



## Department of Energy

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**FEB 03 2012**

PPPO-02-1360328-12C

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Ms. Jennifer Tufts  
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Dear Mr. Mullins and Ms. Tufts:

**TRANSMITTAL OF REMEDIAL DESIGN WORK PLAN FOR SOLID WASTE MANAGEMENT UNITS 1, 211-A, AND 211-B VOLATILE ORGANIC COMPOUND SOURCES FOR THE SOUTHWEST GROUNDWATER PLUME AT THE PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY (DOE/LX/07-1268&D2)**

References:

1. Letter from Jennifer Tufts to Reinhard Knerr, "Comments on the Remedial Design Work Plan for Solid Waste Management Units 1, 211-A, and 211-B Volatile Organic Compound Sources for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-1268&D1)," dated December 20, 2011
2. Letter from April Webb to Reinhard Knerr, "Comments to the Remedial Design Work Plan for Solid Waste Management Units 1, 211A, 211B and Part of 102 Volatile Organic Compound Sources for the Southwest Groundwater Plume (DOE/LX/07-1268&D1)," dated December 16, 2011

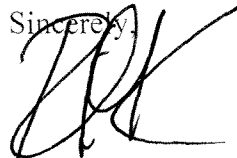
Please find enclosed the certified subject document. The *Remedial Design Work Plan for Solid Waste Management Units 1, 211-A, and 211-B Volatile Organic Compound Sources for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-1268&D2, (RDWP) has been prepared based on comments received on the D1 version of the work plan. Where appropriate the document has been revised to reflect changes based on the incorporation of comments. Both clean and redline versions of the D2 document are provided to show the modifications made to the document as a result of the comments.

For clarification, General Comment 1 from the U.S. Environmental Protection Agency (EPA) indicated that a sampling and analysis plan is required to be submitted with the RDWP. The U.S. Department of Energy is preparing a Remedial Design Support Investigation (RDSI) Characterization Plan. This document will provide the information requested in the comment

and will be submitted to Kentucky and EPA for review and approval in accordance with the Federal Facilities Agreement (FFA). The development and sequence of delivery of the RDWP and RDSI Characterization Plan are consistent with the requirements of the project and FFA (Section XX). In addition the development and delivery of separate documents, the RDSI Characterization Plan and the RDWP, is consistent with the approach previously utilized for the C-400 Interim Remedial Action.

If you have any questions or require additional information, please contact David Dollins at (270) 441-6819.

Sincerely,



Reinhard Knerr  
Paducah Site Lead  
Portsmouth/Paducah Project Office

Enclosures:

1. Certification Page
2. D2 Remedial Design Work Plan
3. Redline D2 Remedial Design Work Plan
4. Comment Response Summary for Kentucky Comments
5. Comment Response Summary for EPA Comments

e-copy w/enclosures:

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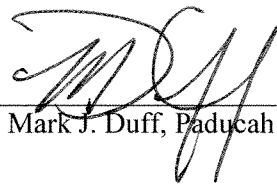
## CERTIFICATION

**Document Identification:**

***D2 Remedial Design Work Plan for Solid Waste Management Units 1, 211-A, and 211-B Volatile Organic Compound Sources for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,  
DOE/LX/07-1268&D2***

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or 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.

Paducah Remediation Services, LLC  
Operator



Mark J. Duff, Paducah Project Manager

2-3-12  
Date Signed

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or 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 (DOE)  
Owner



Reinhard Knerr, Paducah Site Lead  
Portsmouth/Paducah Project Office

2/3/12  
Date Signed

**DOE/LX/07-1268&D2  
Primary Document**

**Remedial Design Work Plan for Solid Waste Management  
Units 1, 211-A, and 211-B Volatile Organic Compound  
Sources for the Southwest Groundwater Plume at the  
Paducah Gaseous Diffusion Plant,  
Paducah, Kentucky**



**CLEARED FOR PUBLIC RELEASE**



**Remedial Design Work Plan for Solid Waste Management  
Units 1, 211-A, and 211-B Volatile Organic Compound  
Sources for the Southwest Groundwater Plume at the  
Paducah Gaseous Diffusion Plant,  
Paducah, Kentucky**

Date Issued—February 2012

Prepared for the  
U.S. Department of Energy  
Office of Environmental Management

Prepared by  
LATA Environmental Services of Kentucky, LLC  
managing the  
Environmental Remediation Activities at the  
Paducah Gaseous Diffusion Plan  
U.S. Department of Energy  
under contract DE-AC30-10CC40020

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## ACRONYMS

ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFC	certified for construction
<i>CFR</i>	<i>Code of Federal Regulation</i>
DCE	dichloroethene
DNAPL	dense nonaqueous-phase liquid
DOE	U.S. Department of Energy
EISB	enhanced <i>in situ</i> bioremediation
EPA	U.S. Environmental Protection Agency
E/PP	Excavation/Penetration Permit
ES&H	Environment, Safety, and Health
FFA	Federal Facility Agreement
FFS	focused feasibility study
KDEP	Kentucky Department for Environmental Protection
LUC	land use control
MCL	maximum contaminant level
NEPA	National Environmental Policy Act
O&M	operation and maintenance
OU	operable unit
PCB	polychlorinated biphenyl
PGDP	Paducah Gaseous Diffusion Plant
PM	project manager
PP	proposed plan
PPE	personal protective equipment
RAO	remedial action objective
RAWP	remedial action work plan
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RDR	remedial design report
RDSI	remedial design support investigation
RDWP	remedial design work plan
RG	remediation goal
RGA	Regional Gravel Aquifer
RI	remedial investigation
ROD	record of decision
SWMU	solid waste management unit
TCE	trichloroethene
UCRS	Upper Continental Recharge System
VOC	volatile organic compound
WAG	waste area grouping

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## EXECUTIVE SUMMARY

This remedial design work plan (RDWP) defines the scope of activities and approach for implementing the remedial action for the *Record of Decision for Solid Waste Management Units 1, 211-A, 211-B, and Part of 102 Volatile Organic Compound Sources for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (ROD) (DOE 2011a). The selected remedy, as identified in the proposed plan and will be documented in a signed ROD.

- Oil Landfarm [Solid Waste Management Unit (SWMU) 1]—*in situ* source treatment using deep soil mixing with interim land use controls (LUCs).
- C-720 Building Northeast and Southeast Spill Site (SWMUs 211-A and 211-B)—Final characterization of source extent and magnitude followed by *in situ* source treatment using enhanced *in situ* bioremediation (EISB) with interim LUCs or long-term monitoring with interim LUCs.

Through these treatment processes, the contribution of contaminants from the Upper Continental Recharge System soils into the Regional Gravel Aquifer (RGA) groundwater will be reduced. This plan specifically addresses the location of the project, the nature of the work, the major work activities required to perform the design for the remedial action, the schedule, and the project applicable or relevant and appropriate requirements, as included in the ROD. This remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act. The U.S. Department of Energy (DOE) is the owner and the lead agency for Paducah Gaseous Diffusion Plant (PGDP) cleanup activities. Both the U.S. Environmental Protection Agency and the Kentucky Department for Environmental Protection are supporting agencies providing oversight for DOE's environmental restoration of PGDP.

In support of designing and implementing the selected remedies, a Remedial Design Support Investigation (RDSI) Characterization Plan will be performed consistent with the requirements of the ROD. The following are the purposes of the RDSI:

- Collect soil contaminant concentration data from the SWMUs to allow the source treatment to be focused on the contamination areas necessary to meet the cleanup levels;
- Collect soil contamination concentration data from the C-720 SWMUs for source extent and magnitude to allow the Federal Facility Agreement (FFA) parties to review the information and identify whether treatment of areas will be by enhanced *in situ* bioremediation *in situ* source treatment using EISB with interim LUCs or long-term monitoring with interim LUCs; and
- Collect engineering and geological data to support the remedial design and implementation of the remedial actions to be performed.

The drilling, sampling, analytical testing activities, and other supporting functions to be performed in the RDSI are documented in the *Remedial Design Support Investigation Characterization Plan for the C-747-C Oil Landfarm and C-720 Northeast and Southeast Sites at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0350, which is a secondary document developed as a corresponding document to this RDWP primary document, consistent with Section XX of the FFA.

The technical approach for reducing volatile organic compounds (VOCs) at the source areas has the following remedial action objectives:

- (1) Treat and/or remove the principal threat wastes consistent with the National Contingency Plan.
- (2a) Prevent exposure to VOC contamination in the source areas that will cause an unacceptable risk to excavation workers (< 10 ft).
- (2b) Prevent exposure to non-VOC contamination and residual VOC contamination through interim LUCs within the Southwest Plume source areas (i.e., SWMU 1, SWMU 211-A, and SWMU 211-B) pending remedy selection as part of the Soils Operable Unit and the Groundwater Operable Unit.
- (3) Reduce VOC migration from contaminated subsurface soils in the treatment areas at the Oil Landfarm and C-720 Northeast and Southeast Sites so that contaminants migrating from the treatment areas do not result in the exceedance of maximum contaminant levels in underlying RGA groundwater.

# 1. INTRODUCTION AND PURPOSE

This Remedial Design Work Plan (RDWP) documents the design approach that will be followed to prepare to implement the remedial action for the Southwest Plume source areas for volatile organic compounds (VOCs) at the Paducah Gaseous Diffusion Plant (PGDP) near Paducah, Kentucky (Figure 1). The remedial action addresses the source zones at the Southwest Plume source areas (Figure 2).

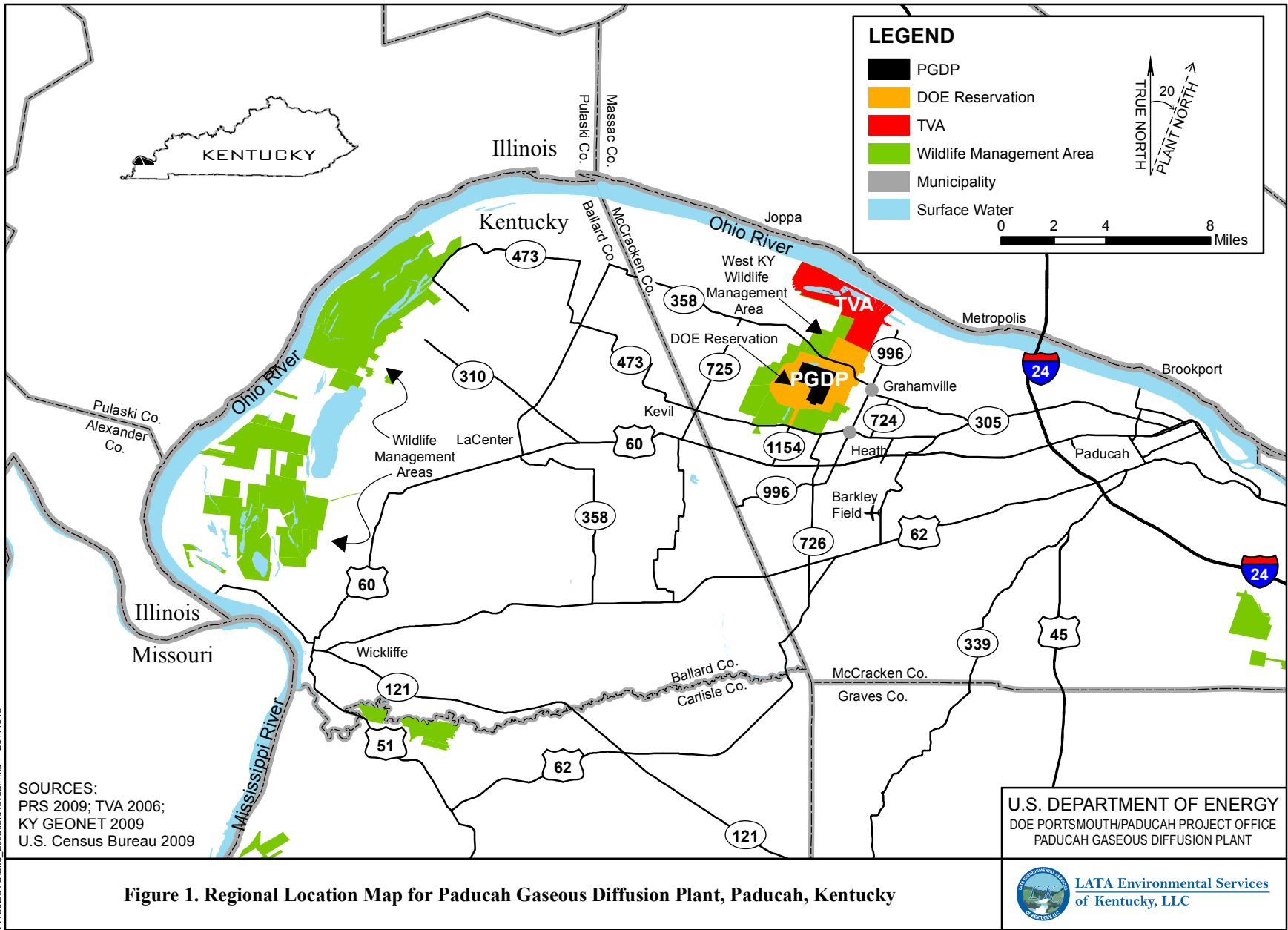
The RDWP is divided into six sections (BJC 2005). The Introductory and Purpose section details the purpose and scope of the RDWP; the regulatory drivers requiring the remedial action selected as identified by the record of decision (ROD) (DOE 2011a); and the method of accomplishment. Section 2 provides the project organization and the roles and responsibilities for the remedial action tasks. The site background is presented in Section 3, including site history, geophysical description, and the VOCs of concern. Section 3 also presents the technical approach, including the remedial design (RD) objectives, major components of the remedial action, and the regulatory considerations necessary to develop the design criteria and supporting assumptions. Section 4 of the RDWP describes the project schedule for the RD of the remedy. Section 5 contains the listing of the applicable criteria, codes, and standards for development of the RD, while the Appendix provides the discussion of applicable or relevant and appropriate requirements (ARARs) that the action must meet. Information regarding remedial action planning is presented in Section 6. Section 7 provides the references utilized during RDWP preparation.

This remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and is the response action selected in the ROD (DOE 2011a). The U.S. Department of Energy (DOE) is the owner and lead agency for PGDP cleanup activities. Both the U.S. Environmental Protection Agency (EPA) and the Kentucky Department for Environmental Protection (KDEP) are support agencies providing oversight for DOE's environmental restoration of PGDP, which was placed on the National Priority List in 1994. Section 120 of CERCLA required the negotiation and implementation of the PGDP Federal Facility Agreement (FFA) that integrates regulatory requirements from the Resource Conservation and Recovery Act (RCRA) and CERCLA (EPA 1998). Section 104 of CERCLA addresses the mitigation of releases or threatened releases of hazardous substances to the environment through response action. Executive Order 12580, "Superfund Implementation," delegates to DOE the authority for response actions for DOE facilities.

*The Revised Focused Feasibility Study for Solid Waste Management Units 1, 211-A, and 211-B Volatile Organic Compound Sources for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (FFS) was submitted to EPA and Commonwealth of Kentucky in May 2011 (DOE 2011b). The FFS provided an evaluation of eight alternatives for remediation of three VOC sources to the Groundwater Operable Unit (OU). The FFS was approved in May 2011. Subsequently, the proposed plan (PP) was developed and approved in September 2011 (DOE 2011c). A public comment period for the PP was held from October 2, 2011, to November 16, 2011.

This RDWP defines the scope of activities necessary to design the engineering drawings and specifications for use in implementing the remedial action selected in the ROD. This RDWP specifically addresses the location of the project, the nature of the work, the major work activities required to perform the design for the remedial action, the schedule, and the ARARs, as stated in the ROD (DOE 2011a).





