
Deed Restrictions ^b	Limit use of the property to industrial activities, prevent industrial worker exposure to soil/groundwater contamination, and restrict use of the soil/groundwater to protect human health and the environment from the potential of inadvertent exposures to residual contamination.	LUCs will be maintained until the concentrations of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and unlimited exposure. The LUC will remain in place until Kentucky/EPA approve a DOE request to modify/delete the LUCs.	The DOE will prepare and then record the deed with the McCracken County Clerk, in accordance with the laws of the Commonwealth of Kentucky and federal requirements. Concurrent with the transfer of fee title from DOE to the Grantee, information regarding the environmental use restrictions and land use controls will be communicated in writing to the property owners and to appropriate state and local agencies to ensure such agencies can factor such conditions into their oversight and decision-making activities regarding the property.	C-400 Area (Located within the PGDP security fence.)
Environmental Covenant ^c	Impose enforceable activity and use restrictions on contaminated property to protect human health and the environment from the potential of inadvertent exposures to residual contamination.	LUCs will be maintained until the concentrations of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and unlimited exposure. The LUC will remain in place until Kentucky/EPA approve a DOE request to modify/delete the LUCs.	DOE is to record the Environmental Covenant prior to any other interest(s) ^b being created in the DOE property that is the subject of this interim action or before any actual transfer of such property. The Environmental Covenant is to be recorded at the McCracken County Clerk’s Office in accordance with applicable federal and state law.	C-400 Area (Located within the PGDP security fence.)

^aProperty Record Notice – Refers to any nonenforceable, purely informational document recorded along with the original property acquisition records of DOE and its predecessor agencies that alerts anyone searching property records to important information about contamination/waste on the property.

^bDeed Restrictions – Refers to conditions and/or covenants that restrict or prohibit certain uses of real property and to limitations on its use necessitated by residual contamination in accordance with federal and state law.

^cEnvironmental Covenant – Refers to the document executed by the property owner (i.e., the United States) and approved by KEPPC pursuant to KRS 224.80-100 that includes activity and use restrictions for contaminated property (i.e., Impacted Area), which is recorded and enforceable by Kentucky, EPA, and interest holders against owners and subsequent owners.

Table 1. Summary of LUCs for the area of VOC contamination at C-400 at PGDP (continued)

Type of control	Purposes of control	Duration	Implementation	Affected areas
Excavation/ Penetration Permits Program ^d	Requires review and approval of any proposed intrusive activities to protect workers and remedy integrity; process may prohibit or limit intrusive activities.	LUCs will be maintained until the concentrations of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and unlimited exposure. The LUC will remain in place until Kentucky/EPA approve a DOE request to modify/delete the LUCs.	<ul style="list-style-type: none"> • Implemented by DOE and/or its contractors. • Provide permits program with contamination information as soon as practicable after signing the ROD and update information regularly while remediation proceeds. • Initiated by permit request. 	C-400 Area (Located within the PGDP security fence.)
Access Controls ^e (e.g., signage, fences, gates, security measures, etc.)	Restrict access to workers and prevent public/uncontrolled access to contaminated areas.	LUCs will be maintained until the concentrations of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and unlimited exposure. The LUC will remain in place until Kentucky/EPA approve a DOE request to modify/delete the LUCs.	Access controls will be implemented during installation and operation ERH systems at select areas within the C-400 Area. These access controls will include warning and informational signage, temporary fencing and/or barricades, and visitor sign-in controls. Upon completion of the remedial action, these interim controls will cease and long-term access controls may be selected as LUCs to be maintained in accordance with the requirements of this LUCIP.	C-400 Area (Located within the PGDP security fence.)

^d Excavation/Penetration Permits Program – Refers to the internal DOE/DOE contractor administrative program(s) that requires the permit requestor to obtain authorization, usually in the form of a permit, before beginning any excavation/penetration activity (e.g., well drilling) for the purpose of ensuring that the proposed activity will not affect underground utilities/structures, or in the case of contaminated soil or groundwater, will not disturb the affected area without the appropriate precautions and safeguards.

^e Access Controls – Physical barriers or restrictions to entry. (e.g., signage, fences, gates, security measures, etc.)

4.2 DEED RESTRICTIONS

The term “Deed Restriction,” as used in this LUCIP, refers to conditions and/or covenants that restrict or prohibit certain uses of real property and to limitations on its use necessitated by residual contamination in accordance with federal and state law.

DOE will provide notice to EPA and Kentucky at least 90 days prior to any transfer or sale of the C-400 Area (Figure 1, hatched area) so that EPA and Kentucky can be involved in discussions to ensure that appropriate provisions to maintain effective LUCs are included in the transfer terms or conveyance documents. In addition to the land transfer notice above, DOE will provide EPA and Kentucky with similar notice, within the same time frames, as to any federal-to-federal transfer of property. DOE will provide a copy of executed deed or transfer assembly to EPA and Kentucky.

Each transfer of fee title from DOE of any portion (i.e., parcel) of contaminated land in the C-400 Area will include a covenant as specified in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 120(h)(3), which will contain a description of the residual contamination on the property and the environmental use restrictions, expressly prohibiting activities inconsistent with the remedial action and LUC objectives. The environmental restrictions are included in a section of the CERCLA 120(h)(3) covenant that DOE is required to include in the deed for any property that has had hazardous substances stored for one year or more, or on which hazardous substances are known to have been released or disposed of on the property. Each deed also will contain a reservation of access to the property for DOE, EPA, and Kentucky and their respective officials, agents, employees, contractors, and subcontractors for purposes consistent with implementing remedial investigations/actions pursuant to the FFA.

