

March 26, 2026

FRNP-26-10047

Ms. April Webb
Federal Facility Agreement Manager
Hazardous Waste Branch Manager
Division of Waste Management
Kentucky Department for Environmental Protection
300 Sower Blvd., 2nd Floor
Frankfort, KY 40601

Dear Ms. Webb:

Hazardous Waste Management Facility Permit Class 1 Modification Request at the Paducah Gaseous Diffusion Plant, Paducah Kentucky, Permit No. KY8-890-008-982, Agency Interest No. 3059

Enclosed is the Hazardous Waste Management Facility Permit Class 1 Modification Request. This modification is being requested in accordance with 40 *CFR* § 270.42, *Permit modification at the request of the permittee*. The enclosed clean and redline copies detail each change. These changes are necessary to reflect the current status of each permitted facility, to make general administrative changes, to clarify information, and to ensure compliance with all applicable regulations.

The Hazardous Waste Management Facility Permit renewal, Permit No. KY8-890-008-982 was submitted electronically via the Energy and Environmental Cabinet website using “DWM Hazardous Waste Electronic Submittal eForm #208.”

In support, the following is an overview of this modification.

1. Part A—New Part A forms with updated figures. Both the U.S. Environmental Protection Agency form and the Kentucky Division of Waste Management form are fillable PDFs; therefore, no redlines are available for these forms.
2. Part E—The updated solid waste management unit (SWMU) list was broken into two tables to remove five (5) no further action SWMUs from the permit. The SWMU table was reformatted and SWMU names were updated to better align with the site management plan.
3. Part G—The verbiage was updated for the DOE Operations and Site Mission Support contractor transition and new mutual aid agreements.

A copy of the notification to all persons on the facility mailing list is enclosed, and the notification will be distributed within 90 calendar days of the director’s approval of the request.

If you have any questions or comments, please contact Bruce Ford at (270) 441-5357.

Sincerely,

MYRNA REDFIELD
(Affiliate)

Digitally signed by MYRNA
REDFIELD (Affiliate)
Date: 2026.03.26 14:15:32
-05'00'

Myrna Espinosa Redfield
Program Manager

Enclosures:

1. *Hazardous Waste Management Facility Permit Mod 1—Part A—Clean*
2. *Hazardous Waste Management Facility Permit Mod 1—Part E—Clean*
3. *Hazardous Waste Management Facility Permit Mod 1—Part G—Clean*
4. *Hazardous Waste Management Facility Permit Mod 1—Part A—Redline*
5. *Hazardous Waste Management Facility Permit Mod 1—Part E—Redline*
6. *Hazardous Waste Management Facility Permit Mod 1—Part G—Redline*
7. Public Notification Mailer

e-copy:

abigail.parish@pppo.gov, PPPO
april.ladd@pppo.gov, PPPO
april.webb@ky.gov, KDEP
arcorrespondence@pad.pppo.gov, FRNP
bart.schaffer@ky.gov, KDEP
bruce.ford@pad.pppo.gov, FRNP
carrie.maxie@pad.pppo.gov, FRNP
erik.olds@orem.doe.gov, PPPO
frnp_correspondence@pad.pppo.gov, FRNP
joel.bradburne@pppo.gov, PPPO
katrina.hall@pad.pppo.gov, FRNP
ken.davis@pad.pppo.gov, FRNP
leo.williamson@ky.gov, KDEP
myrna.redfield@pad.pppo.gov, FRNP
ryan.callihan@pppo.gov, PPPO
stephaniec.brock@ky.gov, KYRHB

PART A
RCRA PART A APPLICATION
HAZARDOUS WASTE MANAGEMENT FACILITY PERMIT
CLASS 1 MODIFICATION

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United States Environmental Protection Agency
RCRA SUBTITLE C SITE IDENTIFICATION FORM



1. Reason for Submittal (Select only one.)

☐	Obtaining or updating an EPA ID number for on-going regulated activities (Items 10-17 below) that will continue for a period of time.
☐	Submitting as a component of the Hazardous Waste Report for _____ (Reporting Year)
☐	Site was a TSD facility, a reverse distributor, and/or generator of $\geq 1,000$ kg of non-acute hazardous waste, > 1 kg of acute hazardous waste, or > 100 kg of acute hazardous waste spill cleanup in one or more months of the reporting year (or State equivalent LQG regulations)
☐	Notifying that regulated activity is no longer occurring at this Site
☐	Obtaining or updating an EPA ID number for conducting Electronic Manifest Broker activities
☒	Submitting a new or revised Part A (permit) Form

2. Site EPA ID Number

K	Y	8	8	9	0	0	0	8	9	8	2
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3. Site Name

United States Department of Energy - Paducah Gaseous Diffusion Plant

4. Site Location Address

Street Address 5600 Hobbs Road		
City, Town, or Village Kevil		County McCracken
State Kentucky	Country USA	Zip Code 42053
Latitude 37° 6' 41.95"	Longitude 88° 48' 46.09"	☐ Use Lat/Long as Primary Address

5. Site Mailing Address

☐ Same as Location Street Address

Street Address 5501 Hobbs Road		
City, Town, or Village Kevil		
State Kentucky	Country USA	Zip Code 42053

6. Site Land Type

☐ Private	☐ County	☐ District	☒ Federal	☐ Tribal	☐ Municipal	☐ State	☐ Other
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7. North American Industry Classification System (NAICS) Code(s) for the Site (at least 5-digit codes)

A. (Primary) 562910	C. 562212
B. 562211	D.

8. Site Contact Person

Enter the primary site contact here and additional contacts in Appendix A.

First Name Myrna	MI E	Last Name Redfield
Title Program Manager		
Email myrna.redfield@pad.pppo.gov		
Phone 270-441-5113	Ext N/A	Fax 270-441-6103
Preferred Language English		

A. Site Contact Address☐ Same as Location Address

Street Address 5511 Hobbs Road		
City, Town, or Village Kevil		
State Kentucky	Country USA	Zip Code 42053

9. Legal Owner and Operator of the Site**A. Name of Site's Legal Owner**☐ Same as Location Address

Full Name United States Department of Energy	Date Became Owner (mm/dd/yyyy) 10/18/1950
Owner Type ☐ Private ☐ County ☐ District ☒ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other	
Street Address 5501 Hobbs Road	
City, Town, or Village Kevil	
State Kentucky	Country USA Zip Code 42053
Email erik.olds@orem.doe.gov	
Phone 865-574-7701	Ext N/A Fax N/A
Comments N/A	

B. Name of Site's Legal Operator☐ Same as Location Address

Full Name Four Rivers Nuclear Partnership, LLC	Date Became Operator (mm/dd/yyyy) 10/20/2017
Operator Type ☒ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other	
Street Address 5511 Hobbs Road	
City, Town, or Village Kevil	
State Kentucky	Country USA Zip Code 42053
Email myrna.redfield@pad.pppo.gov	
Phone 270-441-5113	Ext N/A Fax 270-441-6103
Comments The United States Department of Energy [DOE and Four Rivers Nuclear Partnership, LLC, (FRNP)] are co-operators. Please see item 18 for an explanation of the division of the operator responsibilities.	

10. Type of Regulated Waste Activity (at your site)

Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities

☒ Y ☐ N	1. Generator of Hazardous Waste—If "Yes", mark only one of the following—a, b, c	
☒	a. LQG	-Generates, in any calendar month, 1,000 kg/mo (2,200 lb/mo) or more of non-acute hazardous waste (includes quantities imported by importer site); or - Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lb/mo) of acute hazardous waste; or - Generates, in any calendar month or accumulates at any time, more than 100 kg/mo (220 lb/mo) of acute hazardous spill cleanup material.
☐	b. SQG	100 to 1,000 kg/mo (220-2,200 lb/mo) of non-acute hazardous waste and no more than 1 kg (2.2 lb) of acute hazardous waste and no more than 100 kg (220 lb) of any acute hazardous spill cleanup material.
☐	c. VSQG	Less than or equal to 100 kg/mo (220 lb/mo) of non-acute hazardous waste.
☒ Y ☐ N	Is State Generator of Hazardous Waste the same as Federal— If "No", indicate State Generator Category in the space provided.	
☐ Y ☒ N	2. Short-Term Generator (generates from a short-term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section. <i>Note: If "Yes", you MUST indicate that you are a Generator of Hazardous Waste in Item 10.A.1 above.</i>	
☒ Y ☐ N	3. Treater, Storer or Disposer of Hazardous Waste—Note: Part B of a hazardous waste permit is required for these activities.	
☐ Y ☒ N	4. Receives Hazardous Waste from Off-site	
☐ Y ☒ N	5 Recycler of Hazardous Waste	
☐	a. Recycler who stores prior to recycling	
☐	b. Recycler who does not store prior to recycling	
☐ Y ☒ N	6. Exempt Boiler and/or Industrial Furnace—If "Yes", mark all that apply.	
☐	a. Small Quantity On-site Burner Exemption	
☐	b. Smelting, Melting, and Refining Furnace Exemption	

B. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g. D001, D003, F007, U112). Use an additional page if more spaces are needed.

DXXX	FXXX	UXXX	PXXX			

C. Waste Codes for State Regulated (non-Federal) Hazardous Wastes. Please list the waste codes of the State hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

N/A						
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11. Additional Regulated Waste Activities (NOTE: Refer to your State regulations to determine if a separate permit is required.)**A. Other Waste Activities**

☒ Y ☐ N	1. Transporter of Hazardous Waste—If “Yes”, mark all that apply.	
	☒	a. Transporter
	☐	b. Transfer Facility (at your site)
☐ Y ☒ N	2. Underground Injection Control	
☐ Y ☒ N	3. United States Importer of Hazardous Waste	
☐ Y ☒ N	4. Recognized Trader—If “Yes”, mark all that apply.	
	☐	a. Importer
	☐	b. Exporter
☐ Y ☒ N	5. Importer/Exporter of Spent Lead-Acid Batteries (SLABs) under 40 CFR 266 Subpart G—If “Yes”, mark all that apply.	
	☐	a. Importer
	☐	b. Exporter

B. Universal Waste Activities

☒ Y ☐ N	1. Large Quantity Handler of Universal Waste (you accumulate 5,000 kg or more) - If “Yes” mark all that apply. Note: Refer to your State regulations to determine what is regulated.	
	☒	a. Batteries
	☐	b. Pesticides
	☐	c. Mercury containing equipment
	☒	d. Lamps
	☒	e. Aerosol Cans
	☐	f. Other (specify) _____
	☐	g. Other (specify) _____
☐ Y ☒ N	2. Destination Facility for Universal Waste Note: A hazardous waste permit may be required for this activity.	

C. Used Oil Activities

☐ Y ☒ N	1. Used Oil Transporter—If “Yes”, mark all that apply.	
	☐	a. Transporter
	☐	b. Transfer Facility (at your site)
☐ Y ☒ N	2. Used Oil Processor and/or Re-refiner—If “Yes”, mark all that apply.	
	☐	a. Processor
	☐	b. Re-refiner
☐ Y ☒ N	3. Off-Specification Used Oil Burner	
☐ Y ☒ N	4. Used Oil Fuel Marketer—If “Yes”, mark all that apply.	
	☐	a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
	☐	b. Marketer Who First Claims the Used Oil Meets the Specifications

D. Pharmaceutical Activities

☐ Y ☒ N	1. Operating under 40 CFR Part 266, Subpart P for the management of hazardous waste pharmaceuticals—if “Yes”, mark only one. Note: See the item-by-item instructions for definitions of healthcare facility and reverse distributor.
☐	a. Healthcare Facility
☐	b. Reverse Distributor
☐ Y ☒ N	2. Withdrawing from operating under 40 CFR Part 266, Subpart P for the management of hazardous waste pharmaceuticals. Note: You may only withdraw if you are a healthcare facility that is a VSQG for all of your hazardous waste, including hazardous waste pharmaceuticals.

12. Eligible Academic Entities with Laboratories—Notification for opting into or withdrawing from managing laboratory hazardous wastes pursuant to 40 CFR Part 262, Subpart K.

☐ Y ☒ N	A. Opting into or currently operating under 40 CFR Part 262, Subpart K for the management of hazardous wastes in laboratories— If “Yes”, mark all that apply. Note: See the item-by-item instructions for definitions of types of eligible academic entities.
☐	1. College or University
☐	2. Teaching Hospital that is owned by or has a formal written affiliation with a college or university
☐	3. Non-profit Institute that is owned by or has a formal written affiliation with a college or university
☐ Y ☒ N	B. Withdrawing from 40 CFR Part 262, Subpart K for the management of hazardous wastes in laboratories.

13. Episodic Generation

☐ Y ☒ N	Are you an SQG or VSQG generating hazardous waste from a planned or unplanned episodic event, lasting no more than 60 days, that moves you to a higher generator category. If “Yes”, you must fill out the Addendum for Episodic Generator.
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14. LQG Consolidation of VSQG Hazardous Waste

☐ Y ☒ N	Are you an LQG notifying of consolidating VSQG Hazardous Waste Under the Control of the Same Person pursuant to 40 CFR 262.17(f)? If “Yes”, you must fill out the Addendum for LQG Consolidation of VSQG hazardous waste.
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15. Notification of LQG Site Closure for a Central Accumulation Area (CAA) (optional) OR Entire Facility (required)

☐ Y ☒ N	LQG Site Closure of a Central Accumulation Area (CAA) or Entire Facility.
A. ☐ Central Accumulation Area (CAA) or ☐ Entire Facility	
B. Expected closure date: _____ mm/dd/yyyy	
C. Requesting new closure date: _____ mm/dd/yyyy	
D. Date closed : _____ mm/dd/yyyy	
☐	1. In compliance with the closure performance standards 40 CFR 262.17(a)(8)
☐	2. Not in compliance with the closure performance standards 40 CFR 262.17(a)(8)

16. Notification of Hazardous Secondary Material (HSM) Activity

☐ Y ☒ N	Are you notifying under 40 CFR 260.42 that you will begin managing, are managing, or will stop managing hazardous secondary material under 40 CFR 260.30, 40 CFR 261.4(a)(23), (24), (25), or (27)? If "Yes", you must fill out the Addendum to the Site Identification Form for Managing Hazardous Secondary Material.
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17. Electronic Manifest Broker

☐ Y ☒ N	Are you notifying as a person, as defined in 40 CFR 260.10, electing to use the EPA electronic manifest system to obtain, complete, and transmit an electronic manifest under a contractual relationship with a hazardous waste generator?
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18. Comments (include item number for each comment)

Item 9.B., continued: Preamble to Certification Statement: Except for general policy direction and funding, which are the responsibility of DOE, effective 12:01 a.m. on October 20, 2017, FRNP is responsible for performing RCRA generator requirements on behalf of both FRNP and DOE for all activities under the scope of FRNP's Contract DE-EM0004895. For purposes of the certification described in 401 KAR 39:060, Section 5 and 40 CFR 270.11, DOE and FRNP representatives are certifying, to the best of their knowledge and belief, the truth, accuracy, and completeness of the RCRA Subtitle C Site Identification Form for their respective areas of responsibility consistent with the Co-generator Agreement dated September 13, 2017. The U.S. Department of Energy (DOE) has signed as "owner and co-operator" and Four Rivers Nuclear Partnership, LLC, (FRNP) has signed as "operator" of the permitted facility. DOE has determined that multiple signatures best reflect the actual apportionment of responsibility under which DOE's RCRA responsibilities are for policy, programmatic, funding, and scheduling decisions and FRNP's RCRA responsibilities are for day-to-day operations, including but not limited to, the following responsibilities: waste analysis and handling, monitoring, record keeping, reporting, and contingency planning. For purposes of the certification as prescribed by 270.11(d) and 401 KAR 39:060, Section 5, DOE's and FRNP's representatives certify, to the best of their knowledge and belief, the truth, accuracy, and completeness of the document for their respective areas of responsibility. Item 10.B., Note: The DXXX, FXXX, UXXX, and/or PXXX codes are used for waste streams where waste codes can vary or are currently unknown. Use of these generic codes is intended to cover those waste code(s) from some or all of the identified list(s) that are applicable to the waste stream.

19. Certification I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. **Note: For the RCRA Hazardous Waste Part A permit Application, all owners and operators must sign (see 40 CFR 270.10(b) and 270.11).**

Signature of legal owner, operator or authorized representative THEODORE OLDS Digitally signed by THEODORE OLDS Date: 2026.03.25 17:27:59 -04'00'	Date (mm/dd/yyyy)
Printed Name (First, Middle Initial Last) Theodore E. Olds	Title Acting Manager, PPPO
Email erik.olds@orem.doe.gov	
Signature of legal owner, operator or authorized representative MYRNA REDFIELD (Affiliate) Digitally signed by MYRNA REDFIELD (Affiliate) Date: 2026.03.25 11:15:23 -05'00'	Date (mm/dd/yyyy) 3/25/2026
Printed Name (First, Middle Initial Last) Myrna E. Redfield	Title Program Manager
Email myrna.redfield@pad.pppo.gov	

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT PART A FORM



1. Facility Permit Contact

First Name	Myrna	MI	E	Last Name	Redfield
Title	Program Manager				
Email	myrna.redfield@pad.pppo.gov				
Phone	270-441-5113	Ext	N/A	Fax	270-441-6103

2. Facility Permit Contact Mailing Address

Street Address	5511 Hobbs Road				
City, Town, or Village	Kevil				
State	Kentucky	Country	USA	Zip Code	42053

3. Facility Existence Date (mm/dd/yyyy)

1/1/1952

4. Other Environmental Permits

A. Permit Type	B. Permit Number												C. Description
N	K	Y	0	0	0	4	0	4	9				KY Pollutant Discharge Elimination System
E	S	W	0	7	3	0	0	0	1	4			Solid Waste Permit-Residential Landfill
E	S	W	0	7	3	0	0	0	1	5			Solid Waste Permit-Inert Landfill
E	S	W	0	7	3	0	0	0	4	5			Solid Waste Permit-Contained Landfill
E	V	2	1	0	1	1	R	2					Title V Operating Permit

5. Nature of Business

Site was formerly used for isotopic enrichment of uranium hexafluoride. Although the Paducah Gaseous Diffusion Plant (PGDP) no longer enriches uranium, the U.S. Department of Energy (DOE) and its contractors remain responsible for the management and stewardship of the facilities and remedial activities, which results in the generation of hazardous wastes. The majority of these hazardous wastes contain radioactive constituents. Waste that is both hazardous and radioactive is referred to as "mixed" waste, for which there are limited disposal options; therefore, DOE stores wastes greater than 90 days and requires RCRA-permitted facilities. In addition, this waste may require on-site or off-site treatment to facilitate proper disposal.

6. Process Codes and Design Capacities

Line Number		A. Process Code			B. Process Design Capacity		C. Process Total Number of Units	D. Unit Name
					(1) Amount	(2) Unit of Measure		
X	1	D	8	0	5	A	1	C-404LLRAD
X	2	S	0	1	306,240	G	1	C746QSTORG
X	3	T	0	4	5,000	U	1	C746QSTAB
X	4	S	0	1	110	G	2	C746QFLUCR
X	5	T	0	4	1,600	J	2	C746QFLUCR

7. Description of Hazardous Wastes (Enter codes for Items 7.A, 7.C and 7.D(1))

Line No.		A. EPA Hazardous Waste No.				B. Estimated Annual Qty of Waste	C. Unit of Measure	D. Processes											
								(1) Process Codes								(2) Process Description (if code is not entered in 7.D1))			
X	1	D	0	0	6	0	J	D	8	0									
X	2	D	0	0	8														Included With Above
X	3	D	0	1	0														Included With Above
X	4	D	X	X	X	0.0571	J	S	0	1									
X	5	F	X	X	X														Included With Above
X	6	U	X	X	X														Included With Above
X	7	D	X	X	X	0.0571	J	S	0	1									
X	8	F	X	X	X														Included With Above
X	9	U	X	X	X														Included With Above
1	0	D	X	X	X	0.0571	J	S	0	1	,	T	0	4					
1	1	F	X	X	X														Included With Above

8. Map

Attach to this application a topographical map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all spring, rivers, and other surface water bodies in this map area. See instructions for precise requirements.

9. Facility Drawing

All existing facilities must include a scale drawing of the facility. See instructions for more detail.

10. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, and disposal areas; and sites of future storage, treatment, or disposal areas. See instructions for more detail.

11. Comments**Section 7. Description of Hazardous Wastes:**

The DXXX, FXXX, UXXX, and/or PXXX codes are used for waste streams where waste codes can vary or are currently unknown. Use of these generic codes is intended to cover those waste codes from some or all of the identified list(s) that are applicable to the waste stream.