**Figure 1. Regional Location Map for Paducah Gaseous Diffusion Plant, Paducah, Kentucky**

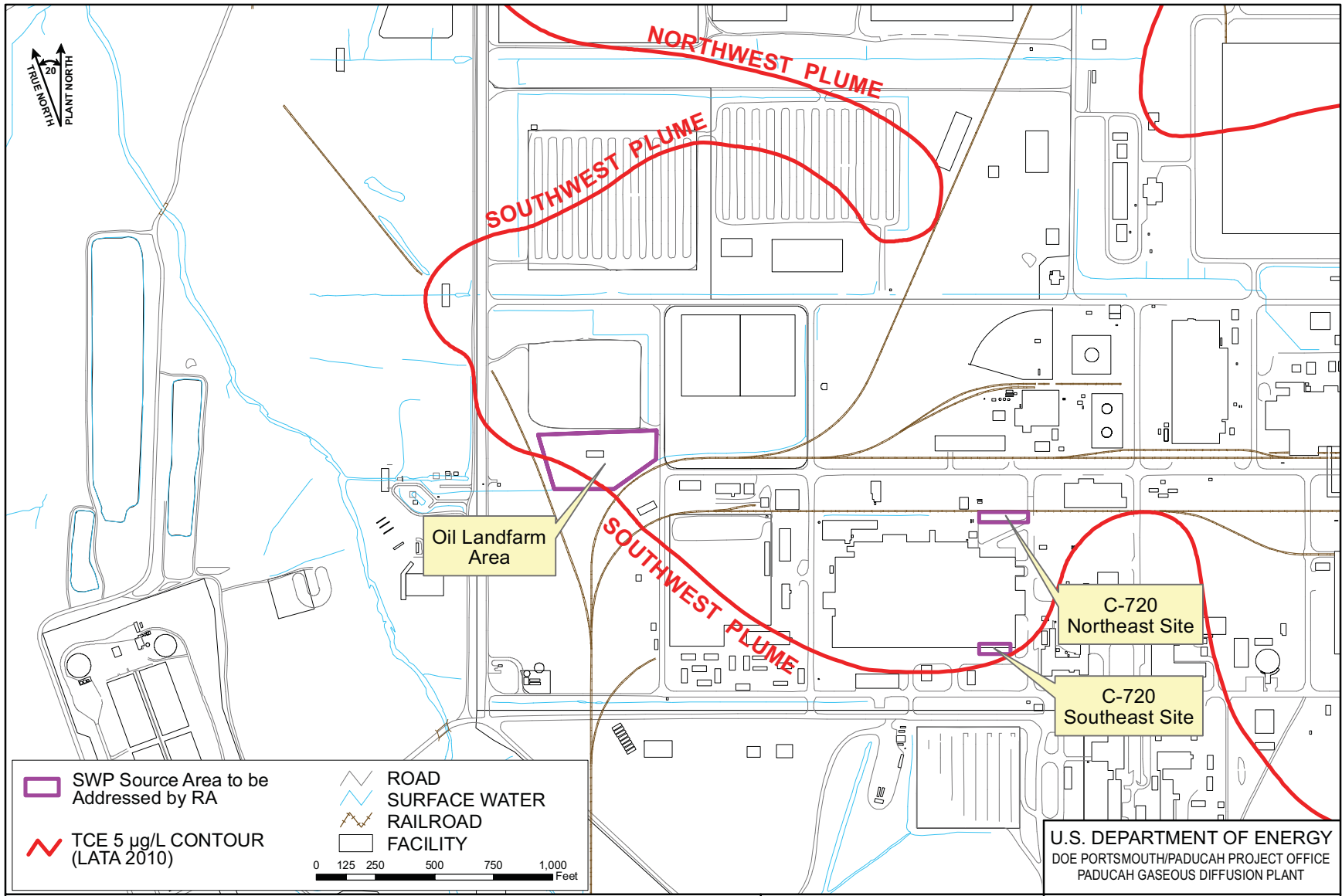


Figure 2. Southwest Plume Potential Source Areas Addressed by the Remedial Design

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A corresponding FFA secondary document to this RDWP is the Remedial Design Support Investigation (RDSI) Characterization Plan. This secondary document supports implementing the selected remedies. The following are the purposes of the RDSI:

- Collect soil contaminant concentration data from the solid waste management units (SWMUs) to allow the source treatment to be focused on the contamination areas necessary to meet the cleanup levels;
- Collect soil contamination concentration data from the C-720 SWMUs for source extent and magnitude to allow the FFA parties to review the information and identify whether treatment of areas will be by *in situ* source treatment using enhanced *in situ* bioremediation (EISB) with interim land use controls (LUCs) or long-term monitoring with interim LUCs; and
- Collect engineering and geological data to support the RD and implementation of the remedial actions to be performed.

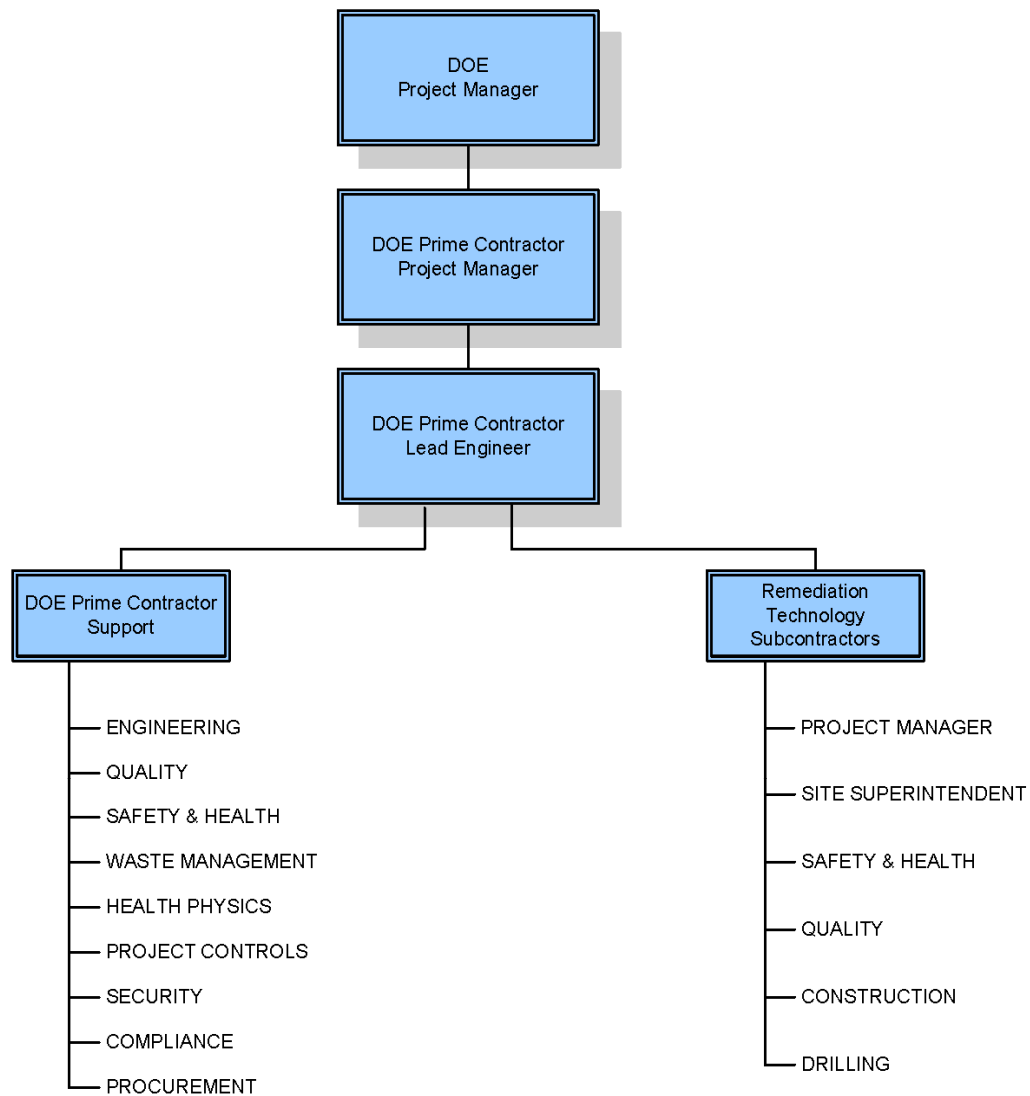
The drilling, sampling, analytical testing activities, and other supporting functions to be performed in the RDSI are documented in the *Remedial Design Support Investigation Characterization Plan for the C-747-C Oil Landfarm and C-720 Northeast and Southeast Sites at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0350. The RDSI Characterization Plan is a secondary document developed as a corresponding document to this RDWP, consistent with Section XX of the FFA.

A remedial design report (RDR), based on a design-build approach, will be produced by the DOE subcontractor. The 90% design, including drawings and specifications, will represent the D1 RDR, which will be submitted to EPA and KDEP for review, as required under the PGDP FFA. Following review, the drawings and specifications will be issued as certified for construction (CFC) and will represent the D2 RDR and also will become part of the procurement package to obtain a LATA Environmental Services of Kentucky, LLC, construction contractor.

## 2. PROJECT ORGANIZATION

The project organization chart showing relationships of key personnel and organizations is shown in Figure 3. The following are a description of responsibilities and authority of key personnel.

- DOE Project Manager (PM)—Serves as the point of contact with regulatory agencies and provides oversight for the overall completion of the remedial action in accordance with the approved ROD and RD. The PM establishes baseline scope, schedule, and budget and serves as the primary interface for environmental management activities implemented by DOE's prime contractor.
- DOE Prime Contractor PM—Serves as the primary point of contact with DOE to implement the remedial action. Performs work in accordance with the baseline scope and schedule and directs the day-to-day activities of DOE prime contractor personnel. Serves as the DOE prime contractor primary point of contact with the subcontractor during RD and remedial action activities. Verifies work is performed in accordance with the subcontract document and approved work plans.
- DOE Prime Contractor Lead Engineer—Performs technical review of the engineering submittals and ensures that the design drawings and specifications meet the design objectives and DOE prime contractor requirements. Interfaces with prime contractor PM to coordinate engineering support during the implementation of the remedial action by the subcontractor.
- Remediation Technology Subcontractor PM—Serves as the remedial action subcontractor's primary point of contact with the prime contractor PM and is responsible for the performance, quality, schedule, and budget. Provides overall project direction and execution; implements corrective actions, as necessary; verifies compliance with Environment, Safety, and Health (ES&H) requirements; and participates in the readiness review.
- Remediation Subcontractor Project Superintendent—Oversees all remedial action field activities and verifies that field operations follow established and approved plans, designs, specifications, and procedures. Interfaces with the prime contractor PM and subcontractor technical and support personnel and lower-tier subcontractors.
- Prime Contractor Support Staff—Provides support to the prime contractor PM concerning technical and nontechnical aspects such as engineering, safety, quality, compliance, and waste management while implementing the remedial action.



Note: Only key personnel are identified. Additional project support functions from DOE, LATA, remedial subcontractors, or other DOE prime contracts will be identified and utilized as needed.

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PADUCAH GASEOUS DIFFUSION PLANT

**Figure 3. Project Organization for Southwest Plume Source Areas Remedial Action**



LATA Environmental Services  
of Kentucky, LLC

## 3. PROJECT DESCRIPTION

### 3.1 SITE HISTORY AND DESCRIPTION

PGDP is located approximately 10 miles west of Paducah, Kentucky, population approximately 26,000, and 3.5 miles south of the Ohio River in the western part of McCracken County (Figure 1). The plant is located on a DOE-owned site; approximately 650 acres are within a fenced security area, approximately 800 acres are located outside the security fence, and the remaining 1,986 acres are licensed to Kentucky as part of the West Kentucky Wildlife Management Area. Bordering the PGDP Reservation to the northeast, between the plant and the Ohio River, is a Tennessee Valley Authority reservation on which the Shawnee Fossil Plant is located (Figure 1). All plant and process water at PGDP is drawn from the Ohio River.

Before the PGDP was built, a munitions-production facility, Kentucky Ordnance Works, was operated during World War II at the current PGDP location and at an adjoining area southwest of the site. Construction of PGDP was initiated in 1951 and the plant began operations in 1952. Construction was completed in 1955, and PGDP became fully operational in 1955, supplying enriched uranium.

Trichloroethene (TCE), a chlorinated solvent that is a VOC, is the most widespread groundwater contaminant associated with PGDP. The TCE degradation products *cis*-1,2-dichloroethene (*cis*-1,2-DCE), *trans*-1,2-DCE, and vinyl chloride also are present in some areas. These contaminants have resulted in three dissolved-phase plumes that are migrating from PGDP toward the Ohio River. These groundwater plumes are the Northwest Groundwater Plume SWMU 201, the Northeast Groundwater Plume (SWMU 202), and the Southwest Groundwater Plume (SWMU 210).

### 3.2 SOURCE AREAS AND NATURE AND EXTENT OF CONTAMINATION

The contamination from the three source areas to be addressed by this remedial action is summarized to assist with understanding the nature and extent of contamination. The data is discussed within the SWMU setting of each source area.

#### 3.2.1 C-747-C Oil Landfarm (SWMU 1)

Between 1973 and 1979, the Oil Landfarm was used for landfarming (mixing waste oils with soil to aid biodegradation of the oil in an area that prevents runoff) waste oils contaminated with TCE, uranium, polychlorinated biphenyls (PCBs), and 1,1,1-trichloroethane. These waste oils are believed to have been derived from a variety of PGDP processes. The landfarm consisted of two 1,125-ft<sup>2</sup> plots that were plowed to a depth of 1 to 2 ft. Waste oils were spread on the surface every three to four months; then the area was limed and fertilized.

Five soil borings were placed within and adjacent to the contaminated area defined in the Waste Area Group (WAG) 27 Remedial Investigation (RI). Figure 4 shows the locations and TCE results of the Upper Continental Recharge System (UCRS) soil sampling from the Southwest Plume Site Investigation and the previous investigations that were used to define the source zones (DOE 2007). No Regional Gravel Aquifer (RGA) groundwater samples were collected at this unit. Soils analysis showed the highest levels of TCE (3.5 mg/kg) during the RDSI were found in boring 001-202 from a sample located at 47 ft bgs (DOE 2007).