In the event DOE plans to transfer fee title to any portion (i.e., parcel) of the contaminated land in the C-400 Area, DOE will comply with the transfer provisions of CERCLA Section 120(h)(3), the FFA, and the LUCAP, including any requirements pertaining to the imposition of restrictions on future land use (see Appendix B). The deed(s) (or other conveyance document) for such transfer will contain appropriate provisions to ensure that the use restrictions continue to run with the land and are enforceable by the DOE against the Grantee (including any successors and/or assigns). The deed(s) will provide that any lease or subsequent deed executed by the Grantee for the parcels within the C-400 Area property must include land/groundwater use restrictions that are no less restrictive than the use restrictions described in Appendix B of this LUCIP. The deed(s) also will include the requirement that any transferee lease contain the same use restrictions and conditions related to LUCs. Before executing the deed(s) for conveyance, the DOE will provide notice to EPA and Kentucky Department for Environmental Protection (KDEP) of the final draft deed language and provide an opportunity to review the restrictive covenants, use conditions, and other LUC provisions. The DOE will prepare and then record the deed with the Real Estate Office of the McCracken County Clerk, in accordance with the laws of the Commonwealth of Kentucky and federal law. Concurrent with the transfer of fee title from DOE to the Grantee, information regarding the environmental use restrictions and LUCs will be communicated in writing to the property owners and to appropriate state and local agencies to ensure such agencies can factor such conditions into their oversight and decision-making activities regarding the property. During the time between the adoption of the ROD for the C-400 Area and the deeding of the property, DOE shall ensure that any new lease contains land/groundwater use restrictions and controls no less restrictive than the use restrictions included in Appendix B of this LUCIP. These lease terms shall remain in place until the property is transferred by deed, at which time they will be superseded by the LUCs described in the ROD and this LUCIP.

4.3 ENVIRONMENTAL COVENANT

An Environmental Covenant will be created for the C-400 Area (Figure 1, hatched area) in accordance with federal and state law, including KRS 224.80-100 et seq., and recorded prior to any other interests being created in the DOE property (e.g., liens, mortgages, leases, easements, licenses, profits, servitudes, covenants, or life estates) or before any actual transfer of such property. The term “Environmental Covenant,” as used in this LUCIP, refers to the document executed by the property owner (i.e., the United States) and approved by EPA and KEPPC pursuant to KRS 224.80-100 that includes activity and use restrictions for the Impacted Area (i.e., the contaminated property indicated by the hatched area on Figure 1), which is recorded and enforceable by Kentucky, EPA, and interest holders against owners and subsequent owners. The Environmental Covenant will include the information, restrictions, and requirements in accordance with the ROD, LUCIP, and KRS Chapter 224 Subchapter 80. Prior to recording the Environmental Covenant, DOE shall request modification to revise the final C-400 Remedial Design Report, Appendix H, (namely this LUCIP) in accordance with FFA Section XX.J *Subsequent Modifications of Final Documents*. DOE shall submit a draft revised LUCIP, including an executed copy of the Environmental Covenant, for review and approval by EPA and KEPPC. Following approval of the revised Appendix H of the Remedial Design Report, DOE shall record the Environmental Covenant at the McCracken County Clerk’s Office, in accordance with applicable federal/state law, and send file stamped copies to the Kentucky Division of Waste Management and EPA. In addition, the DOE shall include a file-stamped copy of the Environmental Covenant in the revised copy of the LUCIP that must be attached to the LUCAP. The restrictions to be included in the Environmental Covenant are provided in Appendix B. The Environmental Covenant will be maintained until the concentrations of hazardous substances within the soil and groundwater are at such levels to allow for unrestricted use and unlimited exposure. The Environmental Covenant will remain in place until KEPPC and EPA approve a request by DOE to modify or delete it.

4.4 EXCAVATION/PENETRATION PERMITS PROGRAM

This LUC will apply to the C-400 Area, as depicted in Figure 1 (hatched area). The E/P Program will be the primary mechanism to control industrial worker exposure to waste, below-grade structures, or contaminated soil/groundwater left in place that could be encountered during excavation activities. The E/P Program refers to the existing program administered by DOE’s contractors at PGDP and currently includes a specific permitting procedure (PA-2012 or equivalent) designed to provide a common site wide system to identify and control potential personnel hazards related to trenching, excavation, and penetration. The E/P permits are issued by the Paducah Site’s DOE Prime Contractor. These permits currently are being issued by the Engineering Department of Paducah Remediation Services, LLC.¹ The primary objective of the E/P permits procedure is to provide notice to the organization requesting a permit of existing underground utility lines and/or other structures and to ensure that any E/P activity is conducted safely and in accordance with all environmental compliance requirements pertinent to the area.

The E/P permits procedure

- Requires formal authorization (i.e., internal permits/approvals) before beginning any intrusive activities at PGDP;
- Is reviewed annually; and

¹ The contractor and/or organization may change from time-to-time without need to modify this LUCIP.

- Is implemented by trained personnel knowledgeable in its requirements.