United States Environmental Protection Agency
HAZARDOUS WASTE PERMIT PART A FORM CONTINUATION

6. Process Codes and Design Capacities (Continued)

Line Number	A. Process Code	B. Process Design Capacity		C. Process Total Number of Units	D. Unit Name
		(1) Amount	(2) Unit of Measure		
X6	T04	1,000	U	1	C746QSTAB
X7	T04	100	S	1	C746QCOMP/MACRO
X8	S01	496,000	G	1	C752ASTORG
X9	T04	1,000	U	1	C752ASTAB
10	T04	5,000	U	1	C752ASTAB
11	T04	100	I	1	C752ACOMP/MACRO
12	S01	110	G	2	C752AFLUCR
13	T04	1,600	J	2	C752AFLUCR
14	S01	38,500	G	1	C733STORG
15	T04	700	I	1	C733STORG
16	T04	100	I	1	C733COMP/MACRO

United States Environmental Protection Agency
HAZARDOUS WASTE PERMIT PART A FORM CONTINUATION

7. Description of Hazardous Wastes (Continued) (Enter codes for Items 7.A, 7.C and 7.D(1))

Line No.	A. EPA Hazardous Waste No.	B. Estimated Annual Qty of Waste	C. Unit of Measure	D. Processes	
				(1) Process Codes	(2) Process Description (if code is not entered in 7.D1)
12	UXXX				Included With Above
13	DXXX	0.361	J	S01, T04	
14	FXXX				Included With Above
15	UXXX				Included With Above
16	DXXX	0.158	J	S01	
17	DXXX	0.228	J	S01	
18	FXXX				Included With Above
19	UXXX				Included With Above
20	DXXX	0.000571	J	S01	
21	FXXX				Included With Above
22	DXXX	0.112	J	S01	
23	DXXX	0.0685	J	S01, T04	
24	DXXX	0	J	S01	
25	FXXX				Included With Above
26	UXXX				Included With Above
27	PXXX				Included With Above
28	DXXX	2.38	J	S01	
29	FXXX				Included With Above
30	UXXX				Included With Above
31	PXXX				Included With Above
32	DXXX	0.784	J	S01	
33	FXXX				Included With Above
34	U228				Included With Above
35	DXXX	0.228	J	S01	
36	FXXX				Included With Above
37	UXXX				Included With Above
38	DXXX	0.0685	J	S01, T04	
39	FXXX				Included With Above
40	UXXX				Included With Above
41	PXXX				Included With Above
42	DXXX	0.0685	J	S01, T04	
43	UXXX				Included With Above

Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
300 Sower Boulevard, Frankfort, KY 40601
(502) 564-6716

Part A Application Addendum
(EPA Form 8700-23)

FOR OFFICIAL USE ONLY.
DO NOT WRITE IN THIS SPACE.

	FEE SUBMITTED: \$____ (See instructions to determine your fee)		
I. Reason for Submittal (see instructions)	Reason for Submittal: ☐ FIRST SUBMITTAL – Must be accompanied by the completed forms EPA 8700-12 and Addendum DWM-7037A. ☒ REVISION – Identify the classification of the revision. See instructions for when a revised application should be submitted. ☐ Class 1 not requiring approval ☒ Class 1 requiring approval ☐ Class 2 ☐ Class 3 ☐ RENEWAL – See instructions for when a renewal application should be submitted. ☐ STANDARDIZED PERMIT – See instructions for the eligibility of a standardized permit.		
II. ID Numbers	A. EPA ID Number: KY8-890-008-982		B. AGENCY INTEREST Number: 3059
III. Existing and New Facilities	Existing Facilities, the date operation began or construction commenced: (mm/dd/yyyy) 01/01/1952 New Facilities, the date operation is expected to begin: (mm/dd/yyyy) / /		
IV. Contact Email Address	Facility Contact Email address: myrna.redfield@pad.pppo.gov		
V. Facility Operator (2)	Name of Facility Operator 2 (see Instructions):		
VI. Type of Operator (2)	Type of Operator 2: ☒ Federal (F) ☐ State (S) ☐ County (C) ☐ Indian (I) ☐ Municipal (M) ☐ District (D) ☐ Private (P) ☐ Other (O) Specify:		
VII. Operator Mailing Address (2)	Operator 2 Street Address or P.O. Box: 5501 Hobbs Road City: Kevil State: Kentucky County: McCracken Zip Code: 42053 Facility Operator 2 Telephone Number: (270) 441-6000 Phone Number Extension: New Operator Assumed Responsibility for Facility on this Date: (mm/dd/yyyy) 01/01/1952		
VIII. Facility Operator (3)	Name of Facility Operator 3 (see Instructions):		
IX. Type of Operator (3)	Type of Operator 3: ☐ Federal (F) ☐ State (S) ☐ County (C) ☐ Indian (I) ☐ Municipal (M) ☐ District (D) ☐ Private (P) ☐ Other (O) Specify:		
X. Operator Mailing Address (3)	Operator 3 Street Address or P.O. Box: City: State: County: Zip Code: Facility Operator 3 Telephone Number: Phone Number Extension: New Operator Assumed Responsibility for Facility on this Date: (mm/dd/yyyy) / /		

EPA ID Number: KY8 – 890–008–982

Agency Interest Number: 3059

XI. PROCESS DESCRIPTION: (See Instructions)

a. Commercial Indicator	b. Unique Unit or Group Name	c. Legal Status Code	d. Operating Status Code(s)	e. Description of Process
4	C404LLRAD	PC	CP	Low-level radioactive waste burial ground. Waste lines # 1
4	C746QSTORG	PI	OP	Hazardous and mixed waste storage. Waste lines # 4, 5, 7, 8, 10-30
4	C746QSTAB	PI	OP	Treatment by neutralization, oxidation, reduction, precipitation, and stabilization in containers. Waste lines # 4, 5, 7, 8, 10-30
4	C746QFLUCR	PI	OP	Storage of crushed bulbs in 55-gallon containers. Waste lines #20
4	C746QFLUCR	PI	OP	Fluorescent/miscellaneous lamp crushing – treatment by absorption and size reduction. Waste lines # 20
4	C746QSTAB	PI	OP	Treatment by decanting and absorption in containers. Waste lines # 4, 7, 10, 11, 13, 15, 19, 21, 23, 24
4	C746QCOMP/MACRO	PI	CN	Treatment by compaction and/or macroencapsulation. Waste lines # 4, 5, 7, 8, 10-30
4	C752ASTORG	PI	OP	Hazardous and mixed waste storage. Waste lines # 4, 5, 7, 8, 10-30
4	C752ASTAB	PI	OP	Treatment by decanting and absorption in containers. Waste lines # 4, 7, 10, 11, 13, 15, 19, 21, 23, 24
4	C752ASTAB	PI	OP	Treatment by neutralization, oxidation, reduction, precipitation, and stabilization in containers. Waste lines #4, 5, 7, 8, 10-30

A-14

EPA ID Number: KY8 - 890 - 008 - 982		Agency Interest Number: 3059		
XI. PROCESS DESCRIPTION: (See Instructions)				
a. Commercial Indicator	b. Unique Unit or Group Name	c. Legal Status Code	d. Operating Status Code(s)	e. Description of Process
4	C752ACOMP/MACRO	PI	OP	Treatment by compaction and/or macroencapsulation. Waste lines # 4, 5, 7, 8, 10-30
4	C752AFLUCR	PI		Storage of crushed bulbs in 55-gallon containers. Waste lines # 20
4	C752AFLUCR	PI	OP	Fluorescent/miscellaneous lamp crushing - treatment by absorption and size reduction. Waste lines # 20
4	C733STORG	PI	OP	Container storage. Waste lines # 2, 3, 9, 22, 27, 30
4	C733STORG	PI	OP	Treatment by decanting and absorption in containers. Waste lines # 2, 9, 27, 30
4	C733COMP/MACRO	PI	OP	Treatment by compaction and/or macroencapsulation. Waste lines # 2, 3, 9, 22, 27, 30

A-15

EPA ID Number: KY8-890 - 008- 982

Agency Interest Number: 3059

XII. WASTE STREAM DESCRIPTION (See Instructions)

a. Line Number	b. Waste Stream Number	c. Waste Description
1, 2, 3	1	Gold dissolver precipitate (D006, D008, and/or D010)
4, 5, 6	2	Miscellaneous flammable materials—liquids (DXXX, FXXX and/or UXXX)
7, 8, 9	3	Miscellaneous flammable materials—solids (DXXX, FXXX, and/or UXXX)
10, 11, 12	4	Miscellaneous solutions exhibiting toxicity characteristics (DXXX, FXXX, and/or UXXX)
13, 14, 15	5	Miscellaneous solids exhibiting toxicity characteristics (DXXX, FXXX, and/or UXXX)
16	6	Discarded batteries (DXXX)
17, 18, 19	7	Liquids contaminated with spent solvents (DXXX, FXXX, and/or UXXX)
20, 21	8	Solids contaminated with spent solvents (DXXX and/or FXXX)
22	9	Waste oils (DXXX)
23	10	Miscellaneous acids and bases (DXXX)
24, 25, 26, 27	11	Liquid waste generated as a result of contingency plan implementation (DXXX, FXXX, UXXX, and/or PXXX)
28, 29, 30, 31	12	Contaminated Equipment/debris/PPE (DXXX, FXXX, UXXX, and/or PXXX)
32, 33, 34	13	Miscellaneous liquids contaminated with spent solvents and metals—liquids (DXXX, FXXX and/or U228)
35, 36, 37	14	Miscellaneous solids containing spent solvents and metals— solids (DXXX, FXXX, and/or UXXX)
38, 39, 40, 41	15	Miscellaneous laboratory wastes—liquids (DXXX, FXXX, UXXX, and/or PXXX)
42, 43, 44	16	Miscellaneous laboratory wastes—solids (DXXX, UXXX, and/or PXXX)
45, 46, 47	17	Activated carbon (DXXX, FXXX, and/or UXXX)
48, 49, 50, 51, 52, 53, 54, 55, 56, 57	18	Fuses/circuit boards/vacuum tubes (D001, D003, D004, D005, D006, D007, D008, D009, D010, and/or D011)
58, 59, 60, 61	19	Equipment decontamination fluid and rinseate (DXXX, FXXX, UXXX, and/or PXXX)

EPA ID Number: KY8 - 890-008-982

Agency Interest Number: 3059

XII. WASTE STREAM DESCRIPTION (See Instructions)

a. Line Number	b. Waste Stream Number	c. Waste Description
62	20	Light bulbs (DXXX)
63, 64, 65	21	Sludges/scale (DXXX, FXXX, and/or UXXX)
66, 67, 68	22	Compressed gas/aerosols (DXXX, FXXX, and/or UXXX)
69, 70	23	Spent electroplating solution (DXXX and/or F007)
71, 72, 73, 74, 75	24	Neutralization/scrubber solution (D002, D006, D007, D008, and/or P056)
76	25	Dry scrubber material (P056)
77	26	Personal protection equipment waste (P056)
78	27	Waste vacuum pump oil (P056)
79, 80, 81	28	Contained gas (DXXX, UXXX, and/or PXXX)
82	29	Liquid Mercury (D009)
83, 84	30	Stabilized Millers Fluorinated Lubricant (D004, D006)

The DXXX, FXXX, UXXX, and/or PXXX codes are used for waste streams where waste codes can vary or are currently unknown. Use of these generic codes is intended to cover those waste codes from some or all of the identified list(s) that are applicable to the waste stream.

EPA ID Number: KY8 - 890-008 -982		Agency Interest Number: 3059							
XIII. Facility Status	☒ Waste is NOT received from off-site ☐ Accepts waste from any off-site source(s) [A] ☐ Accepts waste from only a restricted group of off-site sources [R]: Specify:								
XIV. Facility Owner Certification	If the facility owner is also the facility operator, please skip this section and complete item XV below. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. <table style="width: 100%; border-top: 1px solid black; border-bottom: 1px solid black;"> <tr> <td style="width: 50%; text-align: center;">NAME (PRINT OR TYPE)</td> <td style="width: 25%; text-align: center;">SIGNATURE</td> <td style="width: 25%; text-align: center;">DATE</td> </tr> </table>			NAME (PRINT OR TYPE)	SIGNATURE	DATE			
NAME (PRINT OR TYPE)	SIGNATURE	DATE							
XV. Operator Certification	I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. <table style="width: 100%; border-top: 1px solid black; border-bottom: 1px solid black;"> <tr> <td style="width: 50%; text-align: center;"> MYRNA REDFIELD (Affiliate) Myrna E. Redfield, Program Manager Four Rivers Nuclear Partnership, LLC </td> <td style="width: 25%; text-align: center;">SIGNATURE</td> <td style="width: 25%; text-align: center;">DATE</td> </tr> </table> Digitally signed by MYRNA REDFIELD (Affiliate) Date: 2026.03.25 11:16:07 -05'00' <table style="width: 100%; border-top: 1px solid black; border-bottom: 1px solid black;"> <tr> <td style="width: 50%; text-align: center;"> THEODORE OLDS Theodore E. Olds, Acting Manager Portsmouth/Paducah Project Office Co-Director </td> <td style="width: 25%; text-align: center;">SIGNATURE</td> <td style="width: 25%; text-align: center;">DATE</td> </tr> </table> Digitally signed by THEODORE OLDS Date: 2026.03.26 13:26:36 -04'00'			MYRNA REDFIELD (Affiliate) Myrna E. Redfield, Program Manager Four Rivers Nuclear Partnership, LLC	SIGNATURE	DATE	THEODORE OLDS Theodore E. Olds, Acting Manager Portsmouth/Paducah Project Office Co-Director	SIGNATURE	DATE
MYRNA REDFIELD (Affiliate) Myrna E. Redfield, Program Manager Four Rivers Nuclear Partnership, LLC	SIGNATURE	DATE							
THEODORE OLDS Theodore E. Olds, Acting Manager Portsmouth/Paducah Project Office Co-Director	SIGNATURE	DATE							
XVI. Land Owner Certification	I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. <table style="width: 100%; border-top: 1px solid black; border-bottom: 1px solid black;"> <tr> <td style="width: 50%; text-align: center;"> THEODORE OLDS Theodore E. Olds, Acting Manager Portsmouth/Paducah Project Office </td> <td style="width: 25%; text-align: center;">SIGNATURE</td> <td style="width: 25%; text-align: center;">DATE</td> </tr> </table> Digitally signed by THEODORE OLDS Date: 2026.03.26 13:27:13 -04'00'			THEODORE OLDS Theodore E. Olds, Acting Manager Portsmouth/Paducah Project Office	SIGNATURE	DATE			
THEODORE OLDS Theodore E. Olds, Acting Manager Portsmouth/Paducah Project Office	SIGNATURE	DATE							

CERTIFICATION PREAMBLE
U.S. DEPARTMENT OF ENERGY (DOE) AND
FOUR RIVERS NUCLEAR PARTNERSHIP, LLC (FRNP)

Document Identification: **Part A of the Kentucky Hazardous Waste Permit Application,
KY8-890-008-982, Agency Interest No. 3059**

The U.S. Department of Energy (DOE) has signed as “owner and co-operator” and Four Rivers Nuclear Partnership, LLC, (FRNP) has signed as “operator” of the permitted facility. DOE has determined that multiple signatures best reflect the actual apportionment of responsibility under which DOE’s RCRA responsibilities are for policy, programmatic, funding, and scheduling decisions and FRNP’s RCRA responsibilities are for day-to-day operations, including but not limited to, the following responsibilities: waste analysis and handling, monitoring, record keeping, reporting, and contingency planning. For purposes of the certification, as prescribed by 40 *CFR* Section 270.11(d) and adopted by 401 *KAR* 39:060, Section 5, DOE’s and FRNP’s representatives certify, to the best of their knowledge and belief, the truth, accuracy, and completeness of the application for their respective areas of responsibility.

Attachment 1

Hazardous Wastes Generated at PGDP

Waste Stream Number	Description of Waste	EPA Waste Number(s)	Approximate Annual Generator Rate (lb/year)
1	Gold dissolver precipitate	D006, D008, and/or D010	0
2	Miscellaneous flammable materials—liquids*	DXXX, FXXX and/or UXXX	500
3	Miscellaneous flammable materials—solids*	DXXX, FXXX, and/or UXXX	500
4	Miscellaneous solutions exhibiting toxicity characteristics*	DXXX, FXXX, and/or UXXX	500
5	Miscellaneous solids exhibiting toxicity characteristics*	DXXX, FXXX, and/or UXXX	3,165
6	Discarded batteries*	DXXX	1,385
7	Liquids contaminated with spent solvents*	DXXX, FXXX, and/or UXXX	2,000
8	Solids contaminated with spent solvents*	DXXX and/or FXXX	5
9	Waste oils*	DXXX	988
10	Miscellaneous acids and bases*	DXXX	600
11	Liquid waste generated as a result of contingency plan implementation*	DXXX, FXXX, UXXX, and/or PXXX	0
12	Contaminated equipment/debris/personal protective equipment (PPE)*	DXXX, FXXX, UXXX, and/or PXXX	20,836
13	Miscellaneous liquids contaminated with spent solvents and metals—liquids*	DXXX, FXXX and/or U228	6,869
14	Miscellaneous solids containing spent solvents and metals—solids*	DXXX, FXXX, and/or UXXX	2,000
15	Miscellaneous laboratory wastes—liquids*	DXXX, FXXX, UXXX, and/or PXXX	600
16	Miscellaneous laboratory wastes—solids*	DXXX, UXXX, and/or PXXX	600
17	Activated carbon*	DXXX, FXXX, and/or UXXX	21,020

Attachment 1

Hazardous Wastes Generated at PGDP (Continued)

Waste Stream Number	Description of Waste	EPA Waste Number(s)	Approximate Annual Generator Rate (lb/year)
18	Fuses/circuit boards/vacuum tubes	D001, D003, D004, D005, D006, D007, D008, D009, D010, and/or D011	6,786
19	Equipment decontamination fluid and rinseate*	DXXX, FXXX, UXXX, and/or PXXX	200
20	Light bulbs*	DXXX	318
21	Sludges/scale*	DXXX, FXXX, and/or UXXX	4,000
22	Compressed gas/aerosols*	DXXX, FXXX, and/or UXXX	143
23	Spent electroplating solution*	DXXX and/or F007	0
24	Neutralization/scrubber solution	D002, D006, D007, D008, and/or P056	600
25	Dry scrubber material	P056	600
26	PPE waste	P056	600
27	Waste vacuum pump oil	P056	25
28	Contained gas*	DXXX, UXXX, and/or PXXX	600
29	Liquid mercury	D009	10
30	Stabilized millers fluorinated lubricant	D004, D006	670

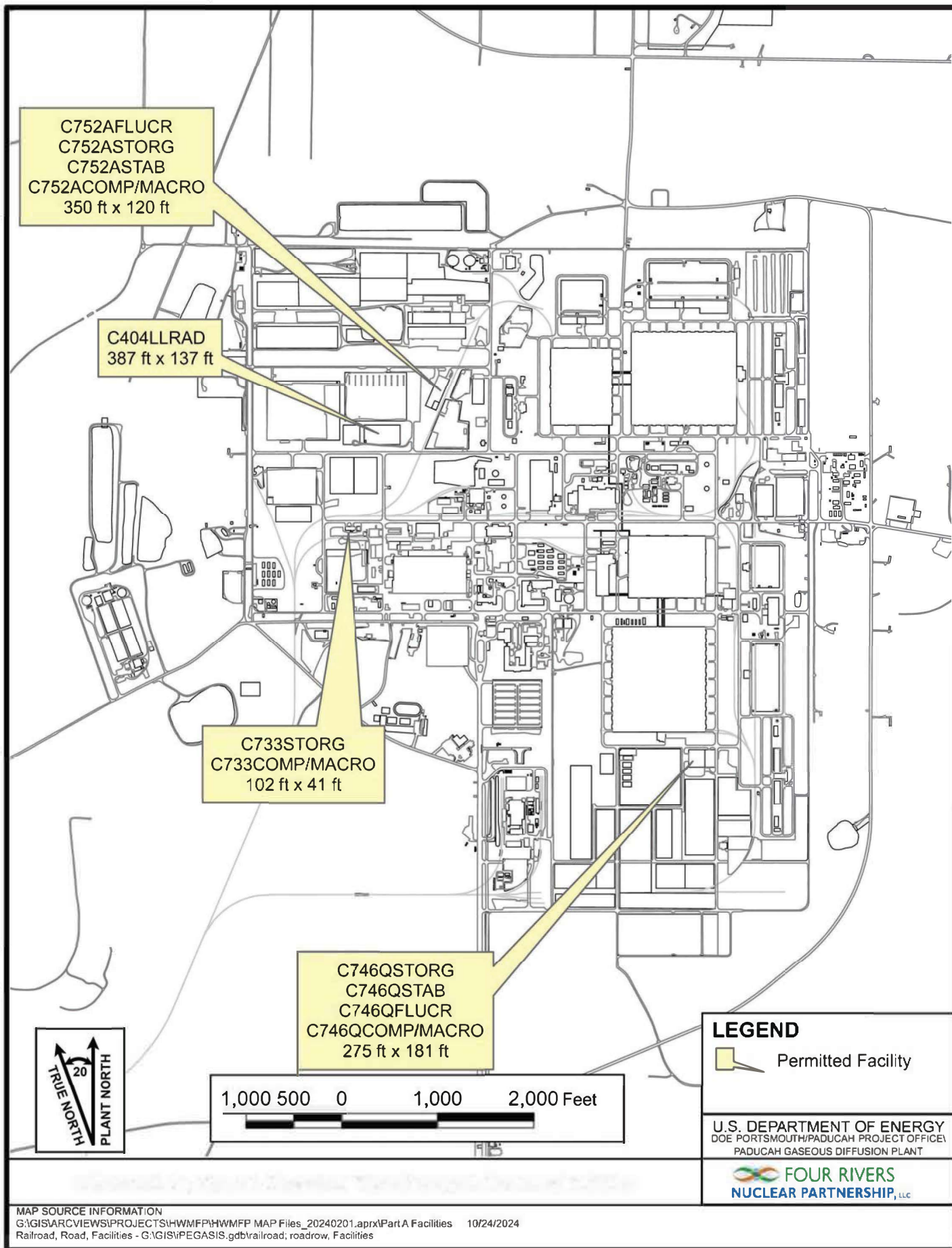
*The DXXX, FXXX, UXXX, and/or PXXX codes are used for waste streams where waste codes can vary or are currently unknown. Use of these generic codes is intended to cover those waste codes from some or all of the identified list(s) that are applicable to the waste stream.