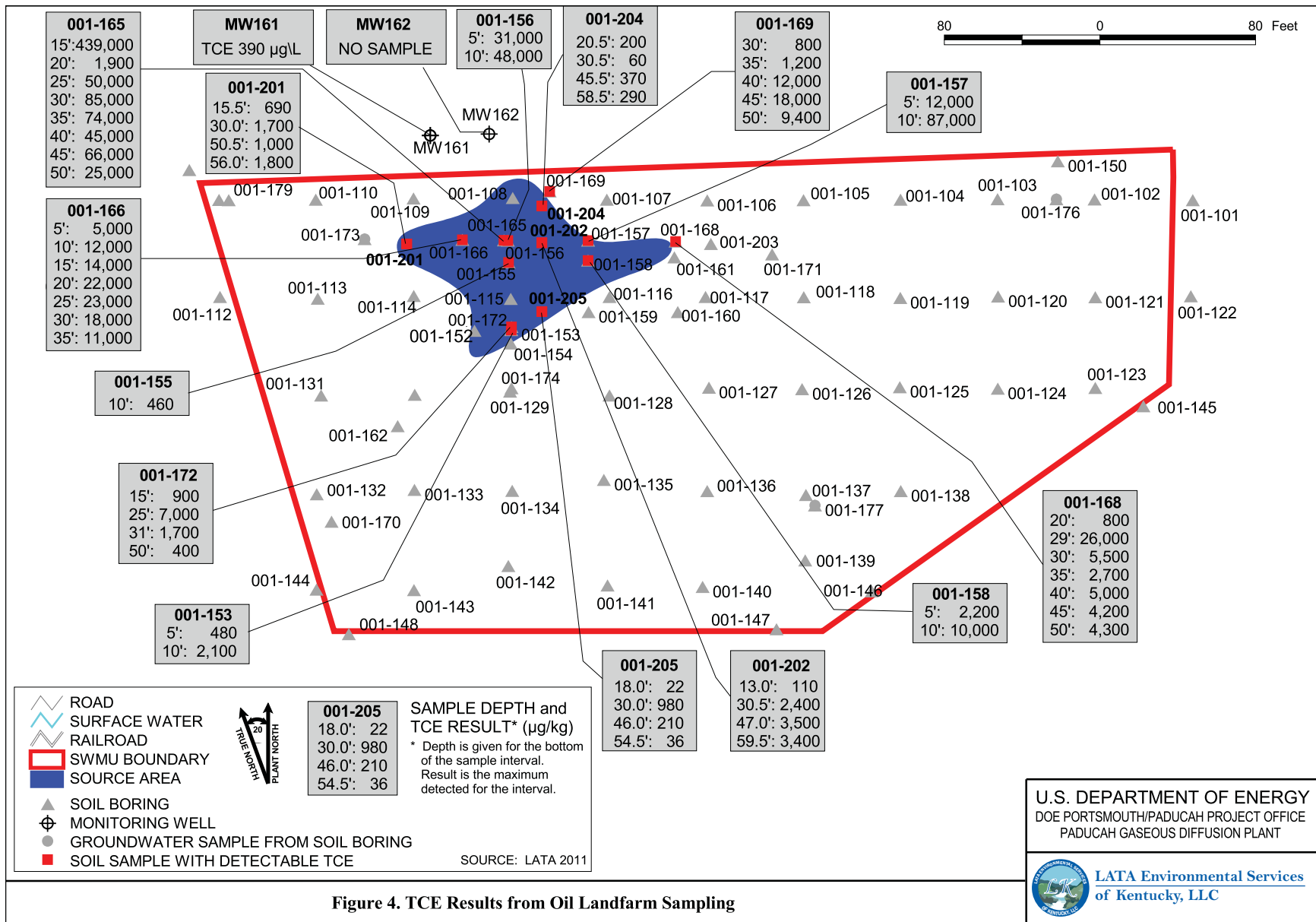


Figure 4. TCE Results from Oil Landfarm Sampling

Significant levels of TCE (1.8 mg/kg) were detected in a second location (001-201) from all intervals collected to a depth of 56 ft, with the highest level of TCE detected at 56 ft bgs. A third location (001-205) exhibited lower levels of TCE with the highest level of TCE (0.98 mg/kg) detected at 30 ft bgs. Lower levels of TCE (0.37 mg/kg) were detected at 45.5 ft in a fourth sample location (001-204). The fifth location did not contain any detectable concentrations of TCE.

### 3.2.2 C-720 Building Area

The WAG 27 RI identified areas of TCE contamination at the C-720 Building Area. The FFS addresses two areas that were identified in the “Resolution of the Environmental Protection Agency Letter of Non-Concurrence for the Site Investigation Report for the Southwest Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky...” (DOE 2008). One area was underneath the parking lot and equipment storage area at the northeast corner of the Building C-720 Northeast (211-A). The second area was located underneath the parking lot adjacent to the loading docks at the southeast corner of C-720 Building Northeast (211-B).

**C-720 Northeast Site (SWMU 211-A).** Figure 5 shows the locations and TCE results of the UCRS soil sampling from the Southwest Plume RDSI and the previous investigations that were used to define the source zones (DOE 2007). During the Southwest Plume RDSI, six borings were placed between the north edge of the parking lot and a storm sewer to which all surface runoff for the parking lot flows. Results indicated that soils containing very low levels of TCE contamination were detectable in the subsurface of the northeast corner of the C-720 Building area. The highest level of TCE (0.98 mg/kg) was detected at 49.5 ft bgs (720-105). The second highest sample identified a maximum TCE concentration of 0.63 mg/kg at 56.5 ft (720-104). A third location (720-106) had a similar maximum detected TCE level of 0.6 mg/kg at 46 ft bgs. The remaining three locations (720-101/102/103) detected low levels of TCE (0.01 to 0.06 mg/kg) (DOE 2007).

Samples from a well cluster (MW203/MW204) completed in the UCRS and the RGA were the only groundwater samples collected during the investigation of this unit. The TCE levels declined from the UCRS to the RGA wells (280 to 99 µg/L).

**C-720 Southeast Site (SWMU 211-B).** The maximum TCE concentration detected during the WAG 27 RI was 68 mg/kg at 21 ft bgs. Figure 5 provides the TCE results from soil sampling of the area. Soil borings drilled in the area as part of the Southwest Plume RDSI showed low levels of TCE (maximum 0.20 mg/kg at 29 ft bgs). No groundwater samples were collected during the RDSI from this unit (DOE 2007).

## 3.3 REMEDIAL ACTION OBJECTIVES

The remedial action objectives (RAOs) describe what the remedial action is expected to accomplish. The following are the RAOs for the Oil Landfarm and the C-720 Building area, as identified in the PP (DOE 2011c).

- (1) Treat and/or remove the principal threat waste consistent with the National Contingency Plan.
- (2a) Prevent exposure to VOC contamination in the source areas that will cause an unacceptable risk to excavation workers (< 10 ft).
- (2b) Prevent exposure to non-VOC contamination and residual VOC contamination through interim land use controls within the Southwest Plume source areas (i.e., SWMU 1, SWMU 211-A, and SWMU 211-B) pending remedy selection as part of the Soils OU.



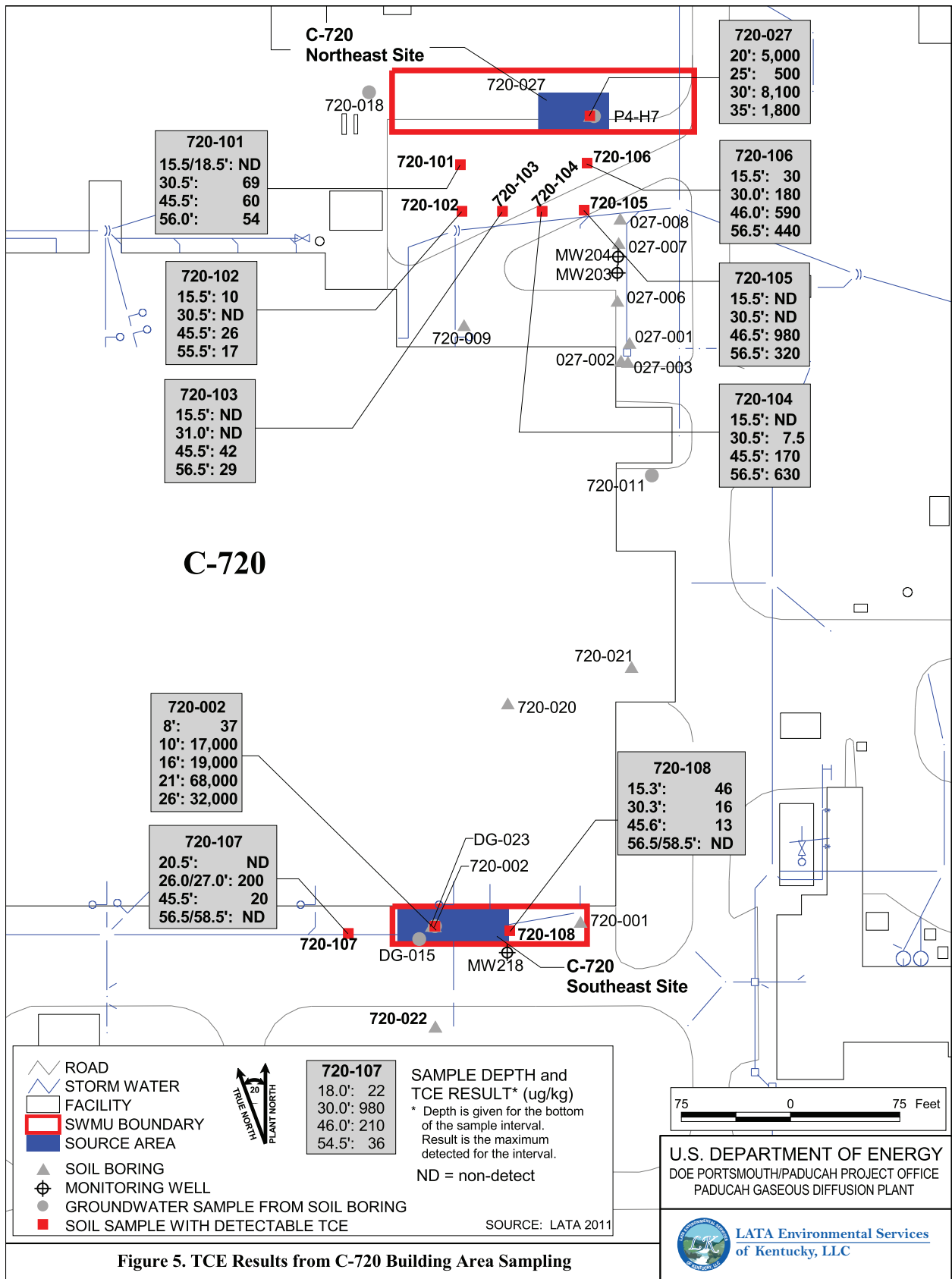


Figure 5. TCE Results from C-720 Building Area Sampling

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DATE 11-09-2011

- (3) Reduce VOC migration from contaminated subsurface soils in the treatment areas at the Oil Landfarm and the C-720 Northeast and Southeast sites so that contaminants migrating from the treatment areas do not result in the exceedance of maximum contaminant levels (MCLs) in the underlying RGA groundwater.

Remediation goals (RGs) were calculated that would meet RAO 3 with no other controls in place. The modeling methodology used to calculate the RGs and the results are presented in the Southwest Plume FFS (DOE 2011b). Final RGs are presented in the Southwest Plume ROD.

### 3.4 SELECTED REMEDIES

The following paragraphs provide descriptions of the selected alternatives for the SWMUs.

All of the alternatives include interim LUCs. Interim LUCs will consist of the Excavation/Penetration Permit (E/PP) Program and placement of warning signs to provide notice and warning of environmental contamination. The interim LUCs will remain in place pending final remedy selection as part of a subsequent OU that addresses the relevant media. The interim LUCs would be implemented using the existing E/PP Program and by posting warning signs at the source areas. The E/PP Program is administered at the PGDP site and is designed to provide a common sitewide system to identify and control potential personnel hazards related to trenching, excavation, and penetration (DOE 2008). Warning signs will be posted for the Southwest Plumes VOC source areas before the initiation of field activities that involve worker exposure to contaminated groundwater or soils. The warning signs will be placed at each of the source areas to provide information to alert the public and industrial workers of the presence of the contamination in the area and will be visible from surrounding areas and at potential routes of entry into the Southwest Plume VOC source areas. The existing E/PP program and warning signs are interim LUCs that will be implemented on an interim basis pending remedy selection as part of the Soils or Groundwater OUs. The remedy selected in either the Soils or Groundwater OUs will determine the need for the continued use of the interim LUCs.

#### SWMU 1—Oil Landfarm

- **Alternative 3: *In Situ* Source Treatment Using Deep Soil Mixing with Interim LUCs.** This alternative consists of an RDSI to refine the extent of VOC contamination and quantify parameters for selecting and applying treatment reagents. The extent and distribution of VOCs in the UCRS would impact the spacing/locations and depths of the augered areas. The amount and type of reagent chosen would be based on RDSI sampling results. The VOC contamination, including potential TCE dense nonaqueous-phase liquid (DNAPL), would be treated using large diameter augers to mix the soil with a potentially steam followed by a chemical reagent/slurry to destroy the VOC contamination. Amendment will be added from approximately 15 ft bgs to the lowest depth of VOC contamination (but no closer than within 10 ft of the UCRS/RGA contact). As the auger is advanced into the soil, a slurry would be pumped through the hollow stem of the shaft and injected into the soil at the tip. The auger would be rotated and raised and the mixing blades on the shaft would blend the soil and the slurry. When the design depth is reached, the auger would be withdrawn, and the mixing process would be repeated on the way back to the surface. This mixing technique would be repeated, as necessary, in each boring.

**SWMUs 211-A and 211-B**—SWMUs 211-A and 211-B would have either Alternative 2 or Alternative 8 implemented following the completion of the RDSI and evaluation by the FFA parties.

- **Alternative 2: Long-term Monitoring with Interim LUCs.** This alternative consists of groundwater monitoring and interim LUCs. It will not include treatment or removal of VOC contamination. The monitoring network would utilize wells in the RGA to monitor conditions of the source areas and determine the groundwater conditions over time. Alternative 2 would prevent the completion of exposure pathways.
- **Alternative 8: *In Situ* Source Treatment Using EISB with Interim LUCs.** In application of EISB at the SWMUs 211-A and 211-B, wells will be utilized to inject the bioamendment. The injection wells are needed at the 211 SWMUs because of infrastructure interferences at the C-720 Building, which prevent the use of the infiltration gallery approach. It is expected that because of not having the infiltration gallery, that amendment will be injected on three levels. The number of injection points will be determined in the design phase; for costing purposes, it was assumed that 211-A would have an estimated 6 locations and 211-B an estimated 12 locations. The monitoring well network is expected to be similar to the network required for all other alternatives with an estimated 4 wells each for SWMUs 211-A and 211-B.

At SWMUs 211-A and 211-B, a bioamendment mixture (i.e., microbes, nutrients, and reductants) would be introduced into the subsurface via vertical injection wells. The bioamendment would be reintroduced on a periodic basis to be determined during the RD and adjusted based upon ongoing monitoring of the performance of the bioremediation system). The specific bioamendment mixture would be determined using sample results from the RDSI. Due to characteristics that are similar to DNAPL, a lactate reductant potentially could be utilized to imitate more efficiently the DNAPL and follow similar migration pathways.

Confirmatory sampling in the treatment area would be required to determine posttreatment TCE soil concentrations. A confirmatory sampling plan would be prepared during RAWP development. The conceptual design for confirmatory sampling includes soil coring using direct push technology and analysis for VOCs using EPA SW-846 Method 8260B or equivalent. Depths and locations of cores would be determined based on the results of the RDSI.

Secondary wastes produced under this alternative would include drill cuttings, personal protective equipment (PPE), and decontamination fluids from the RDSI and purge water from groundwater monitoring. For cost-estimating purposes, drill cuttings, PPE, and decontamination fluids were assumed to require containerization, dewatering, and testing prior to off-site disposal. Polychlorinated biphenyls (PCBs) potentially present at the Oil Landfarm would be expected to occur at concentrations below 50 ppm and would not require management as Toxic Substances Control Act waste. Groundwater monitoring purge water either would be used as makeup water or containerized and treated on-site prior to discharge. Actual disposal requirements would be determined by sampling of containerized soils, decontamination fluids, and purge water. All secondary wastes would be managed in accordance with all ARARs.

Site restoration activities would include demobilizing and removing all equipment; backfilling the horizontal infiltration trenches, if desired; sealing all borings, soil coring, and electron donor injection locations with bentonite; and reseeding disturbed vegetated areas at the SWMUs. Monitoring wells would be left in place until soil RGs were attained.

### 3.5 REMEDY COMPONENTS

The following are the major components of the selected remedy.