An initial draft of an E/P permit is reviewed by project support groups such as Environmental Compliance, Industrial Hygiene, Industrial Safety, Quality Assurance, and Nuclear and Facility Safety and approved by Nuclear and Facility Safety, the Facility Manager, the Issuing Authority/Engineering, and the work group Supervisor and Safety Representative. The reviews conducted by these sections ensure that the latest updates in engineering drawings, utility drawings, and solid waste management unit inventories are considered prior to the issuance of an E/P permit.

Within 30 days of regulatory approval of the LUCIP, the LUCIP and other CERCLA documents containing pertinent information regarding the extent of soil and groundwater contamination associated with the C-400 Area will be made available to the organizations responsible for implementing the E/P Permits Program, and this information will be utilized by these organizations in reviewing an E/P request. The information regarding extent of contamination in these documents will be utilized by these organizations and taken into account before authorizing any E/P. The DOE shall notify EPA and KDEP of any material changes (such as significant revisions, cancellation, etc.) to the E/P permits procedure that would affect implementation of this LUC and potentially affect the remedy effectiveness.

4.5 ACCESS CONTROLS

The PGDP is a federal facility with restricted access by the general public. Physical access to the PGDP is prohibited by security fencing, and armed guards patrol the DOE property 24 hours per day to restrict workers entry and prevent uncontrolled access by the public/site visitors. Figure 2 shows the PGDP Secured Area Boundary. These existing access controls are being maintained outside of the requirements of CERCLA and this LUCIP due to the nature and security needs of the facility. Access controls will be implemented during installation and operation of ERH systems at select locations within the C-400 Area. These interim access controls will include warning and informational signage, temporary fencing and/or barricades, and visitor sign-in controls. The designated locations for these interim access controls will be provided in the Remedial Action Work Plan and depicted in a figure of appropriate scale. Upon completion of the remedial action, these interim actions will cease and long-term access controls may be selected as LUCs to be maintained in accordance with the requirements of this LUCIP.

As interim controls, warning signs for the C-400 Area will be posted before beginning C-400 IRA field activities that involve worker exposure to contaminated groundwater and soils. The signs shall 1) include lettering that is legible from a distance of least 25 feet; 2) contain contact information for DOE and/or contractor personnel; 3) be visible from surrounding areas and at potential routes of entry into the C-400 Area. The warning signs shall contain language similar to the following:

WARNING: CONTAMINATED AREA
Hazardous Substances in Soil and Groundwater
Authorized Access Only
Contact: [Name and phone number]

