DOE/LX/07-2418&D2
Primary Document

Site Management Plan
Paducah Gaseous Diffusion Plant
Paducah, Kentucky

Annual Revision—FY 2018

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Paducah Gaseous Diffusion Plant
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Annual Revision—FY 2018

Date Issued—April 2018

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

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

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CONTENTS

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FIGURES

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ACRONYMS

AOC	area of concern
BGOU	Burial Grounds Operable Unit
bgs	below ground surface
BRA	baseline risk assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
COPC	chemical or radionuclide of potential concern
CSOU	Comprehensive Site Operable Unit
D&D	decontamination and decommissioning
DMP	data management plan
DNAPL	dense nonaqueous-phase liquid
DOE	U.S. Department of Energy
DUF_6	Depleted Uranium Hexafluoride
ELCR	excess lifetime cancer risk
EM	environmental management
EPA	U.S. Environmental Protection Agency
ERH	electrical resistance heating
ESD	explanation of significant difference
FFA	Federal Facility Agreement
FS	feasibility study
FY	fiscal year
GA	geographical area
GDP	gaseous diffusion plant
GSA	generator staging area
GWOU	Groundwater Operable Unit
HI	hazard index
HSWA	Hazardous and Solid Waste Amendment
HVAC	heating, ventilating, and air conditioning
IRA	interim remedial action
KOW	Kentucky Ordnance Works
KPDES	Kentucky Pollutant Discharge Elimination System
KY	Commonwealth of Kentucky
LLW	low-level waste
LUC	land use controls
LUCAP	land use controls assurance plan
LUCIP	land use control implementation plan
MCL	maximum contaminant level
MOA	memorandum of agreement
NA	not applicable
NCP	National Contingency Plan
NFA	no further action
NPL	National Priorities List
NSDD	North-South Diversion Ditch
NTCRA	non-time-critical removal action
O&M	operation and maintenance
OSWDF	on-site waste disposal unit
OU	operable unit
PGDP	Paducah Gaseous Diffusion Plant

PTW	principal threat waste
RACR	remedial action completion report
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RCW	recirculating cooling water
RDSI	remedial design support investigation
RGA	Regional Gravel Aquifer
RI	remedial investigation
ROD	record of decision
SAA	satellite accumulation area
SAP	sampling and analysis plan
SE	site evaluation
SEE	steam-enhanced extraction
SMP	Site Management Plan
SWMU	solid waste management unit
SWOU	Surface Water Operable Unit
TBD	to be determined
TS	treatability study
TSCA	Toxic Substances Control Act
UCRS	Upper Continental Recharge System
USEC	United States Enrichment Corporation
UST	underground storage tank
VOC	volatile organic compound
WAG	waste area group
WDA	waste disposal alternative
WKWMA	West Kentucky Wildlife Management Area

1. INTRODUCTION

The Paducah Gaseous Diffusion Plant (PGDP) was placed on the National Priorities List (NPL) on May 31, 1994. In accordance with Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the U.S. Department of Energy (DOE) entered into a Federal Facility Agreement (FFA) with the U.S. Environmental Protection Agency (EPA) and Kentucky on February 13, 1998. The FFA established one set of consistent requirements for achieving comprehensive site remediation in accordance with the Resource Conservation and Recovery Act (RCRA) and CERCLA, including stakeholder involvement.

Section XVIII of the FFA requires that DOE submit an annual Site Management Plan (SMP), which outlines DOE's strategic approach for achieving cleanup under the FFA, to EPA and the Energy and Environment Cabinet (formerly known as the Kentucky Environmental and Public Protection Cabinet) by November 15th of each year. The FFA states that the purpose of the SMP is to coordinate and document the potential and selected operable units (OUs), including removal actions; to define cleanup priorities; to identify work activities that will serve as the basis for enforceable timetables and deadlines under the agreement; and to establish long-term cleanup goals.

During fiscal year (FY) 2012, based on projected near-term flat funding assumptions (5 years) and reasonable future funding assumptions for the Paducah Site, the FFA Senior Managers commissioned the FFA Managers to review and reprioritize FFA work, as needed, to achieve continuous progress while ensuring a bias for action. A series of meetings were held among the FFA Managers to evaluate options. The FFA Managers and FFA Senior Managers agreed to the following prioritization for work implementation:

- Optimize plume containment (Northeast Plume);
- Address groundwater sources [C-400; Southwest Plume Sources; Burial Grounds OU Solid Waste Management Unit (SWMU) 4];
- Complete decontamination and decommissioning (D&D) of C-340 and C-410/C-420;
- Continue and prioritize CERCLA Waste Disposal Alternatives activities to support future disposal needs;
- Realign the OUs schedules to coordinate disposal of waste with the availability of a potential CERCLA On-site Waste Disposal Facility (if selected); and
- Implement other work (e.g., Sitewide Evaluation) ensuring continuous progress/bias for action.

At that time, the reprioritization of projects based on projected near-term flat funding assumptions (5-years) and reasonable future funding assumptions for the Paducah Site resulted in the rescheduling of milestones, including out-year completion dates for the pre-gaseous diffusion plant (GDP) shutdown scope OUs. The FY 2013 SMP officially incorporated the changes agreed to by the FFA parties and moved completion dates for the pre-GDP shutdown scope OUs from 2019 to 2032.

In October of 2014, the United States Enrichment Corporation (USEC) terminated its lease agreement for operation of the GDP and returned the leased facilities to DOE. Some of these previously leased facilities contain SWMUs that had not been readily accessible during USEC operation. Because DOE now has control of the formerly leased GDP facilities, DOE has reassessed site cleanup priorities to identify areas offering the greatest opportunity to address significant sources of environmental media contamination. As a result, in 2016, DOE identified that a comprehensive characterization and final response action of the C-400 Building and its adjacent areas (see Appendix 3), hereafter referred to as the C-400 Complex, as its highest cleanup priority at the site. The C-400 Complex contains numerous SWMUs and is the largest source of off-site trichloroethene (TCE) groundwater contamination. The implementation of C-400 Complex as Paducah DOE's highest cleanup priority has resulted in resequencing of other cleanup work at the site to align with the new cleanup priorities and revised time frames projected for implementation. The FFA Senior

Managers signed a Memorandum of Agreement (MOA) for the C-400 Complex under the FFA for the PGDP, on August, 8, 2017, to document key aspects of the new strategy for incorporation into the FY 2018 SMP.

The new strategy from the MOA includes the following:

- Addition of the C-400 Complex OU with enforceable milestones and planning dates for all the CERCLA activities under the OU, including the out-year enforceable milestone for the C-400 Remedial Action field start;
- Integration of the pre- and post-GDP shutdown projects and schedules into the overall cleanup scope of the FFA;
- Continuation of the SWMU 211-A groundwater remedial action; and
- Resequencing of all other projects (e.g., CERCLA Waste Disposal Alternatives, Burial Grounds OU, Soils OU, Dissolved-Phase Plumes OU, Surface Water OU, Comprehensive Site OU).

This FY 2018 SMP supersedes the approved FY 2015 SMP. The FY 2016 and FY 2017 SMPs were not finalized in order to allow the FFA Senior Managers time to evaluate DOE's proposed reprioritization strategy and to reach a consensus on the path forward for the cleanup of the site.

This annual update of the SMP sets forth enforceable milestones for FY 2018, FY 2019, and FY 2020, with near-term emphasis on the C-400 Complex and the out-year enforceable completion date for the C-400 remedial action field start, consistent with the MOA. The scope associated with the overall cleanup strategy for the site includes a series of prioritized response actions, site characterization activities to support future response action decisions, and cleanup and decommissioning of the GDP. After completion of these activities, the Comprehensive Site OU (CSOU) evaluation will be conducted, with implementation of additional actions, as needed, to ensure long-term protectiveness of human health and the environment. CERCLA Five-Year Review evaluations are and will continue to be conducted to determine if any modifications to actions are required prior to the CSOU evaluation.

Appendix 1 of this SMP contains a summary of the status of all actions taken to date relative to the signed Records of Decision or Action Memoranda (including both interim and final response actions). This appendix also serves to meet the requirements of Section X.A of the FFA to submit an annual removal action report describing a summary of removal actions performed during the previous FY. More detailed information on the status of each OU is available in the FFA Semiannual Progress Report.

2. LAND USE

The planning assumptions for current land use are depicted in Figure 1, and the reasonably foreseeable future use is depicted in Figure 2. Potential future uses include recreational, industrial, and waste management. Several factors were considered in establishing the land-use assumptions under this cleanup strategy, including current and past land use, stakeholder input, and interest expressed by outside entities for the industrial use of areas on and adjacent to PGDP.

2.1 LAND USE CONTROLS

The site cleanup strategy recognizes that the long-term protectiveness of some response actions might rely upon or be supplemented by engineering barriers, institutional controls, and/or other land use controls (LUCs). To ensure that these controls remain protective, CERCLA five-year reviews, in conjunction with monitoring of requirements contained in the Land Use Control Assurance Plan (LUCAP), are implemented.

A Land Use Control Implementation Plan (LUCIP) is developed for each remedy that includes LUCs. The LUCIPs include a detailed explanation of the implementation and long-term maintenance of the LUCs. The LUCAP requires annual certification in the SMP that the LUCIPs are being implemented. This certification also will identify any noncompliance with a LUCIP and the steps taken to correct any such noncompliance, any nonmajor changes in land use, and any changes in designated officials. Appendix 2 contains the annual certification of LUCIPs implemented at PGDP.

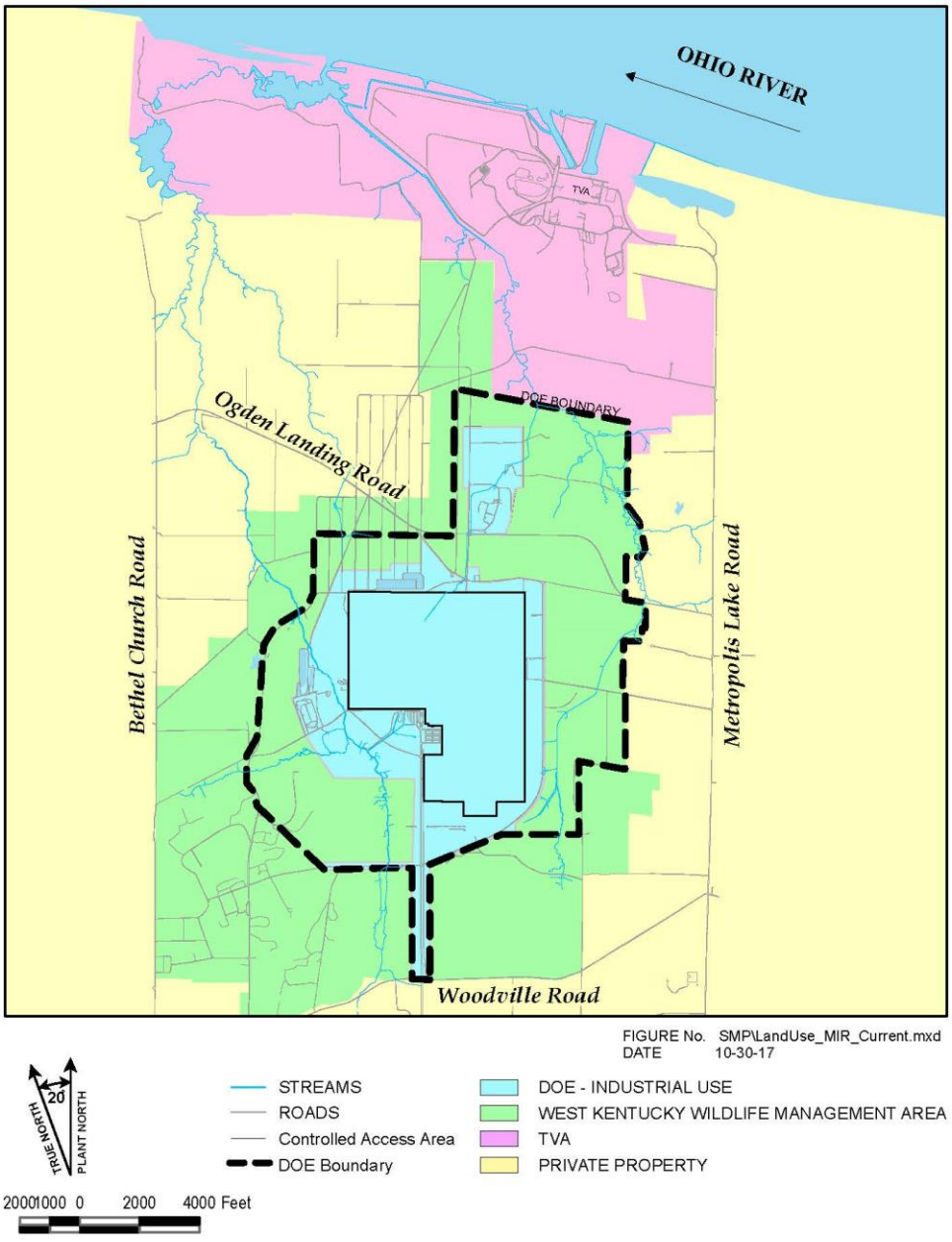

Figure 1. Current Land Use at PGDP

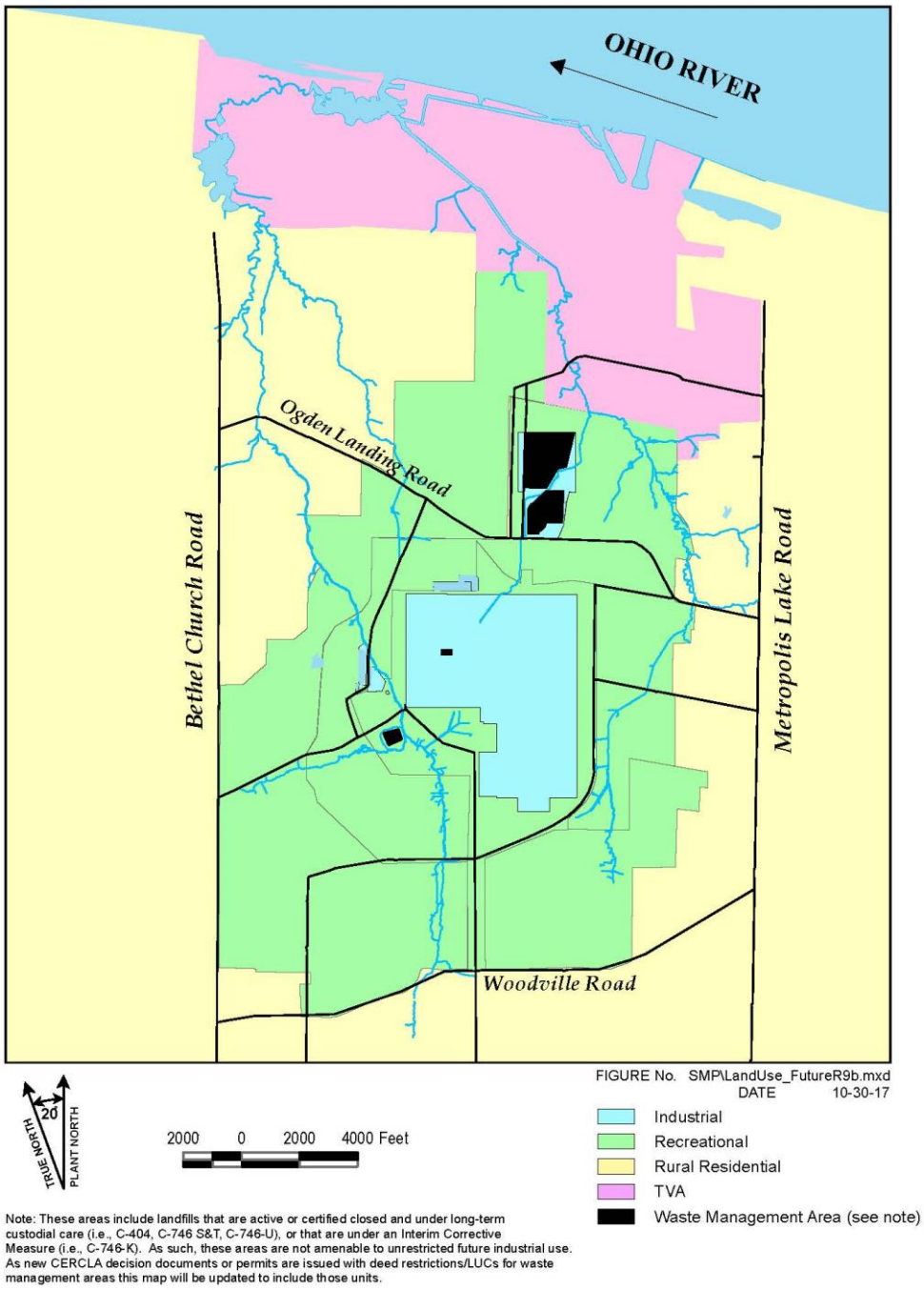

Figure 2. Reasonably Anticipated Future Land Use at PGDP

3. OPERABLE UNITS

In past SMPs, the site cleanup activities were divided as follows: (1) pre-GDP shutdown scope, (2) post-GDP shutdown scope, and (3) CSOU scope. The pre-GDP shutdown scope was associated with media-specific OUs initiated prior to shutdown of the operating GDP (i.e., Pre-GDP shutdown Activities).

In the FY 2018 SMP, the site cleanup OUs are integrated and no longer distinguish between pre- and post-GDP scope. Completion of these OUs is required to achieve delisting of the site from the NPL and the decommissioning of the GDP. Prior to final deletion from the NPL, partial delisting may occur if conditions are met to support potential property transfers. Appendix 3 includes additional information regarding scope and planning assumptions for each of the defined OUs. Appendix 4 contains lists of SWMUs and areas of concern (AOCs) sorted by OUs.

- C-400 Complex OU
- Groundwater OU
- Surface Water OU
- Soils OU
- Burial Grounds OU
- D&D OU
- Lagoons OU
- Depleted Uranium Hexafluoride (DUF_6) Footprint Underlying Soils OU
- CSOU

In addition, DOE currently is implementing deactivation and utility optimization activities outside of the FFA scope to prepare the site for effective implementation of all future mission activities, including cleanup activities. While the FFA parties have agreed to focus cleanup efforts on the C-400 Complex, long-term plans and strategies continue to be refined for future decommissioning of the GDP and cleanup of other OUs.

The final CSOU evaluation will support the final remedial decision for the site following completion of all OUs. Any required environmental monitoring of remedy performance and/or progress toward achieving the remedial action objectives (RAOs) will be conducted and reported in accordance with the selected remedies. Once no further response is appropriate and all RAOs have been achieved, the site (remaining property not previously deleted and/or transferred) would be eligible for deletion from the NPL.

4. SITE PRIORITIZATION

DOE uses a combination of factors to prioritize work being implemented under the Environmental Management (EM) program at PGDP. These include considerations such as regulator expectations; risk-based decision making; compliance with other program; technical considerations associated with GDP transition/turnover; funding projections; mortgage reduction; and demonstrated progress toward completing the EM mission. The site prioritization is evaluated each year as part of the annual update to the SMP.

The risk prioritization criteria incorporate the general program-management principles of the National Contingency Plan (NCP), which emphasize the use of accelerated actions to address imminent threats and reduce migration of off-site contamination.

Enforceable milestones for FY 2018, FY 2019, FY 2020, and out-year enforceable completion dates consistent with these prioritization criteria are included in Appendix 5. Any enforceable completion dates for remedial actions shall be considered satisfied upon issuance of a D1 Remedial Action Completion Report (RACR) (i.e., Final Remedial Action Report, as specified in FFA) for those areas where RAOs have been achieved. In cases where a period of operation and maintenance (O&M) may be required to achieve RAOs, such as groundwater, a D1 Interim RACR will be issued upon completion of remedial construction and a determination by DOE that the remedy is operating as intended.

Risk Prioritization Criteria

- Mitigate immediate threats, both on- and off-site.
- Reduce further migration of off-site contamination.
- Address sources contributing to off-site contamination.
- Address remaining sources contributing to on-site contamination.
- Perform D&D of the GDP/Address Remediation Scope OUs.
- Address soils within the DUF_6 Plant footprint once it ceases operations and D&D of the DUF_6 plant is complete.
- Evaluate the final CSOU.

Decommissioning of surplus DOE facilities is described in the 1995 DOE and EPA Memorandum: *Policy on Decommissioning DOE Facilities under CERCLA.* A total of 681 properties/structures was reviewed and evaluated to identify facilities that should be evaluated under the CERCLA process for decommissioning (Appendix 8). The D&D OU identifies industrial facilities (listed in Appendix 4) that, in some cases, already have been determined to pose a potential threat of release of hazardous substances to the environment that warrants a CERCLA non-time-critical removal action (NTCRA) for decommissioning. For the other facilities included in Appendix 4, a removal site evaluation (SE) is required to determine if a NTCRA is necessary. Additional facilities at PGDP (listed in Appendix 6) will be screened to determine if there is a release threat to the environment that would warrant decommissioning under CERCLA. If it is determined during a facility review that there is a potential release threat, the facility will be included in the D&D OU in Appendix 4. The FFA parties have agreed to continue collaboration on the screening process and time frame for screened the facilities list in Appendix 6 for inclusion in Appendix 4 during scoping of the D1 FY 2019 SMP.

All data collected in support of any removal or remedial action shall be managed in accordance with an approved Data Management Plan (DMP). In accordance with Section XXVII.C of the FFA, Appendix 7 contains the final DMP for the Paducah Site.

APPENDIX 1

ACTIONS TAKEN TO DATE

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Operable Unit Summary

WAGs/Media	Response Type	ROD/Action Memorandum	Response Description	Status[1]
GROUNDWATER OPERABLE UNIT (OPERABLE UNIT DESIGNATION 01)				
WAG 26/Groundwater	Emergency removal action	N/A	Provided temporary water to local residences where private wells are contaminated by TCE and Tc-99.	Complete
WAG 26/Groundwater	Removal action	August 30, 1994	Extended municipal water line to residences affected by off-site groundwater contamination. 2013 Five-Year Review required additional actions for vapor intrusion.	Construction Complete/Operational The Water Policy Screening Study was completed on June 30, 2015. The Water Policy Screening Study Report was approved by KY on November 8, 2017; EPA approved on November 14, 2017.
WAG 26/Groundwater (Northwest Plume)	Interim Remedial Action (IRA) Explanation of Significant Differences (ESD)	July 23, 1993 January 27, 2011	Hydraulic containment and treatment of high concentrations of off-site TCE contamination in the Northwest Plume. Optimization of the Northwest Plume system through placing existing southern extraction wells (EWs) on standby and installing two new EWs east of original southern extraction field.	Construction Complete/Operational Construction Complete/Operational

[1] Detailed information on the status of each project or operable unit is available in the FFA Semiannual Report.

Operable Unit Summary (Continued)

WAGs/Media	Response Type	ROD/Action Memorandum	Response Description	Status[1]
GROUNDWATER OPERABLE UNIT (OPERABLE UNIT DESIGNATION 01) (Continued)				
WAG 26/Groundwater (Northeast Plume)	IRA	June 15, 1995	Hydraulic containment and treatment of high concentrations of off-site TCE contamination in the Northeast Plume. An ESD has been submitted for optimization of the Northeast Plume system through placing existing EWs on standby, installing two new EWs in the upgradient high concentration area of the Northeast Plume near the eastern edge of the PGDP facility, and installing new treatment units for air stripping as an alternative to the cooling towers.	Construction Complete/Operational Construction of an alternate treatment unit was completed on May 30, 2013. The unit became operational on September 4, 2013. The ESD and RAWP were in dispute until July 2015 at which time the Memorandum of Agreement (MOA) for resolution was signed. Optimization, including startup and batch testing, has been completed, and the system became fully operational in October 2017. FFA parties are working to establish transect well baseline determinations. Hydraulic assessment currently is underway.
SWMU 91/Soil	IRA	August 10, 1998	*In situ* treatment of TCE-contaminated soils using the LASAGNA™ technology.	Complete

Operable Unit Summary (Continued)

WAGs/Media	Response Type	ROD/Action Memorandum	Response Description	Status[1]
GROUNDWATER OPERABLE UNIT (OPERABLE UNIT DESIGNATION 01) (Continued)				
SWMU 11 and SWMU 533/Groundwater (C-400 Source Action)	IRA	August 9, 2005	*In situ* treatment of TCE source areas in the UCRS and RGA located in the southeast and southwest corners of the C-400 Building using electrical resistance heating technology.	Field operations for Phase I completed FY 2011. Parties agreed to divide Phase II into Phase IIa and Phase IIb. Phase IIa operations began July 22, 2013, and ceased November 5, 2014. A treatability study for steam-enhanced extraction conducted and completed June 30, 2015. Treatability Study Report approved June 2016. As a result of the DOE proposed strategy and reprioritization agreed to by the FFA Senior Managers in the August 8, 2017, MOA, the remaining VOC source in the Phase IIb area will be addressed by the C-400 Complex OU. Phase I and Phase IIa activities are documented in a Remedial Action Completion Report for the C-400 Interim Remedial Action (ROD, 2005) that is under review by EPA and KY.

WAGs/Media	Response Type	ROD/Action Memorandum	Response Description	Status[1]
GROUNDWATER OPERABLE UNIT (OPERABLE UNIT DESIGNATION 01) (Continued)				
SWMU 1: SWMU 211-A; and SWMU 211-B (Southwest Plume Sources)	Remedial Action	March 20, 2012	SWMU 1—*In situ* source treatment using deep soil mixing with interim LUCs. SWMU 211-A—*In situ* source treatment using enhanced *in situ* bioremediation with interim LUCs or long-term monitoring with interim LUCs based upon RDSI results. SWMU 211-B—*In situ* source treatment using enhanced *in situ* bioremediation with interim LUCs or long-term monitoring with interim LUCs based upon RDSI results.	ROD signed; RDSI field activities initiated on July 18, 2012. Completed RDSI field activities on April 26, 2013. Additional sampling was requested by EPA and completed by DOE. The Final Characterization Report Addendum and Letter Notification proposing remedy for 211-A and 211-B have been evaluated by the FFA parties. The FFA parties have agreed to move forward with 211-A and will determine an appropriate remedial action for 211-B based on a revised conceptual site model consistent with the data in the Final Characterization Report. Mobilization activities for SWMU 1 deep soil mixing were initiated on February 9, 2015, and soil mixing completed October 8, 2015. Soil sampling, monitoring wells installation, and Remedial Action Completion Report for SWMU 1 completed in FY 2016. The Remedial Action Completion Report approved by EPA and Kentucky February 2017.

Operable Unit Summary (Continued)

WAGs/Media	Response Type	ROD/Action Memorandum	Response Description	Status[1]
SURFACE WATER OPERABLE UNIT (OPERABLE UNIT DESIGNATION 03)				
WAG 25/Surface water (NSDD)	IRA	March 28, 1994	Instituted action to treat certain plant effluent and control the migration of contaminated sediment associated with the NSDD.	Construction Complete/Operational
WAGs 18 & 25/Surface water and sediment (Surface Water/Ditches)	IRA	N/A	Institutional controls (fencing/posting) for off-site contamination in surface water, outfalls, and lagoons.	Construction Complete/Operational
WAG 24/Scrap (Scrapyards)	IRA	N/A	Installation of sediment controls to mitigate surface water/sediment runoff from scrap yards.	Construction Complete/Operational
WAGs 1 &7 WAG 1: SWMU 100 (Fire Training Area) and SWMU 136 (C-740 TCE Spill Site) WAG 7: SWMU 8 (C-746-K Landfill), SWMU 130 (C-611 550-gal Gasoline UST), SWMU 131 (C-611 50-gal Gasoline UST), SWMU 132 (C-611 2,000-gal. Oil UST), SWMU 133 (C-611 Grouted UST), and SWMU 134 (C-611 1,000-gal Diesel/Gasoline Tank)	IRA	August 10, 1998	Interim remedial action installed riprap along creek bank to prevent direct contact, implemented institutional controls, and long-term monitoring for SWMU 8. All other SWMUs were determined to require "no further action" under the IRA. It should be noted that at SWMU 100, institutional controls were selected as part of the remedy.	Construction Complete/Operational
Drum Mountain (Scrap)	Non-time-critical removal action	March 27, 2000	Removed and disposed of Drum Mountain.	Complete
WAG 24, WAG 14, and SWMU 99/Scrap	Non-time-critical removal action	September 26, 2001	Removed and disposed of scrap metal with enhanced sediment control measures.	Complete
SWMU 59/Sediment	IRA	September 25, 2002	Remedial action for Sections 1 and 2 of the NSDD.	Complete

Operable Unit Summary (Continued)

WAGs/Media	Response Type	ROD/Action Memorandum	Response Description	Status[1]
SURFACE WATER OPERABLE UNIT (OPERABLE UNIT DESIGNATION 03) (Continued)				
SWMU 58 (Sections 3, 4, and 5 of the NSDD); SWMU 69 (Outfall 001); SWMU 63 (Outfall 008); SWMU 66 (Outfall 010); SWMU 67 (Outfall 011); and SWMU 68 (Outfall 015) and their associated internal ditches and areas (including SWMUs 92 and 97)	Non-time-critical removal action	April 23, 2009	Removal action for contaminants associated with sediment in Sections 3, 4, and 5 of the NSDD and KPDES Outfalls 001, 008, 010, 011, and 015, and associated internal ditches and areas of PGDP.	Complete
BURIAL GROUNDS OPERABLE UNIT (OPERABLE UNIT DESIGNATION 05)				
WAG 22/Waste and soil (SWMU 2- Burial Ground)	IRA	September 11, 1995	The interim ROD selected an impermeable cap to reduce leachate migration from surface infiltration, groundwater monitoring, and institutional controls. Through agreement of the parties, an impermeable cap was not constructed (*Waste Area Grouping (WAG) 22 Post-Record of Decision (ROD) Change*, October 23, 1996). This change also will be documented in the Final Remedial Decision for SWMU 2.	Additional remedial alternatives for a CERCLA final remedial action are being evaluated in the SWMUs 2, 3, 7, and 30 feasibility study. Institutional controls and groundwater monitoring are ongoing pending final remedy selection.

Operable Unit Summary (Continued)

WAGs/Media	Response Type	ROD/Action Memorandum	Response Description	Status[1]
SOILS OPERABLE UNIT (OPERABLE UNIT DESIGNATION 04)				
C-750-A, -B, and -C USTs	N/A	N/A	Tank removal.	Complete
WAG 7 SWMU 8 (C-746-K Landfill)	IRA	N/A	Enhanced existing cap to reduce leachate migration from surface infiltration.	Complete
AOC 124 WAG 17/Soil (Concrete Rubble Piles)	Removal action	N/A	Excavated soil associated with AOC 124.	Complete
WAG 23/Soil	Removal action	September 11, 1997	Excavated PCB and dioxin-contaminated surface soils to reduce risks to plant industrial workers.	Complete
SWMU 193/Soil	Time-critical removal action	February 19, 2002	Removed petroleum-contaminated soils.	Complete
SWMUs 76 and 519/Soil	Time-critical removal action	July 1, 2002	Removed empty sulfuric acid tanks, size reduced for containerization and dispositioned.	Complete
SWMU 19 [C-410-B Hydrogen Fluoride (HF) Neutralization Lagoon], SWMU 40 (C-403) and SWMU 181 (C-218 Firing Range)	Non-time-critical removal action	May 11, 2009	Removal of lead-contaminated soil at the C-218 Firing Range (SWMU 181). Removal of contamination within the respective SWMU boundaries of C-410-B (SWMU 19). Removal of contamination within the respective SWMU boundaries of C-403 (SWMU 40).	SWMU 19 and SWMU 181 are complete. SWMU 40 removal will be implemented as part of the C-400 Complex OU.
SWMU 27 (Acid Neutralization Tank)	Time Critical Removal Action	September 9, 2016	Removed liquid and sludge to the extent practicable within the acid neutralization tank. Filled the tank with flowable fill.	Fieldwork for SWMU 27 completed in September 2016. The final Removal Action Report was submitted in June 2017 and was approved by EPA and Kentucky in July 2017. Final cleanup decision for this SWMU will be addressed as part of the Soils and Slabs OU.

Operable Unit Summary (Continued)

WAGs/Media	Response Type	ROD/Action Memorandum	Response Description	Status[1]
PRE-GDP SHUTDOWN D&D OPERABLE UNIT (OPERABLE UNIT DESIGNATION 02)				
SWMU 478/Infrastructure (C-410)	Non-time-critical removal action	August 3, 2002	Remove process equipment and piping.	Completed December 2013.
SWMU 478/Infrastructure (C-410)	Non-time-critical removal action	November 23, 2009	Addendum to document a change in scope of the removal action to 1) expand the scope of the existing NTCRA to include facility structure demolition to the slabs and disposition of demolition debris and 2) allow the non-process systems to remain in place and to remove these systems at the same time the building is demolished using heavy equipment such as excavators with shears.	Fieldwork for C-410/C-420 completed in December 2015. Removal Action Report approved in June 2016.
SWMU 477/Infrastructure (C-340 Metals Plant) and SWMU 137 (C-746-A East End Smelter)	Non-time-critical removal action	May 18, 2010	Decommissioning of the C-340 Metals Plant and C-746-A East End Smelter, which entails the demolition of C-340-A, -B, and -C structures as well as the C-746-A East End Smelter. The slabs and soils underlying these structures will be addressed in future CERCLA response actions.	Fieldwork for C-746-A East End Smelter completed in FY 2010. Removal Action Report approved in November 2011. Fieldwork for C-340 completed in September 2013. Removal Action Report approved in May 2014.
SWMU 480 (C-402 Lime House); SWMU 55 (C-405 Incinerator); and SWMU 464 (C-746-A West End Smelter)	Non-time-critical removal action	December 5, 2005	Removed, characterized, and disposed of building structure and contents.	Complete

AOC = area of concern; BGOU = Burial Grounds Operable Unit; ESD = explanation of significant differences; FY = fiscal year; IRA = interim remedial action; KPDES = Kentucky Pollutant Discharge Elimination System; LUCs = land use controls; N/A = not applicable; NSDD = North-South Diversion Ditch; NTCRA = non-time-critical removal action; PGDP = Paducah Gaseous Diffusion Plant; PCB = polychlorinated biphenyl; RDSI = remedial design/support investigation; RGA = Regional Gravel Aquifer; ROD = Record of Decision; SWMU = solid waste management unit; Tc-99 = technetium-99; TCE = trichloroethene; UCRS = Upper Continental Recharge System; UST = underground storage tank; WAG = waste area group

Paducah Operable Unit Designations: Groundwater OU—OU Designation 01; Pre-GDP Shutdown Decontamination and Decommissioning OU—OU Designation 02; Surface Water OU—OU Designation 03; Soils OU Designation 04; Burial Grounds OU—OU Designation 05; Waste Disposal OU—OU Designation 06; C-400 Complex OU—OU Designation 07; DUF_6 Footprint Underlying Soils OU—OU Designation 08; Lagoons—OU Designation 09; Remaining Decontamination and Decommissioning OU—OU Designation 10; Soils and Slabs OU—OU Designation 11; Comprehensive Site Operable Unit—OU Designation 12

Note: Operable Unit Designation 00 will be used for the Site Management Plan; Five-Year Review; FFA Semiannual Report; Community Relations Plan; and Data Management Plan

APPENDIX 2

CERTIFICATION OF LUCIPS

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CERTIFICATION OF LUCIPS

In accordance with Section 2.9 of the *Land Use Control Assurance Plan for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-1799&D2, the U.S. Department of Energy (DOE) certifies that requirements of the *Land Use Control Implementation Plan for the North-South Diversion Ditch at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-1949&D2, and the *Land Use Control Implementation Plan for Interim Remedial Action for the Groundwater Operable Unit for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-2151&D2/R2, are being implemented by DOE at Paducah Gaseous Diffusion Plant.

There have been no changes in the designated officials identified under the Land Use Control Implementation Plan/Land Use Control Assurance Plan. There have been no major or "nonmajor" changes of land use.

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APPENDIX 3

OPERABLE UNIT SCOPE DESCRIPTIONS AND KEY PROJECT ASSUMPTIONS

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OPERABLE UNIT SCOPE DESCRIPTIONS AND KEY DOE PLANNING ASSUMPTIONS FROM LIFE CYCLE BASELINE

INTRODUCTION

Pursuant to Section XVIII of the Federal Facility Agreement (FFA), the following operable unit (OU)-specific descriptions document the FFA Managers' common understanding of the expected scope of work for each of the OUs as well as U.S. Department of Energy's (DOE) key planning assumptions. The FFA Managers acknowledge that both the scope and associated assumptions may change as each project progresses; however, this appendix represents the best understanding, given existing information. The milestone dates associated with executing the scope of work are defined in Appendix 5 (Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets). The milestone dates are based on the scope and associated assumptions described in the following sections. Schedules are based on Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) documentation and review/comment time frames established in the FFA.

Paducah Gaseous Diffusion Plant (PGDP) ceased operations in May 2013, and leased property was returned to DOE in October 2014. Prior to delease, site cleanup activities had been divided as (1) pre-Gaseous Diffusion Plant (GDP) shutdown scope, and (2) post-GDP shutdown scope, and (3) Comprehensive Site OU (CSOU) scope. The pre-shutdown scope was associated with media-specific OUs initiated prior to shutdown of the operating GDP. In October of 2014, the United States Enrichment Corporation (USEC) terminated its lease agreement for operation of the GDP and returned the leased facilities to DOE. Some of these previously leased facilities contain solid waste management units (SWMUs) that had not been readily accessible during USEC operation. Because DOE now has control of the formerly leased GDP facilities, DOE has reassessed site cleanup priorities to identify areas offering the greatest opportunity to address significant sources of environmental media contamination. As a result, in 2016, DOE identified a comprehensive characterization and final response action of the C-400 Building and its adjacent areas, hereafter referred to as the C-400 Complex, as its highest cleanup priority at the site. The C-400 Complex contains numerous SWMUs and is the largest source of off-site trichloroethene (TCE) groundwater contamination. The implementation of C-400 Complex as Paducah DOE's highest cleanup priority has resulted in resequencing other cleanup work at the site to align with the new cleanup priorities and revising time frames projected for implementation. This fiscal year (FY) 2018 Site Management Plan (SMP) also has integrated all OUs to support a comprehensive cleanup strategy for PGDP.