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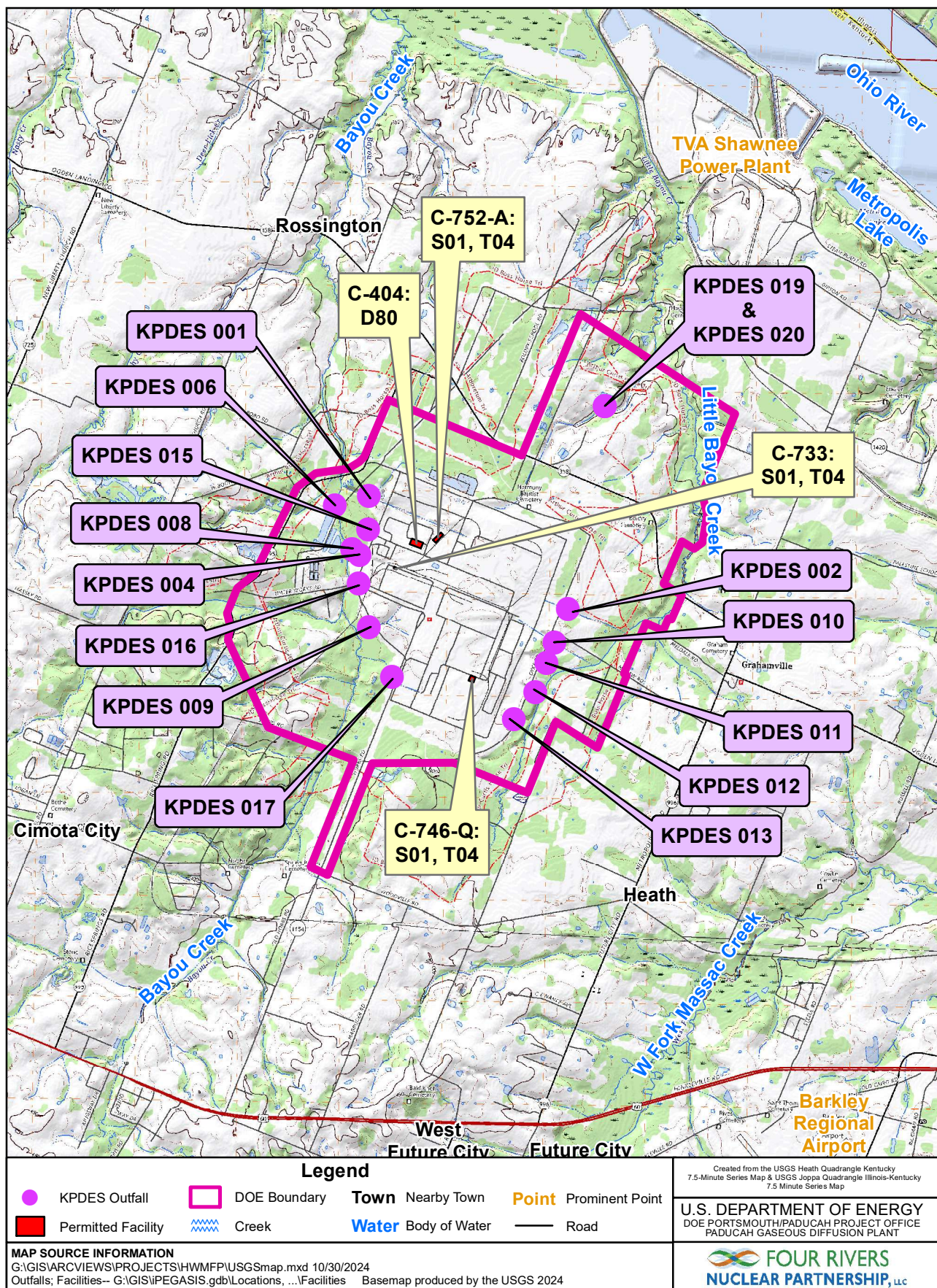
ATTACHMENT A1

MAPS

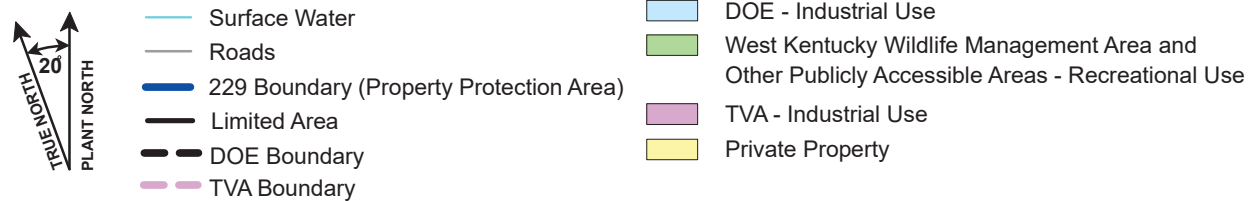
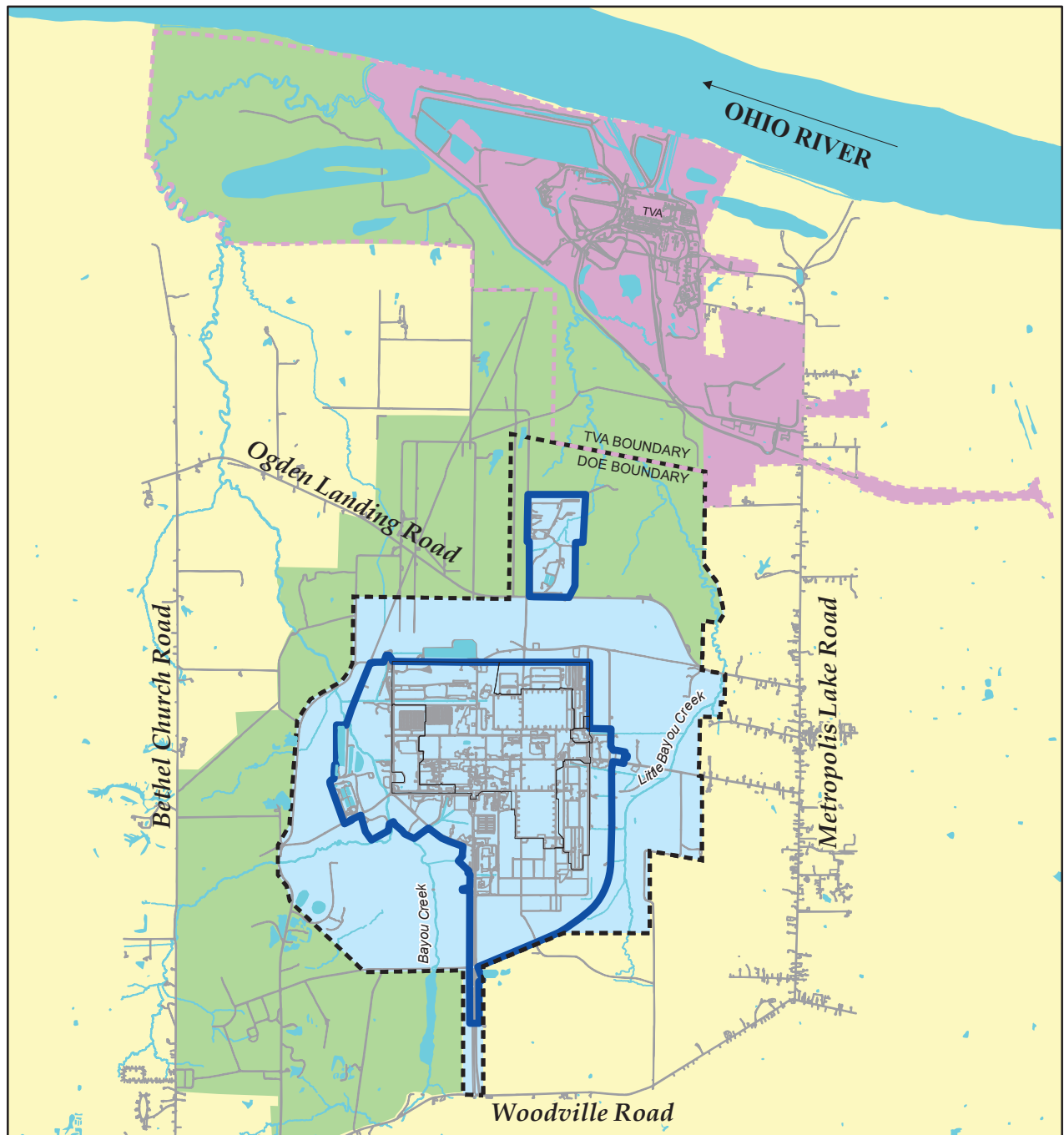
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Attachment A1, Figure 1. Hazardous Waste Storage & Treatment Facilities



Attachment A1, Figure 2. USGS Map



MAP SOURCE INFORMATION

Map Generation Date and Location: 10/28/2025 G:\GIS\ARC\PROJECTS\HWMFP\HWMFP MAP Files_20240201.aprx\GRG Land Use 2025
 WKWMA Boundary: G:\gis\IPEGASIS.gdb\Wildlife_Management_Areas
 DOE Property Boundary: G:\gis\IPEGASIS.gdb\doebnd
 TVA Boundary: G:\gis\IPEGASIS.gdb\tvabnd_official; 229 Boundary: G:\gis\IPEGASIS.gdb\Security_229
 Limited Area: G:\gis\IPEGASIS.gdb\limited_area;
 Industrial Area: G:\gis\IPEGASIS\SHAPES\BOUNDS\Closed_to_Public_Access.shp (8/26/25)
 Roads: G:\gis\IPEGASIS.gdb\roadrow;
 Surface Water: G:\gis\IPEGASIS.gdb\streams and G:\gis\IPEGASIS.gdb\l_2022_21145_areawater

Attachment A1, Figure 3. Land Use of Surrounding Area

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ATTACHMENT A2
PHOTOGRAPHS

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09/24/2024 14:42

September 24, 2024
C-404 Low-Level Radioactive Burial Ground Southeast Facing Northwest
Process Code: D80

A2-4

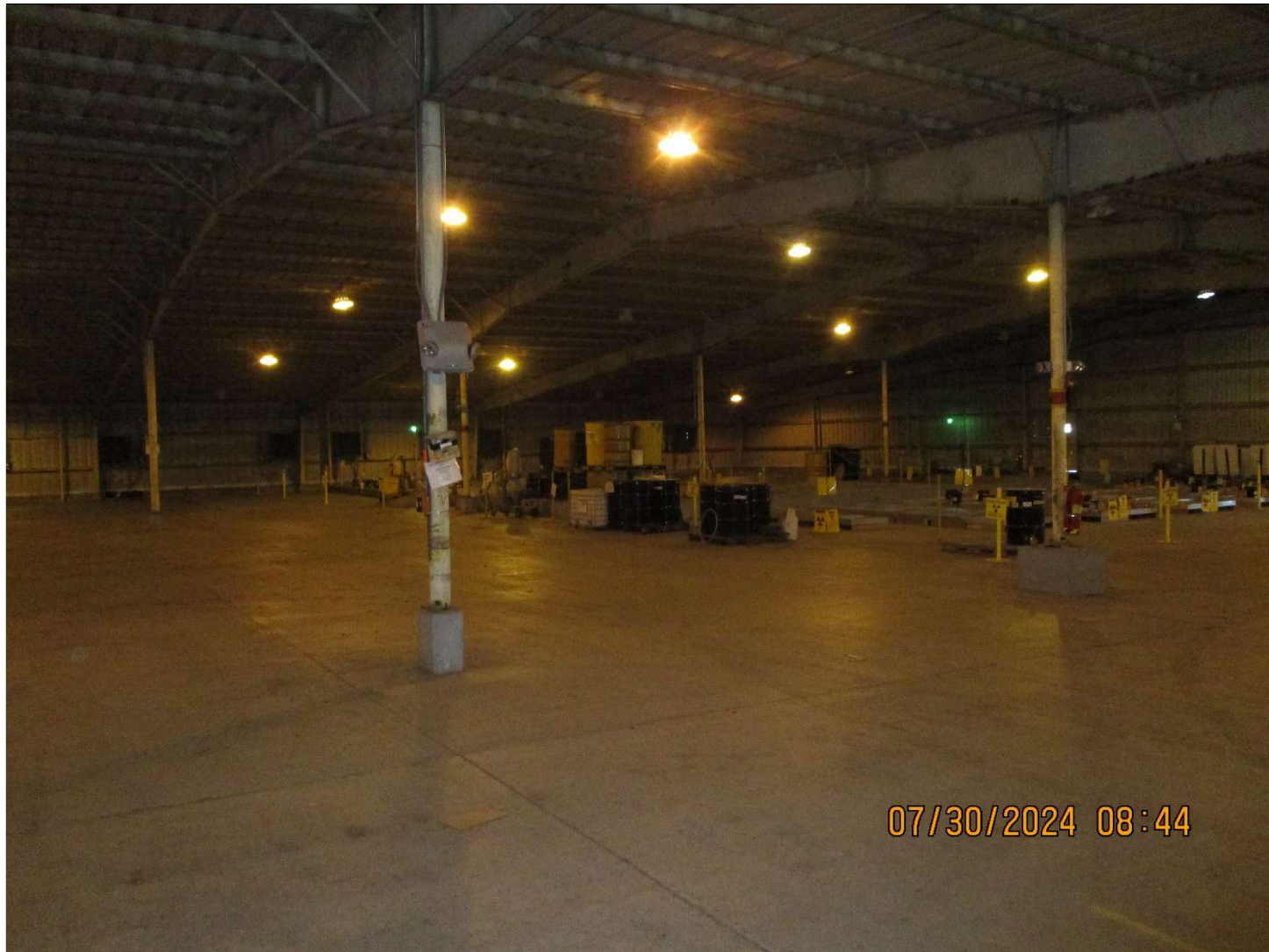


September 18, 2024
C-404 Low-Level Radioactive Burial Ground Northwest Facing East
Process Code: D80

A2-5



July 30, 2024
C-746-Q Hazardous and Mixed Waste Storage and Treatment Facility (Outside), West Side Facing East
Process Codes: S01,T04



July, 30, 2024
C-746-Q Hazardous and Mixed Waste Storage and Treatment Facility (Inside), North Side Facing South
Process Codes: S01,T04



July, 30, 2024
C-752-A Hazardous Waste Storage and Treatment Facility (Outside), North Side Facing South
Process Codes: S01,T04



July, 30, 2024
C-752-A Hazardous Waste Storage and Treatment Facility (inside), North Entrance Facing South
Process Codes: S01,T04



July, 30, 2024
C-733 Hazardous Waste Storage Area (Outside), North Side Facing South
Process Codes: S01,T04



July, 30, 2024
C-733 Hazardous Waste Storage Area (Inside), East Side Facing West
Process Codes: S01,T04

PART E

**C-404 GROUNDWATER MONITORING
HAZARDOUS WASTE MANAGEMENT FACILITY PERMIT
CLASS 1 MODIFICATION**

40 *CFR* Part 264, Subpart F

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ACRONYMS

AOC	area of concern
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
<i>CFR</i>	<i>Code of Federal Regulations</i>
CMS	corrective measures study
DOE	U.S. Department of Energy
EEC	Energy and Environment Cabinet
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
FS	feasibility study
HWBM	Hazardous Waste Branch Manager
HWMFP	Hazardous Waste Management Facility Permit
IM	interim measures
<i>KAR</i>	<i>Kentucky Revised Statutes</i>
KDWM	Kentucky Division of Waste Management
MSL	mean sea level
MW	monitoring well
N/A	not applicable
PGDP	Paducah Gaseous Diffusion Plant
PL	prediction limit
RA	removal action
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RGA	Regional Gravel Aquifer
RI	remedial investigation
SAR	SWMU assessment report
SE	site evaluation
SMP	site management plan
SWMU	solid waste management unit
UCRS	Upper Continental Recharge System

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1. INTRODUCTION

1.1 C-404 GROUNDWATER MONITORING

The C-404 Low-Level Radioactive Waste Burial Ground (C-404) was closed under the closure requirements for landfills containing hazardous waste. The postclosure permit for this facility was incorporated into the hazardous waste management permit for Paducah Gaseous Diffusion Plant (PGDP) in 1992. Groundwater monitoring is required for this landfill. This part of the application describes the groundwater monitoring at the C-404 Landfill.

1.2 C-404 SITE HISTORY AND DESCRIPTION

The C-404 Low-Level Radioactive Burial Ground is located in the west-central portion of PGDP (see Attachment A1, Figure 1). The C-404 unit originally was constructed in the early 1950s as a rectangular aboveground surface impoundment with a floor area of approximately 53,000 ft² (387 ft by 137 ft). The floor of the surface impoundment was constructed of well-tamped earth, and clay dikes provided liquid containment to an operating depth of approximately 6 ft.

From 1952 through 1957, the surface impoundment was operated as a neutralization/sedimentation treatment facility for uranium-contaminated wastewater generated at the C-400 facility. Liquid wastes from the C-400 facility were pumped through an underground steel pipe to the eastern end of the impoundment. A weir at the southwest corner of the impoundment decanted the treated wastewater for discharge. Use of the surface impoundment for treatment of wastewater was terminated in 1957 upon installation of a treatment system at the C-400 facility. At that time, all free liquids were removed from the C-404 impoundment.

From 1957 through 1976, the impoundment was used for the bulk disposal of uranium-contaminated solid waste. The surface impoundment was filled with bulk solid wastes to within 1–2 ft of the top of the original dikes. The facility then was covered with compacted earth to the top of the original dikes and sloped to facilitate runoff. The exit weir was converted to an enclosed concrete basin for use as a leachate collection sump. Since covering the surface impoundment, leachate accumulations in the collection sump have amounted to approximately 2,000 gal per year. This leachate is transferred to portable tanks and placed in storage for appropriate treatment and/or disposition.

In 1977, the placement of bulk and containerized uranium-contaminated solid wastes on top of the previously filled area began. As these wastes were placed on the upper portion of the facility, they were covered with earth. In 1983, the eastern quarter of the site was covered with a clay cap that extends over the out-slope of the dike.

One of the types of containerized solid wastes disposed of in the upper portion of the facility is gold dissolver precipitate, a solid waste containing no free liquid. During a routine testing program, the gold dissolver precipitate disposed of in early 1986 was found to be hazardous based upon the Extraction Procedure Toxicity test. The constituents of concern are lead and cadmium and, to a lesser extent, selenium. The C-404 disposal site was never intended for use as a hazardous waste disposal site and was not included in PGDP's Resource Conservation and Recovery Act (RCRA) permitting process. In May 1986, following the discovery of the presence of characteristic hazardous waste in the C-404 Landfill, disposal of wastes at the site was terminated. Though only a minor portion of the solid waste in the site was found to be hazardous, the decision was made to close the site as a hazardous waste landfill pursuant to the applicable state and federal regulations.

The U.S. Department of Energy (DOE) submitted a Postclosure Permit Application for this unit in 1989. The Hazardous Waste Management Permit incorporated the closure and monitoring requirements for this unit in 1992. The C-404 Low-Level Radioactive Burial Ground was never intended for the burial of hazardous waste and, therefore, does not meet the design requirements as specified in 40 *CFR* § 264.301 *et seq.*

2. SITE GEOLOGY AND HYDROGEOLOGY

PGDP, located in the Jackson Purchase region of western Kentucky, lies within the northern tip of the Mississippi Embayment portion of the Gulf Coastal Plain Province. The stratigraphic sequence in the region consists of Cretaceous, Tertiary, and Quaternary sediments unconformably overlying Paleozoic bedrock (see Part B, Figure 3). The *Report of the Paducah Gaseous Diffusion Plant Groundwater Investigation Phase III* (Clausen 1992) discusses geology and hydrogeology of PGDP in detail. Additional information regarding the geology and hydrogeology at PGDP is covered in the *Northeast Plume Preliminary Characterization Summary Report* (Garner 1995). A number of geological investigations performed in recent years further have refined the basic geological understanding of PGDP. Below is a summary of the PGDP geology and hydrogeology.