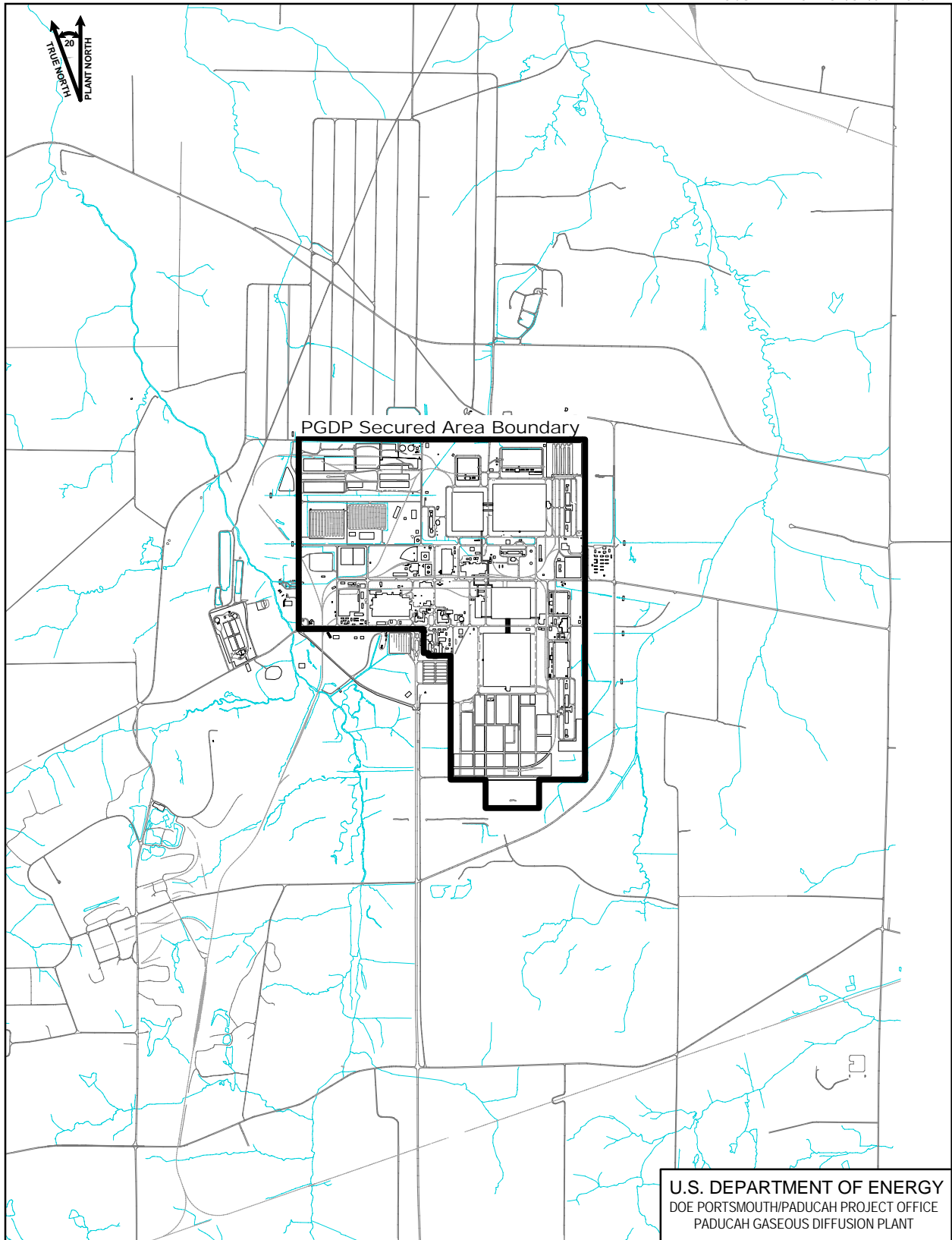


Figure 2. Paducah Gaseous Diffusion Plant (PGDP) Secured Area Boundary

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT



Figure No. C5AC90005SK009r2.apr
DATE 03-30-07

5. MONITORING AND INSPECTING LUCS

LUCs at the C-400 Area (Figure 1, hatched area) will be maintained until the concentration of hazardous substances in the soil and groundwater are at levels to allow for unrestricted use and unlimited exposure. Records pertaining to the monitoring and field inspections will be maintained in accordance with the data and records management provisions of the FFA.

The frequency and implementation of the monitoring of the LUCs is specified herein. The DOE and/or its contractors will perform the monitoring and annual field inspections. Although DOE may transfer these procedural responsibilities to another party by contract, transfer agreement, or through other means, DOE will retain ultimate responsibility for the remedy integrity, including the LUCs, to the extent provided by applicable law. However, DOE's ultimate responsibility will not diminish the transferee's responsibility for conducting such activities in accordance with any agreement with DOE or applicable law. The DOE will notify EPA and KDEP as soon as practicable, but no longer than 10 days, after discovery of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that will interfere with the effectiveness of the LUCs. DOE will notify EPA and KDEP regarding how DOE has addressed or will address the breach within 10 days of sending EPA and KDEP notification of the breach.

The LUC monitoring results will be included in a separate annual report or as a section of another annual environmental report, if appropriate, and provided to the EPA and KDEP. The annual monitoring reports will be used in preparation of the Five Year Review to evaluate the effectiveness of the remedy. The annual monitoring report, submitted to the EPA and KDEP by the DOE, will evaluate the status of the LUCs and how any deficiencies or inconsistent land uses have been addressed. In the event DOE transfers the C-400 Area property, the annual evaluation will address whether 1) the use restrictions and controls referenced above were communicated in the deed(s) or transfer instrument(s); 2) the owners and state and local agencies were notified of the use restrictions and controls affecting the property; and 3) use of the property has conformed with such restrictions and controls.

A summary of the monitoring frequency and implementation actions is provided in Table 2.

5.1 MONITORING

The LUCAP requires monitoring of LUCs quarterly throughout the remediation period unless justification for a different monitoring frequency is provided in the LUCIP (DOE 2000). The Property Record Notice filed for the C-400 Area will be monitored one time within one year of filing and then once every five years in conjunction with the CERCLA Five-Year Review. Similarly, the Deed Restrictions and Environmental Covenant will be monitored within one year of filing and then once every five years in conjunction with the CERCLA Five-Year Review. These reviews will ensure that the Property Record Notice, Deed Restrictions, and Environmental Covenant have been filed properly.

Table 2. Summary of LUC monitoring requirements for the C-400 Area at PGDP

Type of control	Purpose of monitoring	Frequency and justification	Implementation
Property Record Notice	To ensure that Property Record Notice recorded at the McCracken County Clerk’s Office is filed properly.	<ul style="list-style-type: none"> • Frequency: to be monitored (i.e., verified) one time within one year of filing, and then once every five years in conjunction with the CERCLA Five-Year Review. • Justification: Property Record Notice is not expected to change once it has been filed. 	DOE will verify that Property Record Notice is recorded properly.
Deed Restrictions	To ensure that Deed Restrictions recorded at the McCracken County Clerk’s Office are filed properly.	<ul style="list-style-type: none"> • Frequency: to be monitored (i.e., verified) one time within one year of filing, and once every five years in conjunction with the CERCLA Five-Year Review. • Justification: Deed Restriction is not expected to change once it has been filed. 	DOE will verify that Deed Restrictions are recorded properly in accordance with applicable federal and state law.
Environmental Covenant	To ensure that Environmental Covenant recorded at the McCracken County Clerk’s Office is filed properly.	<ul style="list-style-type: none"> • Frequency: to be monitored (i.e., verified) one time within one year of filing, and once every five years in conjunction with the CERCLA Five-Year Review. • Justification: Environmental Covenant is not expected to change once it has been filed. 	DOE will verify that Environmental Covenant is recorded properly in accordance with applicable federal and state law.
Excavation/ Penetration Permits Program	To ensure that Excavation/Penetration Permits Program is functioning properly.	<ul style="list-style-type: none"> • Frequency: to be monitored annually. • Justification: permits program is part of an established procedure and is not expected to be discontinued. 	DOE will verify that the contractor’s permits program is functioning properly in accordance with that described in Section 4.3.
<p>Access controls:</p> <ul style="list-style-type: none"> • Implemented during installation and operation of ERH systems at the C-400 Area (warning and informational signage, temporary fencing and/or barricades, and visitor sign-in controls) • Long-term access controls may be selected upon completion of the remedial action 	To ensure that access controls are functioning properly.	<ul style="list-style-type: none"> • Frequency: to be monitored quarterly during installation and operations of the IRA systems • Justification: sufficient to verify condition and adequacy of controls during changing conditions resulting from installation and operations activities • Frequency: monitoring frequency for long-term access controls to be determined upon selection 	DOE will verify access controls are functioning properly and located in the designated locations.