Scope and Key DOE Planning Assumptions from Life Cycle Baseline have been established based on the current understanding of site conditions and to achieve compliance with CERCLA, the National Contingency Plan (NCP), and the FFA. The actual scope of any given remedy will be developed with the U.S. Environmental Protection Agency (EPA) and the Commonwealth of Kentucky (KY) in compliance with the CERCLA process and documented in the appropriate decision document, each of which is subject to public participation in accordance with the FFA, CERCLA, and the NCP. Goals have been established for each OU to guide the development of project-specific remedial action objectives (RAOs).

Assumptions included herein are for DOE's planning purposes. While DOE maintains that the assumptions are reasonable for bounding cost and schedule forecasts based on existing information, regulatory approval of the SMP does not constitute approval of assumptions. In the event there is a conflict between an assumption in this SMP and an OU primary document, the OU primary document shall govern.

GROUNDWATER OPERABLE UNIT

The Groundwater Operable Unit (GWOU) is being implemented in a phased approach consisting of sequenced response actions designed to accomplish the following goals:

(1) Prevent human exposure to contaminated groundwater;
(2) Prevent or minimize further migration of contaminant plumes;
(3) Prevent, reduce, or control contaminant sources contributing to groundwater contamination; and
(4) Restore the groundwater to its beneficial uses wherever practicable.

A series of actions already have been completed toward meeting these goals, as depicted in Figure 3.1. These previous actions are summarized in Appendix 1 (Actions Taken to Date).

The scope of the GWOU consists of potential sources [e.g., dense nonaqueous-phase liquid (DNAPL) or buried wastes] that are contributing to groundwater contamination and the dissolved-phase groundwater plumes. The dissolved-phase groundwater consists of contaminated groundwater primarily in the Regional Gravel Aquifer (RGA), but also includes limited areas in the Upper Continental Recharge System (UCRS) that typically are associated with source areas. Remedies documented in signed records of decision (RODs) have been selected for the identified C-400 source areas and Southwest Plume source areas to address volatile organic compound (VOC) contamination. The remedy in the Southwest Plume ROD for SWMU 1 has been completed, with long-term monitoring in place. The remaining scope of that ROD related to SWMU 211-A and SWMU 211-B was subject to a recently completed remedial design site investigation.

C-400 Interim Remedial Action

The success of the Six-Phase Heating project conducted in 2003 lead to a ROD signed in 2005 that required mass removal of TCE source material within the UCRS and RGA using electrical resistance heating (ERH). The scope of the interim remedy for the C-400 source action was limited to accessible areas located around the outside perimeter of the east and southwest portions of the C-400 Building due to on-going USEC operations that occupied the C-400 Building. Implementation of the ERH remedy was designed using a two-phase approach. Phase I was completed in 2010 and focused on selected treatment areas around C-400 (east and southwest areas) where the majority of the TCE was confined to the UCRS; however, an important objective of Phase I also was to evaluate the heating performance of the ERH design in the underlying RGA down to the McNairy Formation. During implementation of Phase I, temperature goals were not attained in the lower RGA in the southwest treatment area, particularly in the lower RGA. Because of the inability of ERH to reach target temperatures in the lower RGA, the FFA parties agreed to divide Phase II into Phase IIa (using ERH to address the UCRS and upper RGA to a depth of 60 ft bgs) and Phase IIb (using a technology to be decided to address the lower RGA). Phase IIa operations were completed successfully in fall of 2014 and consisted of the implementation of ERH in the UCRS and upper RGA in the southeast treatment area. To help evaluate applicable technologies for potential use in the lower RGA during Phase IIb, a Steam-enhanced Extraction (SEE) Treatability Study (TS) was performed in 2015 to obtain data specific to understanding the behavior of steam injected into the RGA under variable injection scenarios. The TS Report for Phase IIb, dated May 2016, demonstrated the technology would be technically implementable in the hydrogeological conditions tested, although several uncertainties remained regarding the full nature and extent of the Phase II source area, particularly whether a portion of the source extends beneath the C-400 Building.

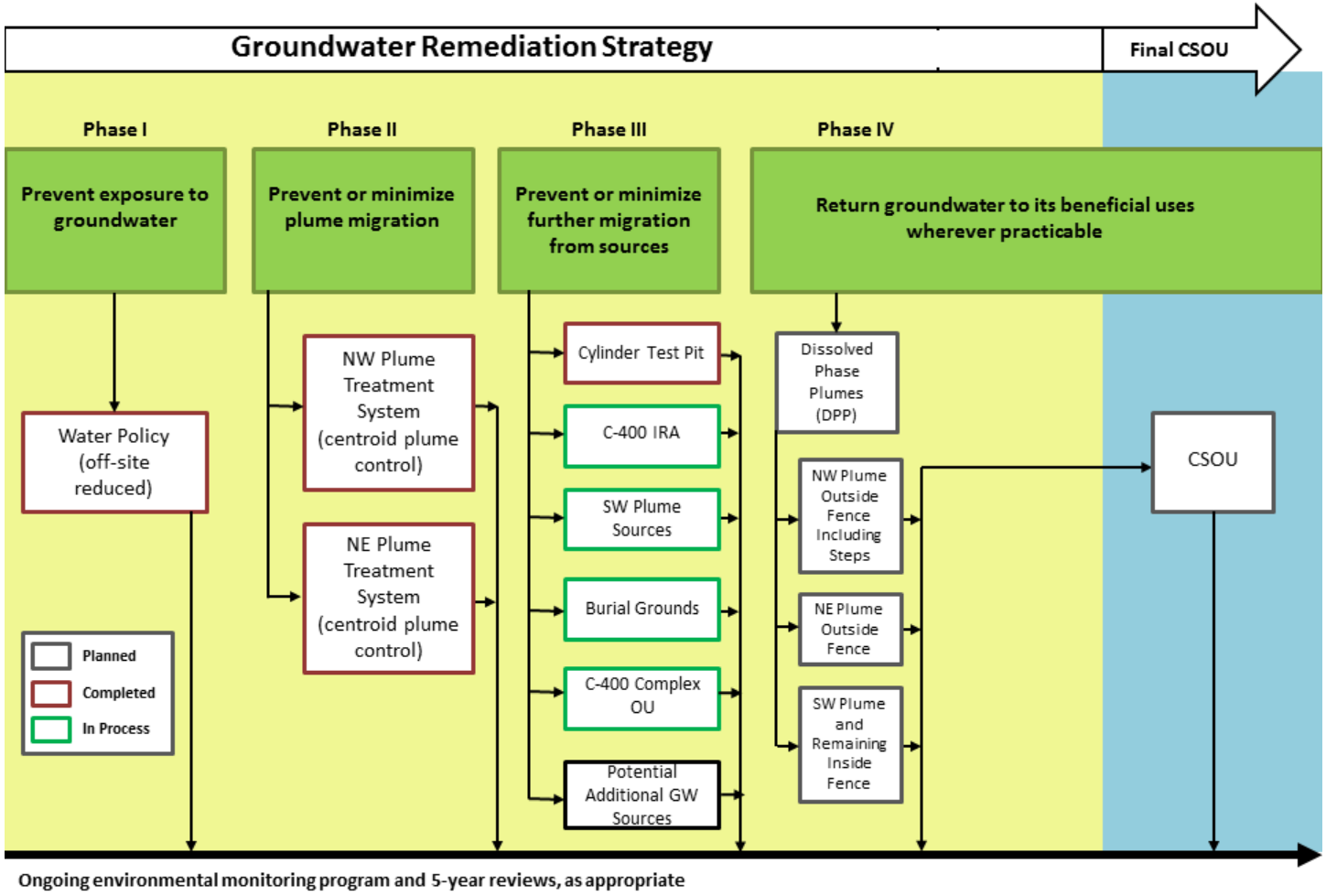


Figure 3.1. Groundwater Remediation Strategy

Prior to moving forward with implementation of the interim remedial action, DOE approached EPA and KY and proposed reprioritization of the DOE mission based on the return of the enrichment facilities (including C-400); the need to perform work in a comprehensive manner at the C-400 Complex; and the expected impacts of anticipated future funding limitations across the DOE Complex. In June 2016, DOE provided a written proposal for the entire C-400 Complex that included acceleration of the investigation and cleanup of the C-400 Complex for all sources of contamination associated with and underlying the C-400 Building. This OU also will address the remaining VOC source in the Phase IIb area. On August 8, 2017, the FFA Senior Managers signed a memorandum of agreement (MOA) for the C-400 Complex that will be implemented as a separate OU identified as the C-400 Complex OU. As a result, the prior work performed under the C-400 Interim Remedial Action for Phase I and Phase IIa will be documented in a Remedial Action Completion Report for the C-400 Interim Remedial Action (ROD 2005).

Southwest Plume Sources Remedial Action

Scope

This project addresses the following three areas in the Southwest Plume: the C-747-C Oil Landfarm (SWMU 1), the areas near the southeast and northeast (SWMU 211) areas of the C-720 Building, and part of the storm sewer between the south side of the C-400 Building and Outfall 008 (SWMU 102). TCE and its breakdown products [*cis*-1,2-dichloroethene (DCE), *trans*-1,2-DCE, and vinyl chloride] and 1,1-DCE are the primary contaminants of concern (COCs) associated with these sources. Evaluation of a final remedial action for non-VOCs COCs associated with direct contact exposure risks will be addressed as part of the Soils OU (see Appendix 4).

Key DOE Planning Assumptions from Life Cycle Baseline

(1) A remedy will be implemented in source areas [i.e., Oil Land Farm (SWMU 1) and Northeast and Southeast of the C-720 Building (SWMU 211 A & B)].

(2) The SWMU 1 remedy is soil mixing with interim land use controls (LUCs). Implementation of this remedy has been completed.

(3) The SWMU 211-A remedy is *in situ* bioremediation with interim LUCs or long-term monitoring with interim LUCs.

(4) The SWMU 211-B remedy will be implemented after the C-720 Building has been removed and the investigation is completed for the C-720 Building Soils and Slabs action to address fully any identified sources under the slab.

(5) No further action will be required for SWMU 102 (Plant Storm Sewer).

Dissolved-Phase Plumes Remedial Action[2]

Scope

This project includes conducting a remedial investigation (RI) [including a baseline risk assessment (BRA)], feasibility study (FS), and selecting a remedy and implementing any necessary response actions for the dissolved-phase groundwater contamination. The RI will evaluate dissolved-phase groundwater

[2] The scope and planning assumptions are consistent with the March 24, 2008, and May 20, 2010, SW Plume Dispute Resolutions.

contamination, including, but not limited to, the Northwest Plume (SWMU 201), Northeast Plume (SWMU 202), Southwest Plume (SWMU 210), and the groundwater contamination contributing to the Little Bayou Creek seeps. The RI also may determine whether any follow-up actions or modifications to response actions for the GWOU are necessary and would be evaluated further in a FS. The primary RAO for this project is based on the resolution of dispute for the Southwest Plume dated March 24, 2008, as follows:

- Return contaminated groundwaters to their beneficial use(s) and attain chemical-specific applicable or relevant and appropriate requirements [e.g., maximum contaminant levels (MCLs)] and/or risk-based concentrations for all identified COCs throughout the plume (or at the edge of the waste management area depending on whether the waste source is removed), consistent with CERCLA, the NCP (including the Preamble), and any pertinent EPA guidance.

Key DOE Planning Assumptions from Life Cycle Baseline

The following elements summarize DOE's key planning assumptions and are illustrated in Figure 3.2.

(1) TCE and Tc-99 are expected to be the primary COCs that will drive the remediation approach.

(2) Continue operations of the Northwest Plume and the Northeast Plume pump-and-treat systems in accordance with the completed optimizations.

(3) Conduct a technology demonstration/treatability study at Little Bayou Creek seeps to address the TCE concentrations in surface water contamination resulting from groundwater discharge. The treatability study may include testing technologies that will have broader application to other areas of the dissolved-phase plumes.

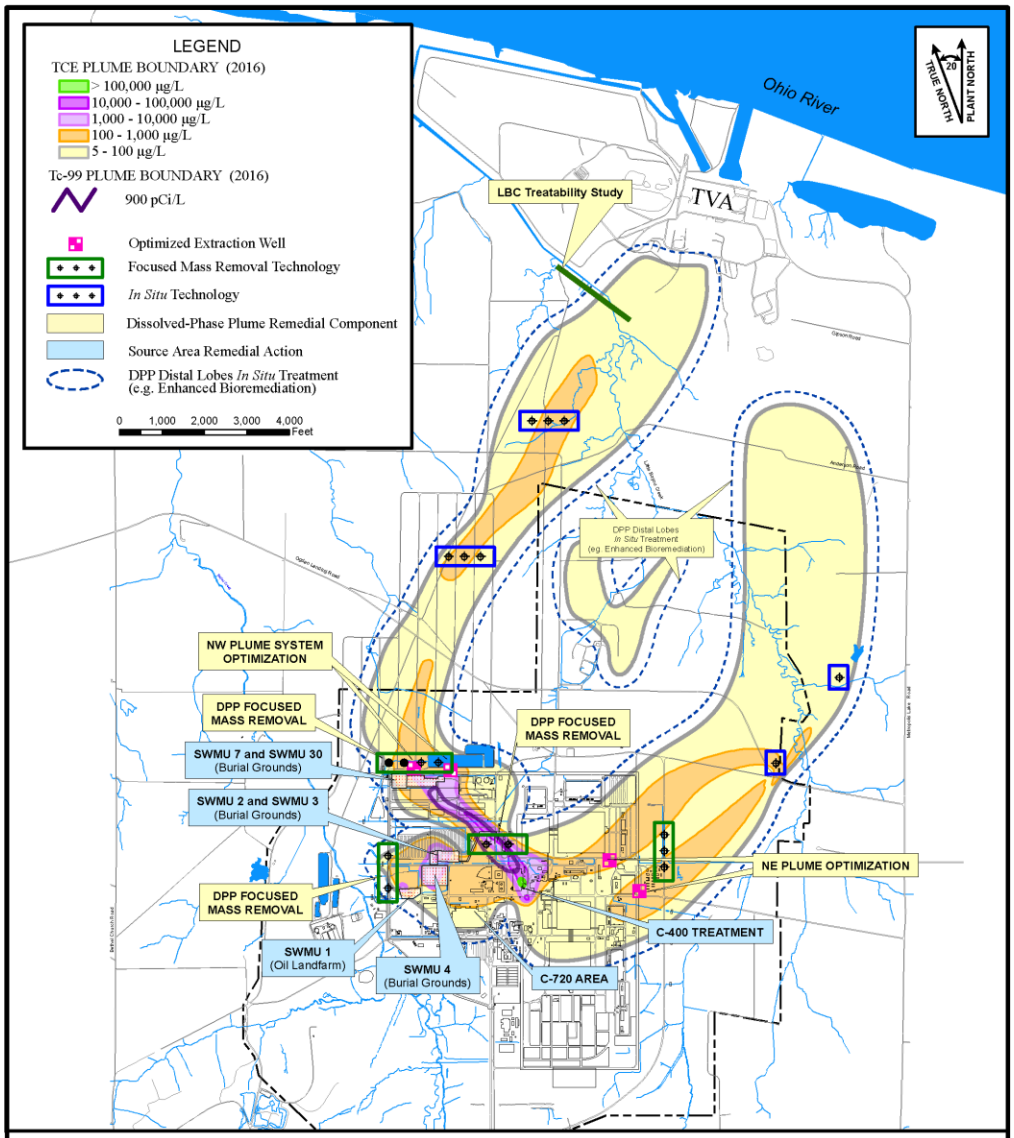
(4) Data collected from the Northwest Plume extraction system optimization; the Northeast Plume extraction system optimization; the TS at the Little Bayou Creek seeps; TCE degradation study; and the groundwater flow/transport model will be used to support the RI/FS process and will be documented accordingly.

(5) The remedial action for the dissolved-phase plumes will include the following: (a) focused mass removal technology to address "high" mass residual volatile organic compounds (VOCs) and Tc-99 in the RGA near source areas in the plant vicinity; (b) operation of groundwater extraction system(s) until they meet shut-down criteria established in the final dissolved-phase plume ROD; and (c) *in situ* treatment (e.g., enhanced bioremediation or alternative technology) for distal lobes of dissolved-phase plumes.

(6) The extent of dissolved-phase plume groundwater contamination is expected to be limited to those areas already defined, consisting of the Northeast Plume, Northwest Plume, and Southwest Plume.

(7) A single RI/FS Work Plan will be developed, encompassing all components of the Dissolved-Phase Plume remedial action; however, the remedial investigations may be conducted separately, and the results may be reported in three separate RI Reports—(1) Northwest Plume Outside Fence Including Seeps, (2) Northeast Plume Outside Fence, and (3) Southwest Plume and Remaining Inside Fence.

(8) In addition to the development and submittal of three separate RI Reports, three separate Feasibility Studies, Proposed Plans, Record of Decisions, Remedial Design Work Plans, Remedial Design Reports, Remedial Action Work Plans, and Remedial Action Completion Reports also may be



DOE PLANNING ASSUMPTIONS

Treatment of Key Source Area Remedial Actions
- C-400 Treatment: Electrical Resistance Heating
- C-720 Area
- SWMU 1 (Oil Landfarm)
- SWMU 2 and SWMU 3 (Burial Grounds)
- SWMU 4 (Burial Grounds)
- SWMU 7 and SWMU 30 (Burial Grounds)

Northwest Plume Extraction System Optimization
- Operate optimized extraction system near northwest corner of plant site consistent with goals of ROD for IRA and Five-Year review.

Northeast Plume Optimization
- Operate optimized Northeast Plume extraction system, to improve reduction in contaminant mass migrating downgradient of PGDP.

Southwest Plume Sources Remedial
- Implement *in situ* deep soil mixing and long-term monitoring at SWMU 1.

Little Bayou Creek Treatability Study
- Exploration of *in situ* treatment or low impact treatment options such as: enhanced bioremediation, passive extraction and treatment (e.g., geosiphon), or engineered wetlands.

Dissolved-Phase Plumes (DPP) Focused Mass Removal
- Implementation of mass removal technology to attain remedial action objectives (e.g., focused extraction, treatment and discharge/reinjection); combined enhanced bioremediation (chemical oxidation) and extraction and treatment; or *in situ* treatment to promote enhanced bioremediation.
- *Note: The locations and number of components representing remedy implementation as depicted above are conceptual and do not represent the actual locations and number of components that may be required.*

DPP Distal Lobes
- *In situ* treatment to attain remedial action objectives (e.g., *in situ* treatment to promote enhanced bioremediation); or combined *in situ* treatment with C-Sparge or groundwater circulation treatment wells.
- *Note: The locations and number of components representing remedy implementation as depicted above are conceptual and do not represent the actual locations and number of components that may be required.*

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Figure 3.2. GWOU Baseline Strategy

developed and submitted for each subproject—(1) Northwest Plume Outside Fence Including Seeps, (2) Northeast Plume Outside Fence, and (3) Southwest Plume and Remaining Inside Fence.

(9) Investigation and remediation of the seep areas along Little Bayou Creek will be addressed as part of the Dissolved-Phase Plume remedial action.

Potential Additional Groundwater Sources

Scope

This project consists of potential sources (e.g., DNAPL) that are contributing to groundwater contamination and the dissolved-phase groundwater plumes under a building structure or newly identified sources not addressed under the other GWOU projects. The project scope includes the management, planning, assessments, CERCLA documents, remedial investigations, final remedial actions per an approved ROD, and preparation of required completion documentation.

This project is being reserved for other sources to groundwater contamination that may be identified in the future.

Key DOE Planning Assumptions from Life Cycle Baseline

(1) A site evaluation (SE) will be conducted to determine if additional unknown sources to groundwater contamination are present based on historical and current groundwater data, process knowledge, interviews, and other documentation that suggest a release to groundwater has occurred.

(2) Conduct an RI and FS (including fieldwork) following completion of the SE for identified sources.

(3) Complete the necessary CERCLA documents supporting remedy selection (e.g., Proposed Plan, Record of Decision) and remedial design.

(4) Implementation of the final remedial action for the identified sources, which are planned for VOCs, radionuclides, and polychlorinated biphenyls (PCBs).

C-400 COMPLEX OPERABLE UNIT

Scope

This project is intended to evaluate fully and take the necessary actions to address all environmental contamination in order to achieve a final remedial action for the entire C-400 Complex as shown in Figure 3.3. This scope is defined to include building demolition, a RI/FS for the entire C-400 Complex, and final remedial action that includes soils, groundwater sources, and slabs. The C-400 Complex action will address all sources of contamination, including, but not limited to, principal threat waste (PTW) (e.g., TCE DNAPL and high concentration TCE contamination). There are 22 SWMUs located within the boundaries of the C-400 Complex OU. Five of the 22 SWMUs (349, 350, 351, 352, and 353) are DMSAs that were under the sole oversight authority of Kentucky pursuant to a DOE-KDEP Agreed Order (October 2003) and excluded from cleanup under the FFA pursuant to Section IV.F of the FFA. Ten of the SWMUs (48, 49, 50, 51, 52, 53, 54, 383, 384, and 537) have been designated as no further action and are listed in the No Further Action section of Appendix 4. As a result, only seven of the 22 SWMUs (11, 40, 47, 98, 203, 480, and 533) located within the boundaries of the C-400 Complex OU will require further CERCLA evaluation under the FFA. These seven SWMUs are listed in the C-400 Complex OU section of Appendix 4.

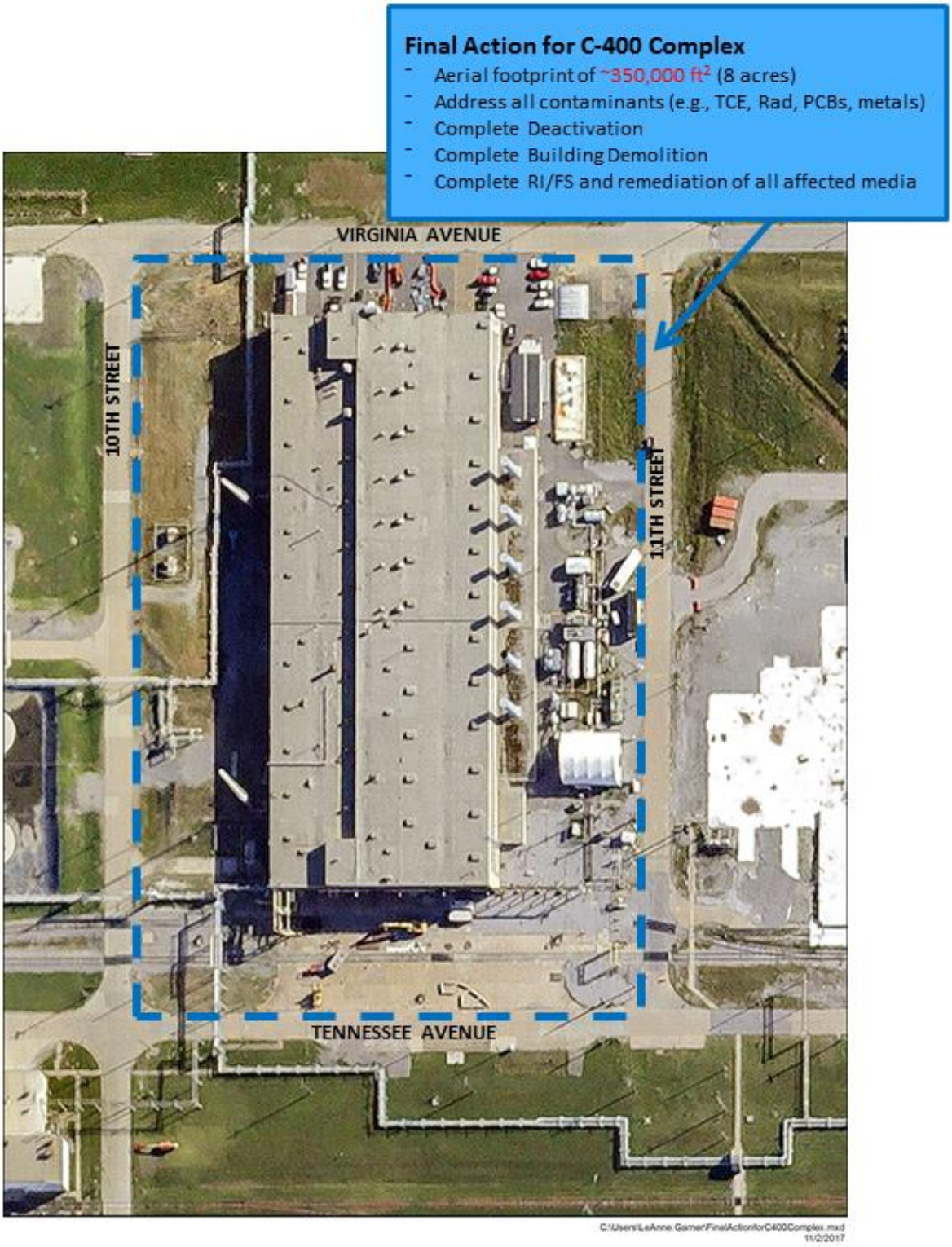

Figure 3.3. C-400 Complex—Scope of Final Action

The C-400 Complex action has been prioritized in the cleanup schedule. The following is the scope.

- CERCLA Non-Time-Critical Removal Action (NTCRA) consisting of demolition of the C-400 Building structure. The building foundation (i.e., slab) will remain in place.

- CERCLA Final Remedial Action consisting of the following:

  — Conduct a combined Remedial Investigation/Feasibility Study (RI/FS) for the C-400 Complex area that includes an investigation of all remaining building structure(s) (e.g., slab and subsurface structures) and releases of any hazardous substances to soils and groundwater associated with the C-400 Building and C-400 Complex area operations (including, but not limited to, TCE DNAPL and high concentration TCE contamination areas considered PTW).

  — RI characterization to define the full nature and extent of all contamination from the surface down through the RGA and to include the upper McNairy.

  — Remedy selection (proposed plan and ROD) to document a final remedial action(s) for all source areas and COCs requiring remediation for the entire C-400 Complex.

  — Post-ROD documents (e.g., remedial design report, remedial action work plan) and implementation of a final remedial action(s) as specified in the ROD.

Key DOE Planning Assumptions from Life Cycle Baseline

The following elements summarize DOE's key planning assumptions for the C-400 Complex area.

(1) Sequencing of work will occur in the following order:

   a. Complete C-400 Building deactivation using DOE's Atomic Energy Act authority;

   b. Demolition of the C-400 Building structure as a CERCLA NTCRA [the building foundation (i.e., slab) will remain in place];

   c. Conduct an RI/FS (including fieldwork) following completion of building demolition;

   d. Implement the final remedial action(s) for the entire C-400 Complex, including the Phase IIb area; and

   e. Address Phase IIb Interim Action source area (as described in the Remedial Action Work Plan for the interim ROD) as part of this final remedial action. All completed work associated with the Phase I and Phase IIa will be documented in a Remedial Action Completion Report.

(2) The final remedial action assumes to include the following:

   a. Addressing all sources of contamination including, but not limited to, PTW (e.g., TCE DNAPL and high concentration TCE contamination) in the UCRS and RGA to include the upper McNairy, within the C-400 Complex OU, based on the results of the RI/FS.

   b. Soils and slabs within the C-400 Complex will be addressed based on the results of the RI/FS. The current planning assumption is excavation of the contaminated media and slabs.

c. Dissolved-phase groundwater contamination will be addressed as part of the Dissolved-Phase Plumes Remedial OU.

BURIAL GROUNDS OPERABLE UNIT

In order to facilitate the development of subsequent documents, the FFA parties have agreed to group the Burial Grounds OU (BGOU) SWMUs into more manageable remedial action subprojects.

The BGOU will employ the CERCLA remedial process to accomplish the following goals (based on February 10, 2012, BGOU dispute resolution):

- Contribute to protection of groundwater by eliminating, reducing, or controlling sources of groundwater contamination;

- Prevent exposure to waste and contaminated soils that present an unacceptable risk from direct contact; and

- Treat or remove PTW wherever practicable, consistent with 40 *CFR* § 300.430(a)(1)(iii)(A).

The following are the SWMU-specific RAOs for SWMUs 5 and 6.

- Contribute to the protection of groundwater by eliminating, reducing, or controlling sources of groundwater contamination that will result in an exceedance of the MCL or risk-based concentration for residential use of groundwater in the absence of an MCL in RGA groundwater.

- Prevent exposure to waste or waste-related contaminated soils that exceed target cumulative excess lifetime cancer risks (ELCRs) and cumulative noncancer hazard indices (HIs) for the future industrial and future outdoor worker receptors. The acceptable cumulative risk levels for this RAO are defined as follows:

  — Surface Soil: cumulative ELCR < 1E-05 and cumulative HI ≤ 1 for a future industrial worker
  — Subsurface Soil: cumulative ELCR < 1E-04 and cumulative HI ≤ 1 for an future outdoor worker

The following are the SWMU-specific RAOs for SWMUs 2, 3, 7, and 30.

- Contribute to the protection of groundwater by eliminating, reducing, or controlling sources of groundwater contamination that could result in an exceedance in RGA groundwater of the MCL (or risk-based concentration for residential use of groundwater in the absence of an MCL).

- Prevent exposure to waste that exceeds target cumulative ELCRs and cumulative noncancer HIs for the future excavation worker receptor. The acceptable cumulative risk levels for this RAO are defined as follows:

  — Waste: cumulative ELCR < 1E-05 and cumulative HI ≤ 1 for a future excavation worker [considering a five-year exposure based upon the outdoor worker scenario in the 2013 Risk Methods Document]

- Prevent exposure to contaminated soils that exceed target cumulative ELCRs and cumulative noncancer HIs for the future industrial and future excavation worker receptors. The acceptable cumulative risk levels for this RAO are defined as follows:

— Surface Soil: cumulative ELCR < 1E-05 and cumulative HI ≤ 1 for a future industrial worker [considering default exposures in the 2013 Risk Methods Document]

— Surface and Subsurface Soil: cumulative ELCR < 1E-05 and cumulative HI ≤ 1 for a future excavation worker [considering a five-year exposure based on the outdoor worker scenario in the 2013 Risk Methods Document]

- Treat or remove PTW wherever practicable, consistent with 40 § *CFR* 300.430 (a)(1)(iii)(A).

The SWMU-specific RAOs for SWMU 4 have been recommended in the RI/FS and will be developed further in the FS, which currently is under review and finalization.

BGOU Remedial (10 SWMUs)

Scope

The BGOU consists of the following 10 SWMUs:

- C-749: Uranium Burial Ground (SWMU 2)
- C-404: Low-Level Radioactive Waste Burial Ground (SWMU 3)
- C-747/748-B: Contaminated Burial Ground (SWMU 4)
- C-746-F: Burial Ground (SWMU 5)
- C-747-B: Burial Area (SWMU 6)
- C-747-A: Burial Ground and Burn Area (SWMUs 7 and 30)
- Residential/Inert Borrow Area/Old North-South Diversion Ditch (NSDD) Disposal Trench (SWMU 145)
- C-746-S: Residential Landfill (SWMU 9)[3]
- C-746-T: Inert Landfill (SWMU 10)[3]

Based on review of existing disposal records and sample data, the burial grounds contain various types of materials such as sanitary and/or hazardous waste; however, the known contents of each individual burial ground are specific to the material that was disposed of within the burial ground and are described in the specific CERCLA documents for each burial ground. Some of the burial grounds contain PTW that has released or may in the future release to soils and groundwater. Surface soil within BGOU SWMUs is being addressed by BGOU rather than Soils OU.

This burial grounds project is grouped as follows: (1) SWMUs 5 and 6; (2) SWMUs 2, 3, 7, and 30; (3) SWMU 4; and (4) SWMUs 9, 10, and 145. To facilitate phased implementation of remedial action, SWMUs 2, 3, 7, and 30 will be divided further, and separate CERCLA documents (i.e., proposed plan,

[3] Previously closed under solid waste regulations (C-746-T closed on 2/9/95; C-746-S closed on 8/4/95).

ROD, remedial design work plan, remedial design report, remedial action work plan, and remedial action completion report) will be developed for SWMUs 2 and 3 and SWMUs 7 and 30.

Key DOE Planning Assumptions from Life Cycle Baseline

(1) Based on DOE's recent reprioritization and proposal to focus near-term cleanup efforts on the C-400 Complex, finalization of the decision documents and implementation of any necessary CERCLA response actions for the BGOU will be resequenced to an out-year activity. The resequencing provides for any excavation activities (if that alternative is selected) to coincide with availability of a potential on-site waste disposal facility (OSWDF). The resequencing also assumes the OSWDF alternative would be identified and selected as the preferred alternative under the waste disposal alternatives (WDA) project.

(2) A supplemental RI and the associated RI Report Addendum will precede the SWMUs 9, 10, and 145 FS.

(3) SWMU 2, SWMU 3, SWMU 4, and SWMU 7 contain PTW.

(4) Soil cover (18-inch) is expected to be included in the remedy selected for SWMU 145.

(5) SWMUs 5 and 6 are expected to implement a Kentucky Subtitle D cap if containment is selected as the final remedy.

(6) SWMUs 7 and 30 are expected to implement a Kentucky Subtitle D cap if containment is selected as the final remedy.

(7) SWMUs 9 and 10 will be evaluated as part of the CERCLA process. Currently only limited actions (e.g., continue current solid waste landfill closure activities) are assumed to be required in the baseline for SWMUs 9 and 10.

(8) Post-closure monitoring data are assumed to substantiate that capping remedies will provide long-term effectiveness, and supplemental remedial actions will not be required.

(9) A groundwater monitoring system at each SWMU (e.g., upgradient and downgradient) will be employed to provide indication of future unanticipated releases and collect data on the effectiveness of the caps and *in situ* actions.

Additional Burial Grounds

Scope

This project includes the remaining burial grounds, as identified in Appendix 4 under Additional Burial Grounds. Currently there are two units identified: SWMU 472 and SWMU 520. The project scope includes the management, planning, assessments, CERCLA documents, RIs, final remedial actions per an approved ROD, and preparation of required completion documentation.

Key DOE Planning Assumptions from Life Cycle Baseline

(1) Based on DOE's recent reprioritization and proposal to focus near-term cleanup efforts on the C-400 Complex, finalization of the decision documents and implementation of any necessary CERCLA response actions for the BGOU will be resequenced to an out-year activity. The

resequencing provides for any excavation activities (if that alternative is selected) to coincide with availability of a potential OSWDF. The resequencing also assumes the OSWDF alternative would be identified and selected as the preferred alternative under the WDA project.

(2) Conduct an RI and FS (including fieldwork) for SWMU 472 and SWMU 520.

(3) Complete the necessary CERCLA documents supporting remedy selection (e.g., Proposed Plan, ROD) and remedial design.

(4) It is assumed that these SWMUs are not contributing to groundwater contamination.

(5) The assumed remedial action for these SWMUs is excavation and disposal in a potential OSWDF (if selected).

SURFACE WATER OPERABLE UNIT

The Surface Water Operable Unit (SWOU) is being implemented in a phased approach consisting of a series of sequenced remedial and removal actions designed to accomplish the following goals:

(1) Prevent human exposure to contaminated sediments presenting an unacceptable risk to on-site workers and off-site recreational users of surface water;

(2) Prevent or minimize further off-site migration of contaminated sediments and surface water;

(3) Reduce, control, or minimize contaminant sources contributing to sediment and surface water contamination; and

(4) Evaluate and select long-term solutions for off-site surface water contamination to protect recreational users and ecological receptors.

A series of actions already have been completed toward meeting these goals, as depicted in Figure 3.4. The previous actions are summarized in Appendix 1 (Actions Taken to Date).

The SWOU consists of the specific SWMUs and areas of concern (AOCs) identified in Appendix 4 (Source Area by Operable Unit), and includes the soils/sediments and storm water corresponding with the points of discharge from facility piping to ditches, outfalls and Bayou and Little Bayou Creeks. Metals, radionuclides, and PCBs are the likely contaminants of interest for the SWOU.