2.1 GEOLOGY

Paleozoic bedrock located below PGDP consists of Mississippian age limestone. The Upper Cretaceous McNairy Formation and the overlying Paleocene Clayton Formation, hereafter referred to collectively as the McNairy Formation, which consists of interbedded and interlensing sand, silt, and clay, overlies the site bedrock. Data indicate that sand may account for 40–50% of this formation near the site. The Porters Creek Clay is Paleocene in age and occurs in the southern portions of the site. It consists of dark-gray-to-black clay with varying amounts of silt, and fine-grained micaceous, commonly glauconitic sand. The Eocene Sands, consisting of interbedded and interlensing sand, silt, and clay, overlie the Porters Creek Clay in the extreme southern portion of the PGDP.

Pliocene, and Pleistocene continental deposits unconformably overlie Cretaceous through Eocene strata at PGDP. The Continental Deposits extend from the southern end of the PGDP to the Ohio River, and overlay an unconformable surface at the base of the deposits that exhibits steps or terraces. The Continental Deposits have been divided into a basal gravel facies (Lower Continental Deposits) and an upper, fine-grained clastic facies (Upper Continental Deposits).

The lower continental deposits consist of chert gravel in a matrix of poorly sorted sand and silt. A Pliocene facies, ranging in thickness from 0–30 ft and averaging less than 10 ft, exists in the southern portions of the site, occurring on the upper surfaces of a buried terrace at elevations greater than 350 ft above mean sea level (MSL). A second gravel facies, ranging in thickness from 15–20 ft, exists in southeastern and eastern portions of the site, occurring on an erosional surface at approximately 320–345-ft elevation. The third and most prominent of the three gravel facies beneath the site consists of Pleistocene deposits, which occur north of a buried terrace face on an erosional surface with elevations varying from approximately 245–310 ft. This thicker sequence of Pleistocene Continental Deposits represents a valley fill that overall comprises a thick, fining upward sequence. The upper surface of these gravel deposits occurs at an average elevation of 310 ft with an average thickness of approximately 30 ft. Thicker deposits, up to 50 ft, exist in deeper scoured channels which trend east-west across the site.

The Upper Continental Deposits primarily consist of clayey silt, with thin zones of sand and occasional gravel, and vary in thickness from approximately 15–55 ft. These deposits have been differentiated into three general lithofacies based on grain-size distributions: (1) clay and silt sediments, (2) sand sediments, and (3) gravel sediments. Sand- and gravel-dominated lithofacies exist at different elevations throughout the upper continental deposits; however, most occur at consistent elevations. Sand and gravel lithofacies appear relatively discontinuous in cross-section, but may be more connected in three dimensions. Eolian origin loess, consisting of yellowish-brown silt and clayey silt, overlies the continental deposits at the site and varies in thickness from approximately 5–25 ft with an average of approximately 15 ft. Holocene alluvial deposits occur at lower elevations within the Ohio River floodplain north of PGDP.

2.2 HYDROGEOLOGY

The local groundwater flow system at PGDP occurs within four specific components: the terrace gravels, the Upper Continental Recharge System (UCRS), the Regional Gravel Aquifer (RGA), and the McNairy Flow System [Report of the Paducah Gaseous Diffusion Plant Groundwater Investigation Phase III (Clausen 1992)]. The components are defined as follows:

- (1) Terrace Gravels—This component consists of Pliocene-aged gravel deposits found at elevations higher than 350 ft in the southern portion of the PGDP. This feature is not expressed in the vicinity of C-404. These deposits usually lack sufficient thickness and saturation to constitute an aquifer. Alluvial channels intersecting the terrace may provide groundwater underflow to recharge the RGA.
- (2) UCRS—The UCRS consists of three distinct hydrogeologic units: HU 1, HU 2, and HU 3. The uppermost unit, HU 1, is the overlying loess that blankets the entire site. HU 2, the second unit, consists of discontinuous sand and gravel lenses with groundwater flow ultimately downward to recharge the RGA. The lowermost unit, HU 3, consists predominantly of clay, silt, or clayey silt. Composition of HU 3 may vary, but it appears to form a partial confining layer due to relatively low hydraulic conductivity. The sand and gravel lithofacies appear relatively discontinuous in cross-section but may be more connected in three dimensions. The most prevalent sand and gravel deposits occur at an elevation of approximately 345–351 ft with less prevalent deposits occurring at an elevation of 337–341 ft. Groundwater flows downward into the RGA from the UCRS in the vicinity of PGDP.
- (3) RGA—This component consists primarily of the lower continental deposits HU 5 of the Quaternary sand and gravel facies, but also includes sands of the hydrogeologic unit HU 4 and coarse-grained upper McNairy sediments in direct contact with the lower continental deposits, and Holocene alluvium found adjacent to the Ohio River, which are of sufficient thickness and saturation to constitute an aquifer. These deposits commonly are thicker than the Pliocene terrace gravel deposits with an average thickness of 30 ft and range up to 50 ft along an axis that trends east-west through the site. The RGA is the uppermost aquifer used locally.
- (4) McNairy Flow System—This component consists of the interbedded and interlensing sand, silt, and clay of the McNairy Formation. The top of the McNairy Formation occurs at a depth of approximately 90 ft below ground surface. Sand facies account for 40–50% of the total formation thickness of approximately 225 ft.

Topographically-controlled recharge and discharge areas to the south and north, respectively, bound the local groundwater flow system. Recharge within the Eocene sands has resulted in a groundwater divide located southwest of the PGDP. The main recharge area for the RGA is located nearer to the site and occurs as percolation through the UCRS. From the PGDP, groundwater flows northward toward the Ohio River, which is the local base level for the system. Flow originates south of the PGDP within the Eocene sands

and subsequently moves into the Pliocene terrace gravels that separate the Eocene sands from the RGA. Groundwater within the Pliocene gravels either discharges to local streams or flows into the RGA, which eventually discharges to the Ohio River.

Differences in permeability and aquifer thickness affect the hydraulic gradient. Toward the southern part of the site, the RGA is either truncated or thins and grades laterally into the Pliocene terrace gravels. The restriction results in a high gradient and probably causes groundwater in the Pliocene terrace gravels to discharge to adjoining streams. In the north central portion of the site, the lower gradients are a result of the thickened Pleistocene sequence containing high fractions of coarse sand and gravel. Northward, near the Ohio River, the hydraulic gradient increases as a result of either a thinner section of the RGA and Holocene alluvium or the low permeability of bottom sediments in the Ohio River.

The major pathway of groundwater flow is within the RGA, which dominates the flow regime. Conceptually, a larger hydraulic conductivity in the aquifer than in the overlying sediments produces high vertical gradients in the aquitard and low horizontal gradients in the aquifer (Freeze and Witherspoon 1967).

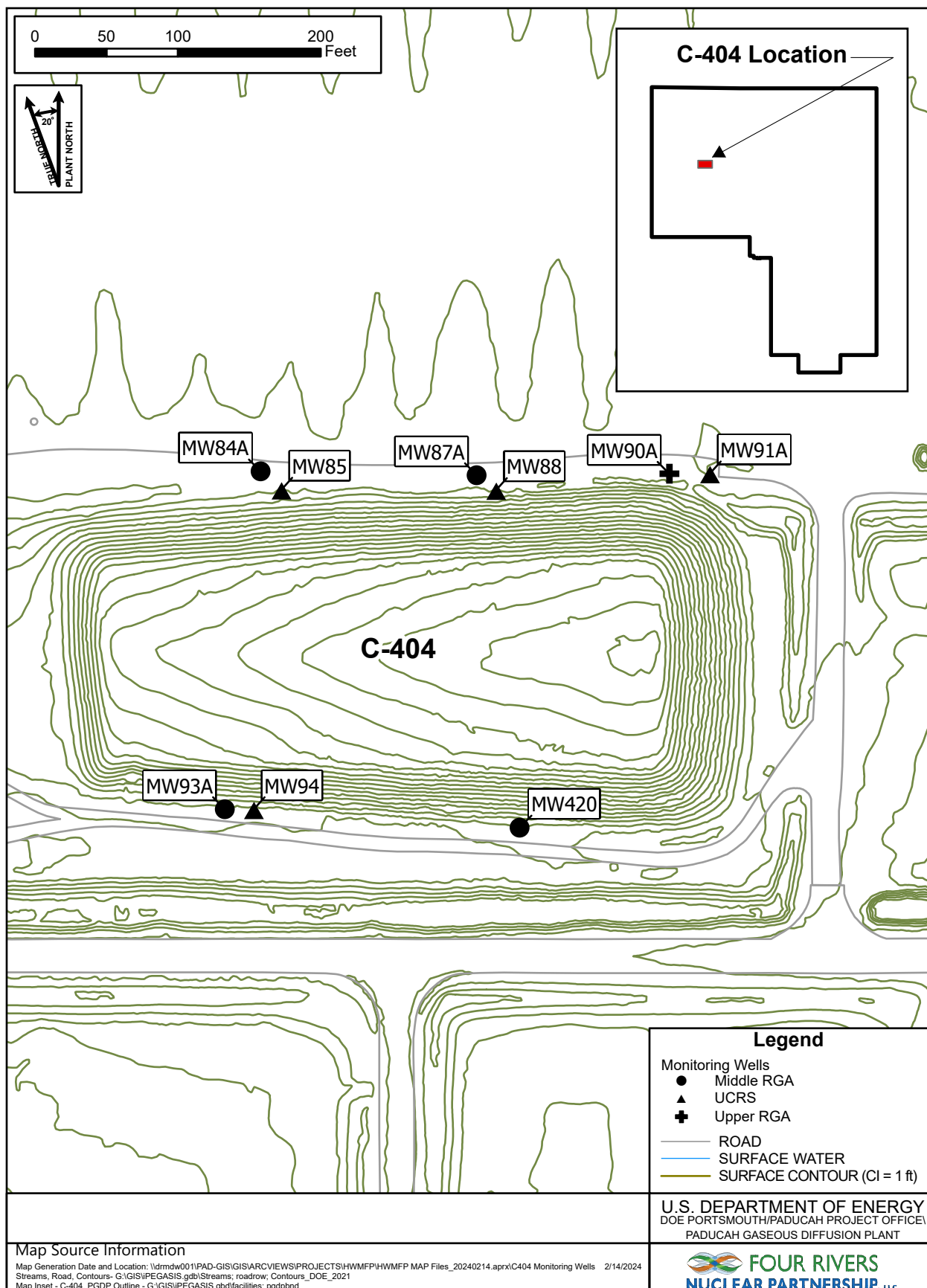
The conceptual model of the RGA flow system is based on the results of a three-dimensional computer model of PGDP. The RGA receives recharge via underflow from the Pliocene terrace gravels to the south and percolation through the UCRS. The discontinuous nature of sands and gravels in the UCRS and the large vertical gradient require groundwater flow in the UCRS to be oriented downward. Indeed, measured hydraulic gradients and results from analytical and numerical analyses suggest that most of the water entering the shallow system flows vertically into the RGA. Some horizontal flow in the UCRS likely occurs, but, near the site, it is probably insignificant because of the lateral discontinuity of shallow sand and gravel lenses. Groundwater flow in the RGA is to the north and discharges into the Ohio River. Hydraulic conductivities of the RGA commonly range between 100–1000 ft/d. Existing regional maps show the RGA thin or absent beneath the Ohio River, suggesting that flow under the river is unlikely.

2.3 AN EVALUATION OF SUBSURFACE GEOLOGIC FORMATIONS AND SURFACE TOPOGRAPHY FOR SOLUTION OR KARST FEATURES

Based on the known subsurface geology at PGDP, the only rock units that are susceptible to solution (karst forming) processes are Mississippian limestones, which lie at a depth approximately 330–350 ft below the surface. For this reason, no sinkholes are evident within the PGDP area.

3. TOPOGRAPHIC MAP

United States Geological Survey quadrangle map is presented in Attachment A1, Figure 2. Site generated topographic maps of the area are presented in Part B, Appendix B1, Maps 1 through 5. Part E, Figure 1 depicts the boundaries for the C-404 Landfill and the monitoring wells (MWs) for this unit on a topographic map.



Part E, Figure 1. Monitoring Wells

4. GROUNDWATER MONITORING SYSTEM

[40 *CFR* § 264.97 and 40 *CFR* § 264.90(b)(3)]

The C-404 Low-Level Radioactive Waste Burial Ground was closed in 1991 under the closure requirements for landfills. The postclosure permit for this facility was incorporated into the hazardous waste management permit for the PGDP in 1992. Groundwater monitoring is required for this landfill but not for the hazardous waste storage facilities. This part addresses the requirements for groundwater monitoring at the C-404 Landfill.

The groundwater monitoring plan for the C-404 Low-Level Radioactive Waste Burial Ground originally provided for the installation of four MW clusters. The locations were determined when the groundwater flow direction in the RGA was verified. The Kentucky Division of Waste Management (KDWM) approved the locations prior to installation of the wells. Each well cluster consisted of two wells screened at depths in the RGA such that detection of waste constituents within the vertical limits of the RGA was assured. One well at each of these location was screened in the UCRS.

In 2008, the MW network was redesigned based on groundwater monitoring results and the *Well Plan for Addition of Wells for C-404 Monitoring Well Network, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, PRS/PROJ/0028, July 2007 (Well Plan) to better orient the groundwater monitoring system relative to groundwater flow directions. The redesigned MW network is described in Section 4.6, Description of Wells.

4.1 UPPERMOST AQUIFER

[40 *CFR* § 270.14(c)(2)]

At the C-404 Landfill, the RGA is the uppermost aquifer. The McNairy Formation occupies the interval between the bottom of the RGA and the top of the Mississippian limestones and consists predominantly of fine sand and silt facies.

Saturated sand lenses within the silt and clay facies in the UCRS at the C-404 Landfill historically have demonstrated low and inconsistent yield characteristics, which limit the usefulness of samples from these wells.

4.2 BOUNDARIES OF THE UPPERMOST AQUIFER

The top of the RGA at C-404 varies between 61–65 ft below the surface at an elevation ranging from 307–310 ft MSL. The thickness of the aquifer varies from 20–22-ft thick with the bottom of the aquifer at an elevation ranging from approximately 285 ft to 290 ft MSL. The RGA is continuous locally at C-404 as well as regionally at PGDP.

4.3 UNDERLYING INTERCONNECTIONS BETWEEN UPPERMOST AQUIFER AND LOWER AQUIFER

[40 *CFR* § 270.14(c)(2)]

The McNairy Formation occurs between the lower boundary of the RGA and the top of Mississippian limestones at a depth approximately 400 ft below the surface. The much lower hydraulic conductivity of the fine sands, silts, and clays of the McNairy Formation is a significant contrast with the high hydraulic conductivity of the sand and gravel units of the RGA. As a result, little communication exists between the two units and the McNairy Formation serves as a lower confining unit to the RGA, with a thickness of approximately 300 ft, which effectively prevents downward migration of groundwater to underlying rock units.

4.4 HYDRAULIC DOWNGRAIENT LIMITS

The hydraulic downgradient limit of the RGA is the Ohio River 4 miles to the north.

4.5 POINT OF COMPLIANCE

[40 *CFR* § 264.95]

The point of compliance for the C-404 site is identified to be the vertical plane at the synthetic liner anchor trench that surrounds the unit. This trench is constructed near the edge of the closure cap. The uppermost aquifer below the regulated unit is the RGA.

The compliance wells were constructed within the uppermost aquifer (RGA). The well numbers are MW84A, MW87A, and MW90A. These wells should detect a release from the unit to the uppermost aquifer.

4.6 DESCRIPTION OF WELLS

[40 *CFR* § 264.97]

Nine wells currently are used as part of the groundwater monitoring network for the C-404 Landfill. Part E, Table 1 lists the MWs for the C-404 Landfill groundwater monitoring network. The current MWs are shown in Part E, Figure 1. Well construction diagrams are contained in Appendix E2.

Several additional wells are located in the vicinity of the C-404 are routinely monitored, but currently are not used as part of the detection monitoring program. These wells (e.g., MW67, MW76, MW86, MW89, MW92, MW95A, MW226, MW227, MW333, MW337, MW338, MW414, MW416, MW548, MW549, MW550, MW551) also support groundwater flow and direction measurements in the vicinity of the C-404 Landfill.

Part E, Table 1. Monitoring Wells for C-404 Hazardous Waste Landfill

Downgradient		Upgradient (Background Wells)	
Upper RGA	UCRS	Upper RGA	UCRS
MW84A	MW85	MW93A	MW94
MW87A	MW88	MW420	
MW90A	MW91A		

4.6.1 Replacement Wells

Replacement wells will be installed as needed to maintain the monitoring program. Wells deleted from the compliance monitoring program and substandard RCRA MWs no longer in use and not used in the environmental monitoring program will be plugged and abandoned in accordance with Appendix E3, Section 2. The Hazardous Waste Branch Manager (HWBM) may approve an alternate method for well decommissioning. Well plugging and abandonment methods and certification will be submitted to the HWBM within 30 days from the date the wells are removed from the monitoring program if the wells are determined to have no further uses (environmental surveillance monitoring and/or water level monitoring).

DOE will install a replacement well for any well that no longer meets the requirements in 40 *CFR* § 264.97. Replacement wells will be designated by the letter “A” following the well number. In the event that an “A” series well is deleted from the monitoring system, the replacement well will be designated as a “B” series and follows C, D, E, etc., for any individual MW that is replaced.

DOE will submit a plan to the HWBM for installation of any replacement wells. The plan will be submitted within 30 days from the date the replacement well is proposed to be installed. The plan will consist of the following items:

- (1) Location(s) of each proposed MW(s);
- (2) Methods and equipment that will be used to install the proposed MW(s);
- (3) Materials and construction details of each MW;
- (4) The proposed methods for developing the newly installed MW(s); and
- (5) Schedules for installation and development.

DOE will submit to the HWBM within 90 days a report of the surveyed elevation and the well construction details and specifications upon completion of any new MW construction, including well development and surveying.

5. DETECTION MONITORING

[40 *CFR* § 264.97]

5.1 SAMPLING AND ANALYSIS PROCEDURES

Specific activities and/or requirements related to groundwater monitoring and MWs are provided in this section.

Groundwater flow rate and direction will be determined annually. Groundwater monitoring is conducted on a semiannual basis and will continue throughout the compliance period (40 years from permit initiation of compliance monitoring in October 1988). Monitoring and testing data will be maintained in the operating record until closure of the facility. The groundwater monitoring results are submitted on forms approved by the Kentucky Energy and Environment Cabinet (EEC).

Water level measurements will be made in all MWs prior to evacuation or collection of samples. The depth to groundwater is measured to an accuracy of 0.01 ft using a water level indicator. The groundwater surface elevation is calculated and recorded in conjunction with each groundwater monitoring event. See Appendix E3, Section 1.3, Water Level Measurements, for additional information on the process of how water level measurements are collected and how equipment decontamination, between each well, is handled. Water level measurements will be collected at the wells of the C-404 MW network, listed in Section 4.6.

Field parameters [pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential (Eh), and turbidity] are measured using a water quality meter. Other field parameters, such as depth to water and barometric pressure, are measured prior to sampling. Measurements of the field parameters are documented using the groundwater sample data forms (similar to the example in Part E, Figure 2) prior to collection of the groundwater samples. Water quality stabilization criteria are met prior to sampling analytical parameters for the C-404 MWs. Appendix E3, Section 1.4, Groundwater Sampling, summarizes the acceptance criteria. Once stabilization has occurred, samples are collected in certified clean sample containers. Sample containers are chosen and preserved according to requirements in Appendix E3, Section 1.6. Clean pairs of protective disposable gloves are utilized during all phases of groundwater sampling.

Collection of field quality control samples (e.g., equipment blanks, field blanks, trip blanks) are done according to Appendix E3, Section 1.5, Field Quality Control. With prior approval from the KDWM, equivalent water specifications are acceptable for field quality control samples. Trip blanks accompany the sample containers for volatile organics and are analyzed for organics identified in Part E, Table 2.

Samples are collected in the following preferred order:

- (1) Samples to be analyzed for volatile organics.
- (2) Samples to be analyzed for total metals.
- (3) Samples to be analyzed for radionuclides.