The E/P Program identified in this LUCIP will be monitored annually to verify that the program is functioning properly. Annual monitoring, initiated by the DOE contractor's Project Assessment Schedule, will be completed by June 30 of each year. Annual monitoring is appropriate for this LUC, since the E/P Program is part of an established procedure and is not expected to be discontinued.

Access controls implemented during installation and operation of ERH systems will be monitored quarterly to verify condition and adequacy during the remedial action; other required access controls will be monitored at the frequency identified when the access controls are selected (i.e., upon completion of the remedial action) to verify that access controls are functioning properly.

5.2 FIELD INSPECTIONS

Field inspections of the C-400 Area will be conducted annually to verify the following:

- The land use remains industrial (i.e., no recreational or residential land uses);
- Groundwater wells have not been installed and groundwater is not being used for any purpose;
- Unpermitted excavation/penetration activities have not occurred;
- Disruption of remedial/monitoring system has not occurred; and
- Access controls remain intact and located in designated areas.

These inspections will be documented and recorded using a checklist similar to the one provided in Appendix C. These records will be maintained in accordance with applicable sections of the LUCAP.

6. MODIFICATION OF LUCS

The aforementioned LUCs are expected to remain in place until the concentration of hazardous substances in the soil and groundwater is at such levels to allow for unrestricted use and unlimited exposure. However, if conditions at the site improve, land use objectives change, and the remedial goals are met, then the parties may agree to modify or discontinue a particular LUC.

DOE will not modify or terminate the aforementioned LUCs or implementation actions, or modify land use without approval by EPA and Kentucky. DOE shall seek prior EPA concurrence before taking any anticipated action that DOE anticipates would disrupt the effectiveness of the LUCs or any action that would alter or negate the need for LUCs. The request by DOE to modify/discontinue a LUC will include an adequate justification and must be in writing. The determination to modify or discontinue a particular LUC will be made by the EPA and Kentucky. The approval to modify or discontinue a LUC will be documented in writing and placed in the Administrative Record file. If changes to the LUCs are deemed significant and affect the scope of the remedy, then an Explanation of Significant Differences or Amendment to the C-400 Cleaning Building ROD may be required.

DOE will in writing notify EPA and KDEP 60 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.

7. ENFORCEMENT OF LUCS

DOE is responsible for implementing, maintaining, monitoring, reporting on, and enforcing the LUCs. Some of the LUCs, such as the Access Controls and the E/P Permit Program, are being implemented by DOE and/or its contractors at PGDP.

Although DOE may transfer these procedural responsibilities to another party by contract, transfer agreement, or through other means, DOE will retain ultimate responsibility for the remedy integrity, including the LUCs, to the extent provided by applicable law. However, DOE's ultimate responsibility will not diminish the transferee's responsibility for conducting such activities in accordance with any agreement with DOE

Any activity that is inconsistent with the LUC Objectives or use restrictions or any other action that may interfere with the effectiveness of the LUCs will be addressed by DOE as soon as practicable, but, in no case, will the process be initiated later than 10 days after DOE becomes aware of the breach.

8. REFERENCES

DOE (U.S. Department of Energy) 2000. *Land Use Control Assurance Plan for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-1799&D2, January.

DOE 2005. *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, July.

EPA (U.S. Environmental Protection Agency) 2000. *Memorandum of Agreement for Implementation of a Land Use Control Assurance Plan for the United States Department of Energy Paducah Gaseous Diffusion Plant*, Signed March 30.

APPENDIX A
PROPERTY RECORD NOTICE

NOTICE OF ENVIRONMENTAL CONTAMINATION AND LAND USE RESTRICTIONS

PURPOSE

The purposes of this document are to 1) provide notice of the environmental contamination in the C-400 Cleaning Building area property at the Paducah Gaseous Diffusion Plant (PGDP) owned by the U.S. Department of Energy (DOE) and located in McCracken County in the Commonwealth of Kentucky; 2) summarize the CERCLA remedial action to be undertaken by DOE in order to protect human health and the environment; and 3) describe the land use restrictions that apply to the C-400 Cleaning Building area.

NOTICE OF ENVIRONMENTAL CONTAMINATION

The C-400 Cleaning Building area subsurface soil and groundwater are contaminated with volatile organic compounds (VOCs) such as TCE and its breakdown products (trans-1,2-dichloroethene, cis-1,2-dichloroethene, and vinyl chloride) and 1,1-dichloroethene, as well as tetrachloroethene, carbon tetrachloride, chloroform, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and toluene. The primary contaminant of concern for the C-400 Cleaning Building area is the TCE contamination in subsurface soil and groundwater. Both the Upper Continental Recharge System (UCRS) and the Regional Gravel Aquifer (RGA) contain high VOC concentrations. Three groundwater plumes of dissolved contaminants have migrated beyond the secured fenced area (see Figure A-1). Groundwater from the C-400 Cleaning Building area flows primarily with the PGDP's Northwest Plume, but also contributes to the Northeast Plume. The PGDP's Northwest Plume reaches approximately 4.6 km (2.8 miles) beyond the PGDP security-fenced area to Little Bayou Creek in the Ohio River floodplain. The Northeast Plume extends approximately 3.5 km (2.2 miles) from the east side of PGDP northward to Metropolis Lake Road. TCE and other VOCs from the C-400 Cleaning Building area also may contribute to the Southwest Plume. The Southwest Plume extends approximately 0.2 km (0.1 miles) west of the PGDP security fence and is contained within PGDP property.