### **SWMU 1 (Alternative 3)**

- RDSI
- Injection and mixing of a reagent in the UCRS using the soil mixing process from the start of contamination (approximately 10 ft bgs) down to the lowest depth of VOC contamination as confirmed by the RDSI
- Confirmatory sampling
- Secondary waste management
- Site restoration
- Interim LUCs
- Groundwater monitoring

### **SWMU 211-A and SWMU 211-B (Alternative 2 or 8)**

- Final characterization/RDSI
- Determination regarding use of Alternative 2 or Alternative 8 at SWMU 211-A and SWMU 211-B, based on the results of the collected data; the determination may be different at each SWMU

#### **Alternative 2**

- Interim LUCs
- Groundwater monitoring
- Secondary waste management

#### **Alternative 8**

- Installation and operation of EISB system
- Introduction of bioamendment
- Confirmatory sampling
- Secondary waste management
- Site restoration
- Interim LUCs
- Groundwater monitoring

### **3.6 DELIVERABLES**

The remedial measures to be implemented at the Oil Landfarm and then at the C-720 SWMU 211-A and 211-B sites are going to be sufficiently different in scope that separate RDs will be warranted. The Oil Landfarm and C-720 sites each will have the following deliverables developed during the design process (EPA 1995a; EPA 1995b):

- 30% design document
- 60% design document

- 90% design document (issued as the D1 RDR)
- CFC design packages (D2 RDR)

Deliverables at each design stage will include, to the degree they are available at the percentage of development stage, specifications, drawings, and associated text. All submittals will be reviewed by the prime contractor and DOE. The 30% designs, 60% designs, and the D1 90% Design RDR will be submitted to DOE, KDEP, and EPA Region 4 for review. The CFC design packages will incorporate resolutions to comments received on the D1 RDR.

### **3.7 DESIGN CRITERIA AND ASSUMPTIONS**

The following are the assumptions utilized in the development of this RDWP for the remedial actions at all three SWMUs.

- The plan is based upon the selected alternative and background information included in the FFS (DOE 2011b); PP (DOE 2011c); and ROD (DOE 2011a).
- CFC designs and the RDR will be developed for each of the two active remedial measures, SWMU 1 and SWMU 211-A and 211-B, due to specialization in remedial action requirements and the need to evaluate final characterization data for the selection of either Alternative 2 or 8.
- Separate remedial action work plans (RAWPs) will be developed for the SWMU 1—Oil Landfarm and the SWMUs 211-A and 211-B—C-720 Building sites due to the specialization in remedial action requirements.
- The criteria and approach to determine when to cease operations for each of the active remedies will be addressed in the RAWPs.
- An operation and maintenance (O&M) plan will be developed to describe the process and procedures for monitoring and evaluating system performance.
- A detailed project cost estimate will be provided with the 90% and final design package for each remedial action.
- The final design package will include the monitoring parameters and values to be utilized in determining when the remedial action is complete.
- The RAWP will include a compliance plan that will include the evaluation and crosswalk for the design to the project ARARs and exempted administrative requirements.
- The method for calculating the annual average discharge of technetium-99 will be detailed in the RAWP and will be based on the final design of the treatment and the outflows of the treatment system.

#### **3.7.1 Soil Mixing—SWMU 1**

The soil mixing system, reagents, and mixing process will be specified based upon the best available and most effective technology and results from the RDSI. The following are the design and construction considerations that are potentially applicable to soil mixing and its associated treatment method.

- Refinement of estimates of the extent of VOC source zone contamination in the UCRS
- Location of a local power supply
- Sizing and selection of augers, drive equipment, pumps, and mixers
- Interface of surface soils with the augering and mixing systems and handling
- Steam generation equipment and processing (steam treatment only)
- Process water location and water chemical quality (steam treatment only)
- Vapor phase treatment system flow and treatment characteristics (steam treatment only)
- Potential water treatment system flow and discharge characteristics (steam treatment only)
- Depth to groundwater
- Groundwater chemical analysis
- Air emissions flow quantity and chemical content (steam treatment only)
- Soil characteristics (density, grain size analysis, soil chemical analysis, geotechnical properties, etc.)
- Waste classification
- Applicable standards and codes (American Society of Mechanical Engineers, etc.)
- ARARs (see Appendix)
- Groundwater monitoring network
- Identification of utilities and/or obstructions and clearances

### **3.7.2 Enhanced *In Situ* Bioremediation—SWMUs 211-A and/or 211-B**

The EISB system will be specified based upon the best available and most effective technology and information obtained in the RDSI. The following are the design and construction considerations that are potentially applicable to EISB, soil mixing, and their associated treatment methods.

- Refinement of estimates of the extent of VOC source zone contamination in the UCRS
- Location of a local power supply
- Sizing and selection of treatment systems, pumps, tankage, and mixers
- Injection well design and capacity
- Potential water treatment system flow and discharge characteristics
- Depth to groundwater
- Groundwater chemical analysis
- Soil characteristics (density, grain size analysis, chemical analysis, etc.)
- Waste classification
- Applicable standards and codes (American Society of Mechanical Engineers, etc.)
- ARARs (see Appendix)
- Groundwater monitoring network
- Identification of utilities and/or obstructions

## **3.8 REMEDIAL DESIGN SUPPORT INVESTIGATION**

The ROD for the source treatment at the three locations requires the performance of an RDSI. The following are the purposes of the support investigation:

- Collect soil contaminant concentration data from the SWMUs to allow the source treatment to be focused on the contamination areas necessary to meet the cleanup levels;
- Collect soil contamination concentration data from the C-720 SWMUs for source extent and magnitude; and

- Collect engineering and geological data to support the RD and implementation of the remedial actions to be performed.

The drilling, sampling, analytical testing activities and other supporting functions to be performed in the support investigation are documented in the *Remedial Design Support Investigation Characterization Plan for the C-747-C Oil Landfarm and C-720 Northeast and Southeast Sites at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0350, which is a secondary document that will be reviewed by the FFA parties and is developed as a corresponding document to this RDWP primary document, consistent with Section XX of the FFA.

The data collected from the two C-720 Northeast and Southeast sites will be utilized by the FFA parties in determining the path for remediation of those two SWMUs. The ROD documented that the RDSI will determine the source extent and magnitude for those SWMUs. Following an assessment by the FFA parties, the FFA parties will determine if active treatment is warranted and will select for implementation at the SWMUs treatment by *in situ* source treatment using EISB with interim LUCs or long-term monitoring with interim LUCs. The selected remedial actions will be documented in an FFA Primary Document by the FFA parties as indicated in the ROD. Preliminary RDSI data and information will be included in the 60% of the RDR, and the final RDSI information and remedy selection will be documented in the 90% RDR.

## 4. REMEDIAL DESIGN SCHEDULE

The schedule for the remedial action is provided in Table 1. These are general planning dates for submittal of the CERCLA decision documents. Any extensions for reviewing documents, submitting comments, or responding to comments will impact the schedule. This schedule is included in this document for information purposes only and is not intended to establish enforceable schedules or milestones. Enforceable milestones are established in the FFA or Site Management Plan and updated in accordance with Sections XIX and/or XXXIX of the FFA (Table 1).

**Table 1. Remedial Design Schedule**

Deliverable/Activity	Milestone
	SWMU 1, SWMUs 211-A and 211-B
RDR (30% issued to regulators)	May 2012
RDR (60% issued to regulators)	August 2012
RDR (90% issued to regulators)	December 2012
RAWP	January 2013
D1 Remedial Action Completion Report	October 2015

Due to the need to review the final characterization data obtained as part of the RDSI and then select the remedial alternative, the time frames for SWMUs 211-A and 211-B design and construction may become separated from those of SWMU 1, as shown in Table 1. DOE will consult with EPA and Kentucky should the need occur, and any milestones impacted will be adjusted in the Site Management Plan once agreement is reached.



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## 5. DESIGN CRITERIA, CODES, AND STANDARDS

The typical 30%, 60%, 90%, and CFC design packages will be developed during the design process, and the 90% design will be issued as the D1 RDR. The specifications will be prepared in Construction Specifications Institute format and organized in 18 major divisions. The drawings will be prepared in accordance with the PGDP Engineering Drafting Standards. The RDR will include CFC drawings and specifications that have been sealed/stamped by a professional engineer registered in the Commonwealth of Kentucky.

This remedial action also satisfies the requirements in 40 *CFR* § 300.430(f)(1)(ii) for remedial actions to meet ARARs. The appendix to this document identifies ARARs pertinent to RD for the Southwest Plume source areas, based on those identified in the Southwest Plume FFS (DOE 2011b). A crosswalk to the specific technical requirements derived from the ARARs that must be met by the design will be performed and will document the method for attaining the requirement in the RAWP.

Consistent with the Secretary of Energy's National Environmental Policy Act (NEPA) policy, DOE relies on the CERCLA process for review of actions to be taken under CERCLA and, as such, will incorporate NEPA values to the extent practicable. These NEPA values will include analysis of cumulative impacts, off-site impacts, ecological and socioeconomic impacts, as well as environmental justice and land use issues, and the impacts to off-site transportation of wastes on the environment. The results of these analyses will be considered and incorporated into the RD documents.

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## **6. REMEDIAL ACTION PLANNING**

An RAWP will be developed as part of the design process. The RAWP will address the following:

- A list of each ARAR, the citation that mandates the ARAR, and, as appropriate, the drawing and/or specification that contractually implements or meets the substantive requirements of the ARAR;
- The target for the contaminant mass removal from the subsurface based on technology capability and the expected site conditions. This should include, to the extent possible, the technological analysis used to support the proposed setting;
- A description of the monitoring and testing that will be utilized to determine if the projected contaminant mass removal has been successful and independent verification protocols to ensure that remediation goals were attained;
- A summary level description of the program-specific plans such as the Construction Environmental Monitoring approach, the Best Management Practices approach, the Waste Management approach, and other plans and work guides that may be required to implement the remedial action; and

### **6.1 ENVIRONMENTAL, SAFETY, AND HEALTH**

To avoid the risk of bodily harm to employees associated with this remedial action, other personnel, and the general public and damage to property or the environment, the subcontractors will ensure that federal, state, and local ES&H regulations that apply to this remedial action are designed into the systems and implemented during the course of this work. The subcontractors shall follow, at a minimum, requirements associated with the handling of TCE, as well as other identified or unidentified hazards associated with this remedial action. These hazards will be identified in Activity Hazard Assessment forms prepared by the designated subcontractor and incorporated into the project health and safety plan prior to start of field activities.

### **6.2 ENVIRONMENTAL COMPLIANCE**

As defined in the signed ROD, this remedial action satisfies the requirements in 40 *CFR* § 300.430(f)(1)(ii) for remedial actions to meet ARARs. The subcontractors performing this remedial action shall comply with the approved ARARs. The subcontractors will prepare an Environmental Compliance Plan as part of the RAWP that identifies and describes activities to be implemented to comply with all ARARs.

### **6.3 WASTE MANAGEMENT**

The subcontractors will submit a Waste Management Plan as part of the RAWP that describes the quantities of waste materials expected to be generated during construction, implementation, and operations and the strategy for management, treatment, and disposal of the generated wastes. The strategy shall ensure the protection of the worker, the environment, and the public. Waste generated from the remedial action will be characterized in accordance with applicable requirements. The Waste Management Plan incorporates requirements for waste characterization, handling, disposal and transportation. The predominant feature of the Waste Management Plan is the waste management plan

checklist that contains specific responsibilities for each type of waste generated and for each organization involved in waste management.

#### **6.4 QUALITY ASSURANCE**

The subcontractors shall have an established Quality Assurance/Quality Control program that defines the administrative procedures for implementing and integrating good quality practices throughout the implementation of the remedial action work. The subcontractors shall ensure that all activities affecting quality are performed in a controlled and consistent manner and in accordance with all applicable procedures and requirements.

#### **6.5 O&M PLAN**

An O&M Plan will be prepared for implementation during the operational phase of the remedial actions. O&M requirements for the remedial action systems include routine maintenance of pumps, mixing units, pipes, gauges, and treatment units. The O&M Plan will contain the necessary working procedures and work guides to perform the remedial operations. The plan will be amended following completion of construction and prior to commencing to include the as-built drawings for the system to insure good conduct of operations.

## 7. REFERENCES

- BJC (Bechtel Jacobs Company LLC) 2005. Remedial Design Work Plan Annotated Outline, Bechtel Jacobs Company, Oak Ridge, TN.
- DOE 2007. *Site Investigation Report for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-2180&D2/R1, U.S. Department of Energy, Paducah, KY, June.
- DOE 2008. Knerr, R., March 24, 2008, U.S. Department of Energy, Paducah, KY, letter to M. Guffy, Kentucky Department for Environmental Protection, Frankfort, KY, and H. Taylor, U.S. Environmental Protection Agency, Atlanta, GA, "Resolution of the Environmental Protection Agency Letter of Non-Concurrence for the Site Investigation Report for the Southwest Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/OR/07-2180&D2) and Notice of Informal Dispute Dated November 30, 2007, McCracken County, Kentucky KY8-890-008-982."
- DOE 2011a. *Record of Decision for Solid Waste Management Units 1, 211-A, 211-B, and Part of 102 Volatile Organic Compound Sources for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0365&D2, U.S. Department of Energy, December.
- DOE 2011b. *Revised Focused Feasibility Study for Solid Waste Management Units 1, 211-A, and 211-B Volatile Organic Compound Sources for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07/0362&D2, May.
- DOE 2011c. *Revised Proposed Plan for Solid Waste Management Units 1, 211-A, 211-B, and Part of 102 Volatile Organic Compound Sources for the Southwest Groundwater Plume at the Paducah Gaseous Diffusion Plan, Paducah, Kentucky*, DOE/LX/07-0363&D2/R2, Primary Document, U.S. Department of Energy, Paducah, KY, September.
- EPA (U.S. Environmental Protection Agency) 1995a. *Guidance for Scoping the Remedial Design*, EPA/540/R-95/025, U.S. Environmental Protection Agency, Washington, DC, March.
- EPA 1995b. *Remedial Design/Remedial Action Handbook*, EPA 54/R-95/059, U.S. Environmental Protection Agency, Washington, DC, June.
- EPA 1998. *Federal Facility Agreement for the Paducah Gaseous Diffusion Plant*, U.S. Environmental Protection Agency, Atlanta, GA, February.