MW GROUNDWATER DATA FORM

LOCATION: _____		FREQUENCY: _____		DATE: _____	
ARRIVAL TIME: _____		SAMPLE TIME: _____		DEPARTURE TIME: _____	
PROJECT ID: _____		LCOC NUMBER(S): _____			
SAMPLE ID(S): _____		TRIP BLANK: _____			
SAMPLED BY: _____					

WELL DEPTH (ft): _____		POINT DATUM: _____		PURGE VOLUME (L): _____	
WATER LEVEL (START) (ft): _____		WATER LEVEL (END) (ft): _____		BAROMETRIC PRESSURE (inches/Hg): _____	
PURGE START TIME: _____		PURGE END TIME: _____			

Time	Conductivity		D.O. (mg/L)	Temp (deg F)	pH (S.U.)	Eh (approx) (mV)	ORP (mV)	Turbidity (NTU)
	(mS/cm)	(µmhos/cm)						
							N/A	

EQUIPMENT INFORMATION

DISPLAY #: _____ TRANSMITTER #: _____

SAMPLE BOX #: _____ DEPTH INDICATOR #: _____ DI WATER SOURCE: _____

EQUIPMENT DECONTAMINATION DESCRIPTION:

Decon sample control box with 600mL of DI water and decon water level with DI wipe.

FIELD COMMENTS AND OBSERVATIONS:

SIGNATURE: _____		DATE: _____	
<i>Data Form Verification</i>			
SIGNATURE: _____		DATE: _____	
PEMS Entry Initials: _____		DATE: _____	

MW Groundwater Data Form generated from PEMS database.

*This form represents the type of information gathered. Changes may be made as necessary without modification of this permit application.

Part E, Figure 2. Example Groundwater Data Form

Samples are preserved in accordance with the procedures in Appendix E3. Samples are analyzed according to the procedures specified in 40 *CFR* § 264 Appendix IX and in Part E, Table 2, for the constituents listed. Alternative SW-846 methods may be substituted with prior written approval from the KDWM. The analytical methods utilized are specified in SW-846 3rd edition (or most recent edition as approved by the Commonwealth of Kentucky).

Part E, Table 2. C-404 Landfill Analyses and Laboratory Methods

Analyte Type	Constituent Type	Analysis	Analytical Method**
METAL	HAZARDOUS	Arsenic	6020
METAL	HAZARDOUS	Cadmium	6020
METAL	HAZARDOUS	Chromium	6020
METAL	HAZARDOUS	Lead	6020
METAL	HAZARDOUS	Mercury	7470
METAL	HAZARDOUS	Selenium	6020
METAL	RADIONUCLIDE	Uranium	6020
RADS	RADIONUCLIDE	Technetium-99 (total)	Liquid Scintillation
RADS	RADIONUCLIDE	Uranium 234 Uranium 235 Uranium 238	Alpha Spectroscopy
VOA	HAZARDOUS	Trichloroethene (TCE)	8260

*Liquid Scintillation—no SW-846 Method is available for analysis of technetium-99. Analytical chemistry, volume 28, page 1651 (1956).

**Newer methods approved by EPA under SW-846 or ASTM may be used.

The analytical laboratory also will report spike recovery data for each applicable series of groundwater samples collected. At least one duplicate sample will be collected and analyzed according to the methods specified in Part E, Table 2, each time the groundwater quality is determined at the compliance point. Samples are tracked and controlled using the chain of custody requirements specified in Appendix E3, Section 1.1.

5.2 STATISTICAL PROCEDURES

[40 *CFR* § 264.97(h)(5)]

DOE will perform statistical analysis of C-404 groundwater MW data. The statistical analysis will be performed in accordance with the procedures found in the U.S. Environmental Protection Agency (EPA) guidance document, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*, now referred to as Unified Guidance (EPA 2009). In accordance with 40 *CFR* § 264.97(h)(5), the statistical testing methods that will be utilized on C-404 groundwater monitoring data are discussed in the following paragraphs.

Prediction limits (PLs) will be the statistical analysis method for C-404 groundwater data, without a retesting strategy, as found in Section 18 of the Unified Guidance. The method will utilize the current data set and 20 previous data sets.

The percentage of nondetects (censored data) of the data set determines how censored data are treated in determining PLs.

- If less than 15% of the background observations are nondetects, then these will be replaced with one-half of the method reporting limit prior to running the analysis.
- If more than 15% but less than 50% of the background data are less than the detection limit, then the data's sample mean and sample standard deviation are adjusted according to the method of Cohen, Aitchison, or Kaplan-Meier.
- If more than 50% of the background data are less than the detection limit, then a nonparametric PL will be computed. Poisson-based PLs are available as an alternative method when greater than 90% of the background data are less than the detection limit.

The data will be tested for statistical outliers using Dixon's and Rosner's outlier evaluation methods. Potential outliers will be evaluated for potential sources of error or evidence that the data point is not representative. Nonrepresentative data points may be excluded from the statistical analysis based on professional judgment. After testing for and exclusion of statistical outliers, the data set will be evaluated for normality distribution using the Shapiro-Wilk or Shapiro-Francia testing methods. If normality of the data set is confirmed, or can be confirmed by transforming the data, parametric PLs will be performed. If normality of the raw or transformed data set cannot be confirmed, nonparametric PLs will be computed.

Groundwater data collected from background MWs will be used to construct a concentration limit PL, which is then compared to one or more observations from a compliance well. The acceptable range of concentrations includes all values no greater than the PL. The appropriate prediction interval will generally have the form [0, PL], with the upper limit PL as the comparison of importance (EPA 2009).

If the PL indicates no statistically significant difference between concentrations in downgradient wells and concentrations in background wells, then there are no indications of statistically significant impacts on the groundwater from the C-404 Landfill.

If the PLs method identifies a statistically significant difference between concentrations in downgradient wells and concentrations in background wells, then the data will be evaluated further to determine if the concentrations in downgradient and vicinity wells are consistent with the findings of the 2007 Alternate Source Demonstration (ASD) (*Revised C-404 Landfill Statistically Significant Increase Source Demonstration*, PRS-ENM-0031/R2, transmitted via DOE correspondence, PPPO-02-506-07, August 1, 2007).

5.3 PROCEDURES FOR ESTABLISHING BACKGROUND

[40 *CFR* § 264.97(h)(5)]

Background water quality data for the original C-404 Landfill MWs has been established from all upgradient MWs for the constituents listed in Part E, Table 2 during the initial year of closure activities. The background data was based on one complete year of data. The initial background concentration was based on four consecutive quarters of data pursuant to 40 *CFR* § 264.97(h)(5). Subsequent background values are calculated continuously (rolling average) on a semiannual basis.

For the statistical analysis of C-404 Landfill groundwater monitoring data, background values are calculated continuously (rolling average) on a semiannual basis utilizing 20 previous data sets and the

current data set. In the statistical procedures discussed in Section 5.2, analytical data from compliance point wells are compared to the PLs calculated from both background wells. For the nonparametric PL statistical analysis to be valid and in accordance with EPA Unified Guidance document, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (EPA 2009), each well must have 19 data sets and a current data set.

5.4 MONITORING PROGRAM AND DATA EVALUATION

DOE will determine whether a confirmed statistically significant exceedance/increase of one of the constituents listed in Part E, Table 2, has occurred over the background values for each time the groundwater quality is determined at the compliance point in accordance with Section 5.2. The measured concentration at each compliance monitoring point will be compared statistically.

DOE will monitor for all hazardous constituents in Part E, Table 2, of this permit during the compliance period. The compliance period is 40 years. The compliance period began when the detection monitoring program was initiated in accordance with 40 *CFR* § 264.96 on October 11, 1988, and will end on October 11, 2028 (unless the C-404 Hazardous Waste Landfill has moved into a Corrective Action Program).

5.5 RECORDKEEPING AND REPORTING

DOE will enter all monitoring, testing, and analytical data obtained in the operating record. The data will include all computations, calculated means, variances, and results of the statistical tests under 40 *CFR* § 264.97(j).

The established background values and the calculation and computation necessary to determine background values will be submitted to the HWBM. DOE will submit the analytical and statistical results in accordance with the schedule shown in Part E, Table 3. The annual evaluation of groundwater flow rate and direction will be submitted by November 30 of each year of the postclosure period.

Part E, Table 3. Schedule for Submitting Sampling Results

Samples to be Collected During the Months of:	Results Due to the Division by:
January–March	May 30
July–September	November 30

6. CONFIRMED STATISTICALLY SIGNIFICANT EXCEEDANCE/INCREASE

Part E, Table 2 identifies the analytes to be measured by constituent type (i.e., hazardous or radionuclide). If it is determined that there has been a confirmed statistically significant exceedance, as defined in Section 5.2, for any hazardous constituents in any compliance point wells, all applicable steps for hazardous constituents will be followed [40 *CFR* § 264.98(g)]. If it is determined that there has been a confirmed statistically significant increase, as defined in Section 5.2, for any of the radionuclide constituents in any compliance point wells, all applicable steps for radionuclide constituents will be followed.

- (1) For any constituent, the HWBM will be notified in writing within seven days, indicating what constituents have shown statistically significant evidence of contamination;
- (2) If the statistically significant evidence of contamination is of a hazardous constituent, the groundwater wells will be sampled immediately¹ to determine the concentration of all constituents identified in 40 *CFR* § 264 Appendix IX or a site-specific subset of constituents, based on the discretion of the HWBM. If the statistically significant evidence of contamination is of a radionuclide constituent, the groundwater wells will be resampled for radionuclides only;
- (3) For any constituents found in the analysis in Step (2), the groundwater wells may be resampled within one month or at an alternative site-specific schedule approved by the HWBM for those constituents detected. If the results of the second analysis confirm the initial results, then these constituents will form the basis for compliance monitoring. If the wells are not resampled within one month or at an alternate schedule, the constituents found during the initial analysis will form the basis for compliance monitoring;
- (4) An application for a permit modification will be submitted to the HWBM within 90 days to establish a compliance monitoring program that meets the requirements of 40 *CFR* § 264.99, unless the constituent which has been confirmed as having a statistically significant increase at any point of compliance well(s) is a radionuclide. If a radionuclide has a confirmed statistically significant increase, DOE will establish a compliance monitoring program in accordance with Section 7.1 of this part: Step (1).a., Step (2), Step (2).b., Step (3), Step (6), and Step (7); and,
- (5) For hazardous constituents, an engineering feasibility plan for a corrective action or all data necessary to justify an alternate concentration limit, as governed by 40 *CFR* 264.98(g)(5), will be submitted to the HWBM within 180 days. This condition is not applicable when a statistically significant increase has been confirmed for a radionuclide.

Alternatively, if DOE determines, pursuant to Section 5.4, there is a statistically significant exceedance/increase at the compliance point for any of the constituents specified in Part E, Table 2, DOE may demonstrate that a source other than a regulated unit caused the increase or that the increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater, in accordance with 40 *CFR* §§ 264.98(g)(6).

- (1) In making a demonstration, DOE must notify the HWBM in writing within seven days of determining statistically significant evidence of contamination at the compliance point that DOE intends to make this demonstration;
- (2) Within 90 days, submit a report to the HWBM that demonstrates that a source other than a regulated unit caused the contamination or that the contamination resulted from error in sampling, analysis, or evaluation;
- (3) Within 90 days, submit to the HWBM an application for a permit modification to make any appropriate changes to the detection monitoring program; and
- (4) Continue to monitor in accordance with the detection monitoring program.

¹ For purposes of this section of the permit application, the term “immediately” means within a reasonable amount of time. The amount of time will also be dependent upon whether or not a site-specific subset of constituents is requested and the amount of time taken for the HWBM to respond to that request.

The Hazardous Waste Management Facility Permit (HWMFP) allows also for demonstrating that the exceedance is consistent with the 2007 Alternate Source Demonstration, which demonstrated that the C-404 Landfill was not the source of the historical, statistically significant background exceedance of TCE in MW84. Furthermore, the HWMFP allows for demonstrations consistent with the 2007 ASD (*Revised C-404 Landfill Statistically Significant Increase Source Demonstration*, PRS-ENM-0031/R2, transmitted via DOE correspondence, PPPO-02-506-07, August 1, 2007) to be submitted within the semiannual report.

7. GROUNDWATER COMPLIANCE MONITORING FOR THE C-404 HAZARDOUS WASTE LANDFILL

If it is determined that there is a confirmed statistically significant exceedance as defined in Section 5.2 for the hazardous constituents listed in Section 5.1, a Compliance Monitoring Program will be initiated within 180 days of the confirmed statistical exceedance. If there has been a confirmed statistically significant increase for a radionuclide constituent, then DOE will implement a Compliance Monitoring Program in accordance with Section 7.1 of this Part: Step (1) a., Step (2); Step (2) b; Step (3); Step (6); and Step (7).

7.1 COMPLIANCE MONITORING PROGRAM

If compliance monitoring is implemented, DOE will monitor wells to ensure that the regulated unit is in compliance with the groundwater protection standard and 40 *CFR* § 264.99. The hazardous constituents and the concentration limits presented in Part E, Table 4 comprise the groundwater protection standard. Additional hazardous constituent concentrations will be determined pursuant to Section 7.

Part E, Table 4. Concentration Limits

Parameter	Chemical Abstract Number	Concentration Limits (mg/L)
Arsenic	7440-38-2	0.05
Cadmium	7440-43-9	0.005
Chromium	7440-47-3	0.10
Lead	7439-92-1	0.05
Selenium	7782-49-2	0.05
Mercury	7439-97-6	0.002
TCE	79-01-6	0.005
Technetium-99	Not applicable (N/A)	*
Uranium-234	N/A	*
Uranium-235	N/A	*
Uranium-238	N/A	*
Uranium	N/A	*

*There are no concentration limits for radionuclides.

- (1) If compliance monitoring is implemented, DOE will monitor for all hazardous constituents in Part E, Table 4 during the compliance period. The compliance period is the number of years equal to the active life of the waste management area including any waste management activity prior to issuance of the postclosure permit. This compliance period is 40 years. The compliance monitoring period will begin when the compliance monitoring program is initiated.
 - a. Beginning with the calendar quarter following the month for which a statistically significant increase was reported for a radionuclide, DOE will begin quarterly monitoring for the radionuclides

and will report the results to the EEC in accordance with Part E, Table 5. At the end of one year of quarterly monitoring, DOE will submit a report to the HWBM that identifies the groundwater fate and transport of the radionuclides. DOE may request that the frequency of the monitoring be modified after one year of quarterly monitoring.

Part E, Table 5. Schedule for Submitting Sampling Results

Samples to be Collected During the Month of:	Results Due to the Division by:
October–March	May 30
April–September	November 30

- (2) DOE will, in accordance with 40 *CFR* § 264.95 and § 264.99, determine groundwater quality upgradient and at the compliance point, as described in Section 5.3 as follows:
 - a. DOE will determine groundwater quality throughout the postclosure care period pursuant to 40 *CFR* § 264.117. These determinations will be made semiannually, from at least one sample for each MW described in Part E, Table 1 and in accordance with 40 *CFR* § 264.97 and 40 *CFR* § 264.99.
 - b. DOE will express the groundwater quality at each MW in a form necessary for the determination of statistically significant exceedances in accordance with Section 5.2.
- (3) Compliance monitoring required in Section 7.1—Step (1) and Step (1).a—will consist of collecting, preserving, transporting, and analyzing samples from each upgradient and downgradient MW in Part E, Table 1 for those constituents listed in Part E, Table 4.
- (4) DOE will, in accordance with 40 *CFR* § 264.99(e), determine the groundwater flow rate and direction in the uppermost aquifer at least annually.
- (5) DOE will analyze samples from all MWs at the compliance point for all constituents contained in 40 *CFR* Part 264 Appendix IX, at least annually, to determine if additional hazardous constituents are present in the uppermost aquifer. If DOE finds additional hazardous constituents present, excluding those constituents in Part E, Table 4, their concentrations will be reported to the HWBM in writing within seven days of analysis, and they will be added to the monitoring list of Part E, Table 4 through permit modification.
- (6) DOE will perform a statistical comparison on a semiannual basis as specified in Section 5.4 pursuant to the reporting schedule in Part E, Table 5.
- (7) DOE will submit the analytical and statistical results required in accordance with the following schedule presented in Part E, Table 5.
- (8) If there has been a confirmed statistically significant exceedance above the groundwater protection standards established in Part E, Table 4, the DOE will do the following, pursuant to 40 *CFR* § 264.99(h):
 - a. Notify the HWBM in writing within seven days.
 - b. Submit to the HWBM an application for a permit modification to establish a corrective action program meeting the requirements of 40 *CFR* § 264.100 within 180 days or within 90 days if an

engineering feasibility study has been submitted previously to the HWBM. This requirement is not applicable when a statistically significant increase has been confirmed for a radionuclide.

- c. If it is demonstrated successfully that a source other than the regulated unit caused the increase or that the increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in the groundwater, as specified by 40 *CFR* § 264.99(i), a permit modification application will be submitted within 90 days for any appropriate changes to the compliance monitoring program.

8. CORRECTIVE ACTION FOR REGULATED UNITS

The C-404 Landfill currently is in detection monitoring and currently is not required to establish a RCRA corrective action plan under 40 *CFR* § 264.100; however, EEC, DOE, and EPA (Region 4) have indicated an intention in the Federal Facility Agreement (FFA) for PGDP to coordinate DOE's Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) response obligations with the corrective measures/actions required by Kentucky's hazardous waste statutes and regulations. Accordingly, the C-404 Landfill has been included in the Burial Ground Operable Unit under the FFA. If corrective action is necessary, any remedial actions taken under the FFA will be coordinated with the corrective action program under this administrative regulation.

DOE will begin corrective action within a reasonable time period after the groundwater protection standard is exceeded. The corrective action program will include establishing and implementing a groundwater monitoring program to demonstrate the effectiveness of the corrective action program. Such a monitoring program may be based on the requirements for a compliance monitoring program under Section E7 and will be as effective as that program in determining compliance with the groundwater protection standard and in determining the success of a corrective action program.

In addition to the other requirements of the corrective action program, DOE will conduct a corrective action program to remove or treat in place any hazardous constituents listed in Part E, Table 4 that exceed concentration limits in groundwater:

- (1) Between the compliance point and the downgradient property boundary; and
- (2) Beyond the facility boundary, where necessary to protect human health and the environment, unless DOE demonstrates to the satisfaction of the EEC that, despite DOE's best efforts, DOE was unable to obtain the necessary permission to undertake such action. DOE is not relieved of all responsibility to cleanup a release that has migrated beyond the facility boundary where off-site access is denied. On-site measures to address such releases will be determined on a case-by-case basis.

Corrective action measures under this subsection may be terminated upon approval of the EEC once the concentration of hazardous constituents listed in Part E, Table 4 is reduced to levels below their respective concentration limits.

DOE will continue corrective action measures during the compliance period to the extent necessary to ensure that the groundwater protection standard is not exceeded. If DOE is conducting corrective action at the end of the compliance period, DOE will continue that corrective action for as long as necessary to achieve compliance with the groundwater protection standard. DOE may terminate corrective action measures taken beyond the period equal to the active life of the waste management area (including the closure period) if DOE can demonstrate to the satisfaction of the EEC based on data from the groundwater

monitoring program that the groundwater protection standard has not been exceeded for a period of three consecutive years. DOE will submit a report to the EEC on the effectiveness of the corrective action program at least semiannually.

If DOE determines that the corrective action program no longer satisfies the requirements of 40 *CFR* § 264.100, DOE will, within 90 days, submit an application for a permit modification to make any appropriate changes to the program.

Alternative requirements for groundwater monitoring and corrective action for releases to groundwater may be used under 40 *CFR* § 264.90(f), if the KDWM determines the alternative requirements will protect human health and the environment.

9. CORRECTIVE ACTION FOR SWMUs AND AOCs

The EEC, DOE, and EPA (Region 4) have indicated an intention in the FFA for the PGDP to coordinate DOE's CERCLA response obligations with the corrective measures/actions required by Kentucky's hazardous waste statutes and regulations. Several solid waste management units (SWMUs), areas of concern (AOCs), and operable units have been identified and investigated under CERCLA. New SWMUs and AOCs are continually being identified at the PGDP. Information regarding these units is provided to the KDWM in an SWMU assessment report (SAR) and in investigation reports submitted under the FFA. Accordingly, these SWMUs are included in appropriate operable units for investigation and corrective actions under the FFA.

Appendix E4 lists SWMUs and AOCs that have been identified at PGDP. Table E4.1 lists the current SWMUs and AOCs at PGDP. Table E4.2 lists former SWMUs and AOCs at PGDP that were removed from the permit. These former SWMUs were deemed not to present a danger to human health or the environment and were granted no further action status. Appendix E5 presents a map, which depicts the location of the current SWMUs/AOCs.

SWMUs/AOCs, which have not been sufficiently addressed, will be addressed by a RCRA facility investigation (RFI)/remedial investigation (RI) or corrective measures study (CMS)/feasibility study (FS) in accordance with this section.

For purposes of compliance with the corrective action requirements of the HWMFP described below, these activities will include RCRA actions and their CERCLA counterparts.