Attachment 1 to this Notice is a survey plat showing the major areas of concern as depicted in Figure 8 of the *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, July 2005, which corresponds to the hatched area in Figure A-2.

CERCLA INTERIM REMEDIAL ACTION

A Record of Decision (ROD) issued by DOE and the U.S. Environmental Protection Agency (EPA) with concurrence from the Kentucky Environmental and Public Protection Cabinet (KEPPC), specifies the selected interim remedial action that DOE must implement to remediate the VOC contamination within the C-400 Cleaning Building area in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 USC Section 9601 et seq. The selected remedy consists of the following actions:

- A remedial design investigation to further determine areal and vertical extent of the contamination in the C-400 Cleaning Building area to determine optimum placement of the remediation system.
- Removal and treatment of TCE and other VOCs from the contaminant source zone in the UCRS and RGA at the C-400 Cleaning Building area using an Electrical Resistance Heating remediation system.

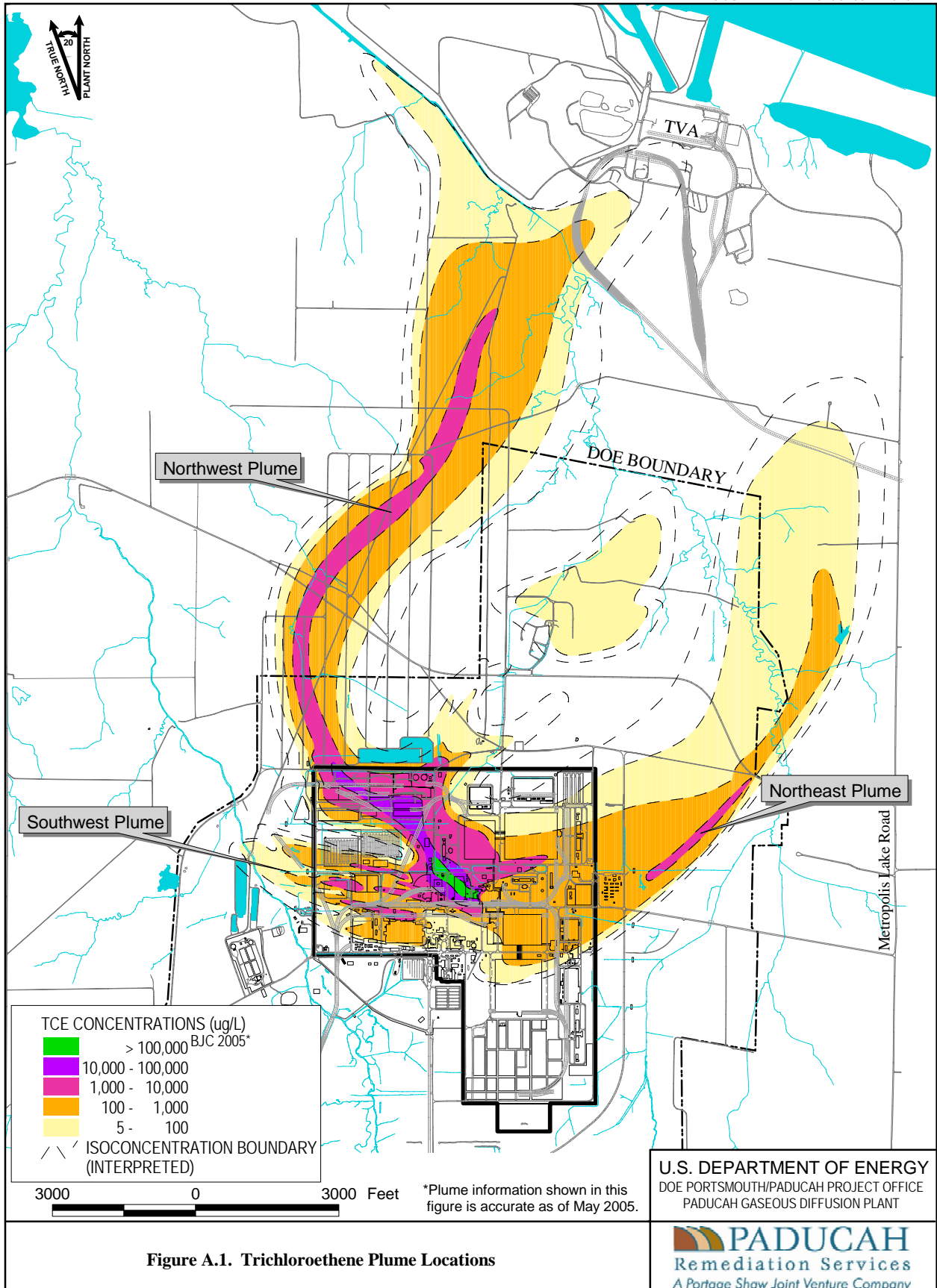


Figure A.1. Trichloroethene Plume Locations

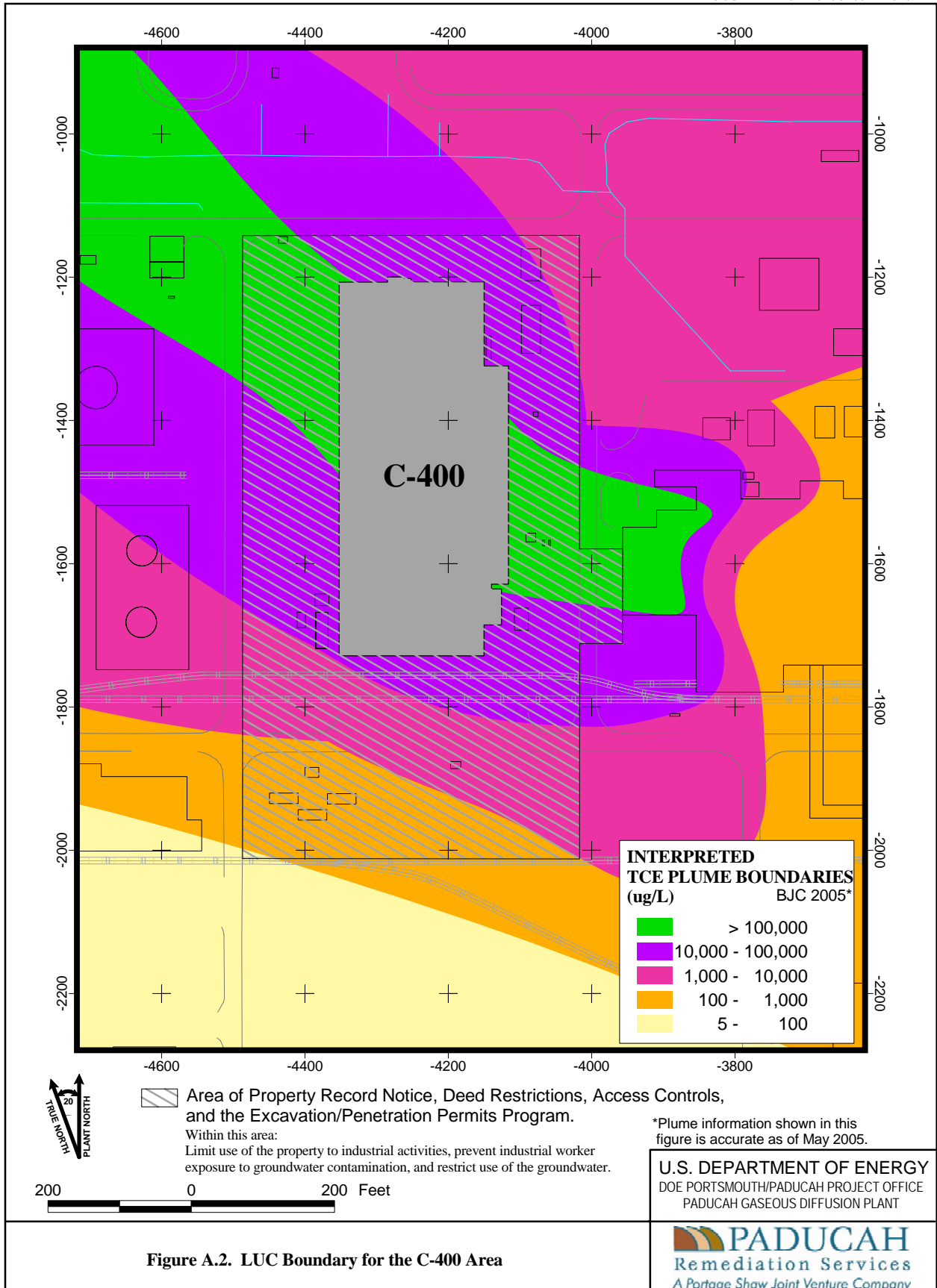


Figure A.2. LUC Boundary for the C-400 Area

- Implementation, maintenance, and reporting of Land Use Controls (LUCs) to prevent unacceptable exposure to contamination in the C-400 Cleaning Building area.
- Continuation of groundwater monitoring of the source and dissolved-phase plumes, since contamination would remain in place following the interim remedial actions.

More detailed information about the contamination at the C-400 Cleaning Building area of PGDP and the interim remedial action may be found in the CERCLA documents that are part of the Administrative Record File relating to selection, design, and implementation of the actions specified in the ROD. These documents are available for public inspection during regular business hours at the Environmental Information Center in the Barkley Centre, Paducah, Kentucky, and at the Paducah Public Library.

LAND USE RESTRICTIONS

The selected remedy for C-400 Cleaning Building Area includes the following LUCs: Property Record Notice, Deed Restrictions, Environmental Covenant, an Excavation/Penetration Permits Program, and Access Controls that are applicable to the area depicted in Figure A-2 (hatched area). Attachment 1 is a survey plat of the C-400 Area that depicts the groundwater contamination (so-called Impacted Area) that is subject to the land use restrictions described below that will be included in an Environmental Covenant and property transfer documents. Any person who is unsure whether DOE has authorized a proposed use in the areas covered by the ROD should contact the U.S. Department of Energy, Paducah Site Office, P.O. Box 1410, Paducah, Kentucky 42001, (270) 441-6800, prior to proceeding with such use.