Surface Water Remedial Action

Scope

The scope of this project includes an RI and FS remedy selection and implementation of any necessary response actions for on- and off-site areas, including Bayou Creek; Little Bayou Creek; Outfalls 001, 002, 008, 009, 010, 011, 012, 013, 015, and 016 and associated internal ditches; and Sections 3, 4, and 5 of the North-South Diversion Ditch; as well as scoping for and completion of a baseline ecological risk assessment for PGDP. This OU also will address the five outfalls formerly identified in the Lagoons and Ditches OU (Outfalls 005, 006, 017, 019 and 020). The Surface Water Remedial Action includes evaluation of all areas with ditches from PGDP that drain to Bayou and Little Bayou Creeks to the Ohio River, including those areas previously addressed in the SWOU Removal Action. The timing and sequence of any remedial actions will require coordination with ongoing site activities, including

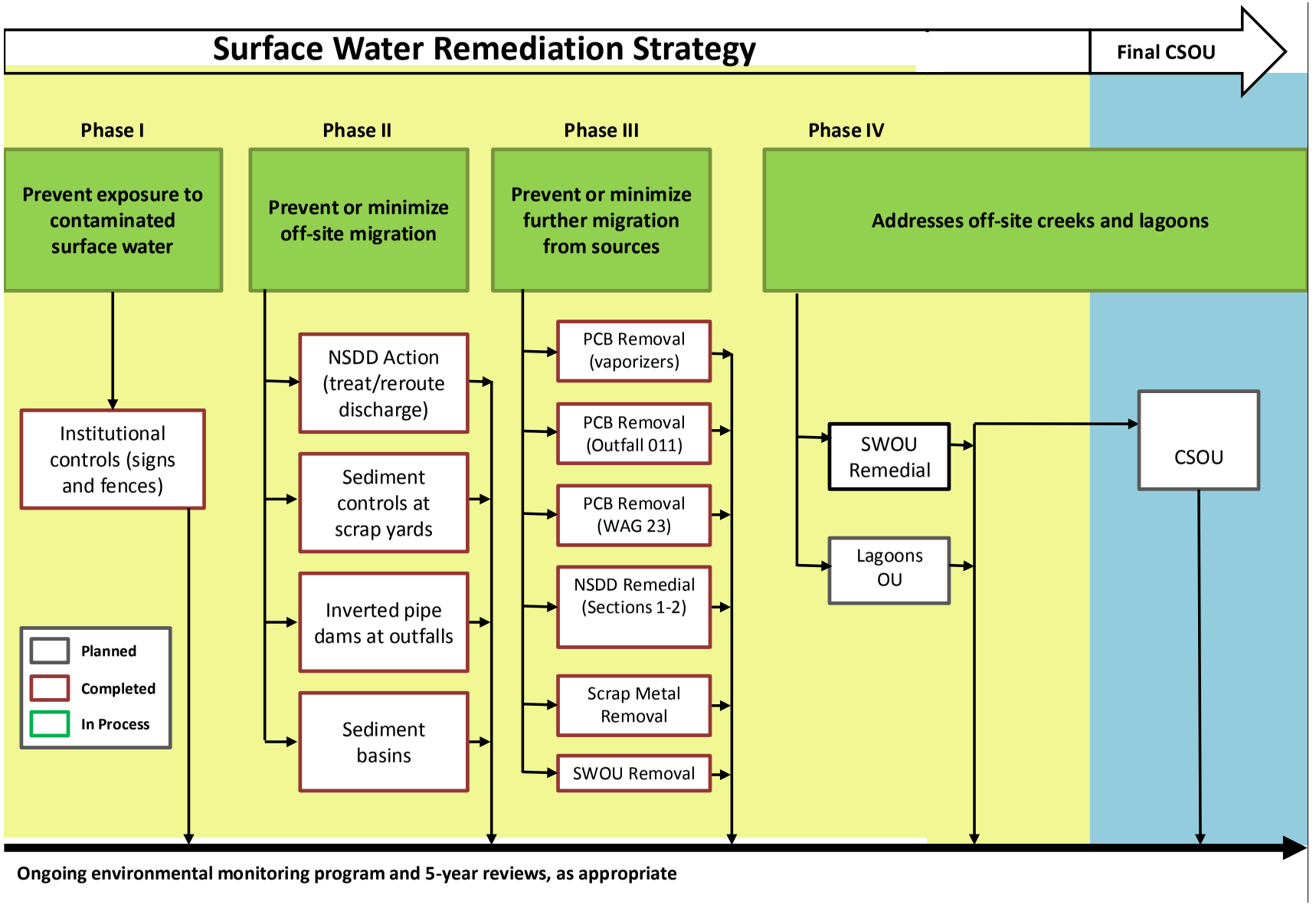

Figure 3.4. Surface Water Remediation Strategy

Depleted Uranium Hexafluoride (DUF_6) operations to prevent recontamination and consideration of ongoing permitted discharges. The SWOU will address contaminated media (e.g., surface water and sediments) associated with ditches and creeks as part of the remedial action consistent with the NCP and EPA guidance. A final remedial action decision for the lagoons will be addressed as part of the Lagoons OU.

Key DOE Planning Assumptions from Life Cycle Baseline

(1) Based on DOE's recent reprioritization and proposal to focus near-term cleanup efforts on the C-400 Complex, finalization of the decision documents and implementation of any necessary CERCLA response actions for the SWOU will be resequenced to an out-year activity. The resequencing provides for any excavation activities (if that alternative is selected) to coincide with availability of a potential OSWDF. The resequencing also assumes the OSWDF alternative would be identified and selected as the preferred alternative under the WDA project.

(2) RI characterization will be conducted in a phased approach, with uranium-238, cesium-137, and Total PCBs being used as indicator parameters during the first phase, and will be followed by a more comprehensive list of analyte sampling (i.e., PCBs, metals, radionuclides, and volatile organic analytes during the second phase to be used for risk assessment).

(3) DOE's current baseline and budget assume that the use of existing data will be sufficient for final characterization; however, EPA and Kentucky have raised concerns, based upon the extended time frame for implementation of the RI and FS and the potential for changing site conditions as a result of plant activities, that the collection of additional samples is warranted. The FFA parties agree to revisit the scope of characterizing the internal ditches prior to implementation of the RI and FS Work Plan.[4]

(4) Little Bayou Creek and Bayou Creek will be investigated to the confluence with the Ohio River.

(5) Biota sampling will be required to support an ecological risk assessment for off-site portions of the SWOU.

(6) The assumed remedial action is excavation of contaminated sediments in outfalls and creeks and will involve coordination with the U.S. Army Corps of Engineers. No operation and maintenance (O&M) period is assumed to be needed to achieve RAOs.

(7) The RI/FS Work Plan is comprehensive, encompassing all components of the SWOU remedial action; however, the document is divided by watershed (Little Bayou Creek and Bayou Creek) to support independent execution of sampling and documentation of results by watershed.

(8) A sitewide ecological risk assessment will be completed for both watersheds and included within the RI/FS Report.

(9) Individual FSs, Proposed Plans, RODs, Remedial Design Work Plans, Remedial Design Reports, Remedial Action Work Plans, and Remedial Action Completion Reports may be developed and submitted per watershed.

[4] Existing information for internal ditches will be used for characterization. Additional sampling will focus primarily on areas between the KPDES compliance points and drainage into Little Bayou Creek and Bayou Creek.

(10) Investigation and remediation of the seep areas along Little Bayou Creek will be addressed as part of the GWOU.

LAGOONS OPERABLE UNIT

Scope

This OU consists of the specific SWMUs and AOCs identified in Appendix 4 (Source Area by OU). It includes both process and water treatment system lagoons and associated soils/sediments. This OU includes the lagoons identified in Appendix 4 under Lagoons OU. Currently, six lagoons are identified (SWMU 17, SWMU 18, SWMU 21, SWMU 22, SWMU 23, and SWMU 171). This OU will address the primary inputs to the outfalls to ensure no risk pathway will continue to contribute contamination to the PGDP outfalls once the remedial actions are completed. For example, the C-613 Sedimentation Basin will be addressed to the extent that no recontamination pathway exists. The project scope includes the management, planning, assessments, CERCLA documents, RIs, final remedial actions per an approved ROD, and preparation of required completion documentation.

Key DOE Planning Assumptions from Life Cycle Baseline

(1) Based on DOE's recent reprioritization and proposal to focus near-term cleanup efforts on the C-400 Complex, finalization of the decision documents and implementation of any necessary CERCLA response actions for the Lagoons OU will be resequenced to an out-year activity. The resequencing provides for any excavation activities (if that alternative is selected) to coincide with availability of a potential OSWDF. The resequencing also assumes the OSWDF alternative would be identified and selected as the preferred alternative under the WDA project.

(2) Radionuclides, metals, and PCBs are the primary COCs. Other COCs will be considered on a case-by-case basis.

(3) RI characterization will be conducted for each lagoon to determine the individual contaminants or radionuclides of potential concern (COPCs).

(4) The assumed remedial action is excavation of contaminated sediments in the lagoons and disposed in a potential OSWDF (if selected). The areas may be backfilled with clean soil or graded for natural sloping and runoff, depending on the verification sampling results. No O&M period is assumed to be needed to achieve RAOs.

(5) The RI/FS Work Plan is comprehensive, encompassing all components of the remedial action.

(6) The RI data will support the sitewide ecological risk assessment conducted as part of the SWOU Remedial Action.

(7) Complete the necessary CERCLA documents supporting remedy selection (e.g., Proposed Plan, ROD) and remedial design.

(8) The OU may be divided further into OUs for the C-616-E and C-616-F Lagoons and the C-611 Water Treatment Plant Lagoons due to the timing of shutdown for the two systems being independent of each other. The outfalls formerly under this OU have been moved and will be addressed as part of the SWOU Remedial Action.

SOILS OPERABLE UNIT

The Soils OU has been implemented in a phased approach consisting of remedial and removal actions to accomplish the following goals:

- Prevent human exposure to contamination presenting an unacceptable risk;
- Prevent or minimize further off-site migration; and
- Reduce, control, or minimize contaminated soil hot spots contributing to off-site contamination.

The original scope of the Soils OU consisted of 86 SWMUs/AOCs; three inactive facilities (SWMUs 181, SWMU 40, and SWMU 19); and the soil/rubble areas that have been identified to date. The scope of the removal action for two of the three inactive facilities has been completed, except excavation of contaminated soil at the C-403 Neutralization Tank (SWMU 40). SWMU 40 will be addressed as part of the C-400 OU Complex. The scope for the soil/rubble areas also has been completed. During the development of the RI/FS Work Plan/Report, it was determined that only 63 of the 86 SWMUs/AOCs included within the original scope could be addressed under this OU, based upon accessibility. Those SWMUs/AOCs identified as inaccessible will be addressed as part of the Soils and Slabs OU scope.

The Soils OU scope focuses on accessible plant surface soils (ground surface to 10 ft bgs and 16 ft bgs in the vicinity of pipelines) not associated with PGDP operations. Sequencing of the work will be determined based on OU-specific circumstances, as mutually agreed by the FFA parties.

A series of Soils OU actions has been completed to date (See Figure 3.5). These previous actions are summarized in Appendix 1 (Actions Taken to Date).

Soils OU Remedial Action

Scope

The scope of this project includes an RI and FS remedy selection, and implementation of any necessary response actions for the 63 SWMUs/AOCs listed in Appendix 4. Sites are included in this OU based on the expectation that they primarily pose a direct contact threat to on-site industrial workers and likely are not a migration threat to groundwater or surface water. The project has incorporated results from previous actions and sitewide evaluations/surveys. Results of the Soils OU RI will be used in scoping for and completion of the baseline ecological risk assessment conducted under the SWOU.

Key DOE Planning Assumptions from Life Cycle Baseline

(1) Based on DOE's recent reprioritization and proposal to focus near-term cleanup efforts on the C-400 Complex, finalization of the decision documents and implementation of any necessary CERCLA response actions for the Soils OU will be resequenced to an out-year activity. The resequencing provides for any excavation activities (if that alternative is selected) to coincide with availability of a potential OSWDF. The resequencing also assumes the OSWDF alternative would be identified and selected as the preferred alternative under the WDA project.

(2) SWMU 27 was sampled as part of Soils RI. Based upon the sampling results, the contents of the tank were removed to the extent practicable and disposed of in accordance with the approved Time-Critical Removal Notification. A remedial decision for SWMU 27 will be selected as part of the Soils and Slabs OU.

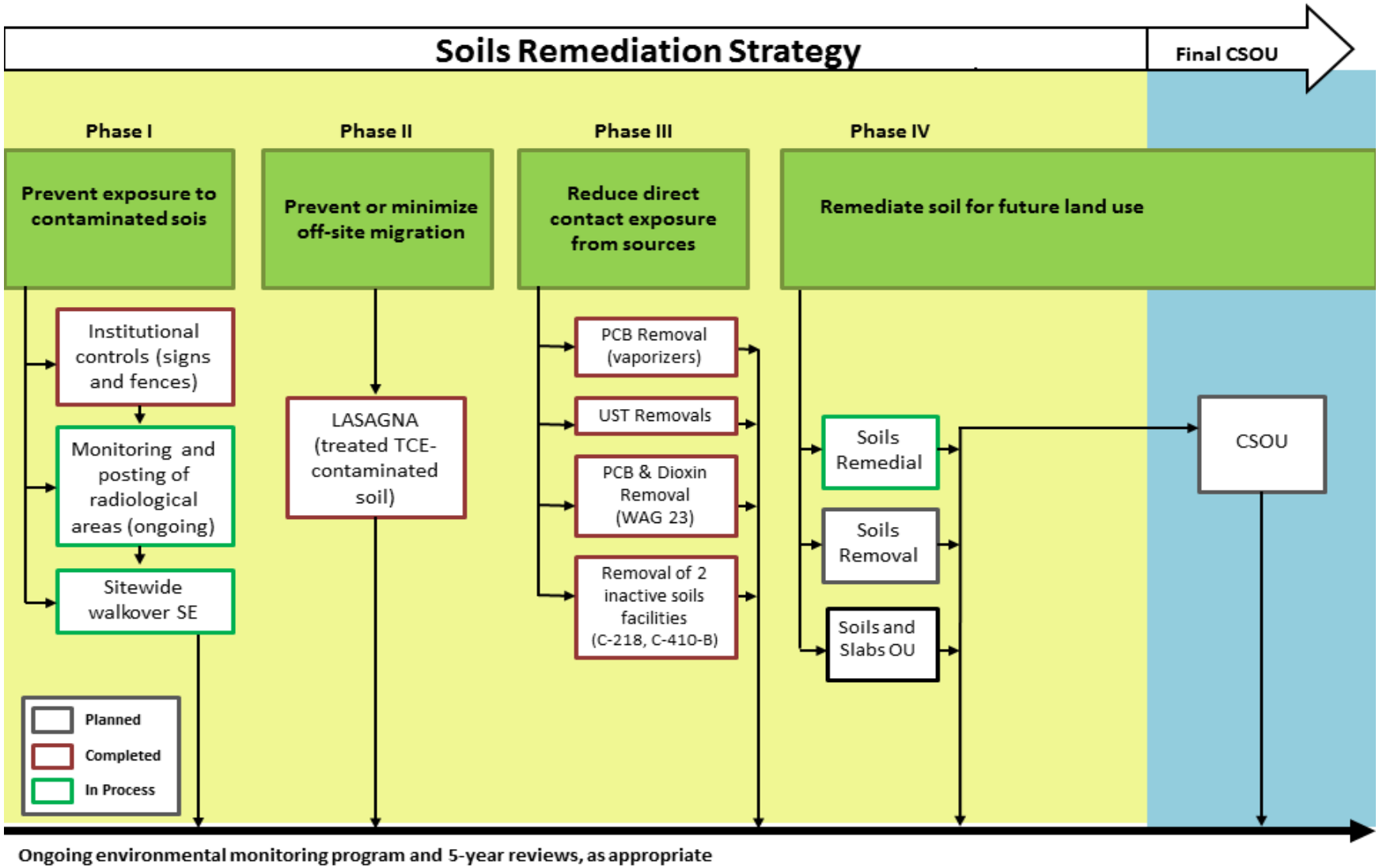

Figure 3.5. Soils Remediation Strategy

(3) SWMUs requiring action will be evaluated in multiple FSs that will focus on the following likely response actions: no action, institutional controls, and excavation. Individual Proposed Plans, RODs, Remedial Design Work Plans, Remedial Design Reports, Remedial Action Work Plans, and Remedial Action Completion Reports may be developed and submitted per grouping. It is currently anticipated that the Soils Remedial Action may be divided into two groupings based upon investigation results. Once the RI data are evaluated, the proposed two groupings may be combined or divided further.

(4) Targeted excavation is the assumed remedy with the majority of the waste being placed in a potential OSWDF (if selected).

Soils OU Removal Action

Scope

This project is contingent upon new sampling results of the RI or newly identified release information for the Soils OU Remedial Action. Scope will include addressing any of the Soils OU SWMUs/AOCs that warrant a removal action. SWMU 27 was the only soil SWMU/AOC that had been identified that required removal action. The following assumptions will remain for project planning purposes should additional soil removal actions be required in the future.

Key DOE Planning Assumptions from Life Cycle Baseline

(1) A single engineering evaluation/cost analysis and Action Memorandum will be developed and submitted for those SWMUs requiring removal action.

(2) Separate Removal Action Reports may be developed.

(3) A time-critical removal action is not warranted.

SOILS AND SLABS OPERABLE UNIT

Scope

This OU includes the units identified in Appendix 4 Soils and Slabs OU. This OU also includes soil units that were determined to be inaccessible during development of the Soils OU RI/FS Work Plan/Report. Other units have been included in this OU for slabs and underlying soils for demolished facilities. The project scope includes the management, planning, assessments, CERCLA documents, RIs, final remedial actions per an approved ROD, and preparation of required completion closure documentation. Each unit in this OU will be evaluated through the CERCLA process. This OU will be segregated into multiple subprojects. The combination and number of units within each will be defined prior to implementation to take advantage of opportunities that may arise to address a limited subset of units.

For planning purposes, the property under control of DOE has been divided into 17 geographical areas (GAs) to assist in the focus of long-term planning efforts for DOE property (See Figure 3.6). GAs are artificial boundaries established for the purpose of planning and evaluating areas for DOE property transfer consistent with 120(h) of CERCLA, deactivation and decommissioning, and remediation integration. No facilities or SWMUs/AOCs are located completely within two of the larger GAs (GA 3 and GA 7). GA 6 does not contain any facilities and GA 8 includes a minimal number of facilities

associated with permitted landfill operations. Figure 3.6 also includes five sites that have been considered for a potential on-site waste disposal facility (Site 1, 5A, 3A, 9, 11). These have been included for reference purposes only. For planning purposes, the Soils and Slabs OU is using these geographical divisions to plan and group the actions that will address the remaining balance of plant soils and slabs.

Key DOE Planning Assumptions from Life Cycle Baseline

(1) Based on DOE's recent reprioritization and proposal to focus near-term cleanup efforts on the C-400 Complex, finalization of the decision documents and implementation of any necessary CERCLA response actions for the Soils and Slabs OU will be resequenced to an out-year activity. The resequencing provides for any excavation activities (if that alternative is selected) to coincide with availability of a potential OSWDF. The resequencing also assumes the OSWDF alternative would be identified and selected as the preferred alternative under the WDA project.

(2) Radionuclides, metals, VOCs, and PCBs are the primary COCs. Other COCs will be considered on a case-by-case basis, based on process knowledge.

(3) The SWMUs that require an RI will be evaluated in multiple FSs that will focus on the following likely response actions: no action, institutional controls, and excavation. Additional SWMUs may be identified as facilities are demolished, based on analytical data of the slab and/or surrounding soils or process knowledge that there was a release or high probability of release that would have impacted the soils around or under the slab. SEs will be conducted for those GAs where there has been a known or potential threat of release.

(4) RI characterization will be conducted to identify the individual COPCs.

(5) The assumed remedial action is excavation of contaminated soils and slab and disposed in a potential OSWDF (if selected). The areas may be backfilled with clean soil or graded for natural sloping and runoff, depending on the verification sampling results. No O&M period is assumed to be needed to achieve RAOs.

(6) The RI/FS Work Plan is comprehensive, encompassing all components of the remedial action.

(7) Complete the necessary CERCLA documents supporting remedy selection (e.g., Proposed Plan, ROD) and remedial design.

(8) The baseline assumption for the CERCLA remedial action scope for GAs includes identified SWMUs/AOCs in the Soils and Slabs OU and facility slabs and associated soils where there was a potential threat of release. The results of the SE and scoping will determine the appropriate CERCLA action; however, for planning purposes, the RI and FS process through Remedial Action Completion is assumed for Gas, except for GA 3, GA 6, GA 7, and GA 8. GA 3 and GA 7 do not have facilities or currently identified SWMU/AOCs; therefore, no planning documents are included. GA 6 and GA 8 include a few discrete SWMUs/AOCs that are covered by other OUs; therefore, no planning documents are included.

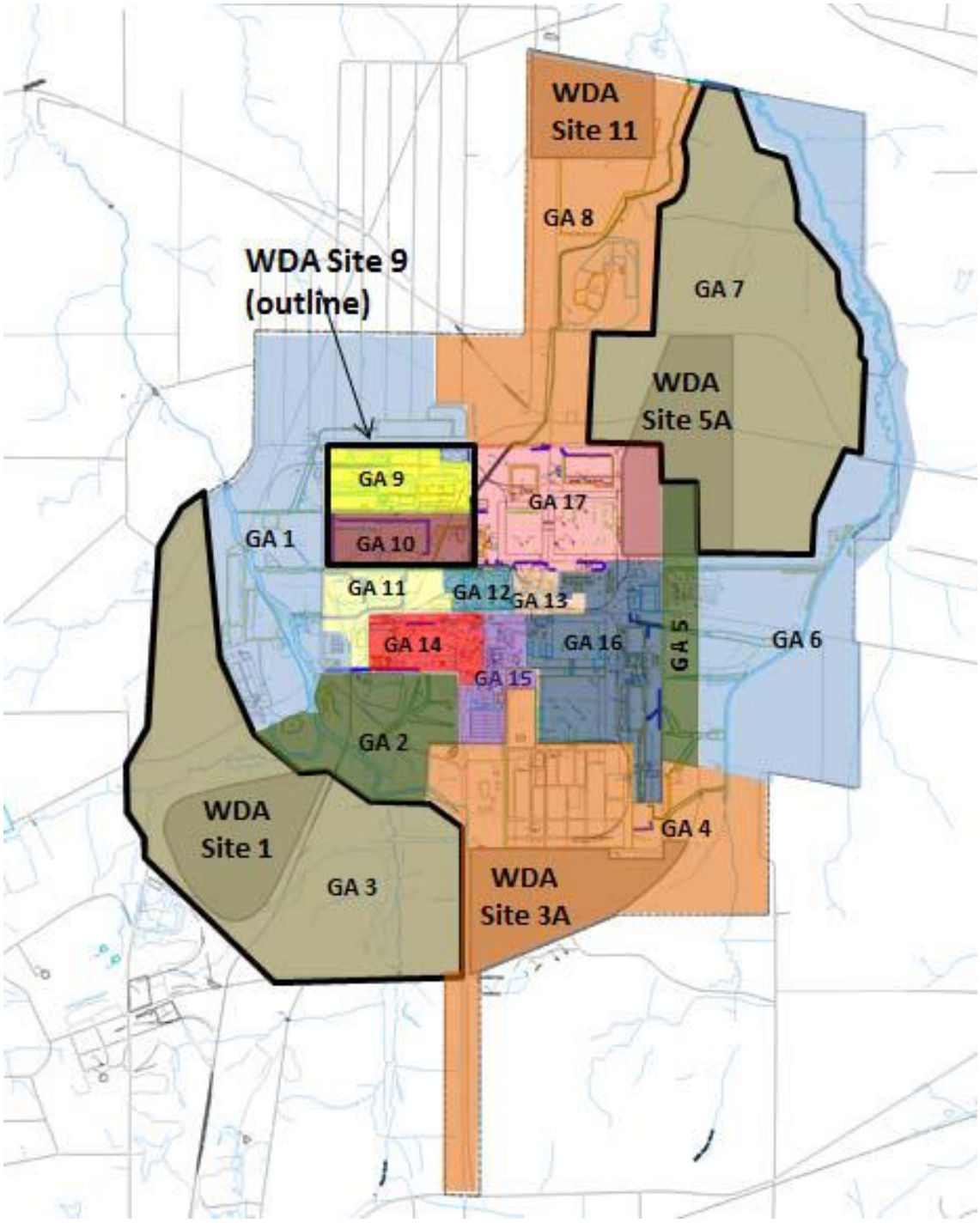

Figure 3.6. DOE Property Geographical Areas

FACILITY D&D OPERABLE UNIT

For the Decontamination and Decommissioning (D&D) OU under the SMP, this OU includes decommissioning activities as defined in the joint policy issued under a DOE and EPA Memorandum dated May 22, 1995, *Policy on Decommissioning DOE Facilities under CERCLA*. Disposition of the GDP consists of two phases: 1) the DOE facilities that were inactive and scheduled for D&D Pre-GDP shutdown, and 2) the facilities previously leased to USEC and/or other DOE facilities planned for D&D after shutdown of the GDP. As part of the lease turnover requirements, USEC was required to (1) shutdown the GDP properly; (2) perform limited deactivation of the USEC leased operations; (3) place the leased operations into a safe, secure condition and remove any immediate threats to human health and safety; (4) remove all USEC waste, including any hazardous waste; and (5) remove USEC-owned property not accepted by DOE under the terms of the lease turnover.

D&D OPERABLE UNIT (PRE-GDP SHUTDOWN)

This OU consisted of 17 inactive facilities (15 small inactive facilities, C-340 Complex, and C-410/C-420 Complex). The completion of the C-410/C-420 Complex in FY 2016 marks the completion of the D&D OU Pre-GDP shutdown scope. Decommissioning of CERCLA facilities completed to date is summarized in Appendix 1 (Actions Taken to Date).

REMAINING D&D OPERABLE UNIT

DOE is proceeding with deactivation work of the remaining facilities not operating to support DOE site activities. The joint policy issued under a DOE and EPA Memorandum dated May 22, 1995, *Policy on Decommissioning DOE Facilities under CERCLA*, establishes a framework for conducting of decommissioning of DOE facilities and provides guidance to EPA Regions and DOE Operations Offices on the use of CERCLA response authority to decommission DOE facilities. Key elements of the Policy provide for the following:

- DOE to conduct CERCLA removal SEs to determine whether a substantial threat of a release exists that warrants a CERCLA NTCRA to protect public health, welfare, or the environment, unless the circumstances at the facilities make in inappropriate;

- DOE to consult with EPA in attempt to reach consensus on decisions regarding the use of CERCLA response actions; and

- Conducting demolition of facilities that pose a substantial release threat as CERCLA NTCRA.

The Policy states that DOE is required to conduct a removal SE in accordance with the NCP and the requirements of any interagency agreements (i.e., FFA). Section IX. (Site Evaluation) of the FFA requires that DOE conduct integrated SEs upon discovery of an area with potential or known release. The FFA further requires DOE to provide the removal SE Reports as part of the removal notification to EPA and KY for review and approval for NTCRAs.

For purposes of implementing this OU strategy, the "facilities" DOE will evaluate for inclusion in the Remaining D&D OU will consist of those permanent structures supported by a concrete slab and/or foundation that have a history of industrial operations. To support this process, 681 DOE properties/structures listed on the PGDP Site Map (Rev. 6) were reviewed and underwent an evaluation to identify those properties/structures that met the above definition of "facilities" [See Appendix 8 (FY 2018 SMP)]. The following categories were established as a result of the evaluation.

- Industrial Facilities that DOE has determined pose a potential threat of release of hazardous substances to the environment that warrant demolition or a removal SE. These facilities are listed as part of the D&D OU in Appendix 4.

- Administrative, nonindustrial, support facilities that have no potential for release and are not subject to a CERCLA response action under the FFA.

- Balance of Plant Facilities are those facilities pending future CERCLA determinations regarding a release or potential threat of release. A process will be scoped in support of the FY 2019 SMP for these facilities. These facilities are listed in Appendix 6.

For those facilities that require a CERCLA response action, NTCRAs will be utilized for demolition, where warranted.[5]

For those industrial facilities in Appendix 4 that require a removal SE, DOE will submit a report within 120 days (or other time frame agreed to by the FFA parties) after completion of deactivation. The SE Report will document any known release or threat of any release from those buildings and the magnitude of the threat of release (i.e., whether there is a substantial threat of release). The SE Report shall state whether demolition of the facility should be conducted using a CERCLA NTCRA and will serve to designate any facility or portions thereof that are related to any identified release as a SWMU and/or AOC. If a facility was designated previously in its entirety as a SWMU/AOC requiring CERCLA Action, DOE may use the existing SE, update or conduct a new SE, or include the SE as part of the removal notification for the NTCRA.

Administrative, nonindustrial support facilities have been identified as having no potential for release. Consequently, these administrative, nonindustrial support facilities will not be included as part of the D&D OU scope. DOE reviewed and evaluated the historical and current information to support the conclusion that these facilities do not pose a threat of release. DOE has documented those facilities and relevant information in a listing that has been placed into the administrative record file and into the FY 2018 SMP as Appendix 8. These facilities will not be decommissioned under CERCLA. DOE will complete demolition of these administrative/support facilities under applicable laws, regulations, and DOE requirements. As agreed to by the FFA parties, no further consultation with the agencies under the FFA will be conducted for these facilities.

Because DOE is in the early stages of deactivation, the listing and categorization in the appendices will be updated to reflect the current status and information with each SMP update. For planning purposes, the D&D OU is using the same geographical divisions described in the Soils and Slabs OU to plan and group the actions that will address the balance of plant facilities soils and slabs for those determined to be in the D&D OU.

Key DOE Planning Assumptions from Life Cycle Baseline

(1) Based on DOE's recent reprioritization and proposal to focus near-term cleanup efforts on the C-400 Complex, finalization of the decision documents and implementation of any necessary CERCLA response actions for the Remaining D&D OU will be resequenced to an out-year activity. The resequencing provides for any excavation activities (if that alternative is selected) to coincide

[5] The D&D OU will employ the CERCLA removal action process to administer decommissioning activities of excess buildings (i.e., inactive with no reuse potential) that have a known or potential release of contamination to the environment. The 1995 DOE and EPA "Memorandum: Policy on Decommissioning DOE Facilities under CERCLA," establishes that decommissioning activities will be conducted as NTCRAs, unless the circumstances at the facilities make it inappropriate.

with availability of a potential OSWDF. The resequencing also assumes the OSWDF alternative would be identified and selected as the preferred alternative under the WDA project.

(2) Radionuclides, metals, and PCBs are the primary COCs. Other COCs will be considered on a case-by-case basis based on process knowledge.

(3) An SE will be conducted for facilities in Appendix 4 within 120 days from completion of deactivation for each facility.

(4) CERCLA NTCRAs will be conducted for Appendix 4 facilities that already have been designated for demolition down to slab. Contaminated slabs and associated underlying soils will be incorporated into the Soils and Slabs OU. Waste will be dispositioned in either a potential OSWDF (if selected) or non-CERCLA disposal facility.

(5) CERCLA NTCRAs will be conducted for a portion of Appendix 6 facilities demolition down to slab. Contaminated slabs and associated underlying soils will be incorporated into the Soils and Slabs OU for those facilities requiring CERCLA NTCRAs, based on information from the SE. Waste from Appendix 6 facilities that are dispositioned under CERCLA will be disposed in a potential OSWDF (if selected) or non-CERCLA disposal facility. Waste from Appendix 6 facilities that are not dispositioned under CERCLA will be disposed in a non-CERCLA disposal facility as the most cost effective option.

(6) Administrative, nonindustrial support facilities will not undergo demolition under CERCLA; however, these facilities will be demolished and dispositioned under applicable laws, regulations, and DOE requirements. Facility waste will be disposed of in non-CERCLA disposal facility as the most cost-effective option.

(7) The CERCLA scope for GAs will include only those facilities that have been determined to pose a potential threat of release. GA 1, GA 10, GA 13, and GA 14 currently are the only ones that include facilities where a potential threat of release during demolition has been determined. The remaining GAs plus Buildings C-750 and C-360 have not undergone deactivation, and the evaluation is not yet complete. GA 3, GA 6, and GA 7 do not have facilities. GA 8 includes only C-746-U Landfill support buildings determined not to pose a threat of release, and the buildings will be completed with the landfill closure activities.

DUF_6 FOOTPRINT UNDERLYING SOILS OPERABLE UNIT

Scope

This OU includes the units identified in Appendix 4 under DUF_6 Footprint Underlying Soils OU. This OU currently has 5 SWMUs that are located beneath or immediately adjacent to the DUF_6 facility. These units existed prior to construction of the DUF_6 facility; as such, the scope of this OU is limited only to those SWMUs. The scope does not include D&D or remediation of the currently operating DUF_6 facility.

The project scope includes the management, planning, assessments, CERCLA documents, RIs, final remedial actions per an approved ROD, and preparation of required completion closure documentation. Each unit in this OU will be evaluated through the CERCLA process.

Key DOE Planning Assumptions from Life Cycle Baseline

(1) Based on DOE's recent reprioritization and proposal to focus near-term cleanup efforts on the C-400 Complex, finalization of the decision documents and implementation of any necessary CERCLA response actions for the DUF_6 OU will be resequenced to an out-year activity. The resequencing provides for any excavation activities (if that alternative is selected) to coincide with availability of a potential OSWDF. The resequencing also assumes the OSWDF alternative would be identified and selected as the preferred alternative under the WDA project.

(2) The RI investigation for this OU will be sequenced and scheduled for implementation after the DUF_6 facility has ceased operation and undergone D&D.

(3) Radionuclides, metals, VOCs, and PCBs are the primary COPCs. Other COPCs will be considered on a case-by-case basis, based on process knowledge.

(4) The RI/FS Work Plan is comprehensive, encompassing all components of the remedial action.

(5) Complete the necessary CERCLA documents supporting remedy selection (e.g., FS, Proposed Plan, ROD) and remedial design.

(6) The assumed remedial action is excavation of contaminated soils and slab media and disposed in a potential OSWDF (if selected). The areas may be backfilled with clean soil or graded for natural sloping and runoff, depending on the verification sampling results. No O&M period is assumed to be needed to achieve RAOs.

FINAL COMPREHENSIVE SITE OPERABLE UNIT[6]

The final CSOU evaluation will occur following completion of the D&D OU, completion of the DUF_6 Footprint Underlying Soils OU, and completion of cleanup of each of the specific OUs. As final actions for SWMUs are completed, those SWMUs will be placed in the CSOU section of Appendix 4 of the SMP to ensure that the results of the completed action are accounted for in the overall CSOU evaluation. The final CSOU will maximize use of the relevant data from previous cleanup activities and document the residual contamination and risk. Circumstances may dictate additional field activities as a result of evaluating existing information; however, it is the assumption of the FFA parties that any SWMUs entered into the CSOU will not require any additional response action. A work plan will compile and evaluate the existing information to determine if any data gaps exist related to conducting a sitewide evaluation. The RI will include a sitewide baseline human health and ecological risk assessment to evaluate residual risks and ensure all actions taken to date, when considered collectively, are protective of human health and the environment from a sitewide perspective. If the results of the final CSOU BRA conclude that overall protection of human health and the environment has been achieved, a final Proposed Plan and no further action ROD will be developed. If the BRA concludes that residual contamination still poses an unacceptable risk that exceeds the criteria established in Section XII of the FFA, a final FS will be developed, followed by a final Proposed Plan, ROD, and implementation of the final remedy. DOE intends to conduct necessary long-term monitoring to evaluate progress toward achieving RAOs. When no further response is appropriate and all the RAOs for all remedies have been achieved, PGDP will be

[6] The FFA, as currently written, contemplates multiple CSOUs, consisting of those associated with integrator units (i.e., groundwater, surface water) and a final CSOU completed after issuance of all final RODs for the site. The FFA parties acknowledge that the scope description above is intended to reflect a single CSOU to address all media, and a future FFA modification will address any inconsistencies between the FFA and SMP strategy.

eligible for deletion from the National Priorities List (NPL). It should be noted that partial NPL delisting may be pursued for eligible areas prior to the CSOU.

OTHER PROJECTS

CERCLA Waste Disposal Alternative Evaluation

Scope

The scope of this project is to evaluate disposal options for CERCLA waste that will be generated as a result of implementing removal and remedial actions for all of the OUs. The evaluation of disposal options will be conducted using the CERCLA remedial decision-making process. Accordingly, the scope of the RI/FS will be focused and tailored to the nature of this project (i.e., this is not a typical project where potential releases are investigated, evaluated, and remediated). Additionally, due to significant public interest in the project, frequent interactions with the public are expected throughout the project life cycle. The decision about whether to implement an on-site disposal facility will be documented in a ROD.

Key DOE Planning Assumptions from Life Cycle Baseline

(1) Based on DOE's recent reprioritization and proposal to focus near-term cleanup efforts on the C-400 Complex, preparation/finalization of the decision documents (i.e., Proposed Plan, ROD) and construction of any OSWDF (if selected as the preferred option under the WDA project) would be resequenced to an out-year activity to coincide with the timing of when waste generation from decommissioning of GDP facilities and remediation of the burial grounds is projected to occur.

(2) A revised D1 RI/FS Report will be issued with updated information on waste types and volumes and other related data pertinent to remedy selection. Assumed waste types include the following categories: low-level waste (LLW), Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), LLW/RCRA, LLW/TSCA, LLW/RCRA/TSCA, classified wastes, asbestos containing materials, and nonhazardous solid.

(3) A potential OSWDF (if selected) will not accept transuranic waste or waste from facilities other than PGDP.

(4) The DUF_6 facility will not be disposed of in the OSWDF (if selected); however, any contamination in the previously defined SWMUs/AOCs that lie beneath the DUF_6 facility will be placed in the OSWDF (if selected).

(5) Implementation of the ROD[7] may require resequencing of other site work.

(6) Final waste acceptance criteria will be defined during the post-ROD design phase.

[7] Regulatory expectations are that sufficient design and waste acceptance criteria information will be available to support the ROD.