9.1 NOTIFICATION AND ASSESSMENT REQUIREMENTS FOR NEWLY IDENTIFIED SWMUs AND AOCs

DOE will prioritize any newly identified SWMUs/AOCs based on the threat that they present to human health and the environment. DOE will assign the new SWMU/AOC to an operable unit that best reflects the priority of the SWMUs/AOCs. DOE will notify the HWBM and recommend assigning the SWMUs/AOCs to an operable unit either within the SAR or within 30 days of approval of the SAR.

9.1.1 Notification of Discovery of SWMU or AOC

DOE will notify the HWBM in writing, within 15 calendar days of discovery, of any additional SWMUs or AOCs [excluding any newly-designated SWMUs or AOCs that are associated with a facility being evaluated under a site evaluation (SE) in Appendix 4 of the site management plan (SMP)] that are discovered under any conditions consistent with the FFA. The notification will include, at a minimum, the location of the units and all available information pertaining to the nature of the release (e.g., media affected, hazardous constituents released, magnitude of release). If the HWBM determines that further investigations are required, then the permit will be modified. The requirements for notifications of Appendix 4 facilities are in the current, approved SMP.

9.1.2 Submittal of an Integrated Site Evaluation Report

DOE will prepare and submit to the HWBM, within 90 calendar days of the notification, an integrated SE report that will consist of an integrated removal/remedial SE and SWMU assessment report [hereinafter referred to as an integrated SE report] for each new SWMU identified at the facility consistent with the FFA. The requirements for the submittal of an integrated SE report of Appendix 4 facilities in the SMP will be in accordance with condition of the Permit. At a minimum, the integrated SE report will provide the following information:

1. Location of unit(s) on a topographic map of appropriate scale as required under 40 *CFR* Part 270, Subpart B;
2. Designation of type and function of unit(s);
3. General dimensions, capacities, and structural description of unit(s) (supply any available plans/drawings);
4. Dates that the unit(s) was operated;
5. Specification of all wastes that have been managed at/in the unit(s) to the extent available (include any available data on constituents in the wastes); and
6. All available information pertaining to any release of hazardous waste or hazardous constituents from such unit(s) (to include groundwater data, soil analysis, air, and/or surface water data).

9.1.3 Notification and Submittal of an Integrated Site Evaluation Report [in Accordance with Section IX, Site Evaluation(s) of the FFA] for Newly Designated SWMUs or AOCs Associated with a Deactivated Facility Being Evaluated Under a Site Evaluation in Appendix 4 of the SMP

DOE will notify the HWBM in the integrated SE report referenced in Section 9.1.2, within 120 days after completion of deactivation of any facility with any SWMUs or AOCs discovered during the deactivation process. The integrated SE report will include, at a minimum, the location of the newly discovered SWMUs or AOCs and all available information pertaining to the nature of the release (e.g., media affected, hazardous constituents released, magnitude of release). If the HWBM determines that further investigations are required, then the permit will be modified.

9.2 RCRA FACILITY INVESTIGATION (RFI)

DOE will prepare and submit RFI work plans to the HWBM. For the investigation, units have been prioritized and assembled into operable units. The RFI work plan(s) will be developed to meet the requirements of the HWMFP.

In many instances, operable units contain both SWMUs/AOCs requiring an RFI and SWMUs/AOCs already being addressed under the FFA.

The RFI work plan(s) will meet all requirements, as applicable. The work plan(s) will include schedules of implementation and completion of specific actions necessary to determine the nature and extent of releases and the potential pathways of contaminant releases to the air, land, surface water, and groundwater. DOE will provide sufficient justification and/or documentation that a release is not probable if a unit or a media/pathway associated with a unit (groundwater, surface water, soil, subsurface gas, or air) is not included in the RFI work plan(s). Such deletions of a unit, media or pathway from the RFI(s) are subject to the approval of the HWBM. DOE will provide sufficient written justification for any omissions or deviations from the minimum requirements. Such omissions or deviations are subject to the approval of the HWBM. In addition, the scope of the RFI work plan(s) will include all investigations necessary to ensure compliance.

9.3 INTERIM MEASURES/REMOVAL ACTION

Upon notification by the HWBM, DOE will prepare and submit an interim measures (IM)/removal action (RA) work plan for any SWMU or AOC that the HWBM determines poses a current or potential threat to human health or the environment. The IM/RA is necessary in order to minimize or prevent the further migration of contaminants and limit human and environmental exposure to contaminants while long-term corrective action remedies are evaluated and, if necessary, implemented. The IM/RA work plan will be submitted within 90 calendar days of such notification. Such interim measures may be conducted concurrently with investigations required under the terms of this permit. The IM/RA work plan will ensure that the interim measures are designed to mitigate any current or potential threat(s) to human health or the environment and is consistent with and integrated into any long-term solution at the facility. The IM/RA work plan will include the interim measures objectives, procedures for implementation (including any designs, plans, or specifications), and schedules for implementation. DOE will notify the HWBM as soon as possible of any planned changes, reductions, or additions to the IM/RA work plan.

9.4 CORRECTIVE MEASURES STUDY/FEASIBILITY STUDY

DOE will submit a CMS/FS for those units requiring a CMS/FS within 180 calendar days of notification by the HWBM that a CMS/FS is required. The CMS/FS will meet all requirements, as applicable. The CMS/FS will include schedules of implementation and completion of specific actions necessary to complete the study. DOE will provide sufficient justification and/or documentation for any unit deleted from the CMS/FS. Such deletion of a unit is subject to the approval of the HWBM. DOE will provide sufficient written justification for any omissions or deviations from the minimum requirements. Such omissions or deviations are subject to the approval of the HWBM.

9.5 REMEDY APPROVAL AND PERMIT MODIFICATION

A remedy will be selected from the remedial alternatives evaluated in the CMS/FS. It will be based at a minimum on protection of human health and the environment, as per specific site conditions, existing regulations, and guidance. The selected remedy may include any interim measures implemented to date.

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APPENDIX EI

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APPENDIX E2

WELL CONSTRUCTION DIAGRAMS

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WELL CONSTRUCTION DIAGRAMS AND BORING LOGS

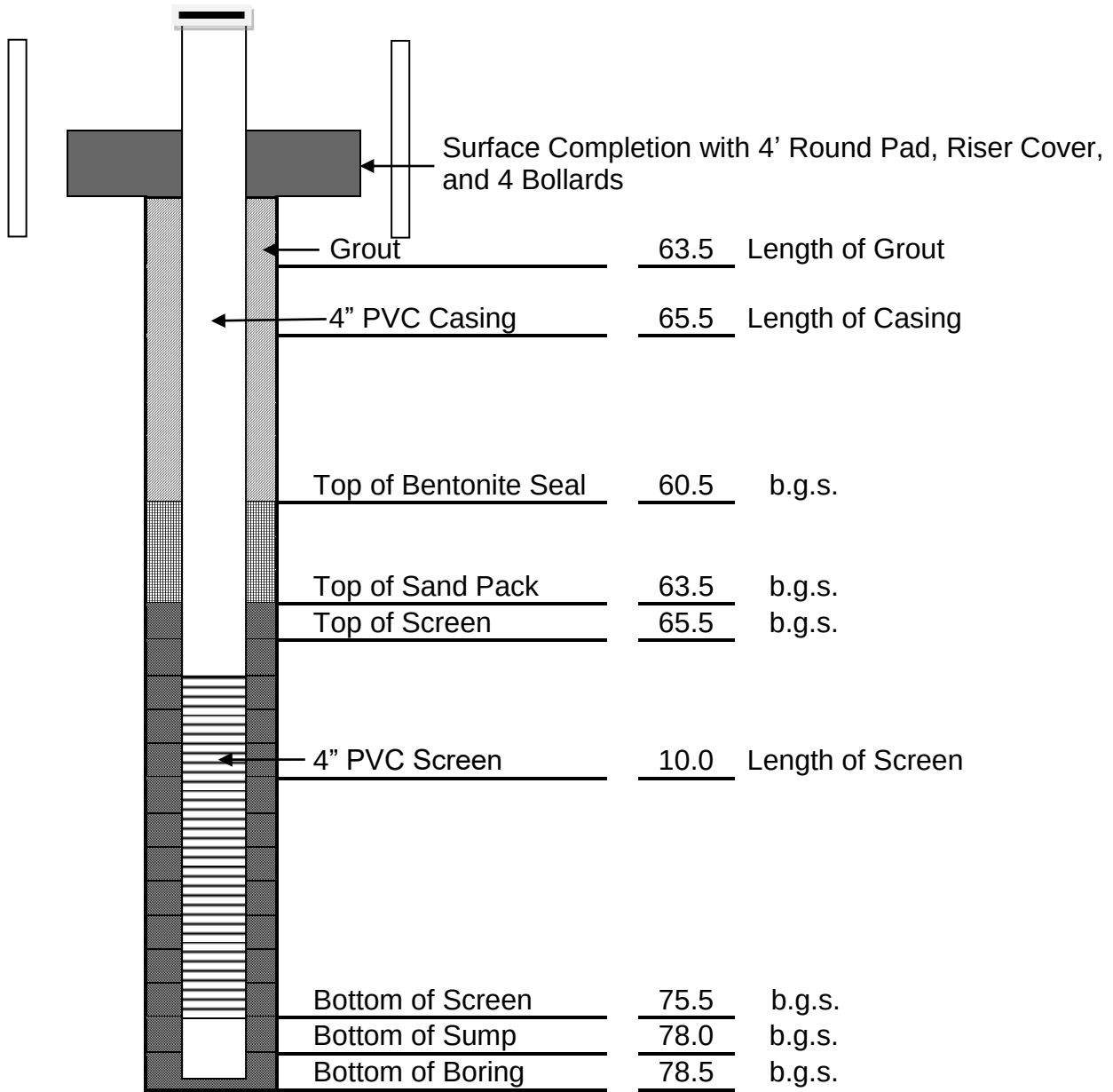
The ground elevation on some boring logs is higher than the ground elevation on the corresponding well construction diagrams. This is due to the fact that a gravel platform was utilized on some boring/well locations to allow operation of the drilling rig in the sloped toe of C-404 closure cap. Boring depths were measured relative to the top of the gravel platform. The top of ground subsequent to removal of the gravel platform is the ground zero elevation indicated on the well construction diagrams. One boring log is included for multiple cluster wells installed in close proximity.

The elevations of C-404 monitoring wells (MWs) are resurveyed, as needed, to ensure groundwater flow and direction calculations are accurate. The results of the resurveys are kept on site and supersede the elevations in the well construction diagrams.

The following well construction diagrams and maps document the materials used in the MWs, the locations of the wells, and the depths and heights of well screens and casings. Depths are presented in ft; diameters are presented in inches. The elevations are relative to mean sea level.

MONITORING WELL CONSTRUCTION LOG

Location Name:	PGDP	State Assigned #	8007-4849
Address:	5600 Hobbs Road	AI #	3059
City/State/Zip:	Kevil, KY 42053	Facility Assigned #	MW-84A



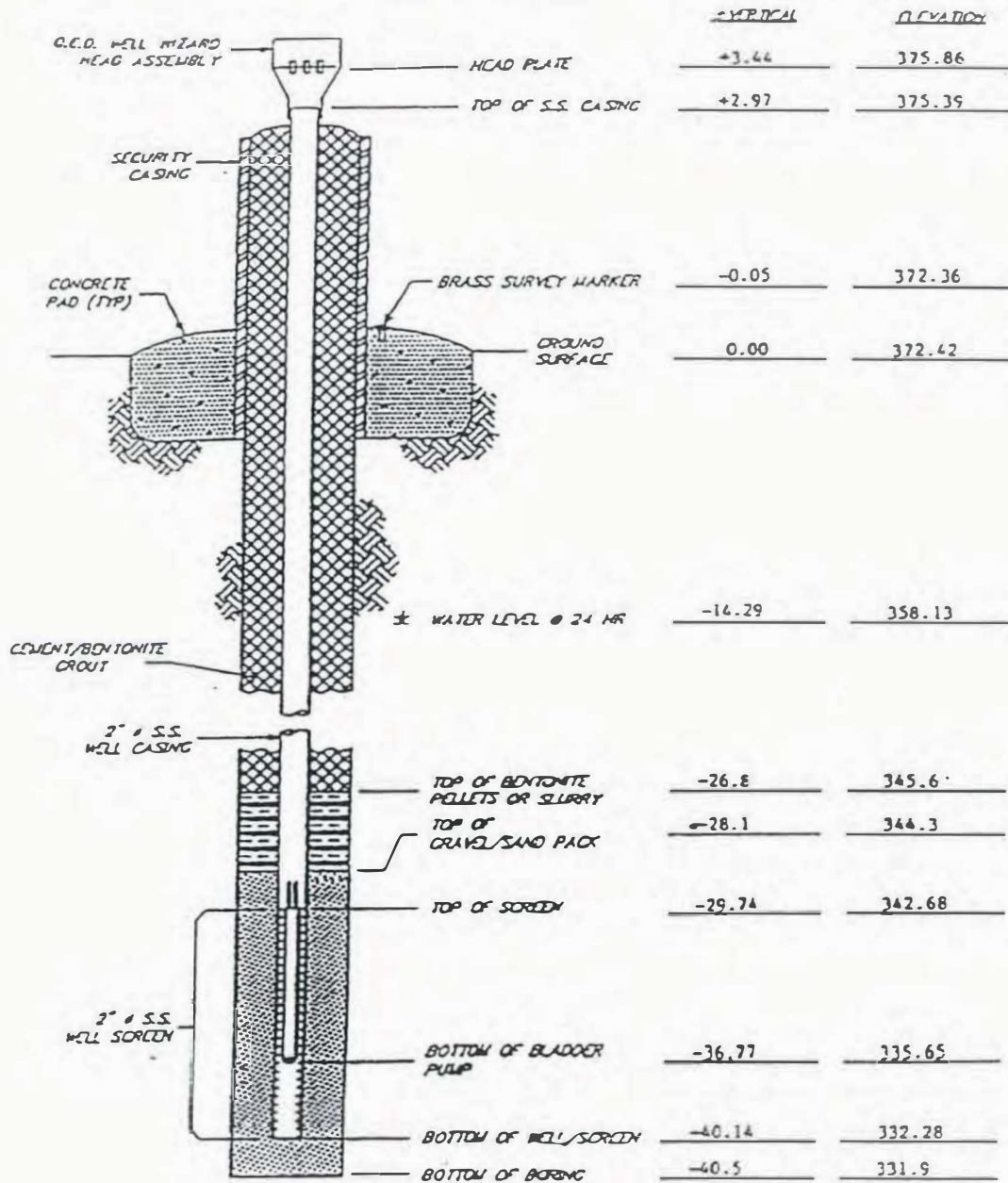
Depth to Groundwater	50	Total Depth of Boring (ft)	78.5	Total Depth of Well (ft)	78.0	Borehole Diameter	12.5
Well Diameter (in)	4.0	Slot Size (in)	0.010	Grout Type	Bentonite	Drilling in Consolidated	N/A
Date:	8-2-19	Completed By:	Todd W. Mills			Top of Casing	374.93

ceg CHASE
Environmental Group INC

Comments: Drawing not to scale.

Four bollards were installed around each well. This is a 2D depiction of the well; therefore, you only see two bollards.

MONITORING WELL NO. ES
 MONITORING WELL COORDINATES 0804.80 S 5960.21 W
 INSTALLATION DATE 4 AUGUST 1988



PROJECT MARTIN MARIETTA ENERGY SYSTEMS
PADUCAH GASEOUS DIFFUSION PLANT, KENTUCKY
C-404 COMPLIANCE WELLS
PROJECT NO. ESO 16749/GWM PHASE 2

PROJECT NO. X619112
 DATE 7-18-88

SURFACE ELEVATION 374.35
 BOTTOM OF HOLE DEPTH 106.5 ELEV 267.85
 BORING LOCATION C-404 NW cluster @ 804.905 5945.24W
 COMPLETION DATE 7-26-88

DRILLER R. Gossage
 HELPER Geotek Staff
 DRILLED FOR ESO 16749
 RIG Mobile B-53
 LOGGED BY W. S. Anderson

LITHOLOGY BREAK	SAMPLE NO.	DEPTH		SAMPLE BLOW*	DESCRIPTIONS AND REMARKS
		FROM	TO		
3.5 18 ±	1	5.0	6.5	5-8-13	Clay, very silty, light grayish-brown. (Loess)
	2	10.0	11.5	6-9-9	Clay, very silty, light grayish-brown. (Loess)
	3	15.0	16.5	4-7-8	Silt, very clayey, light brown, occasional mottled black. (Loess)
28 ±	4	20.0	21.5	50/0.5	Gravel, very clayey, sandy, silty, brown.
	5	25.0	26.5	50/0.4	Gravel, very clayey, silty, reddish-brown.
19.3 37 ±	6	30.0	31.5	4-5-7	Sand, very clayey, very silty, brown. (Cohesive)
	7	35.0	36.5	5-7-8	Sand, very clayey, very silty, brown. (Cohesive)
29.2 56 ±	8	40.0	41.5	7-12-16	Clay, slightly silty, tan mottled light yellowish-brown.
	9	45.0	46.5	8-13-19	Clay, slightly silty, tan mottled light yellowish-brown.
	10	50.0	51.5	7-8-15	Clay, slightly silty, tan mottled light yellowish-brown.
	11	55.0	56.5	9-9-11	Clay, slightly silty, tan mottled light yellowish-brown.
	12	60.0	61.5	6-9-12	Clay, very sandy, very silty, tan mottled grayish-brown to gray (to 66.0 feet).
11.2	13	65.0	66.5	7-18-32	Sand, coarse to medium, light brown.
20.5 87 ±	14	70.0	70.5	50/0.5	Gravel and sand, coarse to fine, slightly silty, brown.
	15	75.0	76.0	28-50/0.5	Gravel and sand, coarse to fine, slightly silty, brown.
	16	80.0	81.5	18-21-25	Gravel and sand, coarse, slightly silty, brown.
	17	85.0	86.5	32-40-50/0.4	Gravel and sand, coarse, slightly silty, brown.
19.5 1 /	18	90.0	91.0	29-43	Sand, fine to very fine, very silty, occasionally clayey, brown.
	19	95.0	96.5	18-39-50/0.3	Sand, very fine to fine, silty, variably clayey with numerous clay seams, brown.
	20	100.0	101.5	14-19-40	Sand, fine, slightly silty, slightly clayey, reddish-brown.
	21	105.0	106.5	24-16-49	Sand, very fine, very clayey, very silty, light reddish-brown to light gray mottled reddish-brown, variegated.
					Boring terminated @ 106.5 feet.

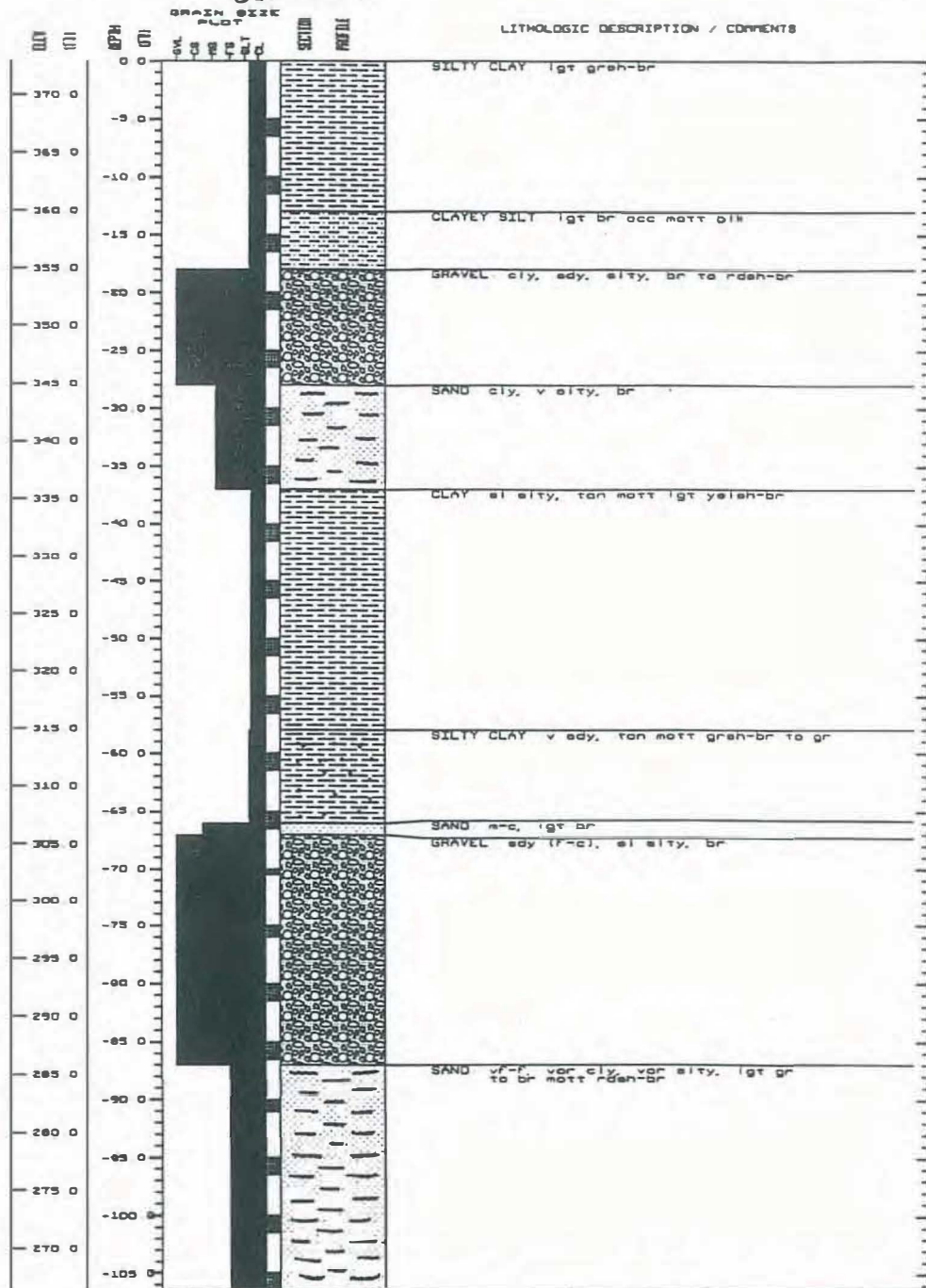
- * NUMBER OF BLOWS PER 6" INTERVALS, TO DRIVE 1-3/8 I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES
 • DENOTES SAMPLES ON WHICH GRAIN SIZE ANALYSES WERE PERFORMED.