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## **APPENDIX**

### **APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**



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**Table A.1. Location-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites**

Location-specific ARARs						
Location	Requirement	Prerequisite	Citation	SWMU 1	C-720 NE	C-720 SE
<i>Cultural Resources</i>						
Presence of wetlands as defined in 10 <i>CFR</i> § 1022.4	Avoid, to the extent possible, the long- and short-term adverse effects associated with destruction, occupancy, and modification of wetlands.	DOE actions that involve potential impacts to, or take place within, wetlands— <b>applicable</b> .	10 <i>CFR</i> § 1022.3(a)	✓	✓	✓
	Take action, to extent practicable, to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.		10 <i>CFR</i> § 1022.3(a)(7) and (8)	✓	✓	✓
	Undertake a careful evaluation of the potential effects of any new construction in wetlands. Identify, evaluate, and, as appropriate, implement alternative actions that may avoid or mitigate adverse impacts on wetlands.		10 <i>CFR</i> § 1022.3(b) and (d)	✓	✓	✓
	Measures that mitigate the adverse effects of actions in a wetland including, but not limited to, minimum grading requirements, runoff controls, design and construction constraints, and protection of ecologically-sensitive areas.		10 <i>CFR</i> § 1022.13(a)(3)	✓	✓	✓
	If no practicable alternative to locating or conducting the action in the wetland is available, then before taking action design or modify the action in order to minimize potential harm to or within the wetland, consistent with the policies set forth in E.O. 11990.		10 <i>CFR</i> § 1022.14(a)	✓	✓	✓
Location encompassing aquatic ecosystem as defined in 40 <i>CFR</i> § 230.3(c)	Except as provided under section 404(b)(2), no discharge of dredged or fill material is permitted if there is a practicable alternative that would have less adverse impact on the aquatic ecosystem or if it will cause or contribute to significant degradation of the waters of the United States.	Action that involves the discharge of dredged or fill material into waters of the United States, including jurisdictional wetlands— <b>relevant and appropriate</b> .	40 <i>CFR</i> § 230.10(a) and (c)	✓	✓	✓

**Table A.1. Location-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Location-specific ARARs						
Location	Requirement	Prerequisite	Citation	SWMU 1	C-720 NE	C-720 SE
	Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken that will minimize potential adverse impacts of the discharge on the aquatic ecosystem. 40 <i>CFR</i> § 230.70 <i>et seq.</i> identifies such possible steps.		40 <i>CFR</i> § 230.10(d)	✓	✓	✓
Nationwide Permit Program	Must comply with the substantive requirements of the NWP 38, General Conditions, as appropriate.	Discharge of dredged or fill material into waters of the United States, including jurisdictional wetlands— <b>relevant and appropriate.</b>	Nationwide Permit (38) Cleanup of Hazardous and Toxic Waste 33 <i>CFR</i> § 323.3(b)	✓	✓	✓

ARAR = applicable or relevant and appropriate requirement

*CFR* = Code of Federal Regulations

DOE = U.S. Department of Energy

E.O. = Executive Order

NWP = Nationwide Permit

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
<i>Site Preparation, Construction, and Excavation Activities</i>						
Activities causing fugitive dust emissions	<p>No person shall cause, suffer, or allow any material to be handled, processed, transported, or stored, a building or its appurtenances to be constructed, altered, repaired, or demolished, or a road to be used without taking reasonable precaution to prevent particulate matter from becoming airborne. Such reasonable precautions shall include, when applicable, but not be limited to, the following:</p> <ul style="list-style-type: none"> <li>• Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;</li> <li>• Application and maintenance of asphalt, oil, water, or suitable chemicals on roads, materials stockpiles, and other surfaces which can create airborne dusts;</li> <li>• Covering, at all times when in motion, open bodied trucks transporting materials likely to become airborne;</li> <li>• The maintenance of paved roadways in a clean condition; and</li> <li>• The prompt removal of earth or other material from a paved street which earth or other material has been transported thereto by trucking or earth moving equipment or erosion by water.</li> </ul>	Fugitive emissions from land-disturbing activities (e.g., handling, processing, transporting or storing of any material, demolition of structures, construction operations, grading of roads, or the clearing of land, etc.)— <b>applicable</b> .	401 <i>KAR</i> 63:010 § 3(1) and (1)(a), (b), (d), (e) and (f)		✓	✓
	No person shall cause or permit the discharge of visible fugitive dust emissions beyond the lot line of the property on which the emissions originate.		401 <i>KAR</i> 63:010 § 3(2)		✓	✓
Activities causing radionuclide emissions	Emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive in any year an EDE of 10 mrem/yr.	Radionuclide emissions from point sources at a DOE facility— <b>applicable</b> .	40 <i>CFR</i> § 61.92 401 <i>KAR</i> 57:002		✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Activities causing toxic substances or potentially hazardous matter emissions	Persons responsible for a source from which hazardous matter or toxic substances may be emitted shall provide the utmost care and consideration in the handling of these materials to the potentially harmful effects of the emissions resulting from such activities. No owner or operator shall allow any affected facility to emit potentially hazardous matter or toxic substances in such quantities or duration as to be harmful to the health and welfare of humans, animals and plants.	Emissions of potentially hazardous matter or toxic substances as defined in 401 <i>KAR</i> 63:020 § 2 (2) — <b>applicable</b> .	401 <i>KAR</i> 63:020 § 3		✓	✓
Activities causing storm water runoff (e.g., clearing, grading, excavation)	Implement good construction techniques to control pollutants in storm water discharges during and after construction in accordance with substantive requirements provided by permits issued pursuant to 40 <i>CFR</i> § 122.26(c).	Storm water discharges associated with small construction activities as defined in 40 <i>CFR</i> § 122.26(b)(15) and 401 <i>KAR</i> 5:002 § 1 (157)— <b>applicable</b> .	40 <i>CFR</i> § 122.26(c)(1)(ii) (C) and (D) 401 <i>KAR</i> 5:060 § 8	✓	✓	✓
	Storm water runoff associated with construction activities taking place at a facility with an existing Best Management Practices (BMP) Plan shall be addressed under the facility BMP and not under a storm water general permit.	Storm water discharges associated with small construction activities as defined in 40 <i>CFR</i> § 122.26(b)(15) and 401 <i>KAR</i> 5:002 § 1 (157)— <b>TBC</b> .	Fact Sheet for the KPDES General Permit for Storm Water Discharges Associated with Construction Activities, June 2009	✓	✓	✓
	Best management storm water controls will be implemented and may include, as appropriate, erosion and sedimentation control measures, structural practices (e.g., silt fences, straw bale barriers) and vegetative practices (e.g., seeding); storm water management (e.g., diversion); and maintenance of control measures in order to ensure compliance with the standards in Section C.5. Storm Water Discharge Quality.	Storm water runoff associated with construction activities taking place at a facility [PGDP] with an existing BMP Plan— <b>TBC</b> .	Appendix C of the PGDP Best Management Practices Plan (2007)—Examples of Storm water Controls	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
<b><i>Monitoring, Extraction, and Injection Well Installation and Abandonment</i></b>						
Monitoring well installation	Permanent monitoring wells shall be constructed, modified, and abandoned in such a manner as to prevent the introduction or migration of contamination to a water-bearing zone or aquifer through the casing, drill hole, or annular materials.	Construction of monitoring well as defined in 401 <i>KAR</i> 6:001 § 1(18) for remedial action— <b>applicable.</b>	401 <i>KAR</i> 6:350 § 1(2)	✓	✓	✓
	All permanent (including boreholes) shall be constructed to comply with the substantive requirements provided in the following Sections of 401 <i>KAR</i> 6:350: <ul style="list-style-type: none"> <li>• Section 2. Design Factors;</li> <li>• Section 3. Monitoring Well Construction;</li> <li>• Section 7. Materials for Monitoring Wells; and</li> <li>• Section 8. Surface Completion.</li> </ul>		401 <i>KAR</i> 6:350 § 2, 3, 7, and 8	✓	✓	✓
	If conditions exist or are believed to exist that preclude compliance with the requirements of 401 <i>KAR</i> 6:350, may request a variance prior to well construction or well abandonment. <i>NOTE: Variance shall be made as part of the FFA CERCLA document review and approval process and shall include:</i> <ul style="list-style-type: none"> <li>• A justification for the variance; and</li> <li>• Proposed construction, modification, or abandonment procedures to be used in lieu of compliance with 401 <i>KAR</i> 6:350 and an explanation as to how the alternate well construction procedures ensure the protection of the quality of the groundwater and the protection of public health and safety.</li> </ul>		401 <i>KAR</i> 6:350 § 1(6)(a)(6) and (7)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Development of monitoring well	Newly installed wells shall be developed until the column of water in the well is free of visible sediment. This well-development protocol shall not be used as a method for purging prior to water quality sampling.	Construction of monitoring well as defined in 401 <i>KAR</i> 6:001 §1(18) for remedial action— <b>applicable.</b>	401 <i>KAR</i> 6:350 § 9	✓	✓	✓
Direct Push monitoring well installation	Wells installed using direct push technology shall be constructed, modified, and abandoned in such a manner as to prevent the introduction or migration of contamination to a water-bearing zone or aquifer through the casing, drill hole, or annular materials.	Construction of direct push monitoring well as defined in 401 <i>KAR</i> 6:001 § 1(18) for remedial action— <b>applicable.</b>	401 <i>KAR</i> 6:350 § 5 (1)	✓	✓	✓
	<p>Shall also comply with the following additional standards:</p> <p>(a) The outside diameter of the borehole shall be a minimum of 1 inch greater than the outside diameter of the well casing;</p> <p>(b) Premixed bentonite slurry or bentonite chips with a minimum of one-eighth (1/8) diameter shall be used in the sealed interval below the static water level; and</p> <p>(c) 1. Direct push wells shall not be constructed through more than one water-bearing formation unless the upper water bearing zone is isolated by temporary or permanent casing. 2. The direct push tool string may serve as the temporary casing.</p>		401 <i>KAR</i> 6:350 § 5 (3)	✓	✓	✓
Monitoring well abandonment	A monitoring well that has been damaged or is otherwise unsuitable for use as a monitoring well, shall be abandoned within 30 days from the last sampling date or 30 days from the date it is determined that the well is no longer suitable for its intended use.	Construction of monitoring well as defined in 401 <i>KAR</i> 6:001 § 1(18) for remedial action— <b>applicable.</b>	401 <i>KAR</i> 6:350 §11 (1)	✓	✓	✓
	Wells shall be abandoned in such a manner as to prevent the migration of surface water or contaminants to the subsurface and to prevent migration of contaminants among water bearing zones.		401 <i>KAR</i> 6:350 § 11 (1)(a)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	Abandonment methods and sealing materials for all types of monitoring wells provided in subparagraphs (a)-(b) and (d)-(e) shall be followed.		401 <i>KAR</i> 6:350 § 11 (2)	✓	✓	✓
Extraction well installation	Wells shall be constructed, modified, and abandoned in such a manner as to prevent the introduction or migration of contamination to a water-bearing zone or aquifer through the casing, drill hole, or annular materials.	Construction of monitoring well for remedial action— <b>relevant and appropriate.</b>	401 <i>KAR</i> 6:350 § 1 (2)			
Reinjection of treated contaminated groundwater, or, injection of bioamendments, surfactants, or reagents	No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 <i>CFR</i> Part 142 or may otherwise adversely affect the health of persons.	Underground injection into an underground source of drinking water— <b>relevant and appropriate.</b>	40 <i>CFR</i> § 144.12(a)		✓	✓
Reinjection of treated contaminated groundwater	Wells are not prohibited if injection is approved by EPA or a State pursuant to provisions for cleanup of releases under CERCLA or RCRA <i>as provided in the FFA CERCLA document.</i>	Class IV wells [as defined in 40 <i>CFR</i> § 144.6(d)] used to reinject treated contaminated groundwater into the same formation from which it was drawn— <b>relevant and appropriate.</b>	40 <i>CFR</i> § 144.13(c) RCRA § 3020(b)			✓
	Prior to abandonment any Class IV well, the owner or operator shall plug or otherwise close the well in a manner <i>as provided in the FFA CERCLA document.</i>	Class IV wells [as defined in 40 <i>CFR</i> § 144.6(d)] used to reinject of treated contaminated groundwater into the same formation from which it was drawn— <b>relevant and appropriate.</b>	40 <i>CFR</i> § 144.23(b)(1)			