APPENDIX 4

SOURCE AREA BY OPERABLE UNIT

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Solid Waste Management Units/Areas of Concern by Operable Unit

C-400 COMPLEX				
Operable Unit	**Subproject**		**SWMU No.**	**Description**
C-400 Complex OU	C-400 D&D		Other	C-400 Building [building foundation (i.e., slab) will remain in place]
	C-400 Final Remedial Action		11	C-400 TCE Leak Site
			40	C-403 Neutralization Tank slab and underlying soils
			47	C-400 Technetium Storage Tank Area
			98	C-400 Basement Sump
			203	C-400 Discard Waste System slab and underlying soils
			480	C-402 Lime House building slab and underlying soils
			533	TCE Spill Site from TCE Unloading Operations at C-400
GROUNDWATER				
GWOU	C-400 Interim Remedial Action		11	C-400 TCE Leak Site
			533	TCE Spill Site from TCE Unloading Operations at C-400
	Southwest Plume Sources		1	C-747-C Oil Land Farm
			211 A	C-720 TCE Spill Site Northeast
			211 B	C-720 TCE Spill Site Southeast
	Dissolved-Phase Plumes		201	Northwest Groundwater Plume
			202	Northeast Groundwater Plume
			210	Southwest Groundwater Plume
	Potential Additional Groundwater Sources		NA	This operable unit is being reserved for remaining sources to groundwater contamination that may be identified in the future
SURFACE WATER				
SWOU	SWOU Remedial Action	Removal Action	58	NSDD (Outside) (includes KPDES 003)
			60	C-375-E2 Effluent Ditch (KPDES 002)[1]
			61	C-375-E5 Effluent Ditch (KPDES 013)[1]
			62	C-375-S6 SW Ditch (KPDES 009)[1]
			63	C-375-W7 Oil Skimmer Ditch (KPDES 008 and KPDES 004)
			66	C-375-E3 Effluent Ditch (KPDES 010)
			67	C-375-E4 Effluent Ditch (C-340 Ditch) (KPDES 011)
			68	C-375-W8 Effluent Ditch (KPDES 015)
			69	C-375-W9 Effluent Ditch (KPDES 001)
			92	Fill Area for Dirt from the C-420 PCB Spill Site
			97	C-601 Diesel Spill
			102B	Plant Storm Sewer associated with C-333-A, C-337-A, C-340, C-535, and C-537[1]
			168	KPDES Outfall Ditch 012[1]
			526	Internal Plant Drainage Ditches (includes KPDES 016)[2]

[1] The results of the Surface Water Operable Unit (SWOU) (On-Site) Site Investigation determined that there were no unacceptable levels of risk to current and anticipated future receptors that warranted inclusion of Solid Waste Management Unit (SWMU) 60 (Outfall 002), SWMU 168 (Outfall 012), or SWMU 102 [Paducah Gaseous Diffusion Plant (PGDP) storm sewer systems associated with C-333-A, C-337-A, C-340, C-535, and C-537]. As a result, no action will be taken for these SWMUs as originally planned under the SWOU removal action. These SWMUs will be evaluated further as part of the SWOU remedial action. It also should be noted that during development of the Sampling and Analysis Plan (SAP) for SWOU (On-Site) Removal Action, Outfall 009 and Outfall 013 were evaluated. This assessment of the outfalls, which included a review of historical data, indicated that Outfall 009 and Outfall 013 did not require an early action, and further assessment of Outfall 009 and Outfall 013 would be addressed during the Comprehensive Site Operable Unit (CSOU). Based upon current site strategy, Outfall 009 and Outfall 013 also will be addressed as part of the SWOU remedial action.

[2] Kentucky Pollutant Discharge Elimination System (KPDES) Outfall 016, in its entirety, will be addressed as part of the SWOU Remedial Investigation.

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

SURFACE WATER (CONTINUED)			
Operable Unit	**Subproject**	**SWMU No.**	**Description**
SWOU	SWOU Remedial Action	64	Little Bayou Creek
		65	Bayou Creek
		93	Concrete Disposal Area East of Plant Security Area
		105	Concrete Rubble Pile (3)
		106	Concrete Rubble Pile (4)
		107	Concrete Rubble Pile (5)
		108	Concrete Rubble Pile (6)
		109	Concrete Rubble Pile (7)
		113	Concrete Rubble Pile (11)
		129	Concrete Rubble Pile (27)
		175	Concrete Rubble Pile (28)
		185	C-611-4 Horseshoe Lagoon (includes KPDES 014)
		199	Bayou Creek Monitoring Station
		205	Eastern Portion of Yellow Water Line
		549	Dirt/Concrete Rubble Pile near Outfall 008
		550	Concrete Culvert Sections Located on the West Bank of the Ditch Leading to Outfall 001
		Others	Outfalls 017, 018, 019/020, and 526 and associated ditches
LAGOONS			
Lagoons OU	Process Lagoons	17	C-616-E Sludge Lagoon
		18	C-616-F Full-Flow Lagoon
		171	C-617-B Lagoon (formerly identified as C-617-A)
	Water Treatment System Lagoons	21	C-611-W Sludge Lagoon
		22	C-611-Y Overflow Lagoon (includes KPDES 006)
		23	C-611-V Lagoon (includes KPDES 005)
BURIAL GROUNDS			
BGOU	BGOU Remedial (10 SWMUs)	2	C-749 Uranium Burial Ground
		3	C-404 Low-Level Radioactive Waste Burial Ground
		4	C-747 Contaminated Burial Ground
		5	C-746-F Classified Burial Ground
		6	C-747-B Burial Area
		7	C-747-A Burial Ground
		9	C-746-S Residential Landfill
		10	C-746-T Inert Landfill
		30	C-747-A Burn Area
		145	Residential/Inert Landfill Borrow Area (P-Landfill)
	Additional Burial Grounds	472	C-746-B Pad
		520	Scrap Material West of C-746-A

SOILS			
Operable Unit	**Subproject**	**SWMU No.**	**Description**
Soils OU	Soils Remedial	1	C-747-C Oil Land Farm
		13	C-746-P Clean Scrap Yard[3]
		14	C-746-E Contaminated Scrap Yard
		15	C-746-C Scrap Yard[3]
		19	C-410-B HF Neutralization Lagoon
		26	C-400 to C-404 Underground Transfer Line[3]
		56	C-540-A PCB Waste Staging Area[3, 4]
		57	C-541-A PCB Waste Staging Area[4]
		76	C-632-B Sulfuric Acid Storage Tank
		77	C-634-B Sulfuric Acid Storage Tank[3, 5]
		80	C-540-A PCB Spill Site[3]
		81	C-541-A PCB Spill Site
		99 B	C-745 Kellogg Bldg. Site—Septic Tank/Leach Field
		138	C-100 Southside Berm
		153	C-331 PCB Soil Contamination (West)
		156	C-310 PCB Soil Contamination (West Side)
		158	Chilled-Water System Leak Site
		160	C-745 Cylinder Yard Spoils (PCB Soils)
		163	C-304 Bldg./HVAC Piping System (Soil Backfill)
		165	C-616-L Pipeline & Vault Soil Contamination
		169	C-410-E HF Vent Surge Protection Tank
		170	C-729 Acetylene Bldg. Drain Pits
		180	Outdoor Firing Range (WKWMA)
		181	Outdoor Firing Range (PGDP)
		194	McGraw Construction Facilities (Southside)
		195	Curlee Road Contaminated Soil Mounds
		196	C-746-A Septic System
		200	Soil Contamination South of TSCA Waste Storage Facility
		204	Dykes Road Historical Staging Area[3]
		211 A	C-720 TCE Spill Site Northeast[3]
		212	C-745-A Radiological Contamination Area
		213	OS-02
		214	OS-03
		215	OS-04
		216	OS-05
		217	OS-06
		219	OS-08
		221	OS-10
		222	OS-11
		224	OS-13[3]
		225A	OS-14[3]

[3] These SWMUs/areas of concern (AOCs) will be evaluated further under a Soils OU RI 2 and addressed by a subsequent Soils OU feasibility study.
[4] SWMUs 56 and 57 are located within, and will be addressed as part of, SWMUs 80 and 81, respectively.
[5] This SWMU was evaluated as part of the Soils Operable Unit. The soils and underlying slabs associated with this SWMU will be addressed under the Soils and Slabs OU as part of post-GDP shutdown activities.

SOILS (CONTINUED)			
Operable Unit	**Subproject**	**SWMU No.**	**Description**
Soils OU (Continued)	Soils Remedial (Continued)	225 B	Contaminated Soil Area near C-533-1 DMSA OS-14[3]
		227	OS-16
		228	OS-17
		229	OS-18[3]
		486	Rubble Pile WKWMA (approximately 116 ft off roadside)
		487	Rubble Pile WKWMA (approximately 483 ft off roadside)
		488	PCB Contamination Area by the C-410 Trailer Complex
		489	Septic Tank North of C-710 Laboratory
		492	Contaminated Soil Area Near Outfall 010
		493	Concrete Rubble Piles Near Outfall 001
		517	Rubble and Debris Erosion Control Fill Area
		518	Field South of C-746-P1 Clean Scrap Yard
		520	Scrap Material West of C-746-A
		531	Aluminum Slag Reacting Area (C-746-H4) near the C-746-A Facility
		541	Contaminated Soil Area South of Outfall 011
		561	Soil Pile I
		562	Soil Piles C, D, E, F, G, H, J, K, and P in subunit 1 north of Soil Pile I on the west bank of Little Bayou Creek
		563	Soil Piles 20, CC, and BW in subunit 4 north of outfall 012 west of Little Bayou Creek
		564	Soil Pile AT in subunit 5 that consists of three soil areas on the east side of the North-South Diversion Ditch north of the P-, S-, and T-Landfills
		565	Rubble Area KY-19 (along Bayou Creek north of C-611 Water Treatment Plant)[3]
		567	Soil Pile K013 near Outfall 013, West of Little Bayou Creek
SOILS AND SLABS			
Soils and Slabs OU (Continued)		16	C-746-D Classified Scrap Yard
		20	C-410-E Emergency Holding Pond slab and underlying soils
		27	C-722 Acid Neutralization Tank
		28	C-712 Laboratory Equalization Tank slab and underlying soils
		31	C-720 Compressor Pit Water Storage Tank slab and underlying soils
		32	C-728 Clean Waste Oil Tanks slab and underlying soils
		33	C-728 Motor Cleaning Facility slab and underlying soils
		38	C-615 Sewage Treatment Plant slab and underlying soils
		41	C-410-C Neutralization Tank slab and underlying soils
		42	C-616 Chromate Reduction Facility slab and underlying soils
		55	C-405 Incinerator building slab and underlying soils
		70	C-333-A Vaporizer slab and underlying soils
		71	C-337-A Vaporizer slab and underlying soils
		74	C-340 PCB Transformer Spill Site
		75	C-633 PCB Spill Site

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

SOILS AND SLABS (CONTINUED)			
Operable Unit	**Subproject**	**SWMU No.**	**Description**
Soils and Slabs OU (Continued)		77	C-634-B-Sulfuric Acid Storage Tank slab and underlying soils
		78	C-420 PCB Spill Site
		79	C-611 PCB Spill Site
		82	C-531 Electric Switchyard slab and underlying soils
		83	C-533 Electric Switchyard slab and underlying soils
		84	C-535 Electric Switchyard slab and underlying soils
		85	C-537 Electric Switchyard slab and underlying soils
		86	C-631 Pumphouse and Cooling Tower slab and underlying soils
		87	C-633 Pumphouse and Cooling Tower slab and underlying soils
		88	C-635 Pumphouse and Cooling Tower slab and underlying soils
		89	C-637 Pumphouse and Cooling Tower slab and underlying soils
		99 A	C-745 Kellogg Bldg. Site–Cylinder Yard
		135	C-333 PCB Soil Contamination (North Side)
		137	C-746-A Inactive PCB Transformer Sump Area[6]
		154	C-331 PCB Soil Contamination (Southeast)
		155	C-333 PCB Soil Contamination (West)
		159	C-746-H3 Storage Pad slab and underlying soils
		161	C-743-T-01 Trailer Site (Soil Backfill)
		162	C-617-A Sanitary Water Line (Soil Backfill)
		166	C-100 Trailer Complex Soil Contamination (East Side)
		167	C-720 White Room Sump slab and underlying soils
		172	C-726 Sandblasting Facility slab and underlying soils
		176	C-331 RCW Leak Northwest Side
		177	C-331 RCW Leak East Side
		178	C-724-A Paint Spray Booth slab and underlying soils
		179	Plant Sanitary Sewer System
		192	C-710 Acid Interceptor Pit slab and underlying soils
		198	C-410-D Area Soil Contamination slab and underlying soils
		209	C-720 Compressor Shop Pit Sump slab and underlying soils
		211 B	C-720 TCE Spill Site Southeast
		218	OS-07 slab and underlying soils
		220	OS-09 slab and underlying soils
		223	OS-12 slab and underlying soils
		226	OS-15
		463	C-746-A East End Smelter slab and underlying soils
		464	C-746-A West End Smelter building slab and underlying soils
		469	C-745-J Yard
		470	C-746-V Yard
		474	West of Vortec Site
		477	C-340 Metals Plant building slab and underlying soils
		478	C-410/420 Feed Plant building slab and underlying soils
		482	C-415 Feed Plant Storage Building slab and underlying soils
		483	Nitrogen Generating Facilities slab and underlying soils

[6] SWMU 137 was evaluated as part of the American Recovery and Reinvestment Act and the Soils OU. SWMU 137 will be addressed as part of Soils and Slabs OU.

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

SOILS AND SLABS (CONTINUED)			
Operable Unit	**Subproject**	**SWMU No.**	**Description**
Soils and Slabs OU (Continued)		498	C-410/420 Sump at Column D & E-1&2 slab and underlying soils
		499	C-410/420 Sump at Column H-9&10 slab and underlying soils
		500	C-410/420 Sump at Column U-10&11 slab and underlying soils
		501	C-410/420 UF_6 Scale Pit Sumps A&B slab and underlying soils
		502	C-410/420 Sump at Column U-9 slab and underlying soils
		503	C-410/420 Sump at Column G-1 slab and underlying soils
		504	C-410/420 Sump at Column L-10 slab and underlying soils
		505	C-410/420 Sump at Column A-3N slab and underlying soils
		506	C-410/420 Sump at Column Wa-9 slab and underlying soils
		507	C-410/420 Condensate Tank Pit slab and underlying soils
		508	C-410/420 Settling Basin slab and underlying soils
		509	C-410/420 Drain pit slab and underlying soils
		510	C-410/420 Sump at Column P&Q-2 slab and underlying soils
		511	C-410/420 Sump at Column Q&R-2 slab and underlying soils
		512	C-410/420 Sump at Column R-2 slab and underlying soils
		513	C-411 Cell Maintenance Room Sump slab and underlying soils
		522	C-340 Work Pit at Ground Floor Level (B-7—B-9) slab and underlying soils
		523	C-340 Metals Plant Pit at Ground Floor (F-6 to F-11) slab and underlying soils
		524	C-340 Pickling System Sump (B-10 to B-11) slab and underlying soils
		529	C-340 Powder Plant Sump at Ground Floor Level slab and underlying soils
DECONTAMINATION AND DECOMMISSIONING			
Facility D&D OU	Remaining D&D	The following SWMUs/AOCs or facilities may include multiple smaller facilities. A more detailed listing is included in the following table entitled D&D OU Facilities.	
		33	C-728 Motor Cleaning Facility
		38	C-615 Sewage Treatment Plant
		42	C-616 Chromate Reduction Facility
		70	C-333-A Vaporizer
		71	C-337-A Vaporizer
		82	C-531 Electric Switchyard
		83	C-533 Electric Switchyard
		84	C-535 Electric Switchyard
		85	C-537 Electric Switchyard
		86	C-631 Pumphouse and Cooling Tower
		87	C-633 Pumphouse and Cooling Tower
		88	C-635 Pumphouse and Cooling Tower
		89	C-637 Pumphouse and Cooling Tower
		172	C-726 Sandblasting Facility
		178	C-724-A Paint Spray Booth
		482	C-415 Feed Plant Storage Building
		Other Buildings	C-310, C-310-A, C-315, C-331, C-333, C-333-A. C-335, C-337, C-337-A, C-409, C-600, C-709, C-710, C-720 Process Building tie-lines and bridges will be included with the appropriate process building.

DUF_6 FOOTPRINT UNDERLYING SOILS			
DUF_6 Footprint Underlying Soils OU		164	KPDES Outfall Ditch 017 Flume - Soil Backfill
		183	McGraw UST
		193	McGraw Construction Facilities (Southside Cylinder Yards)
		194	McGraw Construction Facilities (Southside)
FINAL COMPREHENSIVE SITE OPERABLE UNIT			
CSOU[7,8]	**SWMU No.**		**Description**
	8		C-746-K Inactive Sanitary Landfill
	59		NSDD (Inside)
	91		UF_6 Cylinder Drop Test Area
	100		Fire Training Area

[7] The FFA, as currently written, contemplates multiple CSOUs, consisting of those associated with integrator units (i.e., groundwater, surface water), and a final CSOU completed after issuance of all final RODs for the site. The FFA parties acknowledge that the scope description is intended to reflect a single CSOU to address all media, and a future FFA modification will be conducted to resolve any inconsistencies between the FFA and Site Management Plan strategy.

[8] Historically, once an action has been completed for a particular SWMU whereby no additional active response actions are expected, such SWMUs have been placed in the CSOU for further evaluation; however, the FFA parties recognized the need to reach consensus on the criteria for assigning units to the CSOU. As a result, placement of SWMUs 8, 59, 91, and 100 in the CSOU is provisional pending the FFA parties reaching consensus on such criteria.

PERMITTED		
	SWMU No.	**Description**
Permitted	3	C-404 Low-Level Radioactive Waste Burial Ground[9]
	9	C-746-S Residential Landfill
	10	C-746-T Inert Landfill
	44	C-733 Hazardous Waste Storage Area
	46A	C-746-Q Hazardous and Low-Level Mixed Waste Storage Facility
	207	C-752-A ER Waste Storage Bldg.
	208	C-746-U Solid Waste Contained Landfill

[9] SWMU 3 was issued only a post-closure permit, was not permitted for construction and operation, and was not an engineered hazardous waste landfill.

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

NO FURTHER ACTION		
SWMU No.	**Description**	**NFA Approval By**
12	C-747-A UF_4 Drum Yard	FFA Managers Agreement– November 17, 2011; FFA Managers Meeting, 4/12/2012
24	C-750-D UST	KDWM (UST Branch) 11/23/1999
25	C-750 1,000-gal Waste Oil Tank (UST)	EPA HSWA Class 1 Permit Mod 3/17/1993—Regulated by RCRA Permit; KDWM (UST Branch) 6/20/1994
29	C-746-B TRU Storage Area	EPA HSWA Class 1 Permit Mod 3/17/1993
34	C-746-M PCB Waste Storage Area	EPA HSWA Class 1 Permit Mod 3/17/1993
35	C-337 PCB Waste Storage Area	EPA HSWA Class 1 Permit Mod 3/17/1993
36	C-337 PCB Waste Staging Area	EPA HSWA Class 1 Permit Mod 3/17/1993
37	C-333 PCB Waste Staging Area	EPA HSWA Class 1 Permit Mod 3/17/1993
39	C-746-B PCB Waste Storage Area	EPA HSWA Class 1 Permit Mod 3/17/1993
43	C-746-B Waste Chemical Storage Area	EPA HSWA Class 1 Permit Mod 3/17/1993; Closed after 1993
45	C-746-R Waste Solvent Storage Area	EPA HSWA Class 1 Permit Mod 3/17/1993; Closed after 1993
46	C-409 Hazardous Waste Pilot Plant[10]	EPA HSWA Class 1 Permit Mod 3/17/1993—Regulated by RCRA Permit; KDWM (Mod #13) 9/26/1997
48	Gold Dissolver Storage Tank (DMSA C400-03)	EPA HSWA Class 1 Permit Mod 3/17/1993; KDWM 7/8/2010
49	C-400-B Waste Solution Storage Tank	EPA HSWA Class 1 Permit Mod 3/17/1993—Regulated by RCRA Permit; KDWM 9/26/1997
50	C-400-C Nickel Stripper Evaporation Tank	EPA HSWA Class 1 Permit Mod 3/17/1993—Regulated by RCRA Permit; KDWM (Mod #13) 9/26/1997
51	C-400-D Lime Precipitation Tank	EPA HSWA Class 1 Permit Mod 3/17/1993—Regulated by RCRA Permit; KDWM (ROC) 8/8/1994
52	C-400 Waste Decontamination Solution Storage Tanks	EPA HSWA Class 1 Permit Mod 3/17/1993
53	C-400 NaOH Precipitation Unit	EPA HSWA Class 1 Permit Mod 3/17/1993
54	C-400 Degreaser Solvent Recovery Unit	EPA HSWA Class 1 Permit Mod 3/17/1993; KDWM 7/8/2010
72	C-200 Underground Gasoline Tanks	EPA HSWA Class 1 Permit Mod 3/17/1993; KDWM (UST C-200A; UST Branch) 11/23/1999

[10] Radiological contamination associated with the sump in this unit will be addressed under the D&D program for the C-409 Stabilization Building.

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

NO FURTHER ACTION (CONTINUED)		
SWMU No.	**Description**	**NFA Approval By**
73	C-710 Underground Gasoline Tanks	EPA HSWA Class 1 Permit Mod 3/17/1993; KDWM (UST C-200A; UST C-710; UST Branch) 2/19/2002
90	C-720 Petroleum Naphtha Pipe	KDWM 1/14/2015
96	C-333 Cooling Tower Scrap Wood Pile	EPA HSWA Class 1 Permit Mod 3/17/1993
101	C-340 Hydraulic System	EPA and KDWM 4/2/2015
102A	Plant Storm Sewer—between the south side of the C-400 Building and Outfall 008	EPA and KY via SW Plume ROD 3/16/2012; KDWM 1/14/2015
103	Concrete Rubble Pile (1)	EPA and KY via WAG 17 ROD 9/29/1997
104	Concrete Rubble Pile (2)	EPA and KY via WAG 17 ROD 9/29/1997
110	Concrete Rubble Pile (8)	EPA and KY via WAG 17 ROD 9/29/1997
111	Concrete Rubble Pile (9)	EPA and KY via WAG 17 ROD 9/29/1997
112	Concrete Rubble Pile (10)	EPA and KY via WAG 17 ROD 9/29/1997
114	Concrete Rubble Pile (12)	EPA and KY via WAG 17 ROD 9/29/1997
115	Concrete Rubble Pile (13)	EPA and KY via WAG 17 ROD 9/29/1997
116	Concrete Rubble Pile (14)	EPA and KY via WAG 17 ROD 9/29/1997
117	Concrete Rubble Pile (15)	EPA and KY via WAG 17 ROD 9/29/1997
118	Concrete Rubble Pile (16)	EPA and KY via WAG 17 ROD 9/29/1997
119	Concrete Rubble Pile (17)	EPA and KY via WAG 17 ROD 9/29/1997
120	Concrete Rubble Pile (18)	EPA and KY via WAG 17 ROD 9/29/1997
121	Concrete Rubble Pile (19)	EPA and KY via WAG 17 ROD 9/29/1997
122	Concrete Rubble Pile (20)	WAG 17 RI Work Plan
123	Concrete Rubble Pile (21)	EPA and KY via WAG 17 ROD 9/29/1997
124	Concrete Rubble Pile (22)	EPA and KY via WAG 17 ROD 9/29/1997
125	Concrete Rubble Pile (23)	EPA and KY via WAG 17 ROD 9/29/1997
126	Concrete Rubble Pile (24)	EPA and KY via WAG 17 ROD 9/29/1997
127	Concrete Rubble Pile (25)	EPA and KY via WAG 17 ROD 9/29/1997
128	Concrete Rubble Pile (26)	EPA and KY via WAG 17 ROD 9/29/1997
130	C-611 550-gal Gasoline UST	KDWM 12/6/1996 EPA and KY via WAG 1&7 ROD

NO FURTHER ACTION (CONTINUED)		
SWMU No.	**Description**	**NFA Approval By**
131	C-611 50-gal Gasoline UST	KDWM 12/6/1996 EPA and KY via WAG 1&7 ROD 8/10/1998
132	C-611 2,000-gal Oil UST	KDWM 12/6/1996 EPA and KY via WAG 1&7 ROD 8/10/1998
133	C-611 (unknown size) Grouted UST	KDWM 12/6/1996 EPA and KY via WAG 1&7 ROD 8/10/1998
134	C-611 1,000-gal Diesel/Gasoline Tank	KDWM 12/6/1996 EPA and KY via WAG 1&7 ROD 8/10/1998
136	C-740 TCE Spill Site	EPA and KY via WAG 1&7 ROD 8/10/1998
139	C-746-A1 UST	KDWM 12/9/2005
140	C-746-A2 UST	KDWM 12/19/1996
141	C-720 Inactive TCE Degreaser	KDWM 8/11/1992; EPA HSWA Class 1 Permit Mod 3/17/1993—Regulated by RCRA Permit;
142	C-750-A 10,000-gal Gasoline Tank (UST)	EPA HSWA Class 1 Permit Mod 3/17/1993—Regulated by RCRA Permit; KDWM 3/25/1999
143	C-750-B 10,000-gal Diesel Tank (UST)	EPA HSWA Class 1 Permit Mod 3/17/1993; KDWM 3/25/1999
144	C-746-A Hazardous and Mixed Waste Storage Facility	KDWM 10/10/2011
146	Concrete Rubble Pile (40)	EPA and KY via WAG 17 ROD 9/29/1997
147	Concrete Rubble Pile (41)	EPA and KY via WAG 17 ROD 9/29/1997
148	Concrete Rubble Pile (42)	EPA and KY via WAG 17 ROD 9/29/1997
149	Concrete Rubble Pile (43)	EPA and KY via WAG 17 ROD 9/29/1997
150	Concrete Rubble Pile (44)	EPA and KY via WAG 17 ROD 9/29/1997
151	Concrete Rubble Pile (45)	EPA and KY via WAG 17 ROD 9/29/1997
152	Concrete Rubble Pile (46)	EPA and KY via WAG 17 ROD 9/29/1997
173	C-746-A Trash-Sorting Facility	EPA HSWA Class 1 Permit Mod 3/17/1993; KDWM 12/18/1992
174	C-745-K Low-Level Storage Area	EPA HSWA Class 1 Permit Mod 3/17/1993; KDWM 2/22/1993
184	Concrete Rubble Pile (29)	EPA and KY via WAG 17 ROD 9/29/1997
186	C-751 Fuel Facility	KDWM 10/20/1993
187	C-611 Septic System	KDWM 10/20/1993
188	C-633 Septic System	KDWM 10/20/1993
189	C-637 Septic System	KDWM 10/20/1993
190	C-337A Sewage Treatment Aeration Tank	KDWM 10/20/1993
191	C-333-A Sewage Treatment Aeration Tank	KDWM 10/20/1993

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

NO FURTHER ACTION (CONTINUED)		
SWMU No.	**Description**	**NFA Approval By**
197	Concrete Rubble Pile (30)	EPA and KY via WAG 17 ROD 9/29/1997
206	C-753-A Toxic Substances Control Act Waste Storage Bldg.	KDWM 3/7/1997
208	C-746-U Solid Waste Contained Landfill	KDWM 3/7/1997
360	C-535	KDWM 1/4/2006
361	C-727–90 day	KDWM 8/28/2007
362	G-310-04	KDWM 8/28/2007
363	G-331-03	KDWM 6/29/2004
364	G-331-05	KDWM 6/29/2004
365	G-333-02	KDWM 5/12/2003
366	G-333-03	KDWM 5/12/2003
367	G-333-04	KDWM 5/12/2003
368	G-333-08	KDWM 6/29/2004
369	G-333-10	KDWM 5/12/2003
370	G-333-20	KDWM 5/12/2003
371	G-335-01	KDWM 1/4/2006
372	G-337-02	KDWM 9/11/2003
373	G-337-03	KDWM 9/11/2003
374	G-337-13	KDWM 9/11/2003
375	G-337-14	KDWM 9/11/2003
376	G-337-15	KDWM 9/11/2003
377	C-337-22	KDWM 1/4/2006
378	G-340-01	EPA and KDWM 4/02/2015
379	G-340-03	EPA and KDWM 4/02/2015
380	G-340-04	EPA and KDWM 4/02/2015
381	G-340-05	EPA and KDWM 4/02/2015
382	G-340-06	KDWM 8/28/2007
383	G-400-01	KDWM 5/12/2003
384	G-400-02	KDWM 5/12/2003
385	G-409-25	KDWM 5/12/2003
386	G-410-01	KDWM 8/28/2007
387	C-416-01	KDWM 8/28/2007
388	C-416 Decontamination Pad	KDWM 4/12/2004
389	G-533-01	KDWM 6/29/2004
390	G-535-02	KDWM 6/29/2004
391	G-537-01	KDWM 1/4/2006
392	G-540-A-01	KDWM 2/14/2006
393	G-540-A-1-02	KDWM 2/14/2006
394	G-541-A-01	KDWM 4/12/2004
395	G-600-01	KDWM 3/8/2007
396	C-611-U-01	KDWM 3/8/2007
397	G-612-01	KDWM 3/8/2007
398	G-612-02	KDWM 3/8/2007
399	G-612-A-01	KDWM 3/8/2007
400	G-635-01	KDWM 3/8/2007
401	G-710	KDWM 1/4/2006
402	G-710-04	KDWM 9/11/2003
403	G-710-20	KDWM 1/4/2006
404	G-710-24	KDWM 9/11/2003
405	G-720-22	KDWM 2/14/2003
406	G-743-T-17-01	KDWM 6/29/2004
407	G-743-T-17-02	KDWM 3/8/2007

NO FURTHER ACTION (CONTINUED)		
SWMU No.	**Description**	**NFA Approval By**
408	G-745-B-01	KDWM 3/8/2007
409	G-745-T-01	KDWM 2/14/2006
410	G-746-G-01	KDWM 6/29/2004
411	G-746-G-1-01	KDWM 3/8/2007
412	G-746-G-2-01	KDWM 11/1/2004
413	G-746-G-3-01	KDWM 11/1/2004
414	G-746-F-01	KDWM 1/4/2006
415	G-746-S-01	KDWM 8/28/2007
416	G-746-X-01 (PCBs)	KDWM 3/8/2007
417	G-746-X-01 (Asbestos)	KDWM 3/8/2007
418	G-748-B-01	KDWM 6/29/2004
419	G-752-C-01	KDWM 8/28/2007
420	G-752-C-02	KDWM 3/8/2007
421	G-754-01	KDWM 1/4/2006
422	G-755-A-01	KDWM 1/28/2004
423	G-755-C-01	KDWM 1/28/2004
424	G-755-T-07-01	KDWM 1/28/2004
425	G-755-T-08	KDWM 1/28/2004
426	G-755-T-2-3-01	KDWM 1/28/2004
427	G-755-T-3-1-01	KDWM 1/28/2004
428	G-755-T-3-2-01	KDWM 1/28/2004
429	S-310-04	KDWM 8/28/2007
430	S-331-02	KDWM 1/4/2006
431	S-333-12	KDWM 5/12/2003
432	S-335-09	KDWM 11/23/2004
433	S-337-11	KDWM 9/11/2003
434	S-340-01	EPA and KY 4/2/2015
435	S-409-100	KDWM 5/12/2003
436	S-409-20	KDWM 5/12/2003
437	S-409-40	KDWM 5/12/2003
438	S-409-60	KDWM 5/12/2003
439	S-409-80	KDWM 5/12/2003
440	S-410-05	KDWM 8/28/2007
441	S-540-A-2-01	KDWM 6/29/2004
442	S-612-01	KDWM 2/14/2006
443	S-709-01	KDWM 6/29/2004
444	S-709-02	KDWM 6/29/2004
445	S-710-05	KDWM 2/14/2006
446	S-710-06	KDWM 9/11/2003
447	S-710-09	KDWM 1/4/2006
448	S-710-16	KDWM 9/11/2003
449	S-710-18	KDWM 9/11/2003
450	S-710-32	KDWM 1/4/2006
451	S-710-41	KDWM 9/11/2003
452	S-710-44	KDWM 1/4/2006
453	S-710-46	KDWM 9/11/2003
454	S-743-T-17-01	KDWM 2/14/2006
455	S-755-T-16-01	KDWM 1/28/2004
456	S-755-T-16-02	KDWM 1/28/2004
457	S-755-T-16-03	KDWM 1/28/2004
458	S-755-T-2-3-01	KDWM 1/28/2004
459	S-755-T-3-1-01	KDWM 1/28/2004

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

NO FURTHER ACTION (CONTINUED)		
SWMU No.	**Description**	**NFA Approval By**
460	S-755-T-3-2-01	KDWM 1/28/2004
461	S-755-T-3-2-02	KDWM 1/28/2004
462	S-755-T-3-2-03	KDWM 1/28/2004
465	Yard Rubble Pile and Crushate Storage Area (G-Yard)	KDWM 10/13/2009
466	South of Dyke Road, Pond Area	KDWM 8/17/2009
467	Concrete Cylinder Holders Storage Area on Western Kentucky Wildlife Management Area	KDWM 8/17/2009
468	Area Northwest of Outfall 015	KDWM 2/14/2006
471	Outside C-746-B South Storage Area	KDWM 8/17/2009
473	C-746-B Pad, West	KDWM 8/28/2007
475	C-745-G5-01 (Paint Enclosure)	KDWM 2/14/2006
476	Concrete Crusher	KDWM 2/14/2006
479	C-204 Disintegrator Building	KDWM 6/3/2002
481	C-410-A Hydrogen Holder	KDWM 4/2/2002
484	C-611-M Storage Tank	KDWM 8/30/2002
485	C-611-N Sanitary Water Storage	KDWM 2/18/2002
490	McGraw Fuel Facility Waste Oil Storage Tank	KDWM 12/21/2001
491	Mercury Spill at the C-611 Water Treatment Plant Vault	KDWM 3/22/2004
494	Ash Receiver Area in C-410/420	KDWM 6/3/2016; EPA 6/9/2016
495	C-410-I Ash Receiver Shed	KDWM 6/3/2016; EPA 6/92016
496	C-410 Fluorine/Hydrogen Filters (Northeast Mezzanine)	KDWM 6/320/16; EPA 6/9/2016
497	C-410/420 F_2 Cell Neutralization Room Vats	KDWM 6/3/2016; EPA 6/9/2016
514	C-340 Magnesium Fluoride Reject Silo	EPA and KY 4/2/2015
515	C-340 "Dirty" Dust Collection System	EPA and KY 4/2/2015
516	C-340 Derby Preparation Area Sludge Collection System	EPA and KY 4/2/2015
519	C-410 Sulfuric Acid Tank (C-634-B)	KDWM 1/10/2003
521	C-340 Saw System Degreaser	EPA and KY 4/2/2015
525	Concrete Water Tower Supports (KOW)	KDWM 8/28/2007
527	C-410 GSA/SAA at Column J-6	KDWM 8/28/2007
528	GSA/SAA at the Northwest corner of C-745-G3 Paint Enclosure	KDWM 2/14/2006
530	Soil and Debris Storage Area by C-745-T Yard	KDWM 3/8/2007
532	Photographic Solution Treatment Area in the C-102 Building	KDWM 5/21/2003
534	UST #18, within SWMU 193	KDWM (UST Branch) 12/4/2007
535	S-755-T08-01 (Satellite Accumulation Area at C-755, Trailer 8)	KDWM 2/14/2006
536	Concrete Truck Washout Area	KDWM 6/27/2002
537	S-400-001 (SAA Located Outside at the Southeast Corner of the C-400 Building)	KDWM 2/14/2006
538	S-MST-01-01 & S-MST-01-02 (Mobile Trailer 01)	KDWM 2/14/2006
539	S-MST-02-01 & S-MST-02-02 (Mobile Trailer 02)	KDWM 2/14/2006
540	S-MST-03-01 & S-MST-03-02 (Mobile Trailer 03)	KDWM 2/14/2006
542 A	G-746-B-01; S-746-B-01; S-746-B-02 (GSA/SAAs located outside C-746-A)	KDWM 1/28/2004
542 B	G-746-A-01; S-746-A-01; S-746-A-02 (GSA/SAAs located outside C-746-A)	KDWM 1/28/2004
543	T-746-S-01 (90-Day Storage Area)	KDWM 1/28/2004
544	T-752-C-01 (90-Day Storage Area)	KDWM 1/28/2004
545	C-755-T-22-01 and G-755-T-22	KDWM 1/28/2004
546	PGDP Post 67 Diesel Fuel Spill Area	KDWM 2/14/2006
547	PGDP Post 38 Diesel Spill Area	KDWM 2/14/2006
548	Staging Area for Concrete Piers, Wood and Rubble North Side of C-745-B Cylinder Yard	KDWM 8/28/2007

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

NO FURTHER ACTION (CONTINUED)		
SWMU No.	**Description**	**NFA Approval By**
551	C-755-GSA-23 Located at C-755 near the East Fence Line	KDWM 8/28/2007
552	C-760 90-Day Accumulation Area	KDWM 3/28/2007
566	H-340-01	KDWM 12/02/2010
568	C-340 ST-90 Boxes	KDWM 12/02/2010
569	C-743-T-17 Sample Return Refrigerator	KDWM 5/24/2012
570	Sample Return Sealand	KDWM 5/24/2012

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

PENDING NO FURTHER ACTION DECISION	
SWMU No.	Description
	TBD
SWMUs THAT WILL BE INVESTIGATED AND REMEDIATED BY THE U.S. ARMY CORPS OF ENGINEERS[11]	
94	KOW Trickling Filter and Leach Field
95	KOW Burn Area
157	KOW Toluene Spill Area
182	Western Portion of Yellow Water Line

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CSOU = Comprehensive Site Operable Unit
D&D = decontamination and decommissioning
EPA = U.S. Environmental Protection Agency
ER = environmental remediation
FFA = Federal Facility Agreement
FY = fiscal year
GDP = gaseous diffusion plant
GSA = generator staging area
HSWA = Hazardous and Solid Waste Amendments
HVAC = heating, ventilating, and air-conditioning
KDWM = Kentucky Division of Waste Management
KOW = Kentucky Ordinance Works
KPDES = Kentucky Pollutant Discharge Elimination System
KY = Kentucky
NFA = no further action
NSDD = North-South Diversion Ditch
OU = operable unit
PCB = polychlorinated biphenyl
PGDP = Paducah Gaseous Diffusion Plant
RCW = recirculating cooling water
ROD = record of decision
SAA = satellite accumulation area
SAP = Sampling and Analysis Plan
SWMU = solid waste management unit
SWOU = Surface Water Operable Unit
TBD = to be determined
TCE = trichloroethene
TSCA = Toxic Substances Control Act
UST = underground storage tank
WAG = waste area group
WKWMA = West Kentucky Wildlife Management Area

[11] The Corps of Engineers accepted responsibility for the investigation/remediation of these SWMUs in a letter dated March 13, 1996. EPA review/approval of the CERCLA documentation (not yet available) associated with these SWMUs has not occurred.