MW 86

MW-86

GL = 372.03

TD = 107



C-404 cluster

Loc. Inside PGDP N Virginia Ave/6th St. Intersec

W 5945 - S 805

MAP B, D

CLUSTERED WITH MW 84, 85

Location Inside PGDP, C-404, (W5945 - S805)

MW-86

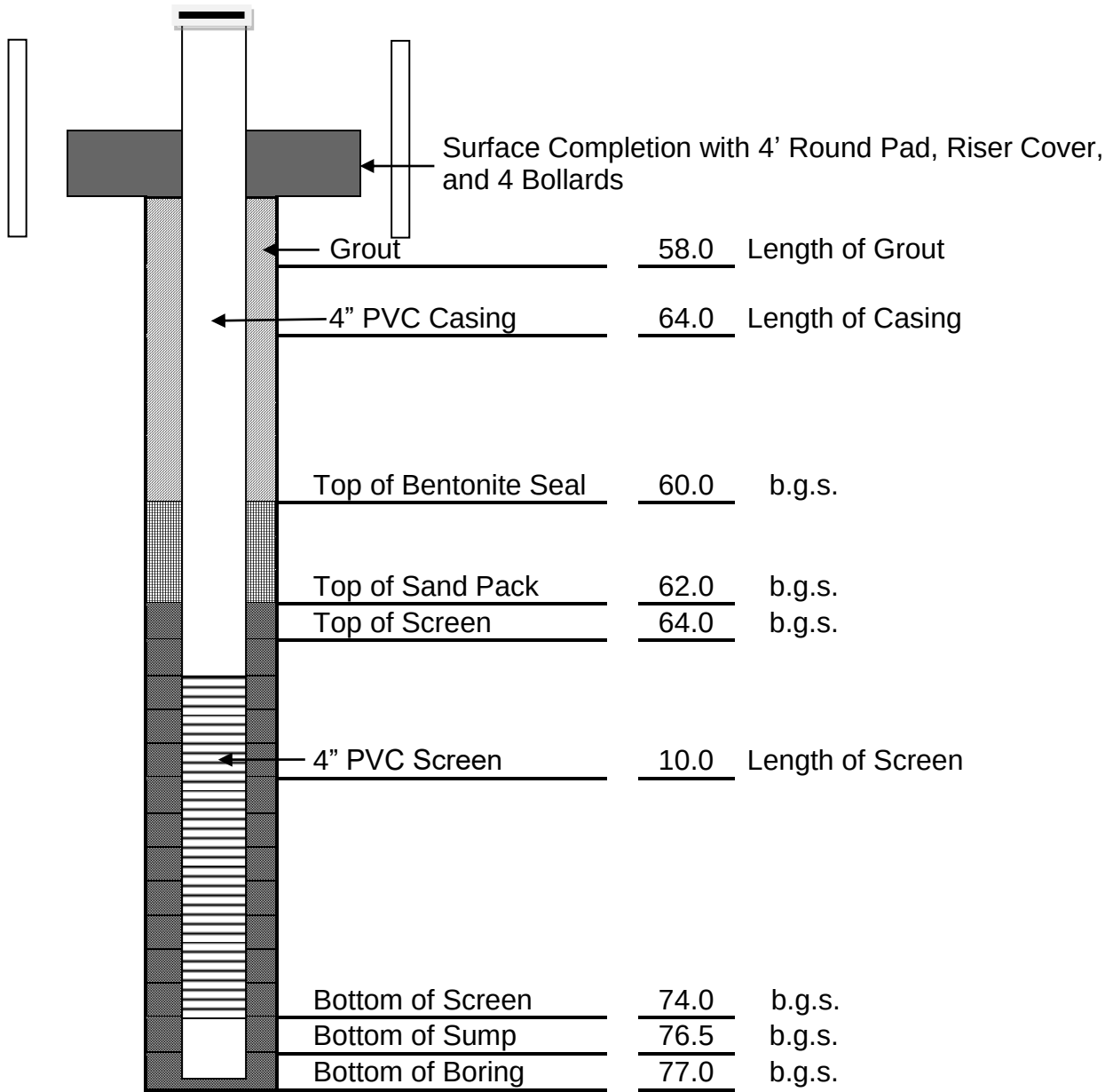
TD 106.5' (Driller)

GL 372.8'

ELEV (FT)	DEPTH (FT)	LITHOLOGY	Sample REC.	LITHOLOGIC DESCRIPTION / COMMENTS
370.0	0.0			No Sample
365.0	-5.0			Silty Clay lt. gray-brown
360.0	-10.0			
355.0	-15.0			Clayey Silt lt. brown with occasional black mottling
350.0	-20.0			Sandy Gravel clayey, silty, brown to red-brown
345.0	-25.0			
340.0	-30.0			Clayey Silty Sand cohesive, brown
335.0	-35.0			
330.0	-40.0			
325.0	-45.0			Clay slightly silty, mottled tan and lt. yellow-brown
320.0	-50.0			
315.0	-55.0			
310.0	-60.0			Sandy Clay silty, mottled tan and gray-brown
305.0	-65.0			Sand m-c, lt. brown
300.0	-70.0			Gravel and Sand sand c-f, slightly silty, brown
295.0	-75.0			
290.0	-80.0			Gravel and Sand sand c, slightly silty, brown
285.0	-85.0			
280.0	-90.0			Silty Sand f-vf, occasionally clayey, brown
275.0	-95.0			Silty Sand interbedded with clay, sand as above, brown
270.0	-100.0			Sand slightly silty, slightly clayey, f, red-brown
	-105.0			Silty Clayey Sand vf, mottled lt. gray and red-brown

MONITORING WELL CONSTRUCTION LOG

Location Name:	PGDP	State Assigned #	8007-4850
Address:	5600 Hobbs Road	AI #	3059
City/State/Zip:	Kevil, KY 42053	Facility Assigned #	MW-87A



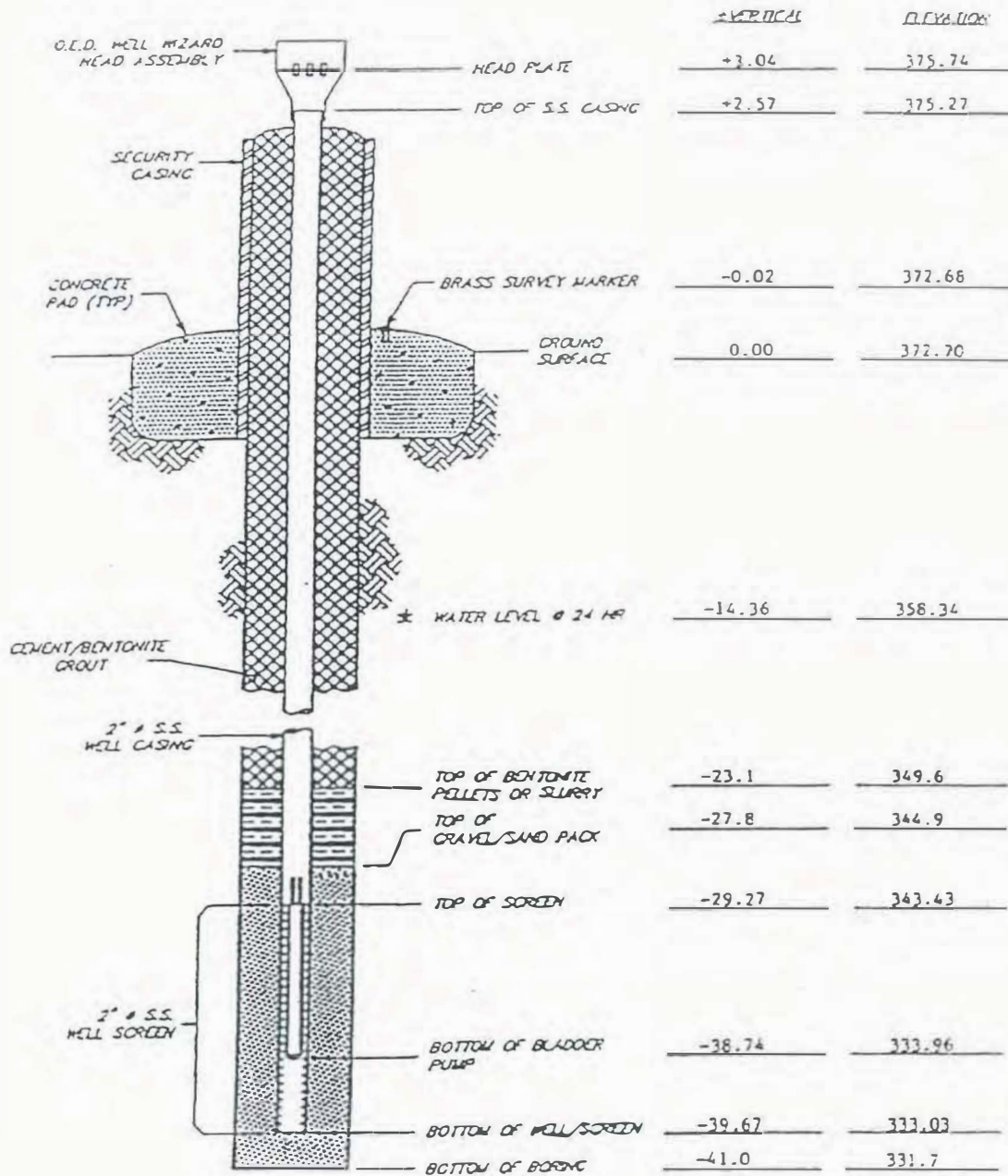
Depth to Groundwater	50	Total Depth of Boring (ft)	77.0	Total Depth of Well (ft)	76.5	Borehole Diameter	12.5
Well Diameter (in)	4.0	Slot Size (in)	0.010	Grout Type	Bentonite	Drilling in Consolidated	N/A
Date:	8-2-19	Completed By:	Todd W. Mills			Top of Casing	374.89

ceg CHASE
Environmental Group INC

Comments: Drawing not to scale.

Four bollards were installed around each well. This is a 2D depiction of the well; therefore, you only see two bollards.

MONITORING WELL NO. 6E
 MONITORING WELL COORDINATES 0805.09 S 5805.90 W
 INSTALLATION DATE 15 JULY 1966



PROJECT MARTIN MARIETTA ENERGY SYSTEMS
PADUCAH GASEOUS DIFFUSION PLANT, KENTUCKY
C-404 COMPLIANCE WELLS
PROJECT NO. ESO 16749/GWM PHASE 2

PROJECT NO. X619112

DATE

SURFACE ELEVATION 372.84
BOTTOM OF HOLE DEPTH 96.5 ELEV 276.34
BORING LOCATION C-404 north center cluster @ 804.135 5795.14W
COMPLETION DATE 7-13-88

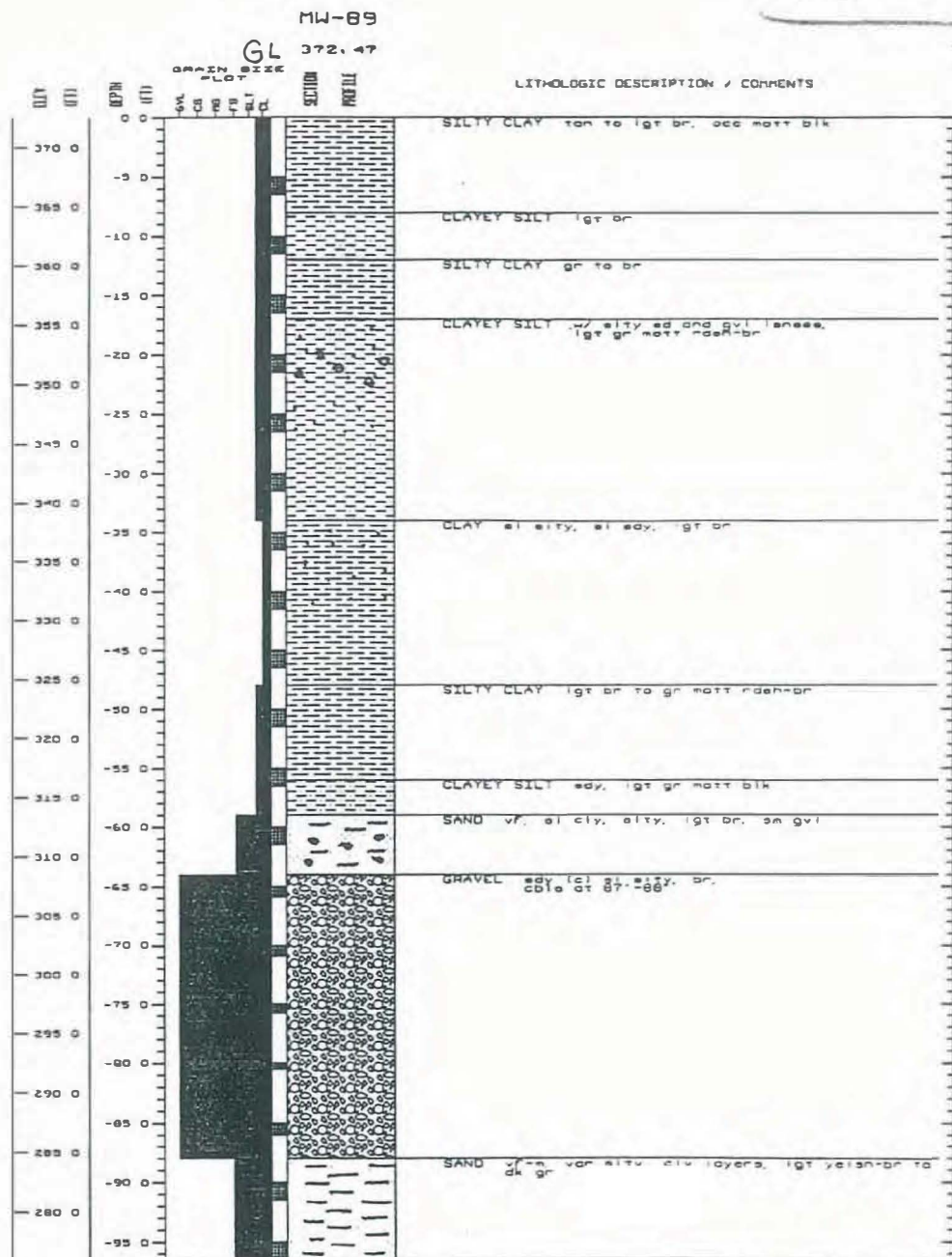
DRILLER R. Gossage
HELPER Geotek Staff
DRILLED FOR ESO 16749
RIG Mobile B-53
LOGGED BY W. S. Anderson

LITHOLOGY BREAK	SAMPLE NO.	DEPTH		SAMPLE BLOW*	DESCRIPTIONS AND REMARKS
		FROM	TO		
1-5	1	5.0	6.5	4-6-9	Clay, silty, tan to light brown, occasional mottled black (Loess).
	2	10.0	11.5	4-5-8	Silt, very clayey, light brown (Loess).
	3	15.0	16.5	5-8-10	Clay, very silty, gray to brown (Loess).
17 ± 17 3	4	20.0	21.5	4-10-10	Silt, very clayey with silty sand lenses and small gravel, light brown (Moist).
	5	25.0	26.5	7-8-13	Silt, very clayey, sandy, light gray mottled reddish-brown (Dry).
	6	30.0	31.5	20-27-31	Silt, slightly clayey, light gray mottled reddish-brown (Dry)(Dense).
25 3	7	35.0	36.5	6-7-7	Clay, slightly silty, slightly sandy, light brown (Moist/Highly cohesive)
	8	40.0	41.5	5-8-11	Clay, slightly silty, slightly sandy, light brown (Moist/Highly cohesive)
	9	45.0	46.5	8-13-17	Clay, slightly silty, slightly sandy, light brown (Moist/Highly cohesive)
	10	50.0	51.5	9-11-13	Clay, silty, light brown to gray mottled reddish-brown.
	11	55.0	56.5	6-6-7	Clay, silty, light brown (to 56.0 feet) then Silt, sandy, clayey, light gray mottled black
1.59 ±	12	60.0	61.5	9-19-22	Sand, very fine, silty, slightly clayey to clayey, light brown, small gravel @ 63.3 feet.
26 5	13	65.0	65.9	30-50/0.4	Gravel and coarse sand, slightly silty, brown.
	14	70.0	70.9	21-50/0.4	Gravel and coarse sand, slightly silty, brown.
	15	75.0	75.8	24-50/0.3	Gravel and coarse sand, slightly silty, brown.
	16	80.0	80.5	50/0.5	Gravel and coarse sand, slightly silty, brown.
	17	85.0	86.0	49-50/0.4	Sand, coarse with abundant gravel, silty, brown (very dense cobbles, gravel 87.0 to 88.0 feet).
88 ± 9.1 -	18	90.0	91.5	25-30-28	Sand, fine occasionally medium to very fine, variably silty, with clay stringers.
	19	95.0	96.5	12-8-15	Sand, fine to very fine, silty with very clayey layers, light yellowish-brown, occasionally dark gray.
					Boring terminated @ 96.5 feet.

- * NUMBER OF BLOWS PER 5" INTERVALS, TO DRIVE 1-3/8 I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES
• DENOTES SAMPLES ON WHICH GRAIN SIZE ANALYSES WERE PERFORMED.