**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Plugging and abandonment of Class IV injection wells	Prior to abandoning the well, the owner or operator shall close the well in accordance with 40 <i>CFR</i> § 144.23(b).	Operation of a Class IV injection well [as defined in 40 <i>CFR</i> § 144.6(d)]— <b>relevant and appropriate.</b>	40 <i>CFR</i> § 146.10(b)			✓
Injection of bioamendments, surfactants, or reagents	An injection activity cannot allow the movement of fluid containing any contaminant into USDWs, if the presence of that contaminant may cause a violation of the primary drinking water standards under 40 <i>CFR</i> Part 141, other health based standards, or may otherwise adversely affect the health of persons. This prohibition applies to well construction, operation, maintenance, conversion, plugging, closure, or any other injection activity.	Class V wells [as defined in 40 <i>CFR</i> § 144.6(e)] used to inject bioamendments, surfactants, or reagents— <b>relevant and appropriate.</b>	40 <i>CFR</i> § 144.82(a)(1)		✓	
	Wells must be closed in a manner that complies with the above prohibition of fluid movement. Also, any soil, gravel, sludge, liquids, or other materials removed from or adjacent to the well must be disposed or otherwise managed in accordance with substantive applicable Federal, State, and local regulations and requirements.		40 <i>CFR</i> § 144.82(b)		✓	✓
Management of PCB waste	Any person storing or disposing of PCB waste must do so in accordance with 40 <i>CFR</i> § 761, Subpart D.	Storage or disposal of waste containing PCBs at concentrations ≥ 50 ppm— <b>applicable.</b>	40 <i>CFR</i> § 761.50(a)	✓	✓	✓
	Any person cleaning up and disposing of PCBs shall do so based on the concentration at which the PCBs are found.	Cleanup and disposal of PCB remediation waste as defined in 40 <i>CFR</i> § 761.3— <b>applicable.</b>	40 <i>CFR</i> § 761.61	✓	✓	✓
Management of PCB/Radioactive waste	Any person storing such waste must do so taking into account both its PCB concentration and radioactive properties, except as provided in 40 <i>CFR</i> § 761.65(a)(1), (b)(1)(ii) and (c)(6)(i).	Generation of PCB/radioactive waste with ≥ 50 ppm PCBs for storage— <b>applicable.</b>	40 <i>CFR</i> § 761.50(b)(7)(i)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	<p>Any person disposing of such waste must do so taking into account both its PCB concentration and its radioactive properties.</p> <p>If, taking into account only the properties of the PCBs in the waste (and not the radioactive properties of the waste), the waste meets the requirements for disposal in a facility permitted, licensed, or registered by a state as a municipal or nonmunicipal nonhazardous waste landfill [e.g., PCB bulk-product waste under 40 <i>CFR</i> § 761.62(b)(1)], then the person may dispose of PCB/radioactive waste, without regard to the PCBs, based on its radioactive properties in accordance with applicable requirements for the radioactive component of the waste.</p>	<p>Generation of PCB/radioactive waste with ≥50 ppm PCBs for disposal—<b>applicable</b>.</p>	<p>40 <i>CFR</i> § 761.50(b)(7)(ii)</p>	✓	✓	✓
<b><i>Waste Characterization</i></b>						
Characterization of solid waste	<p>Must determine if solid waste is excluded from regulation under 40 <i>CFR</i> § 261.4.</p>	<p>Generation of solid waste as defined in 40 <i>CFR</i> § 261.2—<b>applicable</b>.</p>	<p>40 <i>CFR</i> § 262.11(a) 401 <i>KAR</i> 32:010 § 2</p>	✓	✓	✓
	<p>Must determine if waste is listed as a hazardous waste in subpart D of 40 <i>CFR</i> Part 261.</p>	<p>Generation of solid waste which is not excluded under 40 <i>CFR</i> § 261.4—<b>applicable</b>.</p>	<p>40 <i>CFR</i> § 262.11(b) 401 <i>KAR</i> 32:010 § 2</p>	✓	✓	✓
	<p>Must determine whether the waste is characteristic waste (identified in subpart C of 40 <i>CFR</i> Part 261) by using prescribed testing methods <u>or</u> applying generator knowledge based on information regarding material or processes used.</p>	<p>Generation of solid waste that is not listed in subpart D of 40 <i>CFR</i> Part 261 and not excluded under 40 <i>CFR</i> § 261.4—<b>applicable</b>.</p>	<p>40 <i>CFR</i> § 262.11(c) 401 <i>KAR</i> 32:010 § 2</p>	✓	✓	✓
	<p>Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste.</p>	<p>Generation of solid waste which is determined to be hazardous waste—<b>applicable</b>.</p>	<p>40 <i>CFR</i> § 262.11(d) 401 <i>KAR</i> 32:010 § 2</p>	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Characterization of hazardous waste	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 <i>CFR</i> §§ 264 and 268.	Generation of RCRA-hazardous waste for storage, treatment or disposal— <b>applicable</b> .	40 <i>CFR</i> § 264.13(a)(1) 401 <i>KAR</i> 34:020 § 4	✓	✓	✓
Characterization of industrial wastewater	Industrial wastewater discharges that are point source discharges subject to regulation under section 402 of the Clean Water Act, as amended, are not solid wastes for the purpose of hazardous waste management. [Comment: This exclusion applies only to the actual point source discharge. It does not exclude industrial wastewaters while they are being collected, stored or treated before discharge, nor does it exclude sludges that are generated by industrial wastewater treatment.] NOTE: For purpose of this exclusion, the CERCLA on-site treatment system for extracted VOCs and groundwater will be considered equivalent to a wastewater treatment unit and the point source discharges subject to regulation under CWA Section 402, provided the effluent meets all identified CWA ARARs.	Generation of industrial wastewater for treatment and discharge into surface water— <b>applicable</b> .	40 <i>CFR</i> § 261.4(a)(2) 401 <i>KAR</i> 31:010 § 4			
Determinations for management of hazardous waste	Must determine each EPA Hazardous Waste Number (Waste Code) to determine the applicable treatment standards under 40 <i>CFR</i> § 268.40 <i>et seq.</i> <i>Note:</i> This determination may be made concurrently with the hazardous waste determination required in 40 <i>CFR</i> § 262.11.	Generation of hazardous waste— <b>applicable</b> .	40 <i>CFR</i> § 268.9(a) 401 <i>KAR</i> 37:010 § 8	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	Must determine the underlying hazardous constituents [as defined in 40 <i>CFR</i> § 268.2(i)] in the characteristic waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment, or disposal— <b>applicable</b> .	40 <i>CFR</i> § 268.9(a) 401 <i>KAR</i> 37:010 § 8	✓	✓	✓
	Must determine if the hazardous waste meets the treatment standards in 40 <i>CFR</i> §§ 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste. <i>Note:</i> This determination can be made concurrently with the hazardous waste determination required in 40 <i>CFR</i> § 262.11.	Generation of hazardous waste— <b>applicable</b> .	40 <i>CFR</i> § 268.7(a) 401 <i>KAR</i> 37:010 § 7	✓	✓	✓
Characterization of LLW	Shall be characterized using direct or indirect methods and the characterization documented in sufficient detail to ensure safe management and compliance with the WAC of the receiving facility.	Generation of LLW for storage and disposal at a DOE facility— <b>TBC</b> .	DOE M 435.1-1(IV)(I)	✓	✓	✓
	Characterization data shall, at a minimum, include the following information relevant to the management of the waste:		DOE M 435.1-1(IV)(I)(2)	✓	✓	✓
	• Physical and chemical characteristics;		DOE M 435.1-1(IV)(I)(2)(a)	✓	✓	✓
	• Volume, including the waste and any stabilization or absorbent media;		DOE M 435.1-1(IV)(I)(2)(b)	✓	✓	✓
	• Weight of the container and contents;		DOE M 435.1-1(IV)(I)(2)(c)	✓	✓	✓
	• Identities, activities, and concentration of major radionuclides;		DOE M 435.1-1(IV)(I)(2)(d)	✓	✓	✓
	• Characterization date;		DOE M 435.1-1(IV)(I)(2)(e)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
<i>Waste Storage</i>						
	<ul style="list-style-type: none"> <li>• Generating source; and</li> </ul>		DOE M 435.1-1(IV)(I)(2)(f)	✓	✓	✓
	<ul style="list-style-type: none"> <li>• Any other information that may be needed to prepare and maintain the disposal facility performance assessment, or demonstrate compliance with performance objectives.</li> </ul>		DOE M 435.1-1(IV)(I)(2)(g)	✓	✓	✓
Temporary on-site storage of hazardous waste in containers	A generator may accumulate hazardous waste at the facility provided that	Accumulation of RCRA hazardous waste on-site as defined in 40 <i>CFR</i> § 260.10— <b>applicable.</b>	40 <i>CFR</i> § 262.34(a) 401 <i>KAR</i> 32:030 § 5	✓	✓	✓
	<ul style="list-style-type: none"> <li>• Waste is placed in containers that comply with 40 <i>CFR</i> § 265.171-173;</li> </ul>		40 <i>CFR</i> § 262.34(a)(1)(i) 401 <i>KAR</i> 32:030 § 5	✓	✓	✓
	<ul style="list-style-type: none"> <li>• The date upon which accumulation begins is clearly marked and visible for inspection on each container; and</li> </ul>		40 <i>CFR</i> § 262.34(a)(2) 401 <i>KAR</i> 32:030 § 5	✓	✓	✓
	<ul style="list-style-type: none"> <li>• Container is marked with the words “hazardous waste.”</li> </ul>		40 <i>CFR</i> § 262.34(a)(3) 401 <i>KAR</i> 32:030 § 5	✓	✓	✓
	Container may be marked with other words that identify the contents.	Accumulation of 55 gal or less of RCRA hazardous waste or one quart of acutely hazardous waste listed in 261.33(e) at or near any point of generation— <b>applicable.</b>	40 <i>CFR</i> § 262.34(c)(1) 401 <i>KAR</i> 32:030 § 5	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Use and management of containers holding hazardous waste	If container is not in good condition or if it begins to leak, must transfer waste into container in good condition.	Storage of RCRA hazardous waste in containers— <b>applicable</b> .	40 <i>CFR</i> § 265.171 401 <i>KAR</i> 35:180 § 2	✓	✓	✓
	Use container made or lined with materials compatible with waste to be stored so that the ability of the container is not impaired.		40 <i>CFR</i> § 265.172 401 <i>KAR</i> 35:180 § 3	✓	✓	✓
	Keep containers closed during storage, except to add/remove waste.		40 <i>CFR</i> § 265.173(a) 401 <i>KAR</i> 35:180 § 4	✓	✓	✓
	Open, handle and store containers in a manner that will not cause containers to rupture or leak.		40 <i>CFR</i> § 265.173(b) 401 <i>KAR</i> 35:180 § 4	✓	✓	✓
Storage of hazardous waste in container area	Area must have a containment system designed and operated in accordance with 40 <i>CFR</i> § 264.175(b).	Storage of RCRA hazardous waste in containers with free liquids— <b>applicable</b> .	40 <i>CFR</i> § 264.175(a)	✓	✓	✓
	<ul style="list-style-type: none"> <li>• Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or</li> <li>• Containers must be elevated or otherwise protected from contact with accumulated liquid.</li> </ul>	Storage of RCRA-hazardous waste in containers that do not contain free liquids (other than F020, F021, F022, F023, F026, and F027)— <b>applicable</b> .	40 <i>CFR</i> § 264.175(c)	✓	✓	✓
Storage of PCB waste and/or PCB/radioactive waste in a RCRA-regulated container storage area	Does not have to meet storage unit requirements in 40 <i>CFR</i> § 761.65(b)(1) provided unit.	Storage of PCBs and PCB Items at concentrations ≥ 50ppm designated for disposal— <b>applicable</b> .	40 <i>CFR</i> § 761.65(b)(2)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	<ul style="list-style-type: none"> <li>Is permitted by EPA under RCRA § 3004 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 <i>CFR</i> § 761;</li> </ul>		40 <i>CFR</i> § 761.65(b)(2)(i)	✓	✓	✓
	<ul style="list-style-type: none"> <li>Qualifies for interim status under RCRA § 3005 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 <i>CFR</i> § 761; or</li> </ul>		40 <i>CFR</i> § 761.65(b)(2)(ii)	✓	✓	✓
	<ul style="list-style-type: none"> <li>Is permitted by an authorized state under RCRA § 3006 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 <i>CFR</i> § 761.</li> </ul>		40 <i>CFR</i> § 761.65(b)(2)(iii)	✓	✓	✓
	NOTE: For purpose of this exclusion, CERCLA remediation waste, which is also considered PCB waste, can be stored on-site provided the area meets all of the identified RCRA container storage ARARs and spills of PCBs cleaned up in accordance with Subpart G of 40 <i>CFR</i> § 761.					
Storage of PCB waste and/or PCB/radioactive waste in non-RCRA regulated unit	Except as provided in 40 <i>CFR</i> § 761.65 (b)(2), (c)(1), (c)(7), (c)(9), and (c)(10), after July 1, 1978, owners or operators of any facilities used for the storage of PCBs and PCB Items designated for disposal shall comply with the storage unit requirements in 40 <i>CFR</i> § 761.65(b)(1).	Storage of PCBs and PCB Items at concentrations ≥ 50ppm designated for disposal— <b>applicable</b> .	40 <i>CFR</i> § 761.65(b)	✓	✓	✓
	Storage facility shall meet the following criteria: <ul style="list-style-type: none"> <li>Adequate roof and walls to prevent rainwater from reaching stored PCBs and PCB items;</li> </ul>		40 <i>CFR</i> § 761.65(b)(1) 40 <i>CFR</i> § 761.65(b)(1)(i)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	<ul style="list-style-type: none"> <li>Adequate floor that has continuous curbing with a minimum 6-inch high curb. Floor and curb must provide a containment volume equal to at least two times the internal volume of the largest PCB article or container or 25% of the internal volume of all articles or containers stored there, whichever is greater. <i>Note:</i> 6 inch minimum curbing not required for area storing PCB/radioactive waste;</li> </ul>		40 <i>CFR</i> § 761.65(b)(1)(ii)	✓	✓	✓
	<ul style="list-style-type: none"> <li>No drain valves, floor drains, expansion joints, sewer lines, or other openings that would permit liquids to flow from curbed area;</li> </ul>		40 <i>CFR</i> § 761.65(b)(1)(iii)	✓	✓	✓
	<ul style="list-style-type: none"> <li>Floors and curbing constructed of Portland cement, concrete, or a continuous, smooth, non-porous surface that prevents or minimizes penetration of PCBs; and</li> </ul>		40 <i>CFR</i> § 761.65(b)(1)(iv)	✓	✓	✓
	<ul style="list-style-type: none"> <li>Not located at a site that is below the 100-year flood water elevation.</li> </ul>		40 <i>CFR</i> § 761.65(b)(1)(v)	✓	✓	✓
	Storage area must be properly marked as required by 40 <i>CFR</i> § 761.40(a)(10).		40 <i>CFR</i> § 761.65(c)(3)	✓	✓	✓
Risk-based storage of PCB remediation waste	<p>May store PCB remediation waste in a manner other than prescribed in 40 <i>CFR</i> § 761.65(b) if approved in writing from EPA provided the method will not pose an unreasonable risk of injury to human health or the environment.</p> <p><i>NOTE:</i> EPA approval of alternative storage method will be obtained by approval of the FFA CERCLA document.</p>	Storage of waste containing PCBs in a manner other than prescribed in 40 <i>CFR</i> § 761.65(b) (see above) — <b>applicable</b> .	40 <i>CFR</i> § 761.61(c)	✓	✓	✓
Temporary storage of PCB waste (e.g., PPE, rags) in a container(s)	Container(s) shall be marked as illustrated in 40 <i>CFR</i> § 761.45(a).	Storage of PCBs and PCB items at concentrations ≥ 50ppm in containers for disposal— <b>applicable</b> .	40 <i>CFR</i> § 761.40(a)(1)	✓	✓	✓



**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	Storage area must be properly marked as required by 40 <i>CFR</i> § 761.40(a)(10).		40 <i>CFR</i> § 761.65(c)(3)	✓	✓	✓
	Any leaking PCB Items and their contents shall be transferred immediately to a properly marked nonleaking container(s).		40 <i>CFR</i> § 761.65(c)(5)	✓	✓	✓
	Except as provided in 40 <i>CFR</i> § 761.65(c)(6)(i) and (c)(6)(ii), container(s) shall be in accordance with requirements set forth in DOT HMR at 49 <i>CFR</i> §§ 171-180.		40 <i>CFR</i> § 761.65(c)(6)	✓	✓	✓
Staging of LLW	Shall be for the purpose of the accumulation of such quantities of wastes necessary to facilitate transportation, treatment, and disposal.	Staging of LLW at a DOE facility— <b>TBC</b> .	DOE M 435.1-1 (IV)(N)(7)	✓	✓	✓
Temporary storage of LLW	Shall not be readily capable of detonation, explosive decomposition, reaction at anticipated pressures and temperatures, or explosive reaction with water.	Temporary storage of LLW at a DOE facility— <b>TBC</b> .	DOE M 435.1-1 (IV)(N)(1)	✓	✓	✓
	Shall be stored in a location and manner that protects the integrity of waste for the expected time of storage.		DOE M 435.1-1 (IV)(N)(3)	✓	✓	✓
	Shall be managed to identify and segregate LLW from mixed waste.		DOE M 435.1-1 (IV)(N)(6)	✓	✓	✓
Packaging of LLW for storage	Shall be packaged in a manner that provides containment and protection for the duration of the anticipated storage period and until disposal is achieved or until the waste has been removed from the container.	Storage of LLW in containers at a DOE facility— <b>TBC</b> .	DOE M 435.1-1(IV)(L)(1)(a)	✓	✓	✓
	Vents or other measures shall be provided if the potential exists for pressurizing or generating flammable or explosive concentrations of gases within the waste container.		DOE M 435.1-1(IV)(L)(1)(b)	✓	✓	✓
	Containers shall be marked such that their contents can be identified.		DOE M 435.1-1(IV)(L)(1)(c)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Packaging of LLW for off-site disposal	Waste shall not be packaged for disposal in a cardboard or fiberboard box.	Packaging of LLW for off-site shipment of LLW to a commercial NRC or Agreement State licensed disposal facility— <b>relevant and appropriate.</b>	10 <i>CFR</i> § 61.56 902 <i>KAR</i> 100:021 § 7 (1)(b)	✓	✓	✓
	Liquid waste shall be solidified or packaged in sufficient absorbent material to absorb twice the volume of the liquid.	Preparation of liquid LLW for off-site shipment of LLW to a commercial NRC or Agreement State licensed disposal facility— <b>relevant and appropriate.</b>	10 <i>CFR</i> § 61.56 902 <i>KAR</i> 100:021 § 7 (1)(c)	✓	✓	✓
	Solid waste containing liquid shall contain as little freestanding and noncorrosive liquid as is reasonably achievable. The liquid shall not exceed one (1) percent of the volume.	Preparation of solid LLW containing liquid for off-site shipment of LLW to a commercial NRC or Agreement State licensed disposal facility— <b>relevant and appropriate.</b>	10 <i>CFR</i> § 61.56 902 <i>KAR</i> 100:021 § 7 (1)(d)	✓	✓	✓
	Waste shall not be readily capable of <ul style="list-style-type: none"> <li>• Detonation;</li> <li>• Explosive decomposition or reaction at normal pressures and temperatures; or</li> <li>• Explosive reaction with water.</li> </ul>	Packaging of LLW for off-site shipment of LLW to a commercial NRC or Agreement State licensed disposal facility— <b>relevant and appropriate.</b>	10 <i>CFR</i> § 61.56 902 <i>KAR</i> 100:021 § 7 (1)(e)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	Waste shall not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to a person transporting, handling, or disposing of the waste.	Packaging of LLW for off-site shipment of LLW to a commercial NRC or Agreement State licensed disposal facility— <b>relevant and appropriate.</b>	10 <i>CFR</i> § 61.56 902 <i>KAR</i> 100:021 § 7 (1)(f)	✓	✓	✓
	Waste shall not be pyrophoric.	Packaging of pyrophoric LLW for off-site shipment of LLW to a commercial NRC or Agreement State licensed disposal facility— <b>relevant and appropriate.</b>	10 <i>CFR</i> § 61.56 902 <i>KAR</i> 100:021 § 7 (1)(g)	✓	✓	✓
Labeling of LLW packages	Each package of waste shall be clearly labeled to identify if it is Class A, Class B, or Class C waste, in accordance with 10 <i>CFR</i> § 61.55 or Agreement State waste classification requirements.	Preparation for off-site shipment of LLW to a commercial NRC or Agreement State licensed disposal facility— <b>relevant and appropriate.</b>	10 <i>CFR</i> § 61.57 902 <i>KAR</i> 100:021 § 8	✓	✓	✓
<b><i>Waste Treatment and Disposal</i></b>						
Transport or conveyance of collected RCRA wastewater to a WWTU located on the facility	Any dedicated tank systems, conveyance systems, and ancillary equipment used to treat, store or convey wastewater to an on-site KPDES-permitted wastewater treatment facility are exempt from the requirements of RCRA Subtitle C standards.  <i>NOTE:</i> For purposes of this exclusion, any dedicated tank systems, conveyance systems, and ancillary equipment used to treat, store or convey CERCLA remediation wastewater to a CERCLA on-site wastewater treatment unit that meets all of the identified CWA ARARs for point source discharges from such a facility, are exempt from the requirements of RCRA Subtitle C standards.	On-site wastewater treatment units (as defined in 40 <i>CFR</i> § 260.10) subject to regulation under § 402 or § 307(b) of the CWA (i.e., KPDES-permitted) that manages hazardous wastewaters— <b>applicable.</b>	40 <i>CFR</i> § 264.1(g)(6) 401 <i>KAR</i> 34:010 § 1		✓*	