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

D&D OU FACILITIES					
Facility Number	**Description**	**SWMU/AOC Number**	**Facility Status**	**Integrated Site Evaluation (SE) Complete**	**CERCLA NTCRA Required**
Gaseous Diffusion Process Facilities and Process Building Tie Lines and Bridges					
C-310	Purge and Product Building	--	Deactivating	No	Pending SE
C-310-A	Product Withdrawal Building	--	Deactivating	No	Pending SE
C-315	Surge and Waste Building	--	Deactivating	No	Pending SE
C-331	Process Building	--	Deactivating	No	Pending SE
C-333	Process Building	--	Deactivating	No	Pending SE
C-333-A	Feed Vaporization Facility	70	Deactivating	8/24/1987	Yes
C-335	Process Building	--	Deactivating	No	Pending SE
C-337	Process Building	--	Deactivating	No	Pending SE
C-337-A	Feed Vaporization Facility	71	Deactivating	8/24/1987	Yes
C-310-331	Tie-Line	--	Deactivating	No	Pending SE
C-310-331-A	Bridge (Enclosed)	--	Deactivating	No	Pending SE
C-310-331-B	Tie-Line	--	Deactivating	No	Pending SE
C-315-331	Tie-Line	--	Deactivating	No	Pending SE
C-331-333-A	Bridge (Enclosed—300 ft)	--	Deactivating	No	Pending SE
C-331-333-B	Tie-Line (West)	--	Deactivating	No	Pending SE
C-331-333-C	Tie-Line (East)	--	Deactivating	No	Pending SE
C-331-335	Tie-Line	--	Deactivating	No	Pending SE
C-335-337-A	Bridge (Enclosed)	--	Deactivating	No	Pending SE
C-335-337-B	Tie-Line (North)	--	Deactivating	No	Pending SE
C-335-337-C	Tie-Line (South)	--	Deactivating	No	Pending SE
Process Support Facilities					
C-409	Stabilization Building	--	Deactivating	No	Pending SE
C-415	Feed Plant Storage	482	Shutdown	7/18/2001	Yes
C-600	Steam Plant	--	Shutdown	No	Pending SE
Switchyards					
C-531-1	Switch House	82	Operating	8/24/1987	Yes
C-531-2	Switchyard	82	Operating	8/24/1987	Yes
C-531-3A	Fire Valve House No. 1	82	Operating	8/24/1987	Yes
C-531-3B	Fire Valve House No. 2	82	Operating	8/24/1987	Yes
C-532	Relay House	82	Operating	8/24/1987	Yes
C-533-1	Switch House	83	Operating	8/24/1987	Yes
C-533-2	Switchyard	83	Operating	8/24/1987	Yes

D&D OU FACILITIES					
Facility Number	**Description**	**SWMU/AOC Number**	**Facility Status**	**Integrated Site Evaluation (SE) Complete**	**CERCLA NTCRA Required**
Switchyards (Continued)					
C-533-3A	Fire Valve House No. 1	83	Operating	8/24/1987	Yes
C-533-3B	Fire Valve House No. 2	83	Operating	8/24/1987	Yes
C-533-3C	Fire Valve House No. 3	83	Operating	8/24/1987	Yes
C-533-3D	Fire Valve House No. 4	83	Operating	8/24/1987	Yes
C-535-1	Switch House	84	Operating	8/24/1987	Yes
C-535-2	Switchyard	84	Operating	8/24/1987	Yes
C-535-3A	Fire Valve House No. 1	84	Operating	8/24/1987	Yes
C-535-3B	Fire Valve House No. 2	84	Operating	8/24/1987	Yes
C-535-4	Test Shop (Maintenance Office)	84	Operating	8/24/1987	Yes
C-536	Relay House	84	Operating	8/24/1987	Yes
C-537-1	Switch House	85	Operating	8/24/1987	Yes
C-537-2	Switchyard	85	Operating	8/24/1987	Yes
C-537-3A	Fire Valve House No. 1	85	Operating	8/24/1987	Yes
C-537-3B	Fire Valve House No. 2	85	Operating	8/24/1987	Yes
C-537-3C	Fire Valve House No. 3	85	Operating	8/24/1987	Yes
C-537-3D	Fire Valve House No. 4	85	Operating	8/24/1987	Yes
C-537-4	Test Shop	85	Operating	8/24/1987	Yes
C-540-A	Oil Pump House	83	Operating	8/24/1987	Yes
C-541-A	Oil Pump House	84	Operating	8/24/1987	Yes
Cooling Towers					
C-631-1	Pump House	86	Operating	8/24/1987	Yes
C-631-2	Cooling Tower	86	Operating	8/24/1987	Yes
C-631-3	Fire Water Pump House	86	Operating	8/24/1987	Yes
C-631-4	Blending Pump House	86	Operating	8/24/1987	Yes
C-631-5	Blending Cooling Tower (West)	86	Operating	8/24/1987	Yes
C-631-6	Blending Cooling Tower (East)	86	Operating	8/24/1987	Yes
C-633-1	Pump House	87	Deactivating	8/24/1987	Yes
C-633-2A	Cooling Tower (South)	87	Deactivating	8/24/1987	Yes
C-633-2B	Cooling Tower (North)	87	Deactivating	8/24/1987	Yes
C-633-3	Blending Pump House	87	Deactivating	8/24/1987	Yes
C-633-4	Blending Cooling Tower (North)	87	Deactivating	8/24/1987	Yes
C-633-5	Blending Cooling Tower (South)	87	Deactivating	8/24/1987	Yes

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

D&D OU FACILITIES					
Facility Number	**Description**	**SWMU/AOC Number**	**Facility Status**	**Integrated Site Evaluation (SE) Complete**	**CERCLA NTCRA Required**
Cooling Towers (Continued)					
C-633-6	Sand Filter Building	87	Deactivating	8/24/1987	Yes
C-635-1	Pump House	88	Deactivating	8/24/1987	Yes
C-635-2	Cooling Tower	88	Deactivating	8/24/1987	Yes
C-635-3	Blending Pump House	88	Deactivating	8/24/1987	Yes
C-635-4	Blending Cooling Tower (North)	88	Deactivating	8/24/1987	Yes
C-635-5	Blending Cooling Tower (South)	88	Deactivating	8/24/1987	Yes
C-637-1	Pump House	89	Deactivating	8/24/1987	Yes
C-637-2A	Cooling Tower (South)	89	Deactivating	8/24/1987	Yes
C-637-2B	Cooling Tower (North)	89	Deactivating	8/24/1987	Yes
C-637-3	Blending Pump House	89	Deactivating	8/24/1987	Yes
C-637-4	Blending Cooling Tower (North)	89	Deactivating	8/24/1987	Yes
C-637-5	Blending Cooling Tower (South)	89	Deactivating	8/24/1987	Yes
C-637-6	Sand Filter Building	89	Deactivating	8/24/1987	Yes
Phosphate (Former Chromate) Reduction System Facilities					
C-616-A	Chemical Feed Building	42	Operating	12/18/91	Yes
C-616-B	Clarifier-East	42	Operating	12/18/91	Yes
C-616-C	Effluent Control Vault	42	Operating	12/18/91	Yes
C-616-D	Sludge Vault and Valve Pit	42	Operating	12/18/91	Yes
C-616-H1	Ferrous Sulfate Storage Tank (East)	42	Operating	12/18/91	Yes
C-616-H2	Ferrous Sulfate Storage Tank (West)	42	Operating	12/18/91	Yes
C-616-J	Reduction Tank (East)	42	Operating	12/18/91	Yes
C-616-K	Service Building	42	Operating	12/18/91	Yes
C-616-L	Lift Station	42	Operating	12/18/91	Yes
C-616-M	Clarifier (West)	42	Operating	12/18/91	Yes
C-616-N	Reduction Tank (West)	42	Operating	12/18/91	Yes
C-616-P	Sludge Vault and Valve Pit	42	Operating	12/18/91	Yes
Sewage System Facilities					
C-615-A	Primary Settling Tank/Catch Basin	38	Operating	8/24/87	Yes
C-615-B	Final Settling Tank/Catch Basin	38	Operating	8/24/87	Yes
C-615-C	Sewage Plant Monitoring Building	38	Operating	8/24/87	Yes
C-615-D	Digester	38	Operating	8/24/87	Yes
C-615-E	Trickling Filter	38	Operating	8/24/87	Yes
C-615-F	Dry Bed for Trickling Filter	38	Operating	8/24/87	Yes

Solid Waste Management Units/Areas of Concern by Operable Unit (Continued)

D&D OU FACILITIES					
Facility Number	**Description**	**SWMU/AOC Number**	**Facility Status**	**Integrated Site Evaluation (SE) Complete**	**CERCLA NTCRA Required**
Process Laboratory and Maintenance Facilities					
C-709	Plant Laboratory Annex	--	Operating	No	Pending SE
C-710	Technical Services Building/Lab	--	Operating	No	Pending SE
C-720	Maintenance and Storage Building	--	Operating	No	Pending SE
C-724-A	Carpenter Shop Annex	178	Operating	01/25/93	Yes
C-726	Sandblast Building	172	Standby	10/29/92	Yes
C-728	Motor Cleaning Facility	33	Operating	6/2/15	Yes

AOC = area of concern
D&D = Decontamination and Decommissioning
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
NTCRA = non-time-critical removal action
SE = site evaluation
SWMU = solid waste management unit

Operating—Facility is currently in use supporting U.S. Department of Energy mission activities.
Standby—Facility is currently not in use but may be utilized to support future U.S. Department of Energy mission activities.
Shutdown—Facility is not being maintained for future use but has not yet begun deactivation activities.
Deactivating—Deactivation activities have been initiated.
Deactivation Complete—Awaiting decommissioning.

APPENDIX 5

ENFORCEABLE TIMETABLES AND DEADLINES; PLANNING DATES WITH LONG-TERM TARGETS

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Operable Unit Sequencing

The Paducah Life Cycle Baseline has been updated to integrate and logically sequence site projects to remediate environmental media (including slabs); complete operating missions; deactivate facilities and systems; remove equipment and disposition small structures; decommission and demolish facilities; complete the Comprehensive Site Operable Unit (CSOU); achieve National Priorities De-listing; and turn over the site for future use. The following figure shows the major projects and activities in the Paducah Life Cycle Baseline, their sequence, and inter-relationships among projects. This figure shows both non-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site activities and CERCLA activities that are required to complete the decommissioning and remediation scope at the Paducah Site.

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Paducah Site Life Cycle Baseline

Field Work
CERCLA Documents

2020 2024 2028 2032 2036 2040 2044 2048 2052 2056 2060 2064 2068

Security
Surveillance and Maintenance/Utility Operations/Infrastructure Management
Site Operations/Emergency Management/Environmental Monitoring
Waste/Landfill Operations
Remediation Project Operations and Maintenance
▲ Begin Dissolved Phase Operations
▲ Shutdown Pump and Treat Systems
▲ Shutdown Dissolved Phase System

Deactivation and Stabilization
Non-Destructive Assay Program/Characterization/Deposit Removal
▲ Deposit Removal Complete
▲ Deactivation Complete

UF6 Cylinder Management/DUF6 Conversion Operations and Maintenance
▲ DUF6 Facility Demolition Complete

PCB Spill Cleanup, Trough Maintenance, and Process Building Air Sampling
▲ Last Process Building Demolition Start

C-400 Complex OU
Demo
RI
RA(s)

Waste Disposal Alternative OSWDF
Construction Start Operations
CERCLA Cell Construction and operations will continue on thru FY59

Groundwater OU Source Actions
C-400 IRA
SWMU 211-A
RA
SWMU 211-B
RI
RA
Potential Additional Source Actions
SI
RI
RA

Burial Grounds OU
SWMU 4
RA
RA
SWMUs 2 & 3
RA
RA
SWMUs 5 & 6
RA
SWMUs 7 & 30
RA
RA
SWMU 472 and SWMU 520
RI
RA
SWMUs 9,10, 145
RI
RA

Groundwater OU Dissolved Phase
RI
TS
RA

Soils & DUF6 Footprint Underlying Soils OUs
Soils OU
RAs-1&2
DUF6 Footprint Underlying Soils
RI
RA

Lagoons OU
RI
RA

Surface Water OU
RI
RA

Process and Support Facility Demolition
Switchyards
C-315
C-310/C-310-A
Cooling Towers
C-333/C-333-A
C-337/C337-A
C-331
C-409
C-600
C-335
C-709/C-710
C-720

Balance of Plant Demolition

Soils and Slabs OU
RI C-410/C-420 RA
RI C-340 RA
RI C-310/-C-310A RA
RI C-409 RA
RI C-315 RA
RI C-335 RI RA C-331 RA
RI C-337 RI RA C-333/C-333-A RA
RI C-709/C-710 RA
RI C-720 RA
RI GAs 1,4 RA
RI GAs 9,12,13,15,17 RA
RI GA 5 RA
RI GAs 10,11 RA
RI GAs 2,14 RA
RI GA 16 RA

CSOU
Verify 4 KOW SWMUs are Remediated
NPL Delisting

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Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets

C-400 Complex Operable Unit (07)

The C-400 Complex Operable Unit (OU) is the current priority project for the remediation program at the Paducah Site. Deactivation of the C-400 Building is the precursor, non-CERCLA activity to the C-400 Building Decontamination and Decommissioning (D&D) Removal Action. Demolition will be conducted as a CERCLA non-time-critical removal action followed by a CERCLA Remedial Investigation/Feasibility Study (RI/FS) evaluating and identifying the response actions necessary to remediate soil and groundwater sources within the C-400 Complex OU area.

Subproject	Deliverable	Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	Comments
		FY 2018–FY 2020	Out-Year		
C-400 D&D	D1 Removal Notification	3/1/18			
	D1 Engineering Evaluation/Cost Analysis (EE/CA)	5/2/18			
	D1 Action Memorandum	8/14/18			
	D1 Removal Action Work Plan	8/17/18			
	Removal Action Field Start	11/27/18			
C-400 Final Remedial Action	D1 Remedial Investigation Work Plan	11/28/18			
	Remedial Investigation Field Start	11/13/19			
	D1 Remedial Investigation/Feasibility Study Report			3rd Quarter 2021	
	D1 Proposed Plan			1st Quarter 2022	D1 Proposed Plan is submitted 45 days after U.S. Environmental Protection Agency (EPA) and Kentucky (KY) approval of the Feasibility Study.[3] The Proposed Plan is submitted for public comment within two weeks of approval.
	D1 Record of Decision (ROD)			4th Quarter 2022	D1 ROD is submitted 30 days after close of public comment period on the Proposed Plan [Federal Facility Agreement (FFA) Section XIV.D].
	D1 Remedial Design Work Plan			4th Quarter 2022	
	D1 Remedial Design Report (90% Design)			4th Quarter 2023	
	D1 Remedial Action Work Plan			4th Quarter 2023	
	Remedial Action Field Start		1st Quarter 2024		
	D1 Remedial Action Completion Report			4th Quarter 2030	D1 Remedial Action Completion Report is submitted 150 days after Remedial Action is completed.

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Groundwater Operable Unit (01)					
The C-400 Volatile Organic Compound Interim Remedial Source Action is complete. The last phase (Phase IIb) was not completed, and the source area will be addressed under the C-400 Complex OU. A completion report will be submitted for the phases completed (i.e., Phase I, Phase IIa) under the 2005 Interim ROD. The Southwest Plume Sources—Solid Waste Management Unit (SWMU) 211-A is a groundwater source action being implemented under the 2012 Southwest Plume Sources ROD. The area is a source to groundwater contamination and is identified as a priority project to be completed in the near-term, along with the C-400 Complex OU actions.					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
C-400 Interim Remedial Action	D1 Remedial Action Completion Report for IRA	2/7/18			
Southwest Plume Sources—SWMU 211-A (Enhanced *In Situ* Bioremediation)	D1 Remedial Design Report (90% Design)	11/8/19			
	D1 Remedial Action Work Plan	12/8/19			
	D1 Remedial Action Completion Report			2nd Quarter 2021	D1 Remedial Action Completion Report is submitted 150 days after Remedial Action is completed.

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Waste Disposal Alternatives (06)

The Waste Disposal Alternatives Project will evaluate whether various types of waste generated by the CERCLA projects at that Paducah Site will be dispositioned at multiple existing disposal facilities available throughout the country or at an on-site waste disposal facility (OSWDF) to be built at the Paducah Site for disposal of the majority of waste generated by decommissioning, demolition, burial grounds excavation, and environmental media remediation. The project will be completed in the time frame necessary to ensure that an OSWDF (if selected) is available for the first potential burial ground excavation, SWMU 4, and for demolition of gaseous diffusion plant process and support buildings, with the exception of the C-400 Building, which is prioritized for demolition in fiscal year (FY) 2019 in order to complete soil and groundwater remediation beneath the C-400 Building. Design and construction of the first cell (phase) of a potential OSWDF will require a significant budget over a period of four years. During that period, there are no other remedial actions supported by the projected Paducah Site funding levels. All available remediation funding is dedicated to completing this project as quickly as possible, based on the funding that is provided.

Subproject	Deliverable	Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	Comments
		FY 2018–FY 2020	Out-Year		
Waste Disposal Alternatives	D1 Remedial Investigation/Feasibility Study			4th Quarter 2027	
	D1 Proposed Plan			2nd Quarter 2028	D1 Proposed Plan is submitted 45 days after EPA and KY approval of the FS.[3] The Proposed Plan is submitted for public comment within two weeks of approval.
	D1 ROD			4th Quarter 2028	D1 ROD is submitted 30 days after close of public comment period on the Proposed Plan (FFA Section XIV.D).
	D1 Remedial Design Work Plan			3rd Quarter 2029	
	D1 Remedial Design Report			3rd Quarter 2030	FFA schedule logic has been modified to account for the complexity of the project.
	D1 Remedial Action Work Plan			3rd Quarter 2031	FFA schedule logic has been modified to account for the complexity of the project.
	D1 Interim Remedial Action Completion Report			4th Quarter 2035	The D1 Interim Remedial Action Completion Report is a post-construction report to be issued prior to the start of operations. A D1 Final Remedial Action Completion Report will be issued when operations cease and closure has been completed.

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Burial Grounds Operable Unit (05) The Burial Grounds OU consists of 12 SWMUs grouped into subprojects. SWMU 4 is the highest priority project, with the others subprojects being addressed in parallel with and sequenced to have continuous field work, while also considering the best fit to stabilize annual costs.					
		Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	
Subproject	**Deliverable**	**FY 2018–FY 2020**	**Out-Year**		**Comments**
SWMU 4 Remedial Action	D1 Proposed Plan			4th Quarter 2033	
	D1 ROD			2nd Quarter 2034	
	D1 Remedial Design Work Plan (Waste Portion)			4th Quarter 2034	
	D1 Remedial Design Report (Waste Portion)			1st Quarter 2035	
	D1 Remedial Action Work Plan (Waste Portion)			1st Quarter 2035	
	D1 Interim Remedial Action Completion Report (Waste Portion)			4th Quarter 2038	
	D1 Remedial Design Work Plan (Groundwater Treatment)			2nd Quarter 2038	
	D1 Remedial Design Report (Groundwater Treatment)			4th Quarter 2038	
	D1 Remedial Action Work Plan (Groundwater Treatment)			1st Quarter 2039	
	D1 Remedial Action Completion Report (Groundwater Treatment)			3rd Quarter 2041	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Burial Grounds Operable Unit (05) (Continued)					
		Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	
Subproject	**Deliverable**	**FY 2018–FY 2020**	**Out-Year**		**Comments**
SWMUs 2 and 3 Remedial Action	D1 Feasibility Study (if update necessary)			3rd Quarter 2039	
	D1 Proposed Plan			1st Quarter 2040	
	D1 ROD			3rd Quarter 2040	
	SWMU 2 D1 Remedial Design Work Plan (Waste Portion)			1st Quarter 2041	
	SWMU 2 D1 Remedial Design Report (Waste Portion)			2nd Quarter 2041	
	SWMU 2 D1 Remedial Action Work Plan (Waste Portion)			2nd Quarter 2041	
	SWMU 2 D1 Interim Remedial Action Completion Report (Waste Portion)			3rd Quarter 2042	
	SWMU 2 D1 Remedial Design Work Plan (Groundwater Treatment)			2nd Quarter 2043	
	SWMU 2 D1 Remedial Design Report (Groundwater Treatment)			3rd Quarter 2043	
	SWMU 2 D1 Remedial Action Work Plan (Groundwater Treatment)			4th Quarter 2043	
	SWMU 2 D1 Remedial Action Completion Report			2nd Quarter 2045	
	SWMU 3 D1 Remedial Design Work Plan			1st Quarter 2041	
	SWMU 3 D1 Remedial Design Report			2nd Quarter 2041	
	SWMU 3 D1 Remedial Action Work Plan			2nd Quarter 2041	
	SWMU 3 D1 Remedial Action Completion Report			4th Quarter 2043	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Burial Grounds Operable Unit (05) (Continued)					
		Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	
Subproject	Deliverable	FY 2018–FY 2020	Out-Year		Comments
SWMUs 5 and 6 Remedial Action	D1 Proposed Plan			2nd Quarter 2037	
	D1 ROD			4th Quarter 2037	
	D1 Remedial Design Work Plan			2nd Quarter 2038	
	D1 Remedial Design Report			3rd Quarter 2038	
	D1 Remedial Action Work Plan			4th Quarter 2038	
	D1 Remedial Action Completion Report			1st Quarter 2040	
SWMUs 7 and 30 Remedial Action	D1 Feasibility Study (if update necessary)			4th Quarter 2040	
	D1 Proposed Plan			2nd Quarter 2041	
	D1 ROD			4th Quarter 2041	
	D1 Remedial Design Work Plan (Waste Portion)			2nd Quarter 2042	
	D1 Remedial Design Report (Waste Portion)			3rd Quarter 2042	
	D1 Remedial Action Work Plan (Waste Portion)			4th Quarter 2042	
	D1 Interim Remedial Action Completion Report (Waste Portion)			2nd Quarter 2044	
	D1 Remedial Design Work Plan (Groundwater Treatment)			2nd Quarter 2044	
	D1 Remedial Design Report (Groundwater Treatment)			3rd Quarter 2044	
	D1 Remedial Action Work Plan (Groundwater Treatment)			3rd Quarter 2044	
	D1 Remedial Action Completion Report			1st Quarter 2047	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Burial Grounds Operable Unit (05) (Continued)					
		Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	
Subproject	Deliverable	FY 2018–FY 2020	Out-Year		Comments
SWMUs 9, 10, and 145 Remedial Action	D1 Remedial Investigation Work Plan Addendum			4th Quarter 2040	
	D1 Remedial Investigation Report Addendum			1st Quarter 2042	
	D1 Feasibility Study			3rd Quarter 2042	
	D1 Proposed Plan			1st Quarter 2043	
	D1 ROD			3rd Quarter 2043	
	D1 Remedial Design Work Plan			1st Quarter 2044	
	D1 Remedial Design Report			3rd Quarter 2044	
	D1 Remedial Action Work Plan			4th Quarter 2044	
	D1 Remedial Action Completion Report			1st Quarter 2046	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Burial Grounds Operable Unit (05) (Continued)					
		Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	
Subproject	Deliverable	FY 2018–FY 2020	Out-Year		Comments
Additional Burial Grounds	SWMU 472 Remedial Investigation Work Plan			1st Quarter 2039	
	SWMU 472 Remedial Investigation Report			1st Quarter 2040	
	SWMU 472 D1 Feasibility Study			3rd Quarter 2040	
	SWMU 472 D1 Proposed Plan			1st Quarter 2041	
	SWMU 472 D1 ROD			3rd Quarter 2041	
	SWMU 472 D1 Remedial Design Work Plan			1st Quarter 2042	
	SWMU 472 D1 Remedial Design Report			2nd Quarter 2042	
	SWMU 472 D1 Remedial Action Work Plan			2nd Quarter 2042	
	SWMU 472 D1 Remedial Action Completion Report			4th Quarter 2043	
	SWMU 520 Remedial Investigation Work Plan			1st Quarter 2039	
	SWMU 520 Remedial Investigation Report			1st Quarter 2040	
	SWMU 520 D1 Feasibility Study			3rd Quarter 2040	
	SWMU 520 D1 Proposed Plan			1st Quarter 2041	
	SWMU 520 D1 ROD			3rd Quarter 2041	
	SWMU 520 D1 Remedial Design Work Plan			1st Quarter 2042	
	SWMU 520 D1 Remedial Design Report			2nd Quarter 2042	
	SWMU 520 D1 Remedial Action Work Plan			2nd Quarter 2042	
	SWMU 520 D1 Remedial Action Completion Report			4th Quarter 2043	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Groundwater Operable Unit (01) The Groundwater OU includes an additional source action for SWMU 211-B, an investigation to identify any additional sources and potential remedial action, and dissolved phase treatment to complete the groundwater remedial actions.					
		Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	
Subproject	**Deliverable**	**FY 2018–FY 2020**	**Out-Year**		**Comments**
Southwest Plume Sources—SWMU 211-B	D1 Remedial Design Work Plan			4th Quarter 2044	
	D1 Remedial Design Report (90% Design)			2nd Quarter 2048	
	D1 Remedial Action Work Plan			2nd Quarter 2048	
	D1 Remedial Action Completion Report			2nd Quarter 2052	
Potential Additional Groundwater Sources	D1 Site Investigation Work Plan			3rd Quarter 2042	
	D1 Site Investigation Report			3rd Quarter 2043	
	D1 Remedial Investigation Work Plan			4th Quarter 2043	
	D1 Remedial Investigation Report			3rd Quarter 2044	
	D1 Feasibility Study Report			1st Quarter 2045	
	D1 Proposed Plan			4th Quarter 2045	
	D1 Record of Decision			1st Quarter 2046	
	D1 Remedial Design Work Plan			4th Quarter 2046	
	D1 Remedial Design Report (90% Design)			2nd Quarter 2047	
	D1 Remedial Action Work Plan			2nd Quarter 2047	
	D1 Remedial Action Completion Report			4th Quarter 2048	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Groundwater Operable Unit (01)					
		Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	
Subproject	Deliverable	FY 2018–FY 2020	Out-Year		Comments
Dissolved-Phase Plumes	D1 Remedial Investigation Work Plan			1st Quarter 2042	
	D1 Remedial Investigation Report			1st Quarter 2044	
	D1 Feasibility Study Report			3rd Quarter 2044	
	D1 Proposed Plan			2nd Quarter 2045	
	D1 ROD			4th Quarter 2045	
	D1 Treatability Work Plan			2nd Quarter 2043	
	D1 Treatability Study Report			1st Quarter 2045	
	D1 Remedial Design Work Plan			1st Quarter 2046	
	D1 Remedial Design Report			2nd Quarter 2046	
	D1 Remedial Action Work Plan			3rd Quarter 2046	
	D1 Interim Remedial Action Completion Report			4th Quarter 2048	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Soils Operable Unit (04) The Soils OU consists of a number of areas with identified soils contamination. Many of these areas are small units that are in close proximity with site buildings and other structures. The project is planned for two groupings of SWMUs; however, the SWMUs within each grouping have not yet been determined.					
		Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	
Subproject	Deliverable	FY 2018–FY 2020	Out-Year		Comments
Remedial Action 1	D1 Feasibility Study			2nd Quarter 2039	
	D1 Proposed Plan			4th Quarter 2039	
	D1 ROD			2nd Quarter 2040	
	D1 Remedial Design Work Plan			4th Quarter 2040	
	D1 Remedial Design Report			1st Quarter 2041	
	D1 Remedial Action Work Plan			2nd Quarter 2041	
	D1 Remedial Action Completion Report			4th Quarter 2042	
Remedial Action 2	D1 Feasibility Study			4th Quarter 2040	
	D1 Proposed Plan			2nd Quarter 2041	
	D1 ROD			4th Quarter 2041	
	D1 Remedial Design Work Plan			2nd Quarter 2042	
	D1 Remedial Design Report			3rd Quarter 2042	
	D1 Remedial Action Work Plan			4th Quarter 2042	
	D1 Remedial Action Completion Report			1st Quarter 2044	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