An Environmental Covenant will be created for this area in accordance with federal and state law, including KRS 224.80-110, and recorded prior to any other interests (e.g., liens, mortgages, leases, easements, licenses, profits, servitudes, covenants, or life estates) being created in the DOE property described above (Figure A-2 hatched area and Attachment 1) or before any actual transfer of such property. Additionally, in the event DOE transfers fee title to any portion (i.e., parcel) of this area, DOE will comply with applicable requirements, including the transfer provisions of CERCLA Section 120(h)(3) and the Paducah Federal Facility Agreement. Both the Environmental Covenant and any deed(s) of fee title transfer will include restrictions on groundwater and land use consistent with the following:

A. Prohibited Uses:

- i.) No residential use of the Impacted Area shall be permitted, including any residence or dwelling, house, apartment, or condominium, or other purposes with a similar potential for human exposure such as elementary and secondary schools, child care facilities, and playgrounds.
- ii.) No recreational use of the Impacted Area shall be permitted.

B. Prohibited Activities:

- i.) Groundwater at the Impacted Area shall not be used except to the extent that such use has been approved by the U.S. Department of Energy, U.S. Environmental Protection Agency, and the Kentucky Environmental and Public Protection Cabinet.
- ii.) No soil at the Impacted Area shall be disturbed unless in accordance with the DOE Excavation/Penetration Permits Program or by obtaining the written approval of the Director, Division of Waste Management, Kentucky Environmental and Public Protection Cabinet.

- iii.) Except as necessary to protect human health, safety or the environment, no action shall be taken, allowed, suffered, or omitted on the Impacted Area if such action or omission is reasonably likely to:
- a. Create a risk of migration of hazardous substances, pollutants or contaminants or a potential hazard to human health or the environment; or
 - b. Result in a disturbance of the structural integrity of any engineering controls designed or utilized at the Impacted Area to contain hazardous substances, pollutants or contaminants or limit human exposure to hazardous substances, pollutants or contaminants.

Additional facts may be contained in the DOE Realty Office's Land Notation. The DOE Realty Officer can be contacted in the Real Property Management Office of the Environmental Management Consolidated Business Center, Office of Logistics Management at 250 E. 5th Street, Suite 500, Cincinnati, OH 45202, (513) 246-0500.

Attachment 1

(This attachment will contain the survey plat to be prepared by a registered land surveyor.)

APPENDIX B

**RESTRICTIONS TO BE INCORPORATED INTO ENVIRONMENTAL
COVENANT**

RESTRICTIONS TO BE INCORPORATED INTO ENVIRONMENTAL COVENANT

A. Prohibited Uses:

- i. No residential use of the Impacted Area shall be permitted, including any residence or dwelling, house, apartment, or condominium, or other purposes with a similar potential for human exposure such as elementary and secondary schools, child care facilities, and playgrounds.
- ii. No recreational use of the Impacted Area shall be permitted

B. Prohibited Activities:

- i. Groundwater at the Impacted Area shall not be used except to the extent that such use has been approved by the U.S. Department of Energy, U.S. Environmental Protection Agency, and the Kentucky Environmental and Public Protection Cabinet.
- ii. No soil at the Impacted Area shall be disturbed unless in accordance with the DOE Excavation/Penetration Permits Program or by obtaining the written approval of the Director, Division of Waste Management, Kentucky Environmental and Public Protection Cabinet.
- iii. Except as necessary to protect human health, safety or the environment, no action shall be taken, allowed, suffered, or omitted on the Impacted Area if such action or omission is reasonably likely to:
 - a. Create a risk of migration of hazardous substances, pollutants or contaminants or a potential hazard to human health or the environment; or
 - b. Result in a disturbance of the structural integrity of any engineering controls designed or utilized at the Impacted Area to contain hazardous substances, pollutants or contaminants or limit human exposure to hazardous substances, pollutants or contaminants.

APPENDIX C
EXAMPLE LAND USE CONTROLS CHECKLIST

EXAMPLE
C-400 AREA
LAND USE CONTROLS CHECKLIST

Inspector(s): _____ **Date:** _____

Inspector: For unsatisfactory conditions list any deficiencies under the “Deficient Condition or Comment” column.

<u>LAND USE CHANGES (Industrial Land Use Assumed)</u>	NA	Yes	No	Deficient Condition or Comment
Is there evidence (visual, physical, or otherwise) to indicate that there have been changes to land use (e.g., bike trails or hunting grounds)?				
Is there evidence (visual, physical, or otherwise) to indicate that there has been residential use of the Impacted Area (including any residence or dwelling, house, apartment, or condominium, or other purposes with a similar potential for human exposure such as elementary schools, child care facilities, and playgrounds)?				
Is there evidence (visual, physical, or otherwise) to indicate that there has been recreational use of the Impacted Area?				
<u>ACTIVITIES</u>	NA	Yes	No	Deficient Condition or Comment
Have any groundwater wells (for consumption of water) been installed?				
Is there evidence of trenching or excavation other than that specifically addressed by an Excavation/Penetration Permit?				
Are Access Controls intact and located in designated spots with the C-400 Area?				
Is there evidence that remedial or monitoring systems have been tampered with, disrupted, or destroyed?				
Has an unauthorized groundwater well(s) been installed within the C-400 Area?				
Is there evidence of any prohibited uses of the groundwater (including consumptive, irrigation, industrial uses, etc.)?				
<u>REVIEWS</u>	NA	Yes	No	Deficient Condition or Comment
Has the recording of Property Record Notice and Deed Restrictions been verified at the County Court Clerk’s office?				
Are the Property Record Notice and Deed Restrictions up to date?				