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Release of property with residual radioactive material to an off-site commercial facility	Prior to being released, property shall be surveyed to determine whether both removable and total surface contamination (including contamination present on and under any coating) are in compliance with the levels given in Figure IV-1 of DOE O 5400.5 and the contamination has been subjected to the ALARA process.	Generation of DOE materials and equipment with surface residual radioactive contamination— <b>TBC</b> .	DOE O 5400.5 (II)(5)(c)(1) and 5400.5(IV)(4)(d)	✓	✓	✓
	Material that has been radioactively contaminated in depth may be released if criteria and survey techniques are approved by DOE EH-1.	Generation of DOE materials and equipment that are volumetrically contaminated with radionuclides— <b>TBC</b> .	DOE O 5400.5 (II)(5)(c)(6)	✓	✓	✓
<b><i>Discharge of Wastewater from Groundwater Treatment System</i></b>						
General duty to mitigate for discharge of wastewater from groundwater treatment system	Take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of effluent standards which has a reasonable likelihood of adversely affecting human health or the environment.	Discharge of pollutants to surface waters— <b>applicable</b> .	401 KAR 5:065 § 2(1) and 40 CFR § 122.41(d)		✓*	
Operation and maintenance of treatment system	Properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used to achieve compliance with the effluent standards. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.	Discharge of pollutants to surface waters— <b>applicable</b> .	401 KAR 5:065 § 2(1) and 40 CFR § 122.41(e)		✓*	
Criteria for discharge of wastewater with radionuclides into surface water	To prevent the buildup of radionuclide concentrations in sediments, liquid process waste streams containing radioactive material in the form of settleable solids may be released to natural waterways if the concentration of radioactive material in the solids present in the waste stream does not exceed 5 pCi (0.2 Bq) per gram above background level, of settleable solids for alpha-emitting radionuclides or 50 pCi (2 Bq) per gram above background level, of settleable solids for beta gamma-emitting radionuclides.	Discharge of radioactive concentrations in sediments to surface water from a DOE facility— <b>TBC</b> .	DOE O 5400.5 II(3)(a)(4)		✓*	

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	To protect native animal aquatic organisms, the absorbed dose to these organisms shall not exceed 1 rad per day from exposure to the radioactive material in liquid wastes discharged to natural waterways.		DOE O 5400.5 II(3)(a)(5)			
Technology-based treatment requirements for wastewater discharge	<p>To the extent that EPA promulgated effluent limitations are inapplicable, shall develop on a case-by-case Best Professional Judgment (BPJ) basis under § 402(a)(1)(B) of the CWA, technology based effluent limitations by applying the factors listed in 40 <i>CFR</i> § 125.3(d) and shall consider:</p> <ul style="list-style-type: none"> <li>• The appropriate technology for this category or class of point sources, based upon all available information; and</li> <li>• Any unique factors relating to the discharger.</li> </ul>	Discharge of pollutants to surface waters from other than a POTW— <b>applicable.</b>	40 <i>CFR</i> § 125.3(c)(2)		✓*	
Water quality-based effluent limits for wastewater discharge	<p>Must develop water quality based effluent limits that ensure that:</p> <ul style="list-style-type: none"> <li>• The level of water quality to be achieved by limits on point source(s) established under this paragraph is derived from, and complies with all applicable water quality standards; and</li> <li>• Effluent limits developed to protect narrative or numeric water quality criteria are consistent with the assumptions and any available waste load allocation for the discharge prepared by the State and approved by EPA pursuant to 40 <i>CFR</i> § 130.7.</li> </ul>	Discharge of pollutants to surface waters that causes, or has reasonable potential to cause, or contributes to an instream excursion above a narrative or numeric criteria within a State water quality standard established under § 303 of the CWA— <b>applicable.</b>	40 <i>CFR</i> § 122.44(d)(1) (vii)		✓*	
	Must attain or maintain a specified water quality through water quality related effluent limits established under § 302 of the CWA.	Discharge of pollutants to surface waters that causes, or has reasonable potential to cause, or contributes to an instream excursion above a narrative or numeric criteria within a State water quality standard— <b>applicable.</b>	40 <i>CFR</i> § 122.44(d)(2)		✓*	

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	The numeric water quality criteria for fish consumption specified in Table 1 of 401 KAR 10:031 Section 6(1) provides allowable instream concentrations of pollutants that may be found in surface waters or discharged into surface waters.		401 KAR 10:031 § 6(1)		✓*	
Monitoring requirements for groundwater treatment system discharges	In addition to 40 CFR §122.48(a) and (b) and to assure compliance with effluent limitations, one must monitor, as provided in subsections (i) thru (iv) of 122.44(i)(1). <i>NOTE:</i> Monitoring parameters, including frequency of sampling, will be developed as part of the CERCLA process and included in a Remedial Design, RAWP, or other appropriate FFA CERCLA document.	Discharge of pollutants to surface waters— <b>applicable.</b>	40 CFR § 122.44(i)(1) 401 KAR § 5:065 2(4)		✓*	
	All effluent limitations, standards and prohibitions shall be established for each outfall or discharge point, except as provided under § 122.44(k).		40 CFR § 122.45(a) 401 KAR § 5:065 2(5)		✓*	
	All effluent limitations, standards and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as: • Maximum daily and average monthly discharge limitations for all discharges.	Continuous discharge of pollutants to surface waters— <b>applicable.</b>	40 CFR § 122.45(d)(1) 401 KAR § 5:065 2(5)		✓*	
Effluent limits for radionuclides in wastewater	Shall not exceed the limits for radionuclides listed on Table II—Effluent Limitations.	Discharge of wastewater with radionuclides from an NRC Agreement State licensed facility into surface waters— <b>relevant and appropriate.</b>	902 KAR 100:019 § 44 (7)(a)		✓*	

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
<p>General standards for process vents used in treatment of VOC contaminated groundwater</p>	<p>Select and meet the requirements under one of the options specified below:</p> <ul style="list-style-type: none"> <li>• Control HAP emissions from the affected process vents according to the applicable standards specified in §§ 63.7890 through 63.7893.</li> <li>• Determine for the remediation material treated or managed by the process vented through the affected process vents that the average total volatile organic hazardous air pollutant (VOHAP) concentration, as defined in § 63.7957, of this material is less than 10 (ppmw). Determination of VOHAP concentration will be made using procedures specified in § 63.7943.</li> <li>• Control HAP emissions from affected process vents subject to another subpart under 40 <i>CFR</i> Part 61 or 40 <i>CFR</i> art 63 in compliance with the standards specified in the applicable subpart.</li> </ul>	<p>Process vents as defined in 40 <i>CFR</i> § 63.7957 used in site remediation of media (e.g., soil and groundwater) that could emit hazardous air pollutants (HAP) listed in Table 1 of Subpart GGGGG of Part 63 and vent stream flow exceeds the rate in 40 <i>CFR</i> § 63.7885(c)(1)—<b>relevant and appropriate.</b></p>	<p>40 <i>CFR</i> § 63:7885(b) 401 <i>KAR</i> 63:002, §§ 1 and 2, except for 40 <i>CFR</i> § 63.72 as incorporated in § 2(3)</p>		<p>✓*</p>	

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Emission limitations for process vents used in treatment of VOC contaminated groundwater	<p>Meet the requirements under one of the options specified below:</p> <ul style="list-style-type: none"> <li>• Reduce from all affected process vents the total emissions of the HAP to a level less than 1.4 kilograms per hour (kg/hr) and 2.8 Mg/yr (3.0 pounds per hour (lb/hr) and 3.1 tpy);</li> <li>• Reduce from all affected process vents the emissions of total organic compounds (TOC) (minus methane and ethane) to a level below 1.4 kg/hr and 2.8 Mg/yr (3.0 lb/hr and 3.1 tpy);</li> <li>• Reduce from all affected process vents the total emissions of the HAP by 95 percent by weight or more; or</li> <li>• Reduce from all affected process vents the emissions of TOC (minus methane and ethane) by 95 percent by weight or more.</li> </ul> <p><i>NOTE: These emission limits are for the remediation activities conducted at the PGDP by the DOE.</i></p>	Process vents as defined in 40 <i>CFR</i> § 63.7957 used in site remediation of media (e.g., soil and groundwater) that could emit hazardous air pollutants (HAP) listed in Table 1 of Subpart GGGGG of Part 63 and vent stream flow exceeds the rate in 40 <i>CFR</i> § 63.7885(c)(1)— <b>relevant and appropriate.</b>	40 <i>CFR</i> § 63.7890(b)(1)-(4) 401 <i>KAR</i> 63:002, §§ 1 and 2, except for 40 <i>CFR</i> § 63.72 as incorporated in § 2(3)		✓*	
Standards for closed vent systems and control devices used in treatment of VOC contaminated groundwater	<p>For each closed vent system and control device you use to comply with the requirements above, you must meet the operating limit requirements and work practice standards in Sec. 63.7925(d) through (j) that apply to the closed vent system and control device.</p> <p><i>NOTE: EPA approval to use alternate work practices under paragraph (j) in 40 <i>CFR</i> § 63.7925 will be obtained in FFA CERCLA document (e.g., Remedial Design).</i></p>	Closed vent system and control devices as defined in 40 <i>CFR</i> § 63.7957 that are used to comply with § 63.7890(b)— <b>relevant and appropriate.</b>	40 <i>CFR</i> § 63.7890(c)		✓*	
Monitoring of closed vent systems and control devices used in treatment of VOC contaminated groundwater	<p>Must monitor and inspect the closed vent system and control device according to the requirements in 40 <i>CFR</i> § 63.7927 that apply to the affected source.</p> <p><i>NOTE: Monitoring program will be developed as part of the CERCLA process and included in a Remedial Design or other appropriate FFA CERCLA document.</i></p>	Closed vent system and control devices as defined in 40 <i>CFR</i> § 63.7957 that are used to comply with § 63.7890(b)— <b>relevant and appropriate.</b>	40 <i>CFR</i> § 63.7892		✓*	