DUF_6 Footprint Underlying Soils Operable Unit (08) The DUF_6 Footprint Underlying Soils OU includes SWMUs identified as a result of soil contamination prior to construction of the DUF_6 conversion facility. These SWMUs are located underneath the currently operating DUF_6 conversion facility. It also includes the outfall ditches that discharge process and runoff from the facility and DUF_6 area.					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
N/A	D1 Remedial Investigation Work Plan			4th Quarter 2051	
	D1 Remedial Investigation Report			4th Quarter 2052	
	D1 Feasibility Study			3rd Quarter 2053	
	D1 Proposed Plan			1st Quarter 2054	
	D1 ROD			4th Quarter 2055	
	D1 Remedial Design Work Plan			4th Quarter 2055	
	D1 Remedial Design Report			4th Quarter 2056	
	D1 Remedial Action Work Plan			4th Quarter 2056	
	D1 Remedial Action Completion Report			2nd Quarter 2057	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Decontamination and Decommissioning Operable Unit (10) D&D OU consists of many facilities grouped into subprojects that will be dispositioned utilizing the CERCLA process. Some facilities already have been designated for inclusion within this operable unit, based on existing information that requires that the facilities be dispositioned under CERCLA. Other facilities are grouped into geographical areas (GAs) and will be addressed appropriately based on each facility's specific conditions. Facility characterization, deposit removal, and deactivation are non-CERCLA activities that must be completed before D&D can occur. Additionally, the potential OSWDF must be constructed and capable of accepting this CERCLA waste. Additional cells (phases) within the potential OSWDF must be constructed throughout D&D in order to have cells (phases) available for disposition. As demolition is progressing, OSWDF expansion is sequenced logically to account for the facility volumes generated. The D&D OU will take a total of 15 years to complete.					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
Switchyards D&D	D1 Removal Notification (Site Evaluation) Switchyards slabs and soils			2nd Quarter 2036	
	D1 EE/CA Switchyards slabs and soils			3rd Quarter 2036	
	D1 Action Memorandum Switchyards slabs and soils			4th Quarter 2036	
	D1 Removal Action Work Plan Switchyards slabs and soils			1st Quarter 2037	
Cooling Towers D&D	D1 Removal Notification (Site Evaluation) Cooling Tower Buildings			3rd Quarter 2038	
	D1 EE/CA Cooling Tower Buildings			4th Quarter 2038	
	D1 Action Memorandum Cooling Tower Buildings			1st Quarter 2039	
	D1 Removal Action Work Plan Cooling Tower Buildings			2nd Quarter 2039	
C-409 D&D	D1 Removal Notification (Site Evaluation) C-409			1st Quarter 2038	
	D1 EE/CA C-409			2nd Quarter 2038	
	D1 Action Memorandum C-409			3rd Quarter 2038	
	D1 Removal Action Work Plan C-409			4th Quarter 2038	
C-709/C-710 D&D	D1 Removal Notification (Site Evaluation) C-709/C-710			1st Quarter 2038	
	D1 EE/CA C-709/C-710			2nd Quarter 2038	
	D1 Action Memorandum C-709/C-710			4th Quarter 2038	
	D1 Removal Action Work Plan C-709/C-710			1st Quarter 2039	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Decontamination and Decommissioning Operable Unit (10)					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
C-600 D&D	D1 Removal Notification (Site Evaluation) C-600			1st Quarter 2040	
	D1 EE/CA C-600			2nd Quarter 2040	
	D1 Action Memorandum C-600			3rd Quarter 2040	
	D1 Removal Action Work Plan C-600			4th Quarter 2040	
C-720 D&D	D1 Removal Notification (Site Evaluation) C-720			4th Quarter 2040	
	D1 EE/CA C-720			1st Quarter 2041	
	D1 Action Memorandum C-720			2nd Quarter 2041	
	D1 Removal Action Work Plan C-720			3rd Quarter 2041	
C-337/C-337-A D&D	D1 Removal Notification (Site Evaluation) C-337/C-337A			4th Quarter 2041	
	D1 EE/CA C-337/C-337A			1st Quarter 2042	
	D1 Action Memorandum C-337/C-337A			2nd Quarter 2042	
	D1 Removal Action Work Plan C-337/C-337A			3rd Quarter 2042	
C-335 D&D	D1 Removal Notification (Site Evaluation) C-335			3rd Quarter 2043	
	D1 EE/CA C-335			3rd Quarter 2043	
	D1 Action Memorandum C-335			1st Quarter 2044	
	D1 Removal Action Work Plan C-335			2nd Quarter 2044	
C-315 D&D	D1 Removal Notification (Site Evaluation) C-315			1st Quarter 2045	
	D1 EE/CA C-315			2nd Quarter 2045	
	D1 Action Memorandum C-315			4th Quarter 2045	
	D1 Removal Action Work Plan C-315			1st Quarter 2046	
C-333/C-333-A D&D	D1 Removal Notification (Site Evaluation) C-333/C-333-A			1st Quarter 2047	
	D1 EE/CA C-333/C-333A			2nd Quarter 2047	
	D1 Action Memorandum C-333/C-333-A			3rd Quarter 2047	
	D1 Removal Action Work Plan C-333/C-333-A			4th Quarter 2047	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Decontamination and Decommissioning Operable Unit (10)					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
C-331 D&D	D1 Removal Notification (Site Evaluation) C-331			4th Quarter 2047	
	D1 EE/CA C-331			1st Quarter 2048	
	D1 Action Memorandum C-331			3rd Quarter 2048	
	D1 Removal Action Work Plan C-331			4th Quarter 2048	
C-310/C-310-A D&D	D1 Removal Notification (Site Evaluation) C-310/C-310-A			1st Quarter 2048	
	D1 EE/CA C-310/C-310-A			2nd Quarter 2048	
	D1 Action Memorandum C-310/C-310-A			4th Quarter 2048	
	D1 Removal Action Work Plan C-310/C-310-A			1st Quarter 2049	
GA 1 D&D	D1 Removal Notification (Site Evaluation) GA 1 (includes C-615 Sewage Treatment Plant and C-616 Former Chromate Treatment System)			1st Quarter 2047	
	D1 EE/CA GA 1 (includes C-615 Sewage Treatment Plant and C-616 Former Chromate Treatment System)			2nd Quarter 2047	
	D1 Action Memorandum GA 1 (includes C-615 Sewage Treatment Plant and C-616 Former Chromate Treatment System)			4th Quarter 2047	
	D1 Removal Action Work Plan GA 1 (includes C-615 Sewage Treatment Plant and C-616 Former Chromate Treatment System)			1st Quarter 2048	
GA 10 D&D	D1 Removal Notification (Site Evaluation) GA 10 (includes C-726)			2nd Quarter 2041	
	D1 EE/CA GA 10 (includes C-726)			3rd Quarter 2041	
	D1 Action Memorandum GA-10 (includes C-726)			1st Quarter 2042	
	D1 Removal Action Work Plan GA 10 (includes C-726)			2nd Quarter 2042	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Decontamination and Decommissioning Operable Unit (10)					
		Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	
Subproject	**Deliverable**	**FY 2018–FY 2020**	**Out-Year**		**Comments**
GA 13 D&D	D1 Removal Notification (Site Evaluation) GA 13 (includes C-415)			1st Quarter 2041	
	D1 EE/CA GA 13 (includes C-415)			2nd Quarter 2041	
	D1 Action Memorandum GA 13 (includes C-415)			3rd Quarter 2041	
	D1 Removal Action Work Plan GA 13 (includes C-415)			4th Quarter 2041	
GA 14 D&D	D1 Removal Notification (Site Evaluation) GA 14 (includes C-724-A and C-728)			2nd Quarter 2037	
	D1 EE/CA GA 14 (includes C-724-A and C-728)			3rd Quarter 2037	
	D1 Action Memorandum GA 14 (includes C-724-A and C-728)			1st Quarter 2038	
	D1 Removal Action Work Plan GA 14 (includes C-724-A and C-728)			2nd Quarter 2038	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Soils and Slabs Operable Unit (11) This OU contains many subprojects to address the various slabs at the Paducah Site. The large process and support facilities have specific subprojects identified for each slab. Other slabs are grouped in GAs will be addressed appropriately, based on each areas specific conditions. These subprojects are designated for planning purposes only. The physical characteristics and previous actions taken within the GAs will determined the appropriate action for completion. The Soils and Slabs OU will take a total of 15 years to complete and will overlap with the D&D and Soils OUs.					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
C-409 Slab	D1 Remedial Investigation Work Plan C-409 Slab			4th Quarter 2040	
	D1 Remedial Investigation Report C-409 Slab			2nd Quarter 2042	
	D1 Feasibility Study C-409 Slab			4th Quarter 2042	
	D1 Proposed Plan C-409 Slab			2nd Quarter 2043	
	D1 ROD C-409 Slab			4th Quarter 2043	
	D1 Remedial Design Work Plan C-409 Slab			2nd Quarter 2044	
	D1 Remedial Design Report C-409 Slab			3rd Quarter 2044	
	D1 Remedial Action Work Plan C-409 Slab			4th Quarter 2044	
	D1 Remedial Action Completion Report C-409 Slab			1st Quarter 2046	
C-340 Slab	D1 Remedial Investigation Work Plan C-340 Slab			3rd Quarter 2042	
	D1 Remedial Investigation Report C-340 Slab			1st Quarter 2044	
	D1 Feasibility Study C-340 Slab			3rd Quarter 2044	
	D1 Proposed Plan C-340 Slab			1st Quarter 2045	
	D1 ROD C-340 Slab			3rd Quarter 2045	
	D1 Remedial Design Work Plan C-340 Slab			1st Quarter 2046	
	D1 Remedial Design Report C-340 Slab			2nd Quarter 2046	
	D1 Remedial Action Work Plan C-340 Slab			2nd Quarter 2046	
	D1 Remedial Action Completion Report C-340 Slab			3rd Quarter 2047	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Soils and Slabs Operable Unit (11)					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
C-709/C-710 Slab	D1 Remedial Investigation Work Plan C-709/C-710 Slab			2nd Quarter 2044	
	D1 Remedial Investigation Report C-709/C-710 Slab			4th Quarter 2045	
	D1 Feasibility Study C-709/C-710 Slab			2nd Quarter 2046	
	D1 Proposed Plan C-709/C-710 Slab			4th Quarter 2046	
	D1 ROD C-709/C-710 Slab			2nd Quarter 2047	
	D1 Remedial Design Work Plan C-709/C-710 Slab			4th Quarter 2047	
	D1 Remedial Design Report C-709/ C-710 Slab			1st Quarter 2048	
	D1 Remedial Action Work Plan C-709/C-710 Slab			1st Quarter 2048	
	D1 Remedial Action Completion Report C-709/C-710 Slab			3rd Quarter 2049	
C-720 Slab	D1 Remedial Investigation Work Plan C-720 Slab			2nd Quarter 2044	
	D1 Remedial Investigation Report C-720 Slab			3rd Quarter 2045	
	D1 Feasibility Study C-720 Slab			1st Quarter 2046	
	D1 Proposed Plan C-720 Slab			3rd Quarter 2046	
	D1 ROD C-720 Slab			1st Quarter 2047	
	D1 Remedial Design Work Plan C-720 Slab			3rd Quarter 2047	
	D1 Remedial Design Report C-720 Slab			4th Quarter 2047	
	D1 Remedial Action Work Plan C-720 Slab			4th Quarter 2047	
	D1 Remedial Action Completion Report C-720 Slab			2nd Quarter 2049	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Soils and Slabs Operable Unit (11)					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
C-410/C-420 Slabs	D1 Remedial Investigation Work Plan C-410/C-420 Slab			4th Quarter 2043	
	D1 Remedial Investigation Report C-410/C-420 Slab			2nd Quarter 2045	
	D1 Feasibility Study C-410/C-420 Slab			4th Quarter 2045	
	D1 Proposed Plan C-410/C-420 Slab			2nd Quarter 2046	
	D1 ROD C-410/C-420 Slab			4th Quarter 2046	
	D1 Remedial Design Work Plan C-410/C-420 Slab			2nd Quarter 2047	
	D1 Remedial Design Report C-410/C-420 Slab			3rd Quarter 2047	
	D1 Remedial Action Work Plan C-410/C-420 Slab			3rd Quarter 2047	
	D1 Remedial Action Completion Report C-410/ C-420 Slab			1st Quarter 2049	
C-337/C-337-A Slab	D1 Remedial Investigation Work Plan C-337/ C-337A Slab			4th Quarter 2046	
	D1 Remedial Investigation Report C-337/C-337A Slab			3rd Quarter 2047	
	D1 Feasibility Study C-337/C-337A Slab			1st Quarter 2048	
	D1 Proposed Plan C-337/C-337A Slab			3rd Quarter 2048	
	D1 ROD C-337/C-337A Slab			1st Quarter 2050	
	D1 Remedial Design Work Plan C-337/C-337A Slab			3rd Quarter 2050	
	D1 Remedial Design Report C-337/ C-337A Slab			4th Quarter 2050	
	D1 Remedial Action Work Plan C-337/C-337A Slab			1st Quarter 2051	
	D1 Remedial Action Completion Report C-337/ C-337A Slab			3rd Quarter 2052	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Soils and Slabs Operable Unit (11)					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
C-335 Slab	D1 Remedial Investigation Work Plan C-335 Slab			1st Quarter 2047	
	D1 Remedial Investigation Report C-335 Slab			4th Quarter 2047	
	D1 Feasibility Study C-335 Slab			3rd Quarter 2048	
	D1 Proposed Plan C-335 Slab			1st Quarter 2049	
	D1 ROD C-335 Slab			3rd Quarter 2049	
	D1 Remedial Design Work Plan C-335 Slab			1st Quarter 2050	
	D1 Remedial Design Report C-335 Slab			2nd Quarter 2050	
	D1 Remedial Action Work Plan C-335 Slab			3rd Quarter 2050	
	D1 Remedial Action Completion Report C-335 Slab			3rd Quarter 2051	
C-310 Slab	D1 Remedial Investigation Work Plan C-310 Slab			4th Quarter 2048	
	D1 Remedial Investigation Report C- C-310 Slab			4th Quarter 2049	
	D1 Feasibility Study C-310 Slab			2nd Quarter 2050	
	D1 Proposed Plan C-310 Slab			4th Quarter 2050	
	D1 ROD C-310 Slab			2nd Quarter 2051	
	D1 Remedial Design Work Plan C-310 Slab			4th Quarter 2051	
	D1 Remedial Design Report C-310 Slab			1st Quarter 2052	
	D1 Remedial Action Work Plan C-310 Slab			1st Quarter 2052	
	D1 Remedial Action Completion Report C-310 Slab			2nd Quarter 2053	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Soils and Slabs Operable Unit (11)					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
C-315 Slab	D1 Remedial Investigation Work Plan C-315 Slab			4th Quarter 2047	
	D1 Remedial Investigation Report C-315 Slab			2nd Quarter 2049	
	D1 Feasibility Study C-315 Slab			4th Quarter 2049	
	D1 Proposed Plan C-315 Slab			2nd Quarter 2050	
	D1 ROD C-315 Slab			4th Quarter 2050	
	D1 Remedial Design Work Plan C-315 Slab			2nd Quarter 2051	
	D1 Remedial Design Report C-315 Slab			3rd Quarter 2051	
	D1 Remedial Action Work Plan C-315 Slab			3rd Quarter 2051	
	D1 Remedial Action Completion Report C-315 Slab			4th Quarter 2052	
C-333/C-333-A Slab	D1 Remedial Investigation Work Plan C-333/ C-333-A Slab			3rd Quarter 2050	
	D1 Remedial Investigation Report C-333/C-333-A Slab			2nd Quarter 2051	
	D1 Feasibility Study C-333/C-333-A Slab			4th Quarter 2051	
	D1 Proposed Plan C-333/C-333-A Slab			2nd Quarter 2052	
	D1 ROD C-333/C-333-A Slab			4th Quarter 2052	
	D1 Remedial Design Work Plan C-333/C-333-A Slab			2nd Quarter 2053	
	D1 Remedial Design Report C-333/ C-333-A Slab			3rd Quarter 2053	
	D1 Remedial Action Work Plan C-333/C-333-A Slab			3rd Quarter 2053	
	D1 Remedial Action Completion Report C-333/ C-333-A Slab			1st Quarter 2055	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Soils and Slabs Operable Unit (11)					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
C-331 Slab	D1 Remedial Investigation Work Plan C-331 Slab			1st Quarter 2051	
	D1 Remedial Investigation Report C-331 Slab			1st Quarter 2052	
	D1 Feasibility Study C-331 Slab			3rd Quarter 2052	
	D1 Proposed Plan C-331 Slab			1st Quarter 2053	
	D1 ROD C-331 Slab			3rd Quarter 2053	
	D1 Remedial Design Work Plan C-331 Slab			1st Quarter 2054	
	D1 Remedial Design Report C-331 Slab			2nd Quarter 2054	
	D1 Remedial Action Work Plan C-331 Slab			2nd Quarter 2054	
	D1 Remedial Action Completion Report C-331 Slab			3rd Quarter 2055	
GA 9, GA 12, GA 13, GA 15, GA 17 Slabs	D1 Remedial Investigation Work Plan GA 9, GA 12, GA 13, GA 15, GA 17 Slabs			1st Quarter 2044	
	D1 Remedial Investigation Report GA 9, GA 12, GA 13, GA 15, GA 17 Slabs			3rd Quarter 2045	
	D1 Feasibility Study GA 9, GA 12, GA 13, GA 15, GA 17 Slabs			1st Quarter 2046	
	D1 Proposed Plan GA 9, GA 12, GA 13, GA 15, GA 17 Slabs			3rd Quarter 2046	
	D1 ROD GA 9, GA 12, GA 13, GA 15, GA 17 Slabs			1st Quarter 2047	
	D1 Remedial Design Work Plan GA 9, GA 12, GA 13, GA 15, GA 17 Slabs			3rd Quarter 2047	
	D1 Remedial Design Report GA 9, GA 12, GA 13, GA 15, GA 17 Slabs			4th Quarter 2047	
	D1 Remedial Action Work Plan GA 9, GA 12, GA 13, GA 15, GA 17 Slabs			4th Quarter 2047	
	D1 Remedial Action Completion Report GA 9, GA 12, GA 13, GA 15, GA 17 Slabs			1st Quarter 2050	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Soils and Slabs Operable Unit (11)					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
GA 10, GA 11 Slabs	D1 Remedial Investigation Work Plan GA 10, GA 11 Slabs			4th Quarter 2049	
	D1 Remedial Investigation Report GA 10, GA 11 Slabs			2nd Quarter 2051	
	D1 Feasibility Study GA 10, GA 11 Slabs			4th Quarter 2051	
	D1 Proposed Plan GA 10, GA 11 Slabs			2nd Quarter 2052	
	D1 ROD GA 10, GA 11 Slabs			4th Quarter 2052	
	D1 Remedial Design Work Plan GA 10, GA 11 Slabs			2nd Quarter 2053	
	D1 Remedial Design Report GA 10, GA 11 Slabs			3rd Quarter 2053	
	D1 Remedial Action Work Plan GA 10, GA 11 Slabs			3rd Quarter 2053	
	D1 Remedial Action Completion Report GA 10, GA 11 Slabs			4th Quarter 2054	
GA 5 Slabs	D1 Remedial Investigation Work Plan GA 5 Slabs			4th Quarter 2041	
	D1 Remedial Investigation Report GA 5 Slabs			2nd Quarter 2043	
	D1 Feasibility Study GA 5 Slabs			4th Quarter 2043	
	D1 Proposed Plan GA 5 Slabs			2nd Quarter 2044	
	D1 ROD GA 5 Slabs			4th Quarter 2044	
	D1 Remedial Design Work Plan GA 5 Slabs			1st Quarter 2045	
	D1 Remedial Design Report GA 5 Slabs			2nd Quarter 2045	
	D1 Remedial Action Work Plan GA 5 Slabs			3rd Quarter 2045	
	D1 Remedial Action Completion Report GA 5 Slabs			4th Quarter 2046	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Soils and Slabs Operable Unit (11)					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
GA 16 Slabs	D1 Remedial Investigation Work Plan GA 16 Slabs			3rd Quarter 2048	
	D1 Remedial Investigation Report GA 16 Slabs			1st Quarter 2049	
	D1 Feasibility Study GA 16 Slabs			3rd Quarter 2050	
	D1 Proposed Plan GA 16 Slabs			1st Quarter 2051	
	D1 ROD GA 16 Slabs			3rd Quarter 2051	
	D1 Remedial Design Work Plan GA 16 Slabs			1st Quarter 2052	
	D1 Remedial Design Report GA 16 Slabs			2nd Quarter 2052	
	D1 Remedial Action Work Plan GA 16 Slabs			3rd Quarter 2052	
	D1 Remedial Action Completion Report GA 16 Slabs			3rd Quarter 2053	
GA 2, GA 14 Slabs	D1 Remedial Investigation Work Plan GA 2, GA 14 Slabs			1st Quarter 2041	
	D1 Remedial Investigation Report GA 2, GA 14 Slabs			3rd Quarter 2042	
	D1 Feasibility Study GA 2, GA 14 Slabs			1st Quarter 2043	
	D1 Proposed Plan GA 2, GA 14 Slabs			2nd Quarter 2043	
	D1 ROD GA 2, GA 14 Slabs			4th Quarter 2043	
	D1 Remedial Design Work Plan GA 2, GA 14 Slabs			2nd Quarter 2044	
	D1 Remedial Design Report GA 2, GA 14 Slabs			3rd Quarter 2044	
	D1 Remedial Action Work Plan GA 2, GA 14 Slabs			4th Quarter 2044	
	D1 Remedial Action Completion Report GA 2, GA 14 Slabs			1st Quarter 2046	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Soils and Slabs Operable Unit (11)					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
GA 1, GA 4 Slabs	D1 Remedial Investigation Work Plan GA 1, GA 4 Slabs			2nd Quarter 2050	
	D1 Remedial Investigation Report GA 1, GA 4 Slabs			3rd Quarter 2052	
	D1 Feasibility Study GA 1, GA 4 Slabs			1st Quarter 2053	
	D1 Proposed Plan GA 1, GA 4 Slabs			3rd Quarter 2053	
	D1 ROD GA 1, GA 4 Slabs			1st Quarter 2054	
	D1 Remedial Design Work Plan GA 1, GA 4 Slabs			3rd Quarter 2054	
	D1 Remedial Design Report GA 1, GA 4 Slabs			4th Quarter 2054	
	D1 Remedial Action Work Plan GA 1, GA 4 Slabs			4th Quarter 2054	
	D1 Remedial Action Completion Report GA 1, GA 4 Slabs			4th Quarter 2055	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Lagoons Operable Unit (09) The Lagoons OU consists of two subprojects to address two different types of lagoons utilized at the Paducah Site. Lagoons that were constructed to support gaseous diffusion processes are grouped together into one subproject, and lagoons constructed for the purpose of treating water drawn from the Ohio River to provide potable and sanitary water to the Paducah Site are grouped together under another subproject.					
		Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	
Subproject	Deliverable	FY 2018–FY 2020	Out-Year		Comments
Process Lagoons	D1 Remedial Investigation Work Plan			4th Quarter 2048	
	D1 Remedial Investigation Report			2nd Quarter 2050	
	D1 Feasibility Study			4th Quarter 2050	
	D1 Proposed Plan			1st Quarter 2051	
	D1 ROD			3rd Quarter 2051	
	D1 Remedial Design Work Plan			2nd Quarter 2052	
	D1 Remedial Design Report			3rd Quarter 2052	
	D1 Remedial Action Work Plan			3rd Quarter 2052	
	D1 Remedial Action Completion Report			3nd Quarter 2053	
Water Treatment System Lagoons	D1 Remedial Investigation Work Plan			4th Quarter 2048	
	D1 Remedial Investigation Report			2nd Quarter 2050	
	D1 Feasibility Study			4th Quarter 2050	
	D1 Proposed Plan			2nd Quarter 2051	
	D1 ROD			4th Quarter 2051	
	D1 Remedial Design Work Plan			2nd Quarter 2052	
	D1 Remedial Design Report			3rd Quarter 2052	
	D1 Remedial Action Work Plan			3rd Quarter 2052	
	D1 Remedial Action Completion			3rd Quarter 2053	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Surface Water Operable Unit (03) The Surface Water OU includes the internal plant ditches that discharge to Little Bayou Creek and Bayou Creek. The SWMUs within the OU contributed to surface water contamination throughout the system. The outfalls and creeks also are identified as SWMUs.					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
Remedial Action (Little Bayou and Bayou Creek Watersheds)	D1 Remedial Investigation Report			3rd Quarter 2054	
	D1 Feasibility Study Report			1st Quarter 2055	
	D1 Proposed Plan			3rd Quarter 2055	
	D1 ROD			1st Quarter 2056	
	D1 Remedial Design Work Plan			3rd Quarter 2056	
	D1 Remedial Design Report			2nd Quarter 2057	
	D1 Remedial Action Work Plan			2nd Quarter 2057	
	D1 Remedial Action Completion Report			4th Quarter 2058	
Comprehensive Site Operable Unit (12) The CSOU evaluates the final actions taken at the site. It includes a sitewide baseline human health and ecological risk assessment to evaluate residual risks and ensure all actions taken to date, when considered collectively, are protective of human health and the environment from a sitewide perspective and implements any additional actions necessary to achieve final cleanup under the FFA.					
Subproject	**Deliverable**	**Enforceable Timetable and Deadlines[1]**		**Planning Dates with Long-Term Targets for Decision Documents[2]**	**Comments**
		FY 2018–FY 2020	**Out-Year**		
N/A	D1 Remedial Investigation Work Plan			1st Quarter 2062	
	D1 Remedial Investigation/Feasibility Study Report			3rd Quarter 2062	
	D1 Proposed Plan			1st Quarter 2063	
	D1 ROD			3rd Quarter 2063	

Enforceable Timetables and Deadlines; Planning Dates with Long-Term Targets (Continued)

Other FFA Planning Dates					
		Enforceable Timetable and Deadlines[1]		Planning Dates with Long-Term Targets for Decision Documents[2]	
Subproject	Deliverable	FY 2018–FY 2020	Out-Year		Comments
NA	D1 Five-Year Review			7/31/18	This is a statutorily required document that must be approved by 6/4/19.

[1] Enforceable Timetables and Deadlines are based on the planning scope assumptions contained in Appendix 3 and funding levels. Approval of the assumptions does not constitute decision making for the response actions described in this table.

[2] Not enforceable dates. These planning dates are internal DOE dates used for planning purposes only. The parties further agree that the U.S. Department of Energy can adjust the planning dates as part of the annual Site Management Plan update without having to submit an official request or justify "good cause" in accordance with Section XXIX of the FFA.

[3] Assumes that final approval is received on the D2 document.

BGOU = Burial Grounds Operable Unit
D&D = decontamination and decommissioning
EPA = U.S. Environmental Protection Agency
FFA = Federal Facility Agreement
GA = geographical area
GWOU = Groundwater Operable Unit
FY = fiscal year
NA = not applicable
OU = operable unit
RI = remedial investigation
ROD = record of decision
SWOU = Surface Water Operable Unit
SWMU = solid waste management unit
TBD = to be determined

APPENDIX 6

PADUCAH GASEOUS DIFFUSION PLANT FACILITIES PENDING FUTURE CERCLA DETERMINATION

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FACILITIES PENDING FUTURE CERCLA DETERMINATION				
Facility Number	**Description**	**SWMU/AOC Number**	**GA**	**Facility Status**
Sewage System and Water Treatment Ancillary Facilities				
C-611-A	Building and Shop Storage	--	1	Operating
C-611-A1	Activated Carbon Storage Facility	--	1	Operating
C-611-B	Head House	--	1	Operating
C-611-B1	Polymer Feed System Enclosure	--	1	Operating
C-611-C	Flocculator Basin	--	1	Operating
C-611-D	Settling Basin (Northeast)	--	1	Operating
C-611-E	Settling Basin (Northwest)	--	1	Operating
C-611-F	Settling Basin (southeast)	--	1	Operating
C-611-F1	Secondary Coagulation Basin	--	1	Operating
C-611-F2	Chemical Feed Building for C-611-F1	--	1	Operating
C-611-F3	Feed Facility	--	1	Operating
C-611-G	Settling Basin (southwest)	--	1	Operating
C-611-H	Filter Building and Pump Station	--	1	Operating
C-611-I	Clear Well	--	1	Operating
C-611-J	Pump House (Settled Water)	--	1	Operating
C-611-O	Sanitary Water Storage Tank	--	16	Operating
C-611-P	Building – Pump House	--	12	Standby
C-611-Q	36” Raw Water Line Booster Station	--	8	Shutdown
C-611-S	Storage and Chlorine Facility	--	1	Operating
C-611-T	Booster Pump Station Plant Water	--	1	Shutdown
C-611-U	Softening Facility (West)	--	1	Operating
C-611-X	Softening Facility (East)	--	1	Operating
C-611-Z	Flocculator Basin	--	1	Operating
C-615-G	Sewage Lift Station	--	14	Operating
C-615-H	Sewage Lift Station	--	17	Operating
C-615-H1	Sewage Lift Station	--	16	Operating
C-615-H2	Sewage Lift Station	--	17	Operating
C-615-H3	Sewage Lift Station	--	5	Operating
C-615-H4	Sewage Lift Station	--	4	Operating
C-615-H4A	Sewage Lift Station	--	4	Operating
C-615-H5	Sewage Lift Station	--	5	Operating
C-615-H6	Sewage Lift Station	--	9	Operating
C-615-H7	Sewage Lift Station	--	17	Operating
C-615-H8	Sewage Lift Station	--	16	Operating

FACILITIES PENDING FUTURE CERCLA DETERMINATION				
Facility Number	**Description**	**SWMU/AOC Number**	**GA**	**Facility Status**
C-615-K	East/West Ditch (Former Chromate) Lift Station	--	17	Operating
C-615-O	Oil Control Building	--	11	Operating
Gaseous Diffusion Plant Support Facilities				
C-100	Administrative Building		15	Operating
C-101	Former Cafeteria		15	Operating
C-102	Hospital		15	Operating
C-200	Guard and Fire Headquarters		14	Operating
C-203	Emergency Vehicle Shelter	--	14	Operating
C-204	Disintegrator	479	14	Standby
C-205	Respirator Issue Facility	--	14	Operating
C-207	Fire Training Facility	--	11	Operating
C-301	Former Fire Training Building	--	16	Standby
C-303	Supervisory Control and Data Acquisition System		15	Operating
C-320	Communication Building		15	Operating
C-350	Drying Agent Storage Building	--	17	Operating
C-360	Toll Transfer and Sampling Building	--	16	Operating
C-360-A	Toll Transfer and Sampling Building Anne	--	16	Operating
C-400-A	Emergency Power for Critical Alarms	--	12	Deactivating
C-410-D	Fluorine Storage Building	--	13	Operating
C-410-K	Fluorine Facility	--	13	Operating
C-410-L	Quonset Hut	--	13	Operating
C-601	Nitrogen Generator Building Addition	--	12	Deactivating
C-601-C	Steam Plant Fuel Oil Pump House	--	12	Operating
C-604	Utilities Maintenance Building	--	12	Operating
C-605	Substation Building	--	12	Operating
C-606	Coal Crusher Building	--	12	Standby
C-607	Emergency Air Compressor Generator Build	--	12	Operating
C-620	Air Compressor Room	--	16	Operating
C-635-6	Recirculating Heat Utilization Pump House	--	17	Operating
C-710-A	Gas Cylinder Storage Building	--	15	Operating
C-711	Storage/Former Gas Manifold	--	15	Operating
C-720-A	Compressor Shop Addition	--	14	Operating
C-720-B	Machine Shop Addition	--	14	Operating
C-720-C	Converter Shop Addition	--	14	Operating
C-720-C1	Paint Shop	--	14	Operating

FACILITIES PENDING FUTURE CERCLA DETERMINATION				
Facility Number	**Description**	**SWMU/AOC Number**	**GA**	**Facility Status**
C-720-D	Transformer Building	--	14	Operating
C-720-E	Change House Addition	--	14	Operating
C-720-G	Warehouse	--	14	Operating
C-720-H	Warehouse	--	14	Operating
C-720-J	Air Lock	--	14	Operating
C-720-K	Instrument Shop Addition	--	14	Operating
C-721	Gas Manifold Storage	--	14	Operating
C-724-B	Carpenter Shop	--	14	Operating
C-724-C	Paint Shop	--	14	Operating
C-724-D	Lumber Storage Building	--	14	Operating
C-725	Paint Shop	--	14	Operating
C-727	90-Day Mixed Waste Accumulation Facility	--	16	Deactivation Complete
C-729	Acetylene Building	--	14	Standby
C-730	Maintenance Service Building	--	2	Operating
C-731	Railroad Repair Equipment Storage Building	--	14	Operating
C-740-B	Oil Drum Storage Shelter	--	14	Operating
C-742	Cylinder Storage Building	--	14	Operating
C-742-B	Drying Agent Cylinder Storage	--	10	Operating
C-744	Material Handling Building	--	14	Operating
C-745-B1	Cylinder Storage Yard Office	--	4	Shutdown
C-745-R1	Cylinder Changeout Building	--	4	Operating
C-746-A	North Warehouse	--	9	Deactivation Complete
C-746-G	Building – Electrical Equipment Storage	--	16	Operating
C-746-Q1	High Assay Waste Storage Building	--	4	Operating
C-750	Garage	--	14	Operating
C-752-C	Off-Site Decontamination Facility	--	2	Operating
C-753-A	TSCA Waste Storage Facility	206	10	Operating
C-754-B	Low Level Waste Storage	--	16	Operating
C-755-A	Decontamination Building	--	5	Operating
C-755-B	Changehouse Building	--	5	Operating
C-755-C	Sample Shipment/Storage Facility	--	5	Operating
C-757	Solid and Low-Level Waste Processing Facility	--	17	Operating

FACILITIES PENDING FUTURE CERCLA DETERMINATION				
Facility Number	**Description**	**SWMU/AOC Number**	**GA**	**Facility Status**
Remedial Action Facilities				
C-612	Northwest Plume Groundwater Treatment Facility	--	1	Operating

GA = Geographical Area
Operating = Facility currently is in use supporting U.S. Department of Energy mission activities.
Standby = Facility currently is not in use, but may be utilized to support future U.S. Department of Energy mission activities.
Shutdown = Facility is not being maintained for future use, but has not yet begun deactivation activities.
Deactivating = Deactivation activities have been initiated and are ongoing.
Deactivation Complete = Awaiting Decommissioning

APPENDIX 7

DATA MANAGEMENT PLAN

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DATE OF ISSUE: October 2, 1998

DOE/OR/07-1595&D2
Primary Document

DATA AND DOCUMENTS MANAGEMENT AND QUALITY ASSURANCE PLAN FOR PADUCAH ENVIRONMENTAL MANAGEMENT AND ENRICHMENT FACILITIES

J. R. Blewett
T. L. Brindley
L. K. Garner
J. L. White

Prepared by
Environmental Management and Enrichment Facilities
Kevil, Kentucky 42053
Managed by
BECHTEL JACOBS COMPANY LLC
for the
U.S. DEPARTMENT OF ENERGY
Under Contract No. DE-AC05-98OR22700

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DATA AND DOCUMENTS MANAGEMENT AND QUALITY ASSURANCE PLAN APPROVALS

Approved by: D. L. Chumbler **Date:** 10/5/98

D. L. Chumbler
Bechtel Jacobs Company LLC
Quality Manager

Approved by: R. L. Foster **Date:** 10/5/98

R. L. Foster
Bechtel Jacobs Company LLC
Information Technology and Sample Management

Approved by: R. E. Scott **Date:** 10/5/98

R. E. Scott
Bechtel Jacobs Company LLC
Engineering and Technical Services

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PREFACE

This plan is generated to define the roles, responsibilities, and activities affecting data management, document management, and quality for data collection between the Department of Energy (DOE) and the regulatory agencies that govern the Paducah Gaseous Diffusion Plant (PGDP) Federal Facility Agreement (FFA). Pursuant to the FFA section titled "Quality Assurance/Sampling Availability/Data Management," all quality-assured data or summaries of all quality-assured data from all samples collected, analyzed, and reported shall be available no later than 30 days after the analyses have been received and validated. Further, DOE shall maintain one consolidated database for the Site which includes all data/studies generated pursuant to this agreement. To fulfill this requirement, Paducah DOE has an integrated "data system" made up of many databases managed by one organization. Electronic formats and/or hard copies of all data/studies and related documents are made available upon request.

In addition to the requirements in the Federal Facility Agreement (FFA), other agreements require a consolidated data management process:

1) Environmental Protection Agency (EPA) Hazardous and Solid Waste Amendment Permit states:

   Condition I.D.9.d.—Monitoring and Records

   "All environmental monitoring data collected pursuant to Part II of this Permit shall be submitted to the Regional Administrator in a consistent format, with consistent parameters and concentration units. This will facilitate collection and recording of such data in a computer data file. Within one (1) year from the effective date of the Permit, this monitoring data shall also be routinely submitted electronically and on computer disc..."

   Condition II.E.3.b.—Interim Measures (IM) Reports

   "...The IM Report shall contain the following information at a minimum, (e) copies of all relevant laboratory/monitoring data, etc., in accordance with Condition I.D.9."

2) Kentucky Division of Waste Management Hazardous and Solid Waste Permit states:

   Condition III.E.9.a—Monitoring and Records

   "...All environmental and monitoring data collected pursuant to Part II.J and Part IV of the Permit shall be submitted to the Division, both in written and electronic format. Sampling data shall be submitted in accordance with the schedules described in this Permit."

3) Agreement in Principle states:

   "...DOE will promptly furnish to Kentucky environmental monitoring data in electronic format, if available, or paper copies. DOE data reports will be released to Kentucky within 90 days after receipt from the laboratory and completion of the appropriate level of review and quality assurance/quality control (QA/QC) validation..."

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ACRONYMS

AIP	Agreement in Principle
AR	Administrative Record
ASER	Annual Site Environmental Report
ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chain-of-custody
DOE	Department of Energy
DMC	Document Management Center
DMP	Data Management Plan
DMS	Data Management System
DQO	Data Quality Objectives
EDD	Electronic Data Deliverable
EMEF	Environmental Management & Enrichment Facilities
EMP	Environmental Monitoring Program
EMP PEMS	Environmental Monitoring Program Project Environmental Measurements System
EMP RTL	Environmental Monitoring Program Ready-to-Load
EPA	Environmental Protection Agency
ER PEMS	Environmental Restoration Project Environmental Measurements System
ER RTL	Environmental Restoration Ready-to-Load
FFA	Federal Facility Agreement
GIS	Geographic Information System
GW PEMS	Groundwater Project Environmental Measurements System
GW RTL	Groundwater Ready-to-Load
IM	interim measures
NENW PEMS	North East/North West Project Environmental Measurements System
NENW RTL	North East/North West Ready-to-Load
OREIS	Oak Ridge Environmental Information System
PC	personal computer
PEMS	Project Environmental Measurements System
PGDP	Paducah Gaseous Diffusion Plant
QA	quality assurance
QAMS	Quality Assurance Management Staff
QC	quality control
RCRA	Resource, Conservation, and Recovery Act
SAP	Sampling and Analysis Plan
SMO	Sample Management Office
SOW	Statement of Work
SWMU	Solid Waste Management Unit
VOA	volatile organic analysis
VOC	volatile organic compound
WAG	Waste Area Grouping
WM PEMS	Waste Management Project Environmental Measurements System
WM RTL	Waste Management Ready-to-Load

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DEFINITIONS

Administrative Record (AR)—Official body of documents that forms the basis of the selection of a particular response action.

Chain-of-Custody (COC)—A process used to document the transfer of custody of samples from one individual to another from collection until final disposition. A sample is under custody if:

1. it is in the field personnel's possession;
2. it is in the field personnel's view after being in their physical possession;
3. it was in the field personnel's physical possession and then it was secured to prevent tampering; or
4. it is placed in a designated secure area.

Data Backup—The process by which computerized data is copied from one electronic medium to another to guard against the loss of data.

Data Entry—The manual keying of information using data entry screens for transfer into a database.

Data Qualifiers—A set of predefined alphabetic or numeric codes applied to analytical data to signify its usability. Qualifiers pertaining to data include laboratory qualifiers, verification qualifiers, validation qualifiers, and assessment qualifiers.

Data Quality Checks—A list of quality control (QC) elements associated with a data collection activity which are evaluated during data verification and/or data validation.

Data Quality Objectives (DQO)—A set of criteria established for the collection of data. The DQO process is based on the DQO process developed by the Environmental Protection Agency (EPA), Region IV and is a planning tool based on the scientific method that clearly identifies an environmental problem; the remedial decisions to be made to address the problem; and the type, quantity, and quality of data needed to support decision making. The DQO process may be applied in modified form to any data collection activity. The DQO process balances risks with cost, in selecting the most appropriate data collection plan.

Paducah Department of Energy (DOE) Program Integrated Data System—An integrated computer system for data storage and retrieval that organizes data into tables consisting of one or more rows of information, each containing the same set of data items. Data files are cross-referenced to one another to provide flexible access so that data collection is complete, consistent, sufficiently documented, and reusable to the maximum extent possible. The Paducah DOE Program Integrated Data System is compatible with the central Oak Ridge Environmental Information System (OREIS) to comply with the Oak Ridge Federal Facilities Agreement (FFA).

Data Transfer—The exchange of data from one electronic medium to another.

Document—Writings, drawings, graphs, charts, photographs, electronic tapes, diskettes, and data compilation from which information can be obtained.

DEFINITIONS (Continued)

Document Management Center (DMC)—A location established for a targeted audience where individual documents are tracked and maintained for audit purposes. It also may be a center where collection of controlled documents is maintained. Paducah's established location is the document center at 761 Veterans Avenue, Kevil, Kentucky.

Document Management System (DMS)—A computerized system used by the DOE Program at the Paducah Gaseous Diffusion Plant (PGDP) to facilitate the electronic handling of bibliographic, file classification, and index information.

Electronic Data Deliverable (EDD)—Data that is received in electronic format either through transfer on physical media or direct communication between computerized data management systems. EDD contents must meet defined completeness, consistency, and format requirements. These criteria are defined in the Statement of Work (SOW) for each program or project.

Electronic Media—Data storage device such as diskette, disk drive, tape, or optical disk.

Field Logbooks—The primary record for field activities. They should include a description of any modifications to the protocols outlined in the work plan, field sampling plan, or health and safety plan with justifications for such modifications. They are intended to provide sufficient data and observations to enable participants to reconstruct events that occurred. All entries should be dated and signed by the data recorder and quality assured by another individual.

Historical Data—Data which was collected and managed prior to implementation of procedure PMSA-1001, "Quality Assured Data."

Metadata—Information about measurement data that helps to define data usability and associated context.

Quality Assurance (QA) and Data Management Plan (DMP)—A document written for each task that presents in specific terms the policies, organization, objectives, functional responsibilities, and specific QA/Quality Control (QC) activities designed to achieve the data quality goals.

Quality Assurance (QA) Record—A complete document that furnishes evidence of the quality of items, activities, or credentials and has been designated as a QA record. Such records are considered to be lifetime or nonpermanent records.

Protocol—A record or document utilized to provide guidance or work direction. Some examples of protocols would be procedures, SOWs, work guides, work instructions, sampling plans, etc.

Records—Books, papers, maps, photographs, machine-readable materials, or other documentary materials, regardless of physical form or characteristics, made or received by an agency of the U.S. Government under federal law or in connection with the transaction of public business. Virtually all recorded, informational materials in the custody of the government (including information held by contractors that is considered by contract to be government information), regardless of the medium (hard copy, machine-readable, microfilm, etc.), are considered government "records."

DEFINITIONS (Continued)

Sample Delivery Group—A unit used to identify a group of samples for delivery. Each Sample Delivery Group is assigned a unique ID number.

Sampling and Analysis Plan (SAP)—A plan of action developed before implementation of field activities that describes the methods and protocols for obtaining representative portions of the environment being investigated. It also describes the methods for analysis and the required parameters.

Statement of Work (SOW)—The contractual agreement between the requesting organization and the service provider. The SOW defines the scope of work, including associated QA/QC, schedules, and deliverables.

Task Files—Files maintained at the PGDP Site Office pertaining to the site mission. A Task File is required for each task and usually pertains to a single task.

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1. INTRODUCTION

1.1 PURPOSE

This plan will be used for the Paducah Department of Energy (DOE) tasks that are involved in the collection of data. Each section of the plan was written to meet the data quality requirements set forth by the Paducah DOE Program and defined in 10 CFR 830.120 and provides a description of the programmatic elements which should occur for each task. Appendix A provides additional information concerning the quality assurance (QA) and data management aspects which are specific to the task and cannot be defined at this level. Appendix A should be completed once the task has been planned or has documented the Data Quality Objectives (DQOs). This plan, along with a completed Appendix A, will serve as the "Quality Assurance and Data Management Plan" for the task, will be provided to appropriate personnel, and will be maintained as a project record.

For the purpose of this document, Appendix A is not completed but shows the information to be completed for each task involved in the collection of data. Each task will issue the task-specific "Quality Assurance and Data Management Plan" through the designated channels.

1.2 APPLICABILITY

The requirements of this plan apply to the collection and generation of data by Paducah DOE. This plan applies to screening and definitive analytical data as defined in Section 3.2, historical data, and locationally descriptive data which includes the Geographic Information System (GIS), lithology, geophysical data, etc. Implementation for tasks is based on data collection needs and final use of the data. The requirements of this plan do not apply to data collected by the Health and Safety Program or personnel and financial data.

2. PROGRAM ORGANIZATION, RESPONSIBILITY, AND TRAINING

This information describes the basic organization, responsibility, and training requirements for tasks. Specific task plans should be developed using Appendix A as a guide to define individuals and matrix responsibilities. The task will further define training needs based on activities performed in the field.

2.1 ORGANIZATION

The DOE Project Manager and the DOE Performance Management contractor establish task scope and prioritize work to ensure the Paducah DOE Program strategic plans are accomplished. Furthermore, they serve as the primary interface to ensure that task, regulatory agency, stakeholder, and other involved organizations objectives are met. They will ensure that requirements in this plan are incorporated into various protocols and other Statements of Work (SOWs). In addition, they will ensure adequate technical support is in place for the task and that QA and safety are first priorities throughout the task life cycle.

2.2 ROLES AND RESPONSIBILITIES

The functional responsibilities of task staff members shown below relate to their involvement with the data collection and the output process. This section identifies task activities with staff members performing the work. While the descriptions are identified by title, they indicate functional responsibilities that task staff perform rather than individual staff positions.

2.2.1 Stakeholders

- **DOE Project Manager**

The DOE Project Manager has direct communication with the DOE Performance Management contractor Project Manager and is responsible for task oversight, overall compliance for the task, and submitting various reports to, and interfacing with, the Environmental Protection Agency (EPA) and the Commonwealth of Kentucky.

- **Commonwealth of Kentucky**

The Commonwealth of Kentucky is the state regulatory stakeholder for the site. Activities including remedial action, enrichment facilities, and waste management of the Paducah DOE Program are reviewed, commented upon, and approved by the Commonwealth of Kentucky.

- **EPA, Region IV**

EPA is the federal regulatory stakeholder for the Site. Activities, including remedial action, enrichment facilities, and waste management of the Paducah DOE Program are reviewed, commented upon, and approved by EPA.

- **Kentucky Agreement in Principle (AIP)**

The Kentucky AIP reflects the understanding and commitments between DOE and the Commonwealth of Kentucky regarding DOE's provision to provide to the Commonwealth technical and financial support for the Commonwealth's activities in environmental oversight, surveillance, remediation, and emergency-response activities. The AIP is intended to support nonregulatory activities. Its goal is to maintain an independent, impartial, and qualified assessment of the potential environmental impacts of present and future DOE activities at the Paducah Gaseous Diffusion Plant (PGDP).

- **Federal Facility Agreement (FFA)**

The FFA reflects the understanding and commitments between DOE, EPA, and the Kentucky Division of Waste Management regarding the comprehensive remediation of PGDP. The purpose of the FFA is to provide a set of comprehensive requirements for remediation that coordinates the cleanup provisions of both Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource, Conservation, and Recovery Act (RCRA).

2.2.2 DOE Managing and Integrating Contractor

Bechtel Jacobs Company LLC as the managing and integrating contractor is responsible for ensuring the following functions are performed either by their staff or a subcontractor.

- **Data Manager**

The Data Manager is responsible for long-term electronic storage of data, loading Electronic Data Deliverables (EDDs), electronic verification of data, and ensuring compliance to policies and protocols relating to data management. The Data Manager has overall responsibility for the design, operations, and maintenance of the databases; ensures compatibility with central Oak Ridge Environmental Information System (OREIS); serves on the OREIS Steering Committee; reviews the system performance; determines the need for changes; authorizes changes; and oversees the electronic transfer of electronic data to external agencies. The Data Manager interfaces with the Sample Manager and the Project Data Coordinator to set up the Project Environmental Measurements System (PEMS) for each task. The Data Manager oversees the completion of task-specific Data Management Plans.

- **Data Requestor**

The requestor may be a task lead or his designated representative, such as a technical lead, risk assessor, waste management coordinator, compliance coordinator, or other individual who determines the need for data to support decision making. The requestor is responsible for coordinating sample collection, sample analysis, data assessment, and decision making. If the requestor is a designated representative, the task lead has ultimate responsibility.

- **Network Administrator**

The Network Administrator is responsible for implementing the system design for the Paducah DOE Program Integrated Data System platform; coordinating necessary network and personal computer (PC) maintenance; establishing user accounts to the network; and performing daily backups to system data.

- **Project Data Coordinator/Data Management Team**

The Project Data Coordinator/Data Management Team is responsible for ensuring that the requirements relating to data management are met for the task. This includes accumulation of historical data, control of data generated by field activities or as a result of lab analyses, and storage of data as part of the task. The Project Data Coordinator ensures that all data are entered into PEMS. The Project Data Coordinator works with the Data Manager and the Sample Manager to ensure consistency throughout the task data, with other task's data, and the data systems in place. The Project Data Coordinator is responsible for data entry verification; assisting with the data evaluation and review process; data updates and deletions, as authorized by the Data Manager; and performing electronic transfer of data files from electronic data laboratory deliverables to the Paducah DOE Program Integrated Data System.

- **Project Manager**

The Project Manager has direct responsibility for the overall task oversight, including budget, schedule, and milestones. This responsibility includes the management of strategic planning, safety, quality, task activities, and for the successful completion of task assignments within budget and on schedule. The Project Manager ensures that implementation of the QA and Data Management Programs is consistent with guidelines and ensures requirements are adhered to, as stated in this plan. The Project Manager reports to the Bechtel Jacobs Company Manager of Projects and interfaces with DOE and the task team.

- **Task Team**

The Task Team is made up of personnel (i.e., Project Manager, Task Manager, Task Lead, Quality Engineer, Sample Manager, Data Manager, Technical Manager, Field Team Leader, and other field personnel) responsible for a specific task. The team is responsible for the data collection planning; fieldwork; sampling and analysis; data review; and decision making for a set task.

- **Quality Engineer**

The Quality Engineer is responsible for the overall QA concerns of the data and system functions relating to a task. The Quality Engineer is involved in the planning and review of data to ensure that data quality requirements are met. The Quality Engineer is also responsible for helping prepare QA plans, work agreements, protocols, and documents to establish and implement requirements, performing assessments, providing guidance/assistance in resolving quality problems, and ensuring that corrective action is taken and appropriately documented.

- **Records Clerk**

The Records Clerk is responsible for entering records; indexing data into Data Management System (DMS) records; indexing tables; assisting with the records storage and retrieval process; and performing data updates and deletions as authorized by the Records Manager.

- **Records Manager**

The Records Manager is responsible for maintaining all pertinent and required records associated with operating the DMS and preserving the data; determining which records must be stored and the storage requirements; establishing a records classification, inventory, and indexing system; maintaining the DMS records indexing tables; implementing a records storage and retrieval system; and coordinating with the Data Manager and Sample Manager to establish pointers to data processing records and associated metadata (e.g., laboratory data packages, regulatory documents, QA requirements, and program plans).

- **Project Records Coordinator**

The Project Records Coordinator is responsible for the task records. Duties include all activities relating to identification, acquisition, classification, indexing, and storage of task records related to field activities. The task records include data documentation materials; plans and protocols; and all task file requirements. Upon completion of the task, the Project Records Coordinator transmits all task files to the Paducah Document Management Center (DMC).

- **Release Requestor**

The Release Requestor is identified as the person who requests the release of data to an external agency. This responsibility could be filled by several different roles including, but not limited to, the Task Lead or the Technical Manager.

- **Sample Manager**

The Sample Manager is responsible for working with the Task Lead to develop specific analytical requirements for the task, interfacing with the Oak Ridge Sample Management Office (SMO) for procurement of laboratory services, contracting validation services, and coordinating contractual screening. The Sample Manager works with the task team to resolve issues identified during contractual screening or electronic data review of the data with the laboratory. The Sample Manager interfaces with the Data Manager, the Project Data Coordinator, and the task team.

- **Task Lead**

The Task Lead is responsible for direct task coordination, issuing technical reports, and maintaining the task is on schedule and within the budget. The Task Lead coordinates all team personnel working on the task and communicates regularly with the Task Team personnel on the status of task budgets and schedules; assuring all protocols are followed; deliverables are met; and that any issues or concerns associated with the task are properly addressed. The Task Lead ensures that implementation of the QA and Data Management Programs is consistent with guidelines and ensures requirements are adhered to as stated in this plan. The Task Lead reports to the Task Manager and interfaces with the task team.

- **Task Manager**

The Task Manager is responsible for ensuring that the proper resources are available and that personnel are appropriately trained for the assigned task. The Task Manager ensures that all requirements and protocols for the task are followed and that they are consistent with the overall mission of the Environmental Management and Enrichment Facilities (EMEF) Program. The Task Manager also ensures that implementation of the QA and Data Management Programs is consistent with guidelines and ensures requirements are adhered to as stated in this plan. The Task Manager reports to the Project Manager and interfaces with the Task Lead.

- **Technical Manager/Subcontractor Technical Representative**

The Technical Manager/Subcontractor Technical Representative is responsible for providing technical support and guidance to the task. This includes field observations and oversight of subcontractors, generating reports/documents, and making decisions regarding technical issues (i.e., sample locations, analytical methods, etc.).

2.3 TRAINING

Personnel assigned to the task, including field personnel and subcontractors, will be trained to perform the tasks to which they are assigned. Training requirements are defined in the task-specific SOWs and plans.

3. QA OBJECTIVES FOR MEASUREMENT DATA

QA objectives, for the purposes of this plan, apply to measurement data only. Other data (such as locationally descriptive information) is discussed in Section 8.

3.1 DQOs

DQOs are statements developed by data users to specify the quality of data from field and laboratory data collection activities to support specific decisions or regulatory actions. DQOs are qualitative and quantitative specifications that are used to design a study that will limit uncertainty to an acceptable level. The DQOs describe what data is needed, why the data is needed, and how the data will be used to address the problems being investigated. DQOs also establish numeric limits to ensure that data collected is of sufficient quality and quantity for user applications.

The DQO process is a planning tool based on the scientific method that clearly identifies a problem; the decisions to be made to address the problem; and the type, quantity, and quality of data needed to support the decision making. The DQO process may be applied in modified form to any data collection activity. The DQO process balances risks with costs in selecting the most appropriate data collection plan. When applicable, various regulatory agencies (i.e., EPA, Kentucky Department for Environmental Protection, etc.) may participate in the DQO sessions.

Specific DQOs and Sampling and Analysis Plans (SAPs) for tasks are developed per PMSA-1001 and will be documented in Appendix A.

3.2 ANALYTICAL DATA CATEGORIES

Two descriptive data categories have been specified by EPA in the *Data Quality Objectives Process for Superfund, Interim Final Guidance*, EPA/540/G-93/071 (EPA, 1993). These two data categories supersede the five quality control (QC) levels (Levels I, II, III, IV, and V). The two new data categories are associated with specific QA/QC elements and may be generated using a wide range of analytical methods. The type of data generated will be based on the qualitative and quantitative DQOs. The two data categories are:

Screening data—Measurements generated through the use of field- or fixed-laboratory methods in which the level of certainty in the data cannot be determined given physical evidence documenting the acquisition and analysis of the sample. Analytical methods producing field measurements or screening data include those that indicate the presence or absence of an analyte, or class of analytes, or provide a semiquantitative (estimated) result. Field measurement and other screening data include, but are not limited to, Draeger tubes; organic vapor analyses; soil gas surveys; and radiation and contamination monitoring. Screening data results must be confirmed by collecting a specified percentage of definitive data. Screening data should be used conservatively and not rule out the presence of a contaminant without some percentage of the data being confirmed by definitive data.

Definitive data—Analytical measurements for which the presence and corresponding concentration of the target analyte(s) can be determined with a known degree of certainty. The measurements are supported with appropriate physical evidence documenting the acquisition and analysis. Definitive data, in electronic form, must be supported with retrievable, but not necessarily retrieved, physical evidence in the laboratory. This evidence can include analytical results, QA/QC results, chains-of-custody (COCs), logbooks, standards information, etc.

Definitive data, or a combination of screening data, definitive confirmation, and definitive data, will be collected when the task is implemented. A minimum of ten percent of the screening samples will also be analyzed by a fixed-base laboratory using EPA SW-846 Methods (1986) to provide the required definitive data. When not available, other nationally recognized methods such as those of the American Society for Testing and Materials (ASTM), DOE, and EPA, will be used.

Applicable task documents summarize the data uses, data users, data categories, and data deliverable QC levels for each of the media and sample types that will be collected during the investigation.

4. APPLICABLE PROTOCOLS AND DOCUMENTS

Company protocols, sampling methods, administrative procedures, etc., utilize hierarchy documents that relate to data quality. Hierarchy documents such as EPA Quality Assurance Management Staff (QAMS) 005/80, *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*, *EPA Region 4 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*, and Environmental Data Management Implementation Handbook for the Environmental Restoration Program (ES/ER/TM-88/R1) are used as flow-down documents in writing company protocols. Deviations are documented as described in Section 16. Protocols and documents applicable to the processes described will be defined in completion of Appendix A.

5. SAMPLE CUSTODY

COC is a process used to document the transfer of custody of samples from one individual to another from sample collection until final disposition. COC records are handled in accordance with applicable protocols. COC requires signature transfer of samples from sampling personnel to the sample custodians, who then transfer samples to the appropriate analytical laboratory personnel. The transfer of samples between individuals in the same work group located in the same general location (sampling or analytical) does not require a signature transfer since the integrity of the sample is maintained at all times. If the individuals are not in the same general location, a COC is required. This is accomplished by the samples being locked in a refrigerator when laboratory personnel are not available. Sample residuals are disposed of only after notification by the Task Lead that they no longer need archiving or once holding times have been exceeded. Sample custody protocols are identified in Appendix A.

6. CALIBRATION PROTOCOLS AND FREQUENCY

6.1 FIELD EQUIPMENT CALIBRATION PROTOCOLS AND FREQUENCIES

The calibration of field instruments will be checked in the field in accordance with manufacturer's specifications. Field calibration records will be documented in logbooks and/or on field data sheets. Calibration frequencies for field instruments will be defined in Appendix A.

6.2 LABORATORY CALIBRATION PROTOCOLS AND FREQUENCIES

The laboratory(ies) will use written, standard protocols for equipment calibration and frequency. These protocols are based on EPA guidance or manufacturer's recommendations and are given in the EPA-approved analytical methods. Supplemental calibration details, such as documentation and reporting requirements, are given in the laboratory QA Plan. The laboratory QA Plan will be reviewed and approved as part of the contract review process. When available, standards used for calibration will

be traceable by the National Institute of Standards and Technology. Corrective action protocols for malfunctioning equipment will be addressed in the laboratory QA Plan. Calibration records, in accordance with the laboratory QA Plan, will be maintained for each piece of measuring and test equipment and each piece of reference equipment. The records will indicate that established calibration protocols have been followed. Records of equipment use will be kept in the laboratory files.

7. ANALYTICAL PROTOCOLS

When available and appropriate for the sample matrix, SW-846 Methods will be used. When SW-846 Methods are not available or lower detection limits that are required cannot be achieved by SW-846 Methods, other nationally-recognized methods such as those of ASTM, DOE, and EPA will be used. Analytical methods, detection limits, sample preservation, holding times, and container requirements for field measurements and analytical parameters are defined during the DQO process and are incorporated in the analytical SOW for the task and applicable protocols and will be defined in Appendix A.

8. DETAILS OF DATA AND DOCUMENT FLOW

The components of data management include planning, collection, review, archival, and transmittal. Task activities follow identical paths to meet data management requirements. A flow chart (Figure 1) and narrative (Sections 8 and 9) are provided for each component of data and document flow. The Paducah DOE Program Integrated Data System is discussed first. The data system is core to each of the data management components.

8.1 INTEGRATED DATA SYSTEM

The Paducah DOE Program Integrated Data System provides a centralized system for management and storage of environmental information while allowing easy, yet controlled, access. The basis for the Paducah DOE Program Integrated Data System is to establish and maintain a program to provide the most efficient system of data collection, analysis, storage, and retrieval. DOE, as specified in the FFA, is to maintain one consolidated database for the Paducah Site. All data collected under this agreement (the FFA) is to be routinely submitted electronically in a consistent format to the stakeholders (see Section 9.2 and Appendix B). In addition, under the Kentucky AIP, AIP personnel require access to the electronic data that is maintained by the Paducah facility and its contractors. Consequently, the Paducah DOE Program Integrated Data System meets the regulatory requirements and provides Paducah EMEF with a platform to manage its data.

The Paducah DOE Program Integrated Data System is composed of integrated hardware and software to support the collection, management, analysis, and presentation of data associated with environmental restoration/remedial action, compliance, and monitoring activities at PGDP. All environmental measurements, analyses, and locationally descriptive information (e.g., GIS, lithology, and monitoring structure information), as applicable per this plan, is included. In addition, an extensive collection of descriptive and reference information about environmental tasks and permits is stored. A flow diagram for the Paducah DOE Program Integrated Data System is shown in Figure 2.

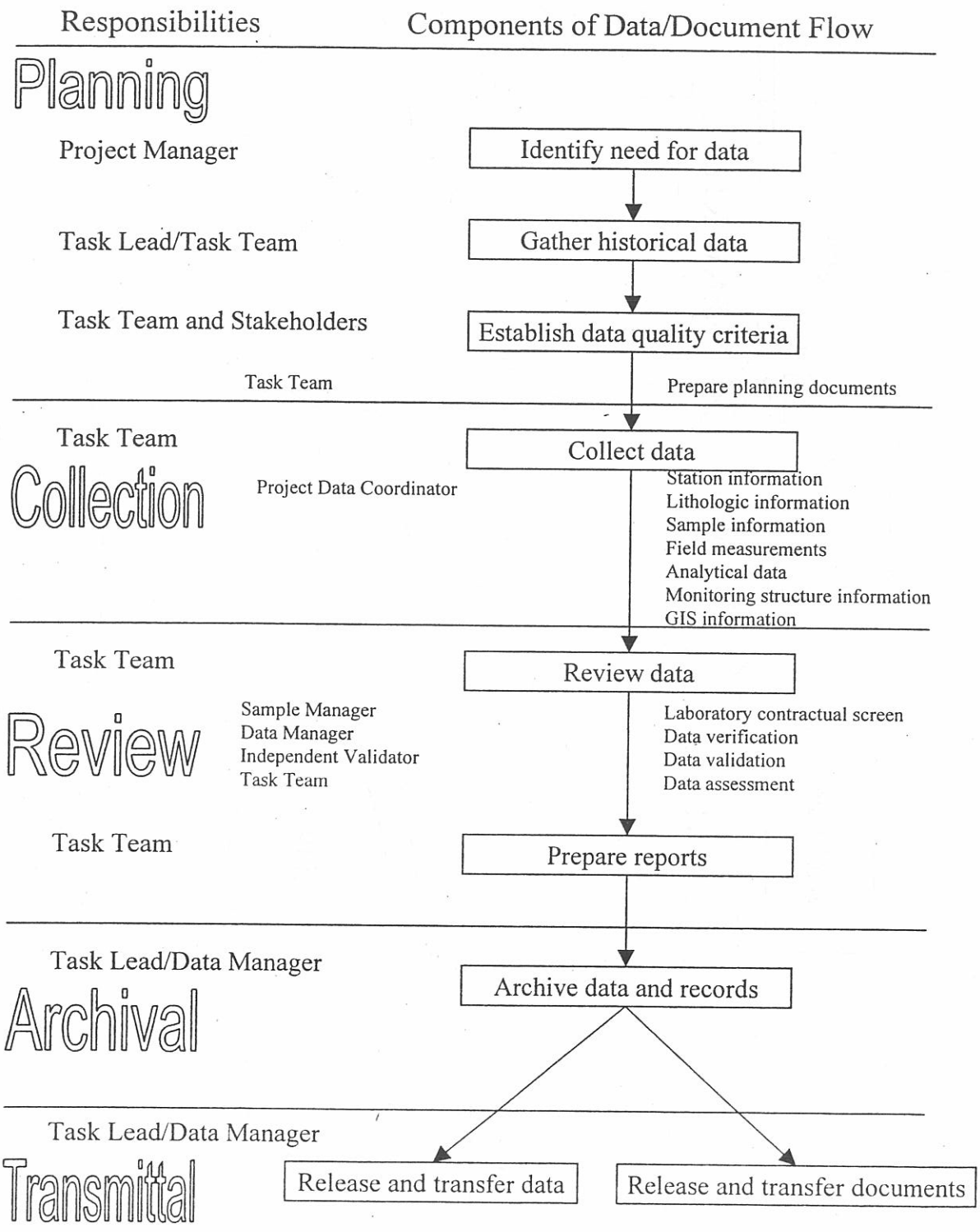

Figure 1. Detail of Data and Data Flow.

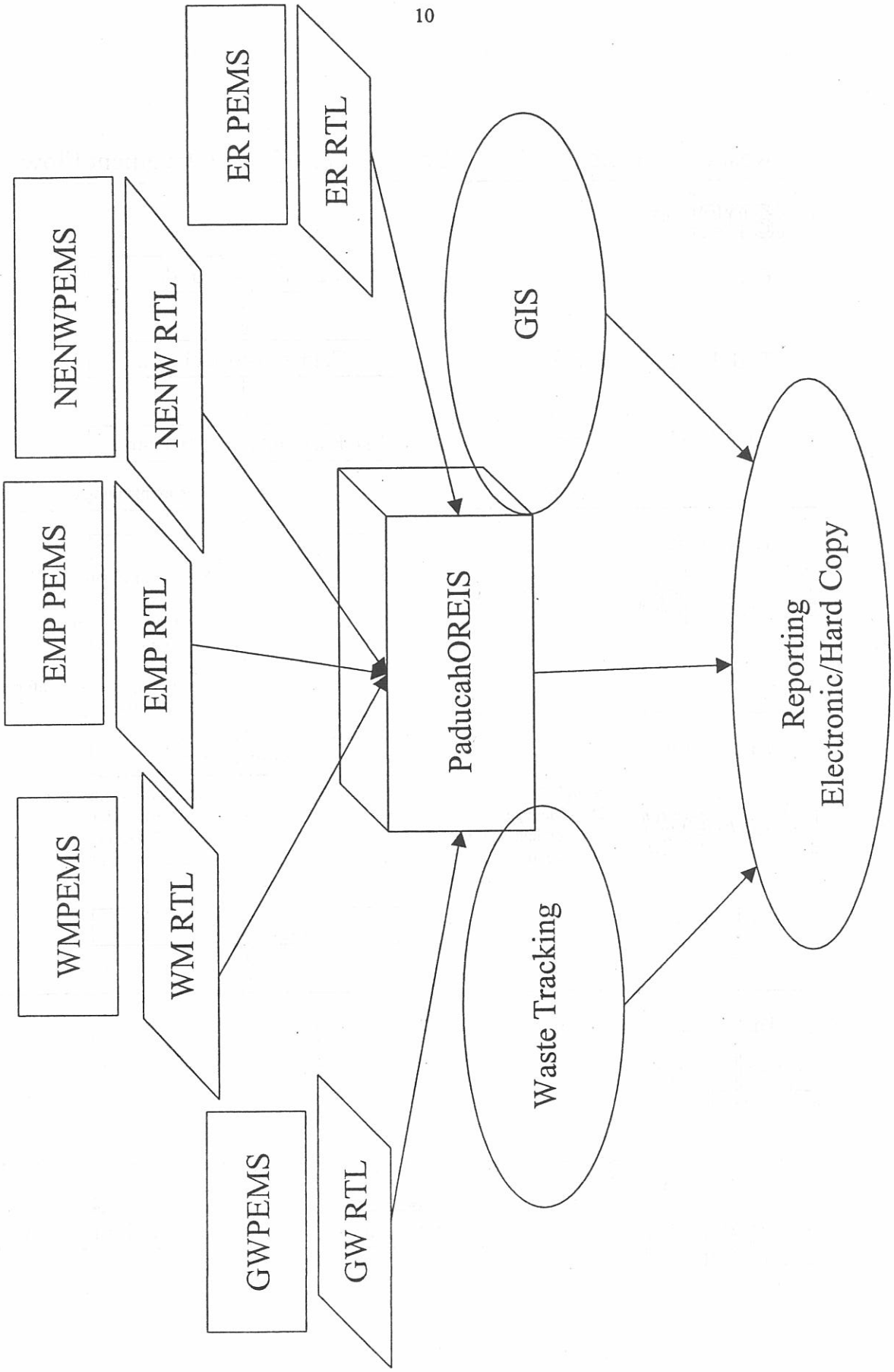

Figure 2. Paducah DOE Integrated Data System.

As part of the Paducah DOE Program Integrated Data System, each project utilizes a PEMS for sample scheduling, collection, and tracking each sample and associated data from point of collection through final data reporting. Each PEMS is established on a project-specific basis. PEMS tracking includes field forms, COCs, hard copy data packages, and EDDs. Project data is entered as the project progresses. All field measurement data, analytical data, lithologic descriptions, monitoring structure information, sample stations, and corresponding coordinates (as appropriate) are entered into PEMS.

Upon completion of the project, or on a routine basis, data from each PEMS is reviewed as described in Section 8.4 and transferred to Paducah OREIS for permanent retention. All final data reporting is reported from Paducah OREIS. Additionally, PEMS data is archived on a specified frequency to ensure data traceability.

The Paducah DOE Program Integrated Data System is accessed by a computer network. The system is designed to allow the electronic transfer of information between all branches of EMEF. A central file server is used to maintain the software and database applications. This server may be accessed from several PC workstations within the computer network.

8.2 DATA PLANNING

8.2.1 Initiation of Data Collection

The need for data collection is determined by the Task Lead and Project Manager to satisfy applicable regulatory requirements and/or DOE Orders. The Task Lead identifies the need for collection of data to support the task and is responsible for the development of applicable documents that outline the specific objectives of the data collection activity.

8.2.2 Historical Data Gathering

A substantial effort should be made by the data requestor (i.e., project manager/task lead) to acquire and analyze all historical data and documents relevant to the task (i.e., in numeric, spatial, attribute, and textual form) prior to the DQO process and/or data generation. For example, these documents and data might include prior work done for preliminary assessments, site characterization tasks, remedial investigations, annual monitoring reports, or data summaries provided by previous analysts. In addition, information specialists who would know of relevant documents, GIS information, and data sets should be consulted to acquire a comprehensive task background. In many cases, descriptive and qualitative information about the data (e.g., metadata) may be required. This is often the case with electronic files that may be received without the basic information provided through proper documentation. Some research may be required to prepare these metadata statements which are essential to the determination of data quality and usability.

If the data is in electronic form, the usable data and metadata should be entered into the Paducah DOE Program Integrated Data System for inclusion into Paducah OREIS. If the data is in document form, the usable data and metadata should be extracted and key-entered into the Paducah DOE Program Integrated Data System. If GIS information is required, themes/coverages should be updated as necessary.

8.2.3 Data Quality Criteria

With the usable historical data now in the Paducah DOE Program Integrated Data System, the data, along with the documents and metadata, can be retrieved, analyzed (both statistically and spatially), modeled, and used in support of DQOs for the task. This data, along with elements from the DQO process such as, contaminants of concern, QA/QC requirements, "Identification of Project Data Quality Checks" checklist, data review options, and the sampling design is used to generate applicable plans.

Field SOWs, sampling plans, and analytical SOWs are developed in support of field preparation. A field SOW describes the field activities to be undertaken and subsequent work to be performed. A sampling plan may be used to further expand on details of field activities. An analytical SOW is prepared which includes analytical parameters, methods, and detection limits. A validation SOW is also prepared when validation services are required to ensure the analytical laboratory's performance is acceptable.

Information from each of the SOWs and sampling plans is used to initiate sampling logbooks, labels, and other required field documentation. Documentation generated by the data collection activity shall be forwarded electronically and/or in hard copy to the Task Lead and the DMC to be indexed and filed as specified per the SOW.

8.3 DATA COLLECTION

Data collection information is recorded and maintained for all data collection activities. This information includes station information, lithologic information, sample information, field measurements, analytical data, monitoring structure information, and GIS information and is explained below.

8.3.1 Station Information

Station information is data describing the location from which a sample is taken. Station information includes plant coordinates (surveyed or estimated, as appropriate), station description, and station type. This information is input directly into PEMS. Methods for determining coordinates and relevant information necessary to determine and document accuracy should be recorded.

8.3.2 Lithologic Information

Lithologic information is data describing the lithology of a borehole. This information is input directly into PEMS.

8.3.3 Sample Information

Sample information is environmental data describing the sampling event and consists of the following: station, date collected, time collected, and other sampling conditions collected for every sampling event. This information is recorded in logbooks and may be included on the COC or sample labels. This information is input directly into PEMS.

8.3.4 Field Measurements

Field measurements are measurements of a parameter without physical collection of a sample which are collected real-time in the field. Field measurements may include water level measurements, pH, conductivity, flow rates, temperature, and dissolved oxygen. Field measurements are taken and recorded on appropriate field forms or in logbooks, and input into PEMS.

8.3.5 Analytical Data

The Sample Manager tracks progress of analytical samples as fieldwork continues. COCs are reviewed and lab receipt of samples is verified. Once samples have entered the laboratory, the laboratory is responsible for sample analysis, data reduction, and data reporting. The analytical data will be checked for completeness and reasonableness. A system is set up within the Paducah DOE Program Integrated Data System to log shipment of samples and receipt of data packages.

All data packages received from the fixed-base and screening/field laboratories are tracked, reviewed, and maintained in a secure environment. The primary individual responsible for these tasks is the Sample Manager. The following information is tracked: sample delivery group number, date received, number of samples, sample analyses, receipt of EDD (if applicable), and comments. The Sample Manager compares the contents of the data package with the COC form and identifies discrepancies. Discrepancies are immediately reported to the laboratory and the data validators. All data packages are forwarded to the Bechtel Jacobs Company EMEF DMC for permanent storage.

8.3.6 Monitoring Structure Information

Monitoring structure information is data describing the monitoring wells and boreholes installed during the combined tasks. Information includes well screen depth; borehole and well diameter; screened aquifer; and datum information. This information is input directly into PEMS.

8.3.7 GIS Information

GIS information is metadata that is visually descriptive of the area around the location of a project. Information may include maps of roads, streams, underground utilities, etc. Projects creating new GIS information or causing required updates to existing GIS information supply the information to the Paducah DOE Program Integrated Data System.

8.4 DATA REVIEW

8.4.1 Laboratory Contractual Screening

Laboratory contractual screening is the process of evaluating a set of data against the requirements specified in the analytical SOW to ensure that all requested information is received. The contractual screening includes, but is not limited to, the COC, number of samples, analytes requested, total number of analyses, methods used, QC samples analyzed, EDDs, units, holding times, and reporting limits achieved.

The Sample Manager conducts the screening upon receipt of data from the analytical laboratory. To the extent possible, the contractual screening should be done electronically. The Sample Manager identifies and documents any exceptions to the SOW on a Laboratory Deliverable Contractual Screening Checklist.

8.4.2 Data Verification

Data verification is the process for comparing a data set against a set standard or contractual requirement. Verification may be performed electronically, manually, or by a combination of both. Data verification includes contractual screening and can include other data quality checks established by the task team. Applicable task plans define the specific verification to be performed. Data is flagged as necessary.

Specific documentation associated with data verification is developed per PMSA-1001, Appendix G, entitled, "Identification of Project Data Quality Checks," and will be provided in Appendix A.

8.4.3 Data Validation

Data validation is the process for evaluating the laboratory adherence to analytical-method requirements. This is performed by a qualified individual for a data set, independent from sampling, laboratory, project management, or other decision-making personnel for the task. Data validation is performed according to PMSA-1001 and is coordinated by the Sample Manager. Validation qualifiers are stored in the Paducah DOE Program Integrated Data System. Documentation associated with data validation (the validation SOW, data validation reports, and exception reports, if applicable) is filed in the DMC. Specific documentation associated with data validation is identified in Appendix A.

8.4.4 Data Assessment

Data assessment is the process for assuring that DQOs are met, and that the type, quality, and quantity of data are appropriate for their intended use. It allows for the determination that a decision (or estimate) can be made with the desired level of confidence given the quality of the data set. Data assessment follows data verification and data validation and must be performed on 100 percent to ensure data is usable.

The data assessment is conducted by a designated task team member in conjunction with other task team members according to PMSA-1001. Assessment qualifiers are stored in the Paducah DOE Program Integrated Data System. Data is made available for reporting upon completion of the data assessment and associated documentation (Data Assessment Review Checklist) is filed with the task files.

8.4.5 Report Preparation

Personnel will utilize the official Paducah OREIS data tables for all official data reporting. Prior to the release of any data, the "Data Release" form shall be completed according to PMSA-1001, Appendix I. Release of all data shall be approved by DOE and the Managing and Integrating Contractor.

8.5 DATA AND RECORDS ARCHIVAL

8.5.1 Data Archival

Data archival refers to the long-term storage of electronic data generated by a task in the Paducah DOE Program Integrated Data System. Long-term storage in a central repository assures maximum accessibility by the environmental engineering community. To ensure its future usability, sufficient documentation, including the associated metadata, must accompany archived data to describe the source, contents, and structure of the data. Paducah OREIS is the database that stores archived data for future use. In addition, the Paducah PEMS used for the task is archived both intact and as exported ASCII text with sufficient documentation to recreate task data. The archive of Paducah PEMS, as well as the back-ups for Paducah OREIS, are stored in the DMC.

8.5.2 Records Archival

The DMC is a repository for all EMEF documents and data. Each EMEF task transmits a copy of all task documentation to be filed in the DMC as the task file. This information is arranged by a file classification scheme and is filed on shelves in color-coded folders. The documents are shelved in mobile file cabinets which are located inside a two-hour-rated firewall vault. The vault is protected by a wet-pipe sprinkler system and intrusion alarm. The DMC staff utilizes the DMS, a database management system designed for management and retrieval of documents, to perform searches. DMS records contain bibliographic information (title; author; issue date; document type and number; etc.), file classification information (document location), and index information (subject keywords, document status, facility name/waste area grouping [WAG]/solid waste management unit [SWMU] number, cleared for public use flag, and administrative record [AR] codes).

By utilizing the DMC, all documents relevant to EMEF work will be located in a central repository and will be available to the EMEF organization as well as other identified users. The DMC will also provide controlled access to these documents.

Information that may be found in a task file include hard copies of all original field and analytical results; data reduction and summarization programs; data packages; logbooks; associated QA/QC forms; correspondence; contracts; meeting minutes; training records; plans; and reports. All contents of a task file are classified, indexed, and stored into appropriate file groups and record series within the task file.

Satellite document centers are sometimes established with routine transfer frequencies to the PGDP DMC. Task records are maintained by the Task Records Coordinator as record copy as specified in task data and document management plans and as required by protocol. Logbooks and field documentation are copied weekly unless maintained as record copies, which are kept in one-hour-rated, fire-resistant, locked file cabinets overnight. If the activities during logbook use could potentially damage the logbook or result in loss, then weekly copies are required. If copies are made, they are maintained separate from the original logbook and are forwarded to the task files and maintained as record copy until the originals are complete. At that time, the originals replace the copies as record copy. The record copy is transferred to the Paducah EMEF DMC. Upon completion of the task, all original logbooks (field and analytical), field documentation, and project deliverables will be forwarded to the DMC by the task manager or designee.

Documents will be selected for the AR from the task file. The AR files are duplicated and made available to the public at the Environmental Information Center. Documentation associated with data and records archival includes archive checklists; indexed and filed copies of all relevant hard copies; and lists of all items recommended for the AR file.

9. DOCUMENT AND DATA RELEASE AND TRANSFER

9.1 DOCUMENT RELEASE AND TRANSFER

A standard distribution list is maintained for regulatory documents submitted according to the FFA. Changes to this distribution list should be submitted through the DOE Site Office. Other documents generated for the EMEF Program may be specially requested through the DOE Site Office or their designee. Requested documents may be historical or newly generated and will be transmitted within a reasonable time frame.

9.2 ELECTRONIC DATA RELEASE AND TRANSFER

Once data has undergone verification, validation, and data assessment, it may be released to external agencies. Routine data or data specially requested by external agencies is downloaded into a standard format (see Appendix B) and transmitted either electronically or by physical transfer on electronic media (diskettes, etc.). If data is transmitted electronically, data files will be placed on an externally-accessible file server that is password protected. The external agency has the responsibility to protect the data that has been provided. Passwords shall not be shared with anyone outside the external agency. External agencies will be notified of data availability via electronic mail.

The Task Lead/Release Requestor will complete the "Paducah EMEF Data Release to External Agencies" form and obtain all appropriate signatures. Field QC data is not routinely transmitted with the data; however, this information is available upon request. Electronic data formats will contain a "Read Me" file that will identify the electronic data package and the number of files associated with the package. The "Read Me" file will also indicate the appropriate data qualifiers along with their associated definitions and the appropriate data quality level. Hard copy data formats will contain a cover letter that will identify the contents of the data package. The cover letter will also indicate the appropriate data qualifiers along with their associated definitions and the appropriate data quality level.

9.2.1 DOE Remedial Action Investigations

DOE will provide electronically-transmitted data concurrent with the D1 Report/Characterization Report or when the Project Completion Report is issued (if formal D1 is not required) for remedial action investigations.

9.2.2 DOE-Permitted Facilities/Routine Environmental Monitoring Reports

Permitted and routine sampling is outlined in Table 8.1. Additionally, Table 8.1 includes reporting and transfer frequencies. DOE will provide electronic-transmitted data per the agreed schedule in this document.

9.2.3 Special Requests

Data will be transmitted routinely as specified in Sections 9.2.1 and 9.2.2. Any additional data generated from sampling activities that are available electronically may be transmitted upon receipt of a special request correspondence. Special requests shall be submitted through the DOE Site Office, or their designee, specifying the sampling event information required.

Table 8.1. Regulatory and routine sampling.