**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Treatment of LLW	Treatment to provide more stable waste forms and to improve the long-term performance of a LLW disposal facility shall be implemented as necessary to meet the performance objectives of the disposal facility.	Treatment of LLW for disposal at a LLW disposal facility— <b>TBC</b> .	DOE M 435.1-1(IV)(O)	✓	✓	✓
Disposal of prohibited RCRA hazardous waste in a land-based unit	May be land disposed if it meets the requirements in the table “Treatment Standards for Hazardous Waste” at 40 <i>CFR</i> § 268.40 before land disposal.	Land disposal, as defined in 40 <i>CFR</i> § 268.2, of prohibited RCRA waste— <b>applicable</b> .	40 <i>CFR</i> § 268.40(a) 401 <i>KAR</i> 37:040 § 2	✓	✓	✓
	All underlying hazardous constituents [as defined in 40 <i>CFR</i> § 268.2(i)] must meet the Universal Treatment Standards, found in 40 <i>CFR</i> § 268.48 Table UTS prior to land disposal.	Land disposal of restricted RCRA characteristic wastes (D001-D043) that are not managed in a wastewater treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well— <b>applicable</b> .	40 <i>CFR</i> § 268.40(e) 401 <i>KAR</i> 37:040 § 2	✓	✓	✓
	Must be treated according to the alternative treatment standards of 40 <i>CFR</i> § 268.49(c) <u>or</u> according to the UTSs specified in 40 <i>CFR</i> § 268.48 applicable to the listed and/or characteristic waste contaminating the soil prior to land disposal.	Land disposal, as defined in 40 <i>CFR</i> § 268.2, of restricted hazardous soils— <b>applicable</b> .	40 <i>CFR</i> § 268.49(b) 401 <i>KAR</i> 37:040 § 10	✓	✓	✓
Disposal of RCRA hazardous debris in a land-based unit	Must be treated prior to land disposal as provided in 40 <i>CFR</i> § 268.45(a)(1)-(5) unless EPA determines under 40 <i>CFR</i> § 261.3(f)(2) that the debris no longer contaminated with hazardous waste <u>or</u> the debris is treated to the waste-specific treatment standard provided in 40 <i>CFR</i> § 268.40 for the waste contaminating the debris.	Land disposal, as defined in 40 <i>CFR</i> § 268.2, of RCRA-hazardous debris— <b>applicable</b> .	40 <i>CFR</i> § 268.45(a) 401 <i>KAR</i> 37:040 § 7		✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Disposal of RCRA characteristic wastewaters in an NPDES permitted wastewater treatment unit	<p>Are not prohibited, if the wastes are managed in a treatment system which subsequently discharges to waters of the U.S. pursuant to a permit issued under 402 of the CWA (i.e., NPDES permitted) unless the wastes are subject to a specified method of treatment other than DEACT in 40 <i>CFR</i> § 268.40, or are D003 reactive cyanide.</p> <p>NOTE: For purposes of this exclusion, a CERCLA on-site wastewater treatment unit that meets all of the identified CWA ARARs for point source discharges from such a system, is considered a wastewater treatment system that is NPDES permitted.</p>	Land disposal of hazardous wastewaters that are hazardous only because they exhibit a hazardous characteristic and are not otherwise prohibited under 40 <i>CFR</i> Part 268— <b>applicable</b> .	40 <i>CFR</i> § 268.1(c)(4)(i) 401 <i>KAR</i> 37:010 § 2		✓*	
Disposal of bulk PCB remediation waste off-site (self-implementing)	May be sent off-site for decontamination or disposal provided the waste either is dewatered on-site or transported off-site in containers meeting the requirements of DOT HMR at 49 <i>CFR</i> Parts 171-180.	Generation of bulk PCB remediation waste (as defined in 40 <i>CFR</i> § 761.3) for off-site disposal— <b>relevant and appropriate</b> .	40 <i>CFR</i> § 761.61(a)(5)(i) (B)	✓	✓	✓
	Must provide written notice including the quantity to be shipped and highest concentration of PCBs [using extraction EPA Method 3500B/3540C or Method 3500B/3550B followed by chemical analysis using Method 8082 in SW-846 or methods validated under 40 <i>CFR</i> § 761.320-26 (Subpart Q)] before the first shipment of waste to each off-site facility where the waste is destined for an area not subject to a TSCA PCB Disposal Approval.	Bulk PCB remediation waste (as defined in 40 <i>CFR</i> § 761.3) destined for an off-site facility not subject to a TSCA PCB Disposal Approval— <b>relevant and appropriate</b> .	40 <i>CFR</i> § 761.61(a)(5)(i) (B)(2)(iv)	✓	✓	✓
	Shall be disposed of in accordance with the provisions for cleanup wastes at 40 <i>CFR</i> § 761.61(a)(5)(v)(A).	Off-site disposal of dewatered bulk PCB remediation waste with a PCB concentration < 50 ppm— <b>relevant and appropriate</b> .	40 <i>CFR</i> § 761.61(a)(5)(i) (B)(2)(ii)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	Shall be disposed of <ul style="list-style-type: none"> <li>In a hazardous waste landfill permitted by EPA under §3004 of RCRA;</li> </ul>	Off-site disposal of dewatered bulk PCB remediation waste with a PCB concentration $\geq$ 50 ppm— <b>relevant and appropriate.</b>	40 <i>CFR</i> § 761.61(a)(5)(i)(B)(2)(iii)	✓	✓	✓
	<ul style="list-style-type: none"> <li>In a hazardous waste landfill permitted by a State authorized under §3006 of RCRA; or</li> </ul>			✓	✓	✓
	<ul style="list-style-type: none"> <li>In a PCB disposal facility approved under 40 <i>CFR</i> § 761.60.</li> </ul>			✓	✓	✓
Disposal of liquid PCB remediation waste (self-implementing)	Shall either <ul style="list-style-type: none"> <li>Decontaminate the waste to the levels specified in 40 <i>CFR</i> § 761.79(b)(1) or (2); or</li> </ul>	Liquid PCB remediation waste (as defined in 40 <i>CFR</i> § 761.3)— <b>relevant and appropriate.</b>	40 <i>CFR</i> § 761.61(a)(5)(iv) 40 <i>CFR</i> § 761.61(a)(5)(iv)(A)	✓	✓	✓
	<ul style="list-style-type: none"> <li>Dispose of the waste in accordance with the performance-based requirements of 40 <i>CFR</i> § 761.61(b) or in accordance with a risk-based approval under 40 <i>CFR</i> § 761.61(c).</li> </ul>		40 <i>CFR</i> § 761.61(a)(5)(iv)(B)	✓	✓	✓
Performance-based disposal of PCB remediation waste	May dispose by one of the following methods <ul style="list-style-type: none"> <li>In a high-temperature incinerator under 40 <i>CFR</i> § 761.70(b);</li> </ul>	Disposal of non-liquid PCB remediation waste (as defined in 40 <i>CFR</i> § 761.3)— <b>applicable.</b>	40 <i>CFR</i> § 761.61(b)(2) 40 <i>CFR</i> § 761.61(b)(2)(i)	✓	✓	✓
	<ul style="list-style-type: none"> <li>By an alternate disposal method under 40 <i>CFR</i> § 761.60(e);</li> </ul>			✓	✓	✓
	<ul style="list-style-type: none"> <li>In a chemical waste landfill under 40 <i>CFR</i> § 761.75;</li> </ul>			✓	✓	✓
	<ul style="list-style-type: none"> <li>In a facility under 40 <i>CFR</i> § 761.77; or</li> </ul>			✓	✓	✓
	<ul style="list-style-type: none"> <li>Through decontamination in accordance with 40 <i>CFR</i> § 761.79.</li> </ul>		40 <i>CFR</i> § 761.61(b)(2)(ii)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	Shall be disposed according to 40 <i>CFR</i> § 761.60(a) or (e), or decontaminate in accordance with 40 <i>CFR</i> § 761.79.	Disposal of liquid PCB remediation waste— <b>applicable</b> .	40 <i>CFR</i> § 761.61(b)(1)	✓	✓	✓
Risk-based disposal of PCB remediation waste	May dispose of in a manner other than prescribed in 40 <i>CFR</i> § 761.61(a) or (b) if approved in writing from EPA and method will not pose an unreasonable risk of injury to [sic] human health or the environment. <i>NOTE:</i> EPA approval of alternative disposal method will be obtained by approval of the FFA CERCLA document.	Disposal of PCB remediation waste— <b>applicable</b> .	40 <i>CFR</i> § 761.61(c)	✓	✓	✓
Disposal of PCB cleanup wastes (e.g., PPE, rags, non-liquid cleaning materials) (self-implementing option)	Shall be disposed of <ul style="list-style-type: none"> <li>• In a municipal solid waste facility under 40 <i>CFR</i> § 258 or non-municipal, nonhazardous waste subject to 40 <i>CFR</i> § 257.5 thru 257.30;</li> <li>• In a RCRA Subtitle C landfill;</li> <li>• In a PCB disposal facility; or</li> <li>• Through decontamination under 40 <i>CFR</i> § 761.79(b) or (c).</li> </ul>	Generation of non-liquid PCBs during and from the cleanup of PCB remediation waste— <b>relevant and appropriate</b> .	40 <i>CFR</i> § 761.61(a)(5)(v) (A)	✓	✓	✓
Disposal of PCB cleaning solvents, abrasives, and equipment (self-implementing option)	May be reused after decontamination in accordance with 40 <i>CFR</i> § 761.79; or For liquids, disposed in accordance with 40 <i>CFR</i> § 761.60(a).	Generation of PCB wastes from the cleanup of PCB remediation waste— <b>relevant and appropriate</b> .	40 <i>CFR</i> § 761.61(a)(5)(v) (B) 40 <i>CFR</i> § 761.60(b)(1)(i) (B)	✓	✓	✓
Disposal of PCB decontamination waste and residues	Shall be disposed of at their existing PCB concentration unless otherwise specified in 40 <i>CFR</i> § 761.79(g)(1) through (6).	PCB decontamination waste and residues for disposal— <b>applicable</b> .	40 <i>CFR</i> § 761.79(g)	✓	✓	✓
Disposal of LLW	LLW shall be certified as meeting waste acceptance requirements before it is transferred to the receiving facility.	Disposal of LLW at a LLW disposal facility— <b>TBC</b> .	DOE M 435.1-1(IV)(J)(2)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
<b><i>Decontamination/Cleanup</i></b>						
Decontamination of movable equipment contaminated by PCBs (self-implementing option)	May decontaminate by <ul style="list-style-type: none"> <li>• Swabbing surfaces that have contacted PCBs with a solvent;</li> <li>• A double wash/rinse as defined in 40 <i>CFR</i> § 761.360-378; or</li> <li>• Another applicable decontamination procedure under 40 <i>CFR</i> § 761.79.</li> </ul>	Movable equipment contaminated by PCB and tools and sampling equipment— <b>applicable</b> .	40 <i>CFR</i> § 761.79(c)(2)	✓	✓	✓
Decontamination of PCB containers (self-implementing option)	Must flush the internal surfaces of the container three times with a solvent containing < 50 ppm PCBs. Each rinse shall use a volume of the flushing solvent equal to approximately 10% of the PCB container capacity.	PCB Container as defined in 40 <i>CFR</i> § 761.3— <b>applicable</b> .	40 <i>CFR</i> § 761.79(c)(1)	✓	✓	✓
Decontamination of PCB contaminated water	For discharge to a treatment works as defined in 40 <i>CFR</i> § 503.9 (aa), or discharge to navigable waters, meet standard of < 3 ppb PCBs; or	Water containing PCBs regulated for disposal— <b>applicable</b> .	40 <i>CFR</i> § 761.79(b)(1)(ii)	✓	✓	✓
	The decontamination standard for water containing PCBs is less than or equal to 0.5 µg/L (i.e., approximately ≤ 0.5 ppb PCBs) for unrestricted use.		40 <i>CFR</i> § 761.79(b)(1)(iii)	✓	✓	✓
<b><i>Unit Closure</i></b>						
Closure performance standard for RCRA container storage unit	Must close the facility (e.g., container storage unit) in a manner that: <ul style="list-style-type: none"> <li>• Minimizes the need for further maintenance;</li> <li>• Controls minimizes or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or the atmosphere; and</li> <li>• Complies with the closure requirements of this subpart, but not limited to, the requirements of 40 <i>CFR</i> § 264.178 for containers.</li> </ul>	Storage of RCRA hazardous waste in containers— <b>applicable</b> .	40 <i>CFR</i> § 264.111 401 <i>KAR</i> 34:070 § 2	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Closure of RCRA container storage unit	<p>At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soils containing or contaminated with hazardous waste and hazardous waste residues must be decontaminated or removed.</p> <p>[Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with 40 <i>CFR</i> § 261.3(d) of this chapter that the solid waste removed from the containment system is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of parts 262 through 266 of this chapter.]</p>	Storage of RCRA hazardous waste in containers in a unit with a containment system— <b>applicable</b> .	40 <i>CFR</i> § 264.178 401 <i>KAR</i> 34:180 § 9	✓	✓	✓
Clean closure of TSCA storage facility	A TSCA/RCRA storage facility closed under RCRA is exempt from the TSCA closure requirements of 40 <i>CFR</i> § 761.65(e).	Closure of TSCA/RCRA storage facility— <b>applicable</b> .	40 <i>CFR</i> § 761.65(e)(3)	✓	✓	✓
<b>Waste Transportation</b>						
Transportation of samples (i.e., contaminated soils and wastewaters)	<p>Are not subject to any requirements of 40 <i>CFR</i> Parts 261 through 268 or 270 when:</p> <ul style="list-style-type: none"> <li>• The sample is being transported to a laboratory for the purpose of testing; or</li> <li>• The sample is being transported back to the sample collector after testing.</li> </ul>	Samples of solid waste <u>or</u> a sample of water, soil for purpose of conducting testing to determine its characteristics or composition— <b>applicable</b> .	40 <i>CFR</i> § 261.4(d)(1)(i) and (ii)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
	<p>In order to qualify for the exemption in paragraphs (d)(1)(i) and (ii), a sample collector shipping samples to a laboratory must:</p> <ul style="list-style-type: none"> <li>• Comply with U.S. DOT, U.S. Postal Service, or any other applicable shipping requirements.</li> <li>• Assure that the information provided in (1) thru (5) of this section accompanies the sample.</li> <li>• Package the sample so that it does not leak, spill, or vaporize from its packaging.</li> </ul>		<p>40 <i>CFR</i> § 261.4(d)(2)(i)            40 <i>CFR</i> § 261.4(d)(2)(i)(A)            40 <i>CFR</i> § 261.4(d)(2)(i)(B)</p>	✓	✓	✓
Transportation of RCRA hazardous waste on-site	The generator manifesting requirements of 40 <i>CFR</i> §§ 262.20–262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 <i>CFR</i> § 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way— <b>applicable.</b>	40 <i>CFR</i> § 262.20(f) 401 <i>KAR</i> 32:020 § 1	✓	✓	✓
Transportation of RCRA hazardous waste off-site	Must comply with the generator requirements of 40 <i>CFR</i> § 262.20–23 for manifesting, § 262.30 for packaging, § 262.31 for labeling, § 262.32 for marking, § 262.33 for placarding, § 262.40, 262.41(a) for record keeping requirements, and § 262.12 to obtain EPA ID number.	Preparation and initiation of shipment of hazardous waste off-site— <b>applicable.</b>	40 <i>CFR</i> § 262.10(h) 401 <i>KAR</i> 32:010 § 1	✓	✓	✓
Transportation of PCB wastes off-site	Must comply with the manifesting provisions at 40 <i>CFR</i> § 761.207 through 218.	Relinquishment of control over PCB wastes by transporting, or offering for transport— <b>applicable.</b>	40 <i>CFR</i> § 761.207(a)	✓	✓	✓

**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Determination of radionuclide concentration	<p>The concentration of a radionuclide may be determined by an indirect method, such as use of a scaling factor which relates the inferred concentration of one (1) radionuclide to another that is measured or radionuclide material accountability if there is reasonable assurance that an indirect method may be correlated with an actual measurement.</p> <p>The concentration of a radionuclide may be averaged over the volume or weight of the waste if the units are expressed as nanocuries per gram.</p>	Preparation for off-site shipment of LLW to a commercial NRC or Agreement State licensed disposal facility— <b>relevant and appropriate.</b>	10 <i>CFR</i> § 61.55 (a)(8) 902 <i>KAR</i> 100:021 § 6(8)(a) and (b)	✓	✓	✓
Labeling of LLW packages	Each package of waste shall be clearly labeled to identify if it is Class A, Class B, or Class C waste, in accordance with 10 <i>CFR</i> § 61.55 or Agreement State waste classification requirements.	Preparation for off-site shipment of LLW to a commercial NRC or Agreement State licensed disposal facility— <b>relevant and appropriate.</b>	10 <i>CFR</i> § 61.57 902 <i>KAR</i> 100:021 § 8	✓	✓	✓
Transportation of radioactive waste	Shall be packaged and transported in accordance with DOE Order 460.1B and DOE Order 460.2.	Preparation of shipments of radioactive waste— <b>TBC.</b>	DOE M 435.1-(I)(1)(E)(11)	✓	✓	✓
Transportation of LLW	To the extent practicable, the volume of the waste and the number of the shipments shall be minimized.	Preparation of shipments of LLW— <b>TBC.</b>	DOE M 435.1-1(IV)(L)(2)	✓	✓	✓
Transportation of hazardous materials	Shall be subject to and must comply with all applicable provisions of the HMR at 49 <i>CFR</i> §§ 171–180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports “in commerce,” or causes to be transported or shipped, a hazardous material— <b>applicable.</b>	49 <i>CFR</i> § 171.1(c)	✓	✓	✓



**Table A.2. Action-specific ARARs for the Oil Landfarm and the C-720 Northeast and Southeast Sites (Continued)**

Action	Requirement	Prerequisite	Citation	Alt 2	Alt 3	Alt 8
Transportation of hazardous materials on-site	Shall comply with 49 <i>CFR</i> Parts 171-174, 177, and 178 or the site- or facility-specific Operations of Field Office approved Transportation Safety Document that describes the methodology and compliance process to meet equivalent safety for any deviation from the Hazardous material Regulations (i.e., <i>Transportation Safety Document for On-Site Transport within the Paducah Gaseous Diffusion Plant</i> , PAD-WD-0661).	Any person who, under contract with the DOE, transports a hazardous material on the DOE facility— <b>TBC</b> .	DOE O 460.1B(4)(b)	✓	✓	✓
Transportation of hazardous materials off-site	Off-site hazardous materials packaging and transfers shall comply with 49 <i>CFR</i> Parts 171-174, 177, and 178 and applicable tribal, State, and local regulations not otherwise preempted by DOT and special requirements for Radioactive Material Packaging.	Preparation of off-site transfers of LLW— <b>TBC</b> .	DOE O 460.1B(4)(a)	✓	✓	✓

✓\* =ARAR trigger if steam utilized in soil mixing operations of Alternative 3 due to need to treat extracted vapor and entrained water.

ALARA = as low as reasonably achievable  
 ARAR = applicable or relevant and appropriate requirement  
 BMP = best management practices  
 BPJ = best professional judgment  
 CERCLA = Comprehensive Environmental Response, Compensation and Liability Act  
*CFR* = Code of Federal Regulations  
 CWA = Clean Water Act  
 DOE = U.S. Department of Energy  
 DOE O = DOE Order  
 DOE M = DOE Manual  
 DOT = U.S. Department of Transportation  
 EDE = effective dose equivalent  
 EPA = U.S. Environmental Protection Agency  
 E.O. = Executive Order  
 HAP = hazardous air pollutant  
 HMR = hazardous material regulations  
*KAR* = Kentucky Administrative Regulations

KPDES = Kentucky Pollutant Discharge Elimination System  
 LLW = low-level waste  
 NPDES = Pollutant Discharge Elimination System  
 NRC = Nuclear Regulatory Commission  
 NWP = Nationwide Permit  
 PCB = polychlorinated biphenyl  
 PGDP = Paducah Gaseous Diffusion Plant  
 PPE = personal protective equipment  
 RCRA = Resource Conservation and Recovery Act  
 ROD = Record of Decision  
 TBC = to be considered  
 TSCA = Toxic Substances Control Act  
 UTS = Universal Treatment Standards  
 VOC = volatile organic compounds  
 VOHAP = volatile organic hazardous air pollutant  
 WAC = waste acceptance criteria