PROGRAM	FREQUENCIES/SCHEDULE		
	SAMPLING	REPORTING	TRANSFER
Permit-Associated Sampling			
Kentucky Pollutant Discharge Elimination System Permit DOE Outfalls	Monthly and Quarterly	Monthly 28th of each month	Monthly 28th of each month
Toxicity Monitoring	Quarterly	Quarterly Publication of the ASER	Quarterly Concurrent with ASER
Bioaccumulation Study	Annually	Annually Publication of the ASER	Annually Concurrent with ASER
Fish Community	Semiannually	Annually Publication of the ASER	Annually Concurrent with ASER
C-746-K Surface Water	Quarterly	Semiannually June 30, December 30	Semiannually June 30, December 30
C-746-S&T Surface Water	Quarterly	Quarterly January 15, April 15, July 15, October 15	Quarterly January 15, April 15, July 15, October 15
C-746-U Surface Water	Quarterly	Quarterly January 15, April 15, July 15, October 15	Quarterly January 15, April 15, July 15, October 15
C-746-K Groundwater	Quarterly	Semiannually June 30, December 30	Semiannually June 30, December 30
C-404 Landfill Groundwater	Quarterly	Semiannually May 30, November 30	Semiannually May 30, November 30
C-746-S&T Landfill Groundwater	Quarterly	Quarterly February 30, May 30, August 30, November 30	Quarterly February 30, May 30, August 30, November 30
C-746-U Groundwater Monitoring	Quarterly	Quarterly February 30, May 30, August 30, November 30	Quarterly February 30, May 30, August 30, November 30
Environmental Monitoring Programs (EMP)			
EMP Surface Water Sampling	Bimonthly	Annually Publication of Annual Site Environmental Report (ASER)	Annually Concurrent with ASER
EMP Annual Sediment Sampling	Annually	Annually Publication of ASER	Annually Concurrent with ASER
EMP Annual Deer Sampling	Annually	Annually Publication of ASER	Annually November
Plume Groundwater Sampling	Monthly and Quarterly	Quarterly January 30, April 30, July 30, October 30	Quarterly January 30, April 30, July 30, October 30
Residential Groundwater Sampling	Monthly, Quarterly, and Annually	Annually Publication of ASER	Semiannually April and October
Surveillance Groundwater Sampling	Monthly, Quarterly, and Annually	Annually Publication of ASER	Semiannually January and July

PROGRAM	FREQUENCIES/SCHEDULE		
	SAMPLING	REPORTING	TRANSFER
Surveillance & Maintenance or Operation & Maintenance Activities			
C-404 Leachate	Per Permit As needed	Per Permit January 30, April 30, July 30, October 15	Annually * October 15
C-746-S&T Leachate	Per Permit As needed	Quarterly per permit	Quarterly per permit
C-746- U Leachate	Per Permit As needed	Quarterly per permit	Quarterly per permit
Northwest Plume/Northeast Plume	Daily	Quarterly and Annually January 30, April 30, July 30, October 30	Quarterly January 30, April 30, July 30, October 30

* If leachate samples were collected.

10. INTERNAL QC CHECKS

10.1 FIELD QC SAMPLES

Standard operating protocols are used for all routine sampling operations. Field QC sampling will be conducted to check sampling and analytical accuracy and precision for both laboratory and field analyses of the original samples. All QC samples will be handled, shipped, and analyzed as stated in Sections 5 and 7. Field QC samples will have sample numbers which are unique and which identify them as QC samples.

A **filter blank** is a sample of ASTM Type II water passed through, or over, a filter before any samples are filtered. Filter blanks are used as a measure of filter contamination. Samples are analyzed for the same parameters as the filtered sample. Filter blanks can be collected at a rate of one per lot number.

Field blanks serve as a check on environmental contamination at the sample site. ASTM Type II water is transported to the site, opened in the field, transferred into each type of sample bottle, and returned to the laboratory for analysis of all parameters associated with that sampling event. It is also acceptable for field blanks to be filled in the lab, transported to the field, and then opened. Field blanks may be used as a reagent blank as needed. It is recommended that field blanks be collected at a rate of 1:20.

Equipment blanks (may also be referred to as equipment rinseates) are samples of ASTM Type II water passed through decontaminated sampling equipment. Equipment blanks are used as a measure of decontamination-process-effectiveness and are analyzed for the same parameters as the sample collected with the equipment. Equipment blanks may also be used as a reagent blank as needed. Equipment blanks are required only when nondisposable equipment is being used. It is recommended that equipment blanks be collected at a rate of 1:20.

A **trip blank** is a sample used to detect contamination by volatile organic compounds (VOCs) during sample shipping and handling. Trip blanks are 40 mL volatile organic analysis (VOA) vials of ASTM Type II water that are filled in the laboratory, transported to the sampling site, and returned to the laboratory with VOA samples. Trip blanks are not opened in the field. One trip blank is to accompany each cooler containing VOA samples. Each trip blank is to be stored at the laboratory with associated samples, and analyzed with those samples. Trip blanks are only analyzed for VOCs.

Duplicates are two separate samples taken from the same source during the same sampling event and are analyzed for the same parameters. Data generated by duplicate samples includes sampling and analytical variability (precision). It is recommended that duplicates be collected at a rate of 1:20.

10.2 ANALYTICAL LABORATORY QC SAMPLES

Fixed-based analytical laboratories that provide services will have an approved QA plan that describes the laboratory QC sample program and the laboratory control sample program. The analytical laboratory has an established internal QC program that is managed by the laboratory supervisors. Analytical laboratory QC samples will be analyzed as required by the analytical method for the parameters of interest and the results will be included in the analytical report. Blind samples are samples in which the laboratory has no information on the sample location and, subsequently, would have no indication of the possible analytical results. These samples will be analyzed for the parameters of interest and the results will be included in the analytical report. Acceptable completion of the blind samples provides an indication of the laboratory's performance. DOE laboratories participating in the blind sample program will follow blind submittal frequencies determined by the SMO.

11. AUDITS AND SURVEILLANCES

11.1 AUDITS

Audits are qualitative reviews of task activity to check that the overall QA program is functioning. Audits should be conducted early in the task so that problems can be corrected quickly. The audit involves the review of all available and relevant task and contract documents and includes an evaluation of QC measures for office and field. Audits will be performed as requested by management.

11.2 SURVEILLANCES

Surveillances follow the same general format as an audit but are less detailed and require a less formal report. A surveillance is designed to give task staff rapid feedback concerning QA compliance and to facilitate corrective action. Surveillances will be performed as requested by management.

12. PREVENTIVE MAINTENANCE

Equipment is an inclusive term for tools, gauges, instruments, and other items. The equipment discussed in this section requires that specific preventive maintenance is serviced as specified by the manufacturer's recommended schedule. All services are documented and performed by qualified and trained individuals. Out-of-service equipment is controlled to prevent inadvertent use and its maintenance is recorded. A list is maintained of the critical, spare parts that should be stocked to minimize equipment downtime. Specific field equipment preventive-maintenance practices, frequencies, and spare parts are described in the factory manual for each instrument.

Preventive-maintenance protocols for laboratory equipment and instruments are provided in laboratory QA plans. All maintenance activities will be recorded in maintenance logs. Laboratories will be required to maintain an adequate inventory of spare parts and consumables to prevent downtime as a result of minor problems.

13. SPECIFIC ROUTINE PROTOCOLS

The precision, accuracy, and completeness parameters are quantitative tools by which data sets can be evaluated. These parameters can help ensure that DQOs are met and are defined as follows:

- **Precision**—A quantitative measurement of the variability of a group of measurements as compared to their average. Usually expressed as a percentage or a standard deviation, it evaluates the reproducibility of the system. Sample duplicates measure the reproducibility of the sampling event, while lab replicates measure the precision of the analytical process. The acceptable precision may be defined by the laboratory method used.

- **Accuracy**—A quantitative measurement of the bias of the data. It represents how close the measurement data is to the true value. Analytical accuracy is measured by percent recoveries associated with the laboratory analytical control spikes (blank spikes), surrogate spikes, or matrix spikes. The acceptable accuracy may be defined by the laboratory method used. Sampling accuracy can be assessed by evaluating field and trip blanks.

- **Representativeness**—A qualitative measurement of the ability of a sample or group of data to adequately describe or define the conditions being measured. Precision, accuracy, and completeness all affect representativeness. Sampling strategy (location, method, and frequency) are critical to ensure that the samples statistically represent the population. Laboratory precision and accuracy reflect how representative the data is of the sample.

- **Completeness**—A quantitative measurement of the percentage of acceptable data as compared to the number planned. Both sampling and analytical completeness can be measured.

- **Comparability**—A qualitative measurement of the confidence with which one data set can be compared with another. Comparability is achieved by using standard techniques for collection and analysis.

Protocols for assessing the precision, accuracy, and completeness are provided in the following text. It should be noted that there are no standard guidelines available for representativeness and comparability.

13.1 PRECISION

To determine the precision of the laboratory analysis, a routine program of replicate analyses, in accordance with the analytical method requirements, is performed by the laboratory. The results of replicate analyses are used to calculate the relative percent difference which is used to assess laboratory precision.

For replicate results C_1 and C_2:

$$\text{Relative percent difference} = \frac{|C_1 - C_2|}{\left(\frac{C_1 + C_2}{2}\right)} \times 100$$

Precision of the total sampling and analytical measurement process will be assessed from field duplicates. Although a quantitative goal cannot be set due to sample variability, the Task Lead will review relative percent difference values of field duplicates to estimate precision. Analytical precision can be measured separately from sampling precision through the use of laboratory duplicate and matrix spikes.

13.2 ACCURACY

To determine the accuracy of an analytical method and/or the laboratory analysis, a periodic program of sample spiking is conducted (minimum one spike and one spike duplicate per 20 samples). The results of sample spiking are used to calculate the QC parameter for accuracy evaluation, the percent recovery (% R).

For surrogate spikes and QC samples:

$$\%R = \frac{C_s}{C_t} \times 100$$

where--

C_s = measured spiked sample concentration (or amount)
C_t = true spiked concentration (or amount)

For matrix spikes:

$$\%R = \frac{|C_s - C_o|}{C_t} \times 100$$

where--

C_s = measured, spiked sample concentration
C_o = sample concentration (not spiked)
C_t = true concentration of the spike

Accuracy of the total sampling and analytical measurement process will not be determined. This would require the addition of chemical-spiking compounds to the samples in the field.

13.3 COMPLETENESS

To determine the completeness of data, the percentage of valid, viable data obtained from a measurement system is compared with the number of total measurements. The goal of completeness is to generate a sufficient amount of valid data to satisfy task needs.

Completeness, *C*, is calculated as follows:

$$\%\,C = \frac{\text{Number of valid measurements}}{\text{Number of total measurements}} \times 100$$

14. NONCONFORMANCES AND CORRECTIVE ACTIONS

Nonconforming equipment, items, activities, conditions, and unusual incidents that could affect compliance with task requirements will be identified, controlled, and reported in a timely manner. Nonconforming equipment will immediately be labeled or tagged, and segregated, if possible. Specific protocols for controlling nonconforming items will be described in applicable documents. Nonconformance Reports issued as a result of an audit or surveillance will identify the root cause of the problem. Laboratories must notify the appropriate personnel of any nonconformance or problems with analytical samples. Laboratory corrective actions reports are completed by the analytical laboratory when a nonconformance is recognized by laboratory personnel. Handling of any nonconformance is described in appropriate plans and protocols.

Corrective actions to audit/surveillance findings and nonconformances are managed. The Task Manager is notified of a nonconformance and/or surveillance finding. These are documented and a copy is furnished to the Task Lead as soon as possible. Copies of audits, surveillances, and/or nonconformances and their dispositions will be forwarded to the appropriate management personnel and will be placed in the DMC.

15. QA REPORTS TO MANAGEMENT

Upon request, QA personnel will provide to management a report which summarizes QA activities for the task, system, and performance audits conducted (internal and external); quality problems found; corrective actions initiated; and other applicable items. Some reports that present measurement data generated during the work assignment may require a QA section addressing the quality and limitations of the data. This QA section will address results of audits or surveillance of the measurement work; quality problems found and corrective actions taken; and deviations from applicable documents.

16. FIELD CHANGES

Field changes will be governed by control measures commensurate with those applied to the documentation of the original protocol. The task team identifies, documents, and approves field changes. These changes are communicated to the team through the use of Change Notices and Change Orders.

REFERENCES

10 CFR 830.120, "*Quality Assurance,*" April 1994.

Bechtel Jacobs Company LLC. Quality Assurance Program Plan, DRAFT, October 1998.

Energy Systems. *Environmental Measurements Data Management Plan Implementation Handbook for the Environmental Restoration Program*, ES/ER/TM-88/R1, 1996.

EPA. *Data Quality Objectives Process for Superfund*, Interim Final Guidance, EPA/540/G-93/071, 1993.

EPA. Hazardous and Solid Waste Amendment Permit, Permit #KY8890008982, August, 19, 1991.

EPA. *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*, QAMS 005/80, December 20, 1980.

EPA. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 1986.

EPA. *EPA Region 4 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*, May 1996.

Kentucky Division of Waste Management Hazardous Waste Management Permit, Permit No. KY8890008982, August 19, 1991.

Kentucky Agreement in Principle, January 1, 1997.

Quality Assured Data, PMSA-1001, Bechtel Jacobs Company LLC Procedures Manual, April 1997.

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APPENDIX A

TASK-SPECIFIC INFORMATION FOR QUALITY AND DATA ELEMENTS

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TASK-SPECIFIC INFORMATION FOR QUALITY AND DATA ELEMENTS

Purpose and Introduction

This plan can be used and implemented for the Paducah DOE tasks requiring the collection of analytical data. Each section of the FFA QA/DMP was written to meet data-quality requirements and provides a description of the programmatic elements which should occur for each task. This appendix provides additional information concerning the QA and Data Management aspects which are specific to the task and cannot be defined at the programmatic level. This appendix should be completed once the task has been planned or once the DQOs have been documented. This completed appendix, along with the "Data and Documents Management and Quality Assurance Plan for the Paducah Environmental Management and Enrichment Facilities Program," will serve as the "Quality Assurance and Data Management Plan" for the task, will be provided to appropriate personnel, and will be maintained as a task record.

For the purpose of this document, this appendix is not completed but shows the information to be completed for each task involved in the collection of analytical data. This appendix should be completed, printed with attachments compiled, combined with the "Data and Documents Management and Quality Assurance Plan for the Paducah Environmental Management and Enrichment Facilities Program," and distributed to the appropriate personnel for review, approval, and use.

INSTRUCTIONS FOR COMPLETING THE QUALITY ASSURANCE/DATA MANAGEMENT PLAN (QA/DMP)

Use the following instructions to complete each section for the task-specific QA/DMP. Attachments may be used to serve as and/or supplement the information provided in the tables.

TITLE PAGE: Type over the task-specific information in the underlined/bolded/italicized portion of the text. Information needed is the issue date, document number, document title, and author(s). Document numbers must be obtained from the Records Manager.

APPROVAL PAGE: Type over the task-specific information in the underlined/bolded/italicized portion of the text. Information needed is the preparers' names and titles and the approvers' names and titles. Minimum approvals are the Task Lead, Project Manager, and QA Manager.

TABLE OF CONTENTS AND ATTACHMENTS: Include the appropriate page numbers to the table of contents and identify and document the attachments provided to supplement this QA/DMP.

SECTION 1.0—TASK ORGANIZATION, RESPONSIBILITY, AND TRAINING: Identify the task organizational chart listing additional roles and responsibilities, including those identified in Section 2.2 of the "Data and Documents Management and Quality Assurance Plan for the Paducah Environmental Management and Enrichment Facilities Program." Also, document in Table 1.1 the training requirements for key personnel. An organizational chart and/or training matrix may be attached to this QA/DMP.

SECTION 2.0—DATA QUALITY OBJECTIVES (DQOs) AND SAMPLE PLANNING: Refer to PMSA-1001, *Quality Assured Data*, Appendix C, for directions to complete DQOs for the project. Attach DQO documentation to this QA/DMP. Using the DQO documentation, with assistance from the task team, identify details of the SAP. The SAP is generated out of the data needs identified in the DQOs and will specify applicable samples (i.e., regular samples, QC samples, and waste characterization samples) to be collected. Complete Table 2.1 (if SAP is not available) and/or attach the task SAP for environmental data. Complete Table 2.2 for waste characterization.

SECTION 3.0—APPLICABLE PROTOCOLS, DOCUMENTS, AND WORK INSTRUCTIONS: Identify the applicable protocols and documents (to data quality activities) which will be followed for the data collection activity and document in Table 3.1. Work instructions may be required for task-specific tasks.

When available and appropriate for the sample matrix, SW-846 Methods will be used. When not available, other nationally-recognized methods such as those of ASTM, DOE, and EPA will be used. Analytical methods are listed in Table 2.0 and in analytical SOWs; therefore, an additional listing of analytical methods is not required in Table 3.1.

SECTION 4.0—CALIBRATION PROTOCOLS AND FREQUENCIES: This section addresses documentation of field equipment and field support laboratory equipment which is to be calibrated for the task. Fixed-base laboratory calibration protocols and frequencies are not required to be included in this plan but are covered in the laboratory QA plans and protocols. The SMO oversight/audit has ensured the laboratory has met the requirements of SW-846. Calibration protocols and frequency information may be attached to this QA/DMP.

Identify the field equipment and field support laboratory equipment to be used during the data collection activity and document in Table 4.1 or attach supplemental information concerning equipment calibrations, the protocols, and frequencies.

SECTION 5.0—DATA REVIEW PROCESS: For details on the data review process, refer to PMSA-1001, *Quality Assured Data*, Appendices E, F, G, and H. Complete verification and assessment.

For the purposes of this section, contractual screening, data verification, and data assessment frequencies are identified in Table 5.1, Table 5.2, and Table 5.4, respectively; however, responsible personnel for these tasks must be identified and documented in the appropriate tables. Complete and attach Appendix G, "Data Quality Checks," from PMSA-1001, *Quality Assured Data*, to better define verification and assessment criteria. Complete Table 5.3 to document the validation strategy defined by the task team.

SECTION 6.0—DOCUMENT AND RECORDS CONTROL AND TRANSFER: Identify the documents and records to be controlled during the task, the document or record name and type (i.e., a document such as a QA project plan or a record such as a logbook) and the frequency of transfer of the document or record to the EMEF DMC. Record this information in Table 6.1 for documents and Table 6.2 for records.

SECTION 7.0—QUALITY ASSESSMENT SCHEDULE: Identify and document in Table 7.1 the quality assessments to be performed for the task as requested by the Task Lead or other applicable managers.

DISTRIBUTION LIST: Identify and document the appropriate personnel to receive a copy of the QA/DMP.

REVIEWING, APPROVING, AND ISSUING THE QA/DMP: Upon completion of the above instructions, the QA/DMP should be printed, noticeably stamped "DRAFT," and provided to the appropriate personnel for review. Comments should be received and resolved in a timely manner. The revised QA/DMP should be printed, approved, and provided to the appropriate personnel as defined in the distribution list.

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DATE OF ISSUE: ***DATE*** ***DOCUMENT NO., REV. NO.***

PROJECT TITLE

QUALITY ASSURANCE AND DATA MANAGEMENT PLAN

AUTHOR(S)

Prepared by
Environmental Management and Enrichment Facilities
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Managed by
BECHTEL JACOBS COMPANY
for the
U. S. DEPARTMENT OF ENERGY
Under Contract No. DE-AC05-98OR22700

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PROJECT TITLE
QUALITY ASSURANCE AND DATA MANAGEMENT PLAN

APPROVALS

Prepared by: _____ **Date:** _____
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CONTENTS

ATTACHMENTS

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1.0 TASK ORGANIZATION, RESPONSIBILITY, AND TRAINING

Table 1.1. Task Organization, Responsibility, and Training.

Job Title or Position	Name	Role, Responsibility, and Interface	Training*
DOE Project Manager			
Data Clerk			
Data Manager	M&I Data Manager/ Subcontractor Personnel		
Network Administrator	M&I Network Administrator		
Project Manager			
Project Engineer			
QA Specialist			
Records Clerk			
Records Manager	M&I Records Manager/ Subcontractor Personnel		
Sample Manager	M&I Sample Manager/ Subcontractor Personnel		
Task Lead			
Task Manager			
Field Team Leader	Subcontractor Personnel		
Samplers	Subcontractor Personnel		
Drillers	Subcontractor Personnel		
Other	Subcontractor Personnel		
Other	Subcontractor Personnel		

*The required training (GET, GERT, RAD II, etc.) should be identified for Subcontractor Personnel for this project.

Identify Location of Training Records for Subcontractor Personnel: _____

2.0 DATA QUALITY OBJECTIVES AND SAMPLE PLANNING

Table 2.1. DQOs and sample planning for environmental data collection.

Sampling Location	Matrix	Sampling Method(s)	Sampling Frequency	Data Type(s) (Screen or Def)	Analyte(s)	Analytical Method	Detection Limit(s)	Holding Time	Container	Preservative
Regular Samples										
QC Samples										

Table 2.2. DQOs and sample planning for waste characterization data collection.

Material/ Volume/ Container	Preliminary Classification	Characterization Method	Future Disposition	Analyte(s)	Analytical Method	Detection Limit(s)	Holding Time	Container	Preservative
Regular Samples									
QC Samples									

3.0 APPLICABLE DOCUMENTS, PROTOCOLS, AND WORK INSTRUCTIONS

Table 3.1. Applicable documents, protocols, and work instructions.

Protocol Number	Protocol Name	Applicability	
		Yes	No
	General		
	List appropriate protocols for to be used for chain-of-custodies, logbooks, ensuring quality data, etc.		
	Sampling		
	List appropriate sampling protocols to be used.		
	Data Management		
	List appropriate data management protocols to be used.		
	Data Validation		
	List appropriate data validation protocols to be used.		

4.0 CALIBRATION PROTOCOLS AND FREQUENCIES

Table 4.1. Field equipment and field support laboratory calibration protocols and frequencies.

Equipment & Serial No.	Field Usage	Calibration Check Frequency	Calibration Check Material	Calibration Check Protocol
Field Equipment				
Field Support Laboratory Equipment				

5.0 DATA REVIEW PROCESS

Table 5.1. Contractual screening.

Responsible Person: _____

Other: _____

Table 5.2. Data verification.

Responsible Person: _____

Other: _____

Table. 5.3. Details for performing data validation.

Frequency	Data Package Type	Analytes & Media	Protocol Used	Completed By

Responsible Person: _____

Table 5.4. Data assessment.

Responsible Person: _____

6.0 DOCUMENT AND RECORDS CONTROL AND TRANSFER

Table 6.1. Identification of documents.				
Document Name and Type	**Controlled Document (Yes* or No)**	**Storage Location**	**Frequency of Transfer**	**Comments**

* If a document is identified as a "controlled document", then a distribution list must be created, maintained, and updated, as needed. The access control method for the "controlled document" must be defined and implemented.

Table 6.2. Identification of records.				
Record Name and Type	**Quality Record (Yes or No)**	**Storage Location**	**Frequency of Transfer**	**Comments**

7.0 ASSESSMENT SCHEDULE

Table 7.1. Assessment schedule.

Audit/Surveillance/ Self Assessment No.	Subject/Topic	Date	Completed By

DISTRIBUTION

(List appropriate names and associated organization, if needed, for distribution of document.)

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APPENDIX B

DATA DICTIONARY AND FORMATS FOR PADUCAH OREIS TRANSMITTALS

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TRANSMITTAL FORMAT

Transmittal format for all data transmittals will be in exported database format (.dbf) and as a Microsoft Access table (version 97 or more recent). The file will be added to the password-protected external server under the base directory \\home\oreis\data\ in a zipped file named according to the structure outlined below that corresponds to Table 1 in addition to other applicable transmittals.

KPDES Permit DOE Outfalls, Toxicity Monitoring, Bioaccumulation Study, Fish Community
...\data\permit\KPDES\KPDESTYYYY-MM

where T corresponds to the sample type (i.e., R=regular permitted sampling, T=toxicity sampling, B=bioaccumulation sampling, F=fish community sampling)
YYYY corresponds to the calendar year, and
MM corresponds to the month

C-746-K Surface Water, C-746-K Groundwater
...\data\permit\C746K\KMYYYY-SA

where M corresponds to the media (i.e., S=Surface water, G=Groundwater)
YYYY corresponds to the calendar year, and
SA corresponds to the 1st or 2nd half of the year

C-746-S&T Surface Water, C-746-S&T Groundwater, C-746-S&T Leachate
...\data\permit\C746S&T\S_TMYYYY-QQ

where M corresponds to the media (i.e., S=Surface water, G=Groundwater, L=Leachate)
YYYY corresponds to the calendar year, and
QQ corresponds to the quarter

C-746-U Surface Water, C-746-U Groundwater, C-746-U Leachate
...\data\permit\C746U\UMYYYY-QQ

where M corresponds to the media (i.e., S=Surface water, G=Groundwater, L=Leachate)
YYYY corresponds to the calendar year, and
QQ corresponds to the quarter

C-404 Groundwater, C-404 Leachate
...\data\permit\C404\404MYYYY-SA

where M corresponds to the media (i.e., S=Surface water, G=Groundwater, L=Leachate)
YYYY corresponds to the calendar year, and
SA corresponds to the 1st or 2nd half of the year

Environmental Monitoring Surface Water Sampling
...\data\envmon\SW-YYYY

where YYYY corresponds to the calendar year

Environmental Monitoring Sediment Sampling
...\data\envmon\SD-YYYY

where YYYY corresponds to the calendar year

Environmental Monitoring Deer Sampling
...\data\envmon\D-YYYY

where YYYY corresponds to the calendar year

Environmental Monitoring Plume Groundwater Sampling
...\data\envmon\Pl-GW\PlGWYYYY-QQ
where YYYY corresponds to the calendar year, and
QQ corresponds to the quarter

Environmental Monitoring Residential Groundwater Sampling
...\data\envmon\Res-GW\ResGWYYYY-SA
where YYYY corresponds to the calendar year, and
SA corresponds to the 1st or 2nd half of the year

Environmental Monitoring Surveillance Groundwater Sampling
...\data\envmon\Sur-GW\SurGWYYYY-SA
where YYYY corresponds to the calendar year, and
SA corresponds to the 1st or 2nd half of the year

S&M/O&M Northwest Plume Operations Sampling
...\data\sm_om\NWYYYY-QQ
where YYYY corresponds to the calendar year, and
QQ corresponds to the quarter

S&M/O&M Northeast Plume Operations Sampling
...\data\sm_om\NEYYYY-QQ
where YYYY corresponds to the calendar year, and
QQ corresponds to the quarter

DOE Remedial Action Investigations
...\data\ra\PROJCODE
where PROJCODE corresponds to the PROJ_CODE in Paducah OREIS (e.g., ERI-WAG6, ERI98-698W22, etc.)

Special Requests
...\data\requests\YYYYMMDD-A
where YYYY corresponds to the calendar year,
MM corresponds to the month,
DD corresponds to the day of the request, and
A corresponds to the sequential number for the request.

Lithology
...\data\lith\PROJCODE
where PROJCODE corresponds to the PROJ_CODE in Paducah OREIS from which the lithology description was collected (e.g., ERI-WAG6, ERI-WAG 27, LASAGNA, etc.)

GIS Themes/Coverages
...\data\gis\

Each file will be named to appropriately describe the theme/coverage. Updates to themes/coverages will be named identical to the previous version with a revision number immediately following (e.g., roads, roads1, roads2,etc).

GIS Themes/coverages will be in a format compatible to be viewed in ArcView 2.0 or higher (i.e., ArcInfo Coverages, AutoCAD drawings, etc.)

DATA DICTIONARY INFORMATION

CODE

The CODE table contains the codes used in Paducah OREIS tables and their descriptions.

CODE	Code referenced in other Paducah OREIS tables.
CODE_DESCRIPTION	Description of the coded value. This is the 'decoded' value.
CODE_TYPE	Column name for the codes and descriptions. This value identifies the type of coded value.

PROJECT FLD SMP MEAS

The export of PROJECT FLD SMP MEAS table contains the measurement data taken in the field, which is associated with specific SAMPLEs collected during a STATION_EVENT. Examples are flow rate, depth, and temperature. Only those field measurements directly associated with a SAMPLE will be stored in the FLD_SMP_MEAS table. Field measurement data collected, not directly associated with a SAMPLE (e.g., water level suites) will also be in this format.

PROJ_CODE	Acronym assigned by the project (e.g., "ERI-WAG6" for the WAG 6 Environmental Restoration Field Investigation).
STA_NAME	Unique station name assigned by the individual projects (e.g., 400-212 or MW156).
PROJ_SAMPLE_ID	Unique sample identifier assigned by the project.
SAMPLE_COMMENTS	Comments about the sample.
SMP_STRT_LEVEL	For a measurement taken over a range of elevations or depths, the upper vertical distance in feet of the measurement from ground surface.
SMP_END_LEVEL	For a measurement taken over a range of elevations or depths, the lower vertical distance in feet of the measurement from ground surface.
MED_TYPE	Coded value that represents the part of the environment from which a sample is collected, or on which a field measurement or observation is made. See CODE table where CODE_TYPE = MED_TYPE for a list of valid values and their descriptions.
SMP_TYPE	Coded value that represents the type of sample collected. See CODE table where CODE_TYPE = SMP_TYPE for a list of valid values and their descriptions.
D_COLLECTED	Date sample was collected.
CHEMICAL_NAME	Description of the chemical or measurement parameter. For CAS numbers, this is the preferred name defined by the Common Lab Practices Committee.
CAS_NUM	Chemical Abstract Services number with dashes, blank if no CAS number is available.
LAB_CODE	Coded value assigned by the project that represents the analytical laboratory that performed the analysis of the sample. See the CODE table where CODE_TYPE = LAB_CODE for a list of valid values and their descriptions.
RESULTS	Measurement for a given parameter.
RSLT_PREFIX_QUALIFIER	A qualifier indicating whether the result is below, within, or above range limits. See CODE table where CODE_TYPE = RSLT_PREFIX_QUALIFIER for a list of valid values and their descriptions.

RSLTQUAL	Coded value that documents any conditions associated with the results of the analysis. See CODE table where CODE_TYPE = RSLTQUAL for a list of valid values and their descriptions.
UNITS	Coded value that represents the units of measure used to report the parameter value. See CODE table where CODE_TYPE = UNITS for a list of valid values and their descriptions.
NON_COMPLI_CODE	For Paducah OREIS, this field designates electronic verification qualifiers assigned during the Data Assessment process according to PMSA-1001. See CODE table where CODE_TYPE = NON_COMPLI_CODE for a list of valid values and their descriptions. A null field may indicate no criteria were established or may indicate verification was clear. Non-standard criteria are established on a project-by-project basis.
VALIDATION	Coded value that represents the outcome of the data validation process. See CODE table where CODE_TYPE = VALIDATION for a list of valid values and their descriptions.
ASSESSMENT	Coded value describing assessment qualifiers added to data as a result of PMSA-1001. Applies only to data generated after effective date of procedure. See CODE table where CODE_TYPE = ASSESSMENT for a list of valid values and their descriptions.
FLD_COMMENTS	Comments about the measurement.
ANA_METHOD	Method number used to identify a standard analysis method.
ANA_TYPE	Coded value of the chemical group to which the analyte belongs. See CODE table where CODE_TYPE = ANA_TYPE for a list of valid values and descriptions.

PROJECT LAB MEAS

The export of PROJECT LAB MEAS table contains the measurement data analyzed by an analytical laboratory, which is associated with specific SAMPLEs collected during a STATION_EVENT.

PROJ_CODE	Acronym assigned by the project (e.g., "ERI-WAG6A" for the WAG 6 Environmental Restoration Field Investigation).
STA_NAME	Unique station name assigned by the individual projects (e.g., 400-212 or MW156).
PROJ_SAMPLE_ID	Unique sample identifier assigned by the project.
SAMPLE_COMMENTS	Comments about the sample.
SMP_STRT_LEVEL	For a measurement taken over a range of elevations or depths, the upper vertical distance in feet of the measurement from ground surface.
SMP_END_LEVEL	For a measurement taken over a range of elevations or depths, the lower vertical distance in feet of the measurement from ground surface.
MED_TYPE	Coded value that represents the part of the environment from which a sample is collected, or on which a field measurement or observation is made. See CODE table where CODE_TYPE = MED_TYPE for a list of valid values and their descriptions.
SMP_TYPE	Coded value that represents the type of sample collected. See CODE table where CODE_TYPE = SMP_TYPE for a list of valid values and their descriptions.
D_COLLECTED	Date sample was collected.

CHEMICAL_NAME	Description of the chemical or measurement parameter. For CAS numbers, this is the preferred name defined by the Common Lab Practices Committee.
CAS_NUM	Chemical Abstract Services number with dashes, blank if no CAS number is available.
LAB_CODE	Coded value assigned by the project that represents the analytical laboratory that performed the analysis of the sample. See the CODE table where CODE_TYPE = LAB_CODE for a list of valid values and their descriptions.
RESULTS	Measurement for a given parameter.
RSLT_PREFIX_QUALIFIER	A qualifier indicating whether the result is below, within, or above range limits. See CODE table where CODE_TYPE = RSLT_PREFIX_QUALIFIER for a list of valid values and their descriptions.
RSLTQUAL	Coded value that documents any conditions associated with the results of the analysis. See CODE table where CODE_TYPE = RSLTQUAL for a list of valid values and their descriptions.
UNITS	Coded value that represents the units of measure used to report the parameter value. See CODE table where CODE_TYPE = UNITS for a list of valid values and their descriptions.
RAD_ERR	The counting error for a specific radionuclide expressed as 2 standard deviations.
NON_COMPLI_CODE	For Paducah OREIS, this field designates electronic verification qualifiers assigned during the Data Assessment process according to PMSA-1001. See CODE table where CODE_TYPE = NON_COMPLI_CODE for a list of valid values and their descriptions. A null field may indicate no criteria were established or may indicate verification was clear. Non-standard criteria are established on a project-by-project basis.
VALIDATION	Coded value that represents the outcome of the data validation process. See the CODE table where CODE_TYPE = VALIDATION for a list valid values and their descriptions.
ASSESSMENT	Coded value describing assessment qualifiers added to data as a result of PMSA-1001. Applies only to data generated after effective date of procedure. See CODE table where CODE_TYPE = ASSESSMENT for a list of valid values and their descriptions.
LAB_COMMENTS	Comments about the individual sample.
ANA_METHOD	Method number used to identify a standard analysis method.
ANA_TYPE	Coded value of the chemical group to which the analyte belongs. See CODE table where CODE_TYPE = ANA_TYPE for a list of valid values and descriptions.

STATION-LOCATION

The export of STATION-LOCATION table contains the data about sampling points associated with one or more projects. Each point has a distinct station name/station type within a project. Locational information contains coordinate and other information describing a point on the ground. Most location are points described by x,y coordinates, but a location could be a line or a polygon where measuring events occur. In those cases, a single point, such as the estimated center point, is used.

STA_NAME	Unique station name assigned by the individual projects (e.g., GW101).
STA_TYPE	Coded value that represents the type of station (e.g., seep, spring, well). See CODE table where CODE_TYPE = STA_TYPE for a list of valid values and their descriptions.
STATION_COMMENTS	Comments about the station.
STA_DESC	Description of the specific sampling or measuring location.
GRND_ELV	Elevation of ground surface (for groundwater, soil, or sediment sampling) at a sampling or measuring location in feet above mean sea level (msl).
ADMIN_EAST	X-value of the distance in feet of a sampling or measuring location from the reference location based on the administrative coordinate grid system.
ADMIN_NORTH	Y-value of the distance in feet of a sampling or measuring location from the reference location based on the administrative coordinate grid system.
SWMU	Acronym for Solid Waste Management Unit, if applicable.
LOCATION_COMMENTS	Comments about the location.
DATUM	Coded value that represents the method by which reference points were established (e.g., NAD27, NAD83). Datum should be associated with the state plane coordinate system. It is not valid for administrative grid. See CODE table where CODE_TYPE = DATUM for a list of valid values and their descriptions.
SPLANE_EAST	X-value of the distance in meters of a sampling or measuring location from the reference location based on the state plane coordinate grid system.
SPLANE_NORTH	Y-value of the distance in meters of a sampling or measuring location from the reference location based on the state plane coordinate grid system.
LOC_ERROR	Station location error in feet.
LOC_METHOD	Coded value that represents the method used for locating the station. See CODE table where CODE_TYPE = LOC_METHOD for a list of valid values and their descriptions.

LITHOLOGY

The LITHOLOGY export provides a description of a material (e.g., sand, gravel) encountered underground at a given location at a specific interval within a well, borehole, etc. and the discrete fixed top and bottom points of the interval where the sample was taken.

CONSTR_DEPTH_VAL	The total measurement from the ground surface of a hole downward to the bottom of the screening material in a well, expressed in feet.

HOLE_DIAM	Diameter in inches of the well. If more than one diameter is available, this column will contain the smallest diameter and the others will be listed in the COMMENTS column.
LOG_FLAG	A flag which indicates that reference source information (e.g., geophysical logs) exists.
LOG_TYPE	Coded value that represents a specific geophysical log. An example would be CL for Caliper Log, GRL for Gamma Ray Log. A name or abbreviation representing a type of LOG used in geologic work (e.g., driller, caliper, gamma). See CODE table where CODE_TYPE = LOG_TYPE for a list of valid values and their descriptions.
TOT_DRILLED_DEPTH	The total measurement from the ground surface to the bottom of a newly-constructed well after any plug back material has been added, expressed in feet.
INT_BOT_DEPTH_VAL	The distance in feet, from the ground surface to the bottom of a monitored interval.
INT_TOP_DEPTH_VAL	The distance in feet, from the ground surface to the top of a monitored interval.
MONIT_INT_NAME	The name (or number) assigned to a given monitored interval at a given location.
MONIT_ZONE_CODE	Coded value that represents the generic interval of a saturated zone that a hole monitors. A monitored interval can cut across multiple zones. See CODE table where CODE_TYPE = MONIT_ZONE_CODE for a list of valid values and their descriptions.
INT_MATL_CODE	Coded value that represents a specific characteristic or set of characteristics of the solid content found at a specific location. See CODE table where CODE_TYPE = INT_MAT_TYPE for a list of valid values and their descriptions.
STRAT_SEQ	Number assigned by the site geologist to each distinct lithologic layer at a site.
VISUAL_DESC	Textual and mineralogical description of the material comprising the layer to augment or qualify the lithtype code (e.g., grain sizes, color, secondary characteristics).

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APPENDIX 8

PGDP SITE MAP (REV 6) FACILITIES EVALUATION WORKSHEET (CD)

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PGDP SITE MAP (REV 6) FACILITIES EVALUATION WORKSHEET

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