MW 89

TCE = 2



Loc. inside PGDP N of Virginia Ave/6th ST

W 5795 - S 804

C-404 cluster

MAP B, D

Same Location
as MW 55, 56, 87, 88
Close to MW 72

* Part of Aquifer test (Terran, 1984)

ELEV (FT)	DEPTH (FT)	LITHOLOGY	Sample REC.	LITHOLOGIC DESCRIPTION / COMMENTS
	0.0			
370.0				No Sample
	-5.0			Silty Clay tan to lt. brown with occasional black mottling
365.0				
	-10.0			Clayey Silt lt. brown
360.0				
	-15.0			Silty Clay gray to brown
355.0				
	-20.0			Clayey Silt with sand and gravel interbeds, lt. brown, moist
350.0				
	-25.0			Clayey Silt with sand, mottled lt. gray and red-brown, dry
345.0				
	-30.0			Silt dense, slightly clayey, mottled lt. gray and red-brown, dry
340.0				
	-35.0			
335.0				
	-40.0			Clay cohesive, slightly silty and sandy, lt. brown, moist
330.0				
	-45.0			
325.0				
	-50.0			Silty Clay lt. brown to gray mottled red-brown
320.0				
	-55.0			
315.0				Sandy Silt clayey, lt. gray mottled black
	-60.0			Silty Sand variable clay, vf, lt. brown
310.0				
	-65.0			Gravelly Sand with silt, vf, lt. brown
305.0				
	-70.0			
300.0				Gravel and Sand sand c, slightly silty, brown
295.0				
	-75.0			
290.0				
	-80.0			
	-85.0			Gravelly Sand silty, c. brown
285.0				Gravel very dense cobbles
	-90.0			Sand and Clay Interbedded, sand f-vf, occasionally m
280.0				
	-95.0			Silty Sand vf-l, with very thin clay interbeds. lt. yellow-brown and occasionally dk. gray

Well No. MW90A	Installation: N/A	
Project No. N/A	Client/Project: BJC/C-404 Well Abandonment/Replacement	Site: PGDP/C-404
Contractor SAIC		Drill Contractor: Miller Government Services
Start Date: 10/17/2001	(1456 M)	End Date: 10/22/2001
		(1224 M)
Elev.: <u>374.46 (TOC)</u> Height: <u>3 ft</u> Elev.: <u>374.25 (WWP)</u> GS Elev. <u>372.41 (brass cap)</u> Protective CSG Material Type: <u>Steel</u> Diameter: <u>10"</u> Depth BGS: <u>2'</u> Weep Hole? (Y/N) <u>(N)</u> Guard Posts (Y/N) <u>(Y)</u> No. <u>2</u> Type <u>Steel</u> Surface Pad Composition and Size <u>4' x 4' Concrete</u> Riser Pipe Type <u>PVC, Schedule 40</u> Diameter <u>4"</u> Total Depth (TOC to TOS) <u>65'</u> Ventilated Cap (Y/N) <u>N/A</u> Grout Composition & Proportions <u>Pure Gold</u> Grout Type <u>Bentonite</u> Weight (lbs/gal.) <u>1.00 - 10.2</u> % Solids <u>30%</u> Tremied (Y/N) <u>(Y)</u> Yes Interval BGS <u>0' - 55'</u> Centralizers (Y/N) <u>(N)</u> Depth(s) <u>N/A</u> Seal Type <u>High Yield Western Bentonite 3/8" Pellets</u> Source <u>Pel Plug</u> Setup/Hydration Time <u>16 hours</u> Vol. Fluid Added <u>N/A</u> Tremied (Y/N) <u>(N)</u> Filter Pack Graduation Designation <u>#1 DSI Filter Sand</u> Grain Size <u>Analysis available in project file</u> Type <u>Sand</u> Amt. Used <u>8.5 bags</u> Tremied (Y/N) <u>(Y)</u> N/A Source <u>Available in project file</u> GR Size Dist <u>Analysis available in project file</u> Screen Type <u>PVC</u> Diameter <u>4"</u> Length <u>10'</u> Slot Size and Type <u>10-slot</u> Interval BGS <u>62' - 72'</u> Isolation Casing (Y/N) <u>(Y)</u> Type <u>PVC</u> Diameter <u>12"</u> Total Length <u>44'</u> Sump (Y/N) <u>(Y)</u> Interval BGS <u>72' - 75'</u> Bottom Cap (Y/N) <u>(Y)</u> Yes Backfill Plug Material <u>N/A</u> Setup/Hydration Time <u>N/A</u> Tremied (Y/N) <u>(Y)</u> N/A		

Monitoring Well 90A Construction Log.

U. S. DEPARTMENT OF ENERGY
 DOE OAK RIDGE OPERATIONS
 PADUCAH GASEOUS DIFFUSION PLANT

BECHTEL BECHTEL JACOBS COMPANY, LLC
 JACOBS MANAGED FOR THE US DEPARTMENT OF ENERGY UNDER
 US GOVERNMENT CONTRACT DE-AC-05-98OR22700
 Oak Ridge, Tennessee • Paducah, Kentucky • Portsmouth, Ohio

SAIC

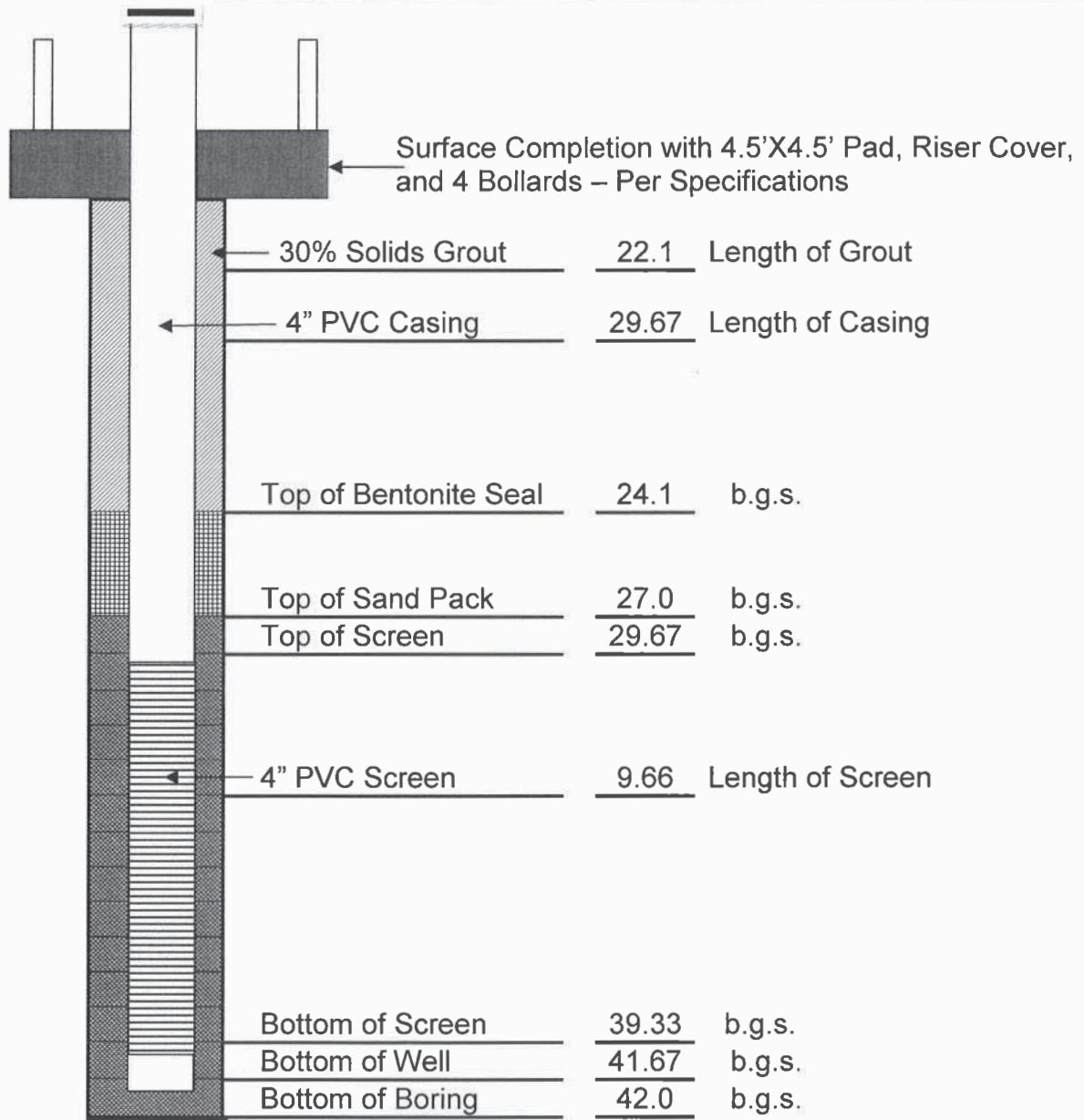
Science Applications
 International Corporation
 P.O. Box 2502
 Oak Ridge, Tennessee 37831

FIGURE No. c5ac90001sk147.ppt
 DATE 12-12-01

MONITORING WELL CONSTRUCTION LOG

Location Name: PGDP NE Plume
Address: 5600 Hobbs Road
City/State/Zip: Kevil, KY 42053

State Assigned # 8007-2917
AI # 3059
Facility Assigned # MW-91A



Depth to Groundwater	21.0	Total Depth of Boring (ft)	42.0	Total Depth of Well (ft)	41.67	Borehole Diameter	12.5
Well Diameter	4	Slot Size	0.010	Grout Type	Bentonite	Drilling in Consolidated	N/A
Date:	10-12-17	Completed By:	Todd W. Mills			Top Of Inside Casing	375.34

ceg CHASE
Environmental Group INC

Comments: Drawing not to scale.

PROJECT MARTIN MARIETTA ENERGY SYSTEMS
PADUCAH GASEOUS DIFFUSION PLANT, KENTUCKY
C-404 COMPLIANCE WELLS
PROJECT NO. ESO 16749/GWM PHASE 2

PROJECT NO. X619112DATE 6-13-88

SURFACE ELEVATION 371.8
 BOTTOM OF HOLE DEPTH 91.0 ELEV 280.8
 BORING LOCATION Northeast cluster @ 805.26 5645.00 W
 COMPLETION DATE 6-15-88

DRILLER R. GossageHELPER Geotek StaffDRILLED FOR ESO 16749RIG Mobile B-53LOGGED BY W. S. Anderson

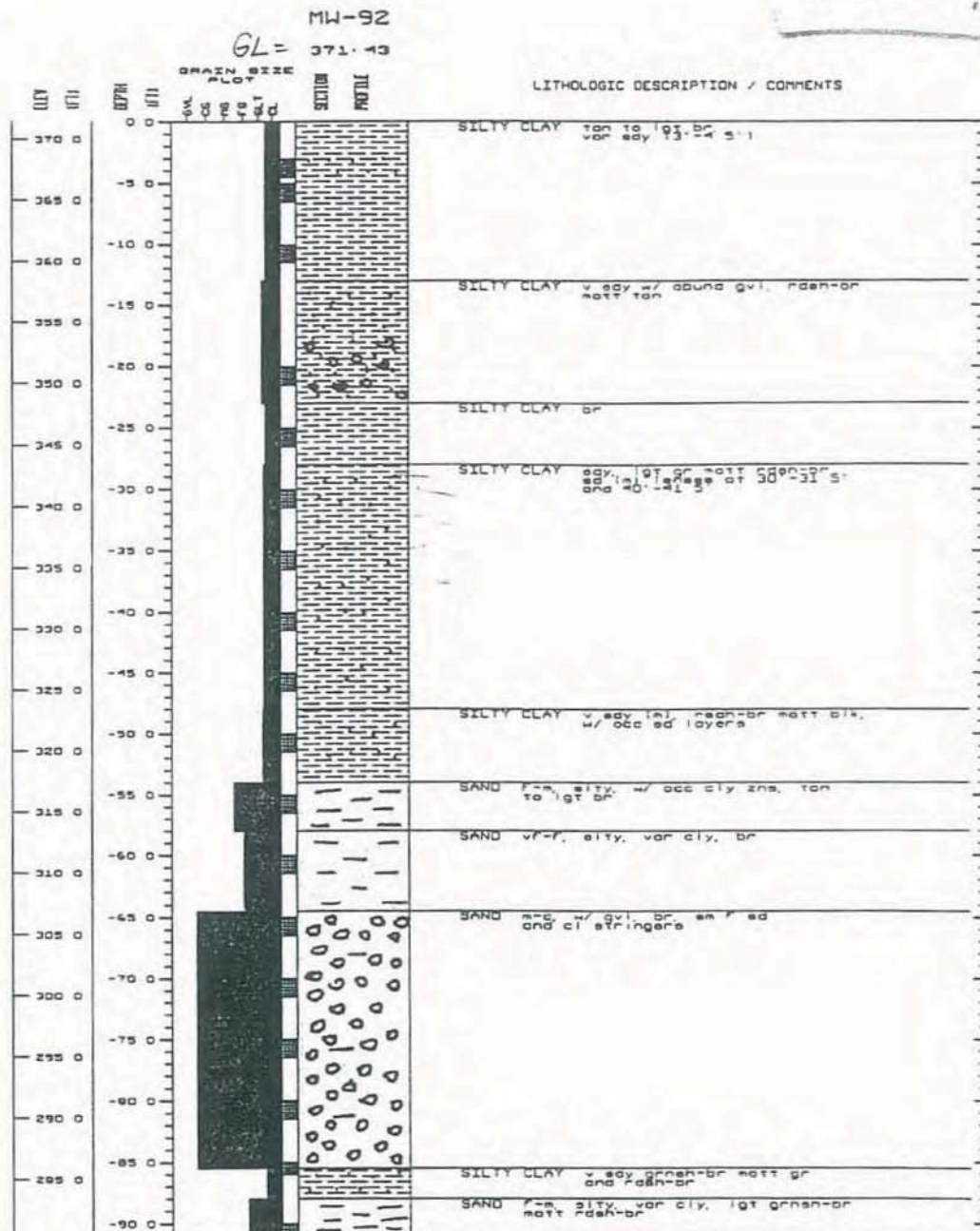
LITHOLOGY BREAK	SAMPLE NO.	DEPTH		SAMPLE BLOW*	DESCRIPTIONS AND REMARKS
		FROM	TO		
17 13 ±	1	3.0	4.5	6-9-13	Clay, silty, variably sandy, light brown (Loess).
	2	5.0	6.5	5-5-7	Clay, silty, light brown to tan (Loess).
	3	10.0	11.5	6-8-9	Clay, silty, light brown to tan (Loess).
0 (2) 4 (3) 54 ±	4	20.0	21.5	16-18-13	Clay, very silty, very sandy with abundant gravel, reddish-brown mottled tan.
	5	25.0	26.5	9-13-13	Clay, silty, brown.
	6	30.0	31.5	19-23-27	Clay, very silty, sandy, light yellowish-brown with sand (medium) lenses.
	7	35.0	36.5	7-9-14	Clay, very silty, sandy, light gray to gray mottled reddish-brown.
	8	40.0	41.5	10-14-22	Clay, slightly silty, brown with occasional sand seams.
	9	45.0	46.5	14-21-29	Clay, silty, sandy, brown.
	10	50.0	51.5	8-3-20	Clay, very sandy (medium), very silty, reddish-brown mottled black with occasional sand seams.
10.5 ± 64.5 ±	11	55.0	56.5	9-16-25	Sand, fine to medium, silty with occasional clayey zones, tan to light brown.
	12	60.0	61.5	10-15-16	Sand, fine to very fine, silty, variably clayey, brown.
21 ± 85.5	13	65.0	66.5	28-35-50/0.4	Sand, (coarse) and gravel with occasional seams of fine sand, very silty, brown.
	14	70.0	71.5	16-18-50/0.3	Sand, coarse to medium with gravel, brown.
	15	75.0	76.5	19-25-30	Sand, coarse, slightly silty with occasional diagonal clay stringers, brown.
	16	80.0	81.5	21-50/0.3	Sand, coarse to medium with abundant gravel, brown.
	17	85.0	86.0	26-27	Sand, coarse to medium with gravel, brown (to 85.5 feet) then Clay, very sandy, very silty, greenish-brown mottled gray and reddish-brown.
1-1-1	18	90.0	91.0	28-50/0.5	Sand, fine to medium, variably clayey, silty, light greenish-brown mottled reddish-brown.
					Boring terminated @ 91.0 feet.

* NUMBER OF BLOWS PER 6" INTERVALS, TO DRIVE 1-3/8 I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES

• DENOTES SAMPLES ON WHICH GRAIN SIZE ANALYSES WERE PERFORMED.

MW 92

TD = 1



C-404 cluster

Loc. Inside P6DP, Virginia / 6th Intersection

W 5645 - S 805

MAP B, D

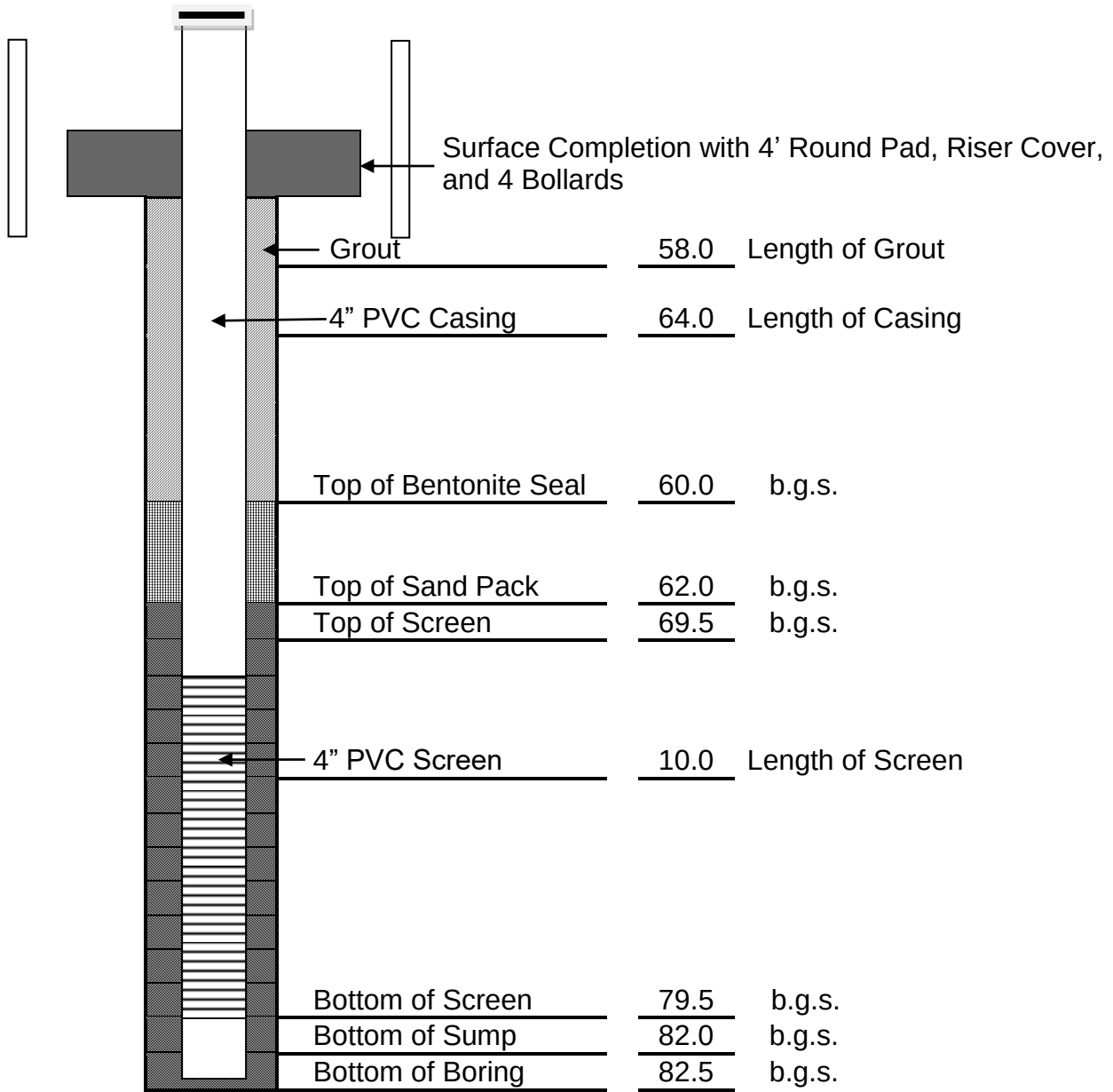
Loc. near MW 75

Twins to MW 90, 91

ELEV (FT)	DEPTH (FT)	LITHOLOGY	Sample REC.	LITHOLOGIC DESCRIPTION / COMMENTS
370.0	0.0			No Sample
365.0	-5.0			Silty Clay variably Sandy, lt. brown
360.0	-10.0			
355.0	-15.0			
350.0	-20.0			Silty Clay with sand and gravel, mottled tan and red-brown
345.0	-25.0			Silty Clay brown
340.0	-30.0			Sandy Clay interbedded with sand, m, lt. yellow-brown
335.0	-35.0			Sandy Clay with silt, mottled lt. gray to mottled gray and red-brown
330.0	-40.0			Clay with occasional sand interbeds, slightly silty, brown
325.0	-45.0			Sandy Clay with silt, brown
320.0	-50.0			Sandy Clay with silt and occasional sand interbeds, red-brown
315.0	-55.0			Silty Sand f-m, with occasional clayey zones, tan to lt. brown
310.0	-60.0			Silty Sand f-vf, variably clayey, brown
305.0	-65.0			Sand and Gravel occasional sand interbeds, silty, brown
300.0	-70.0			Sand and Gravel sand c-m, brown
295.0	-75.0			Sand c, slightly silty with occasional diagonal clay stringers, brown
290.0	-80.0			Sand and Gravel sand c-m, brown
285.0	-85.0			Sandy Clay with silt, green-brown mottled gray and red-brown
	-90.0			Silty Sand f-m, variably clayey, lt. green-brown and red-brown

MONITORING WELL CONSTRUCTION LOG

Location Name:	PGDP	State Assigned #	8007-4851
Address:	5600 Hobbs Road	AI #	3059
City/State/Zip:	Kevil, KY 42053	Facility Assigned #	MW-93A



Depth to Groundwater	50	Total Depth of Boring (ft)	82.5	Total Depth of Well (ft)	82.0	Borehole Diameter	12.5
Well Diameter (in)	4.0	Slot Size (in)	0.010	Grout Type	Bentonite	Drilling in Consolidated	N/A
Date:	8-2-19	Completed By:	Todd W. Mills			Top of Casing	378.20

ceg CHASE
Environmental Group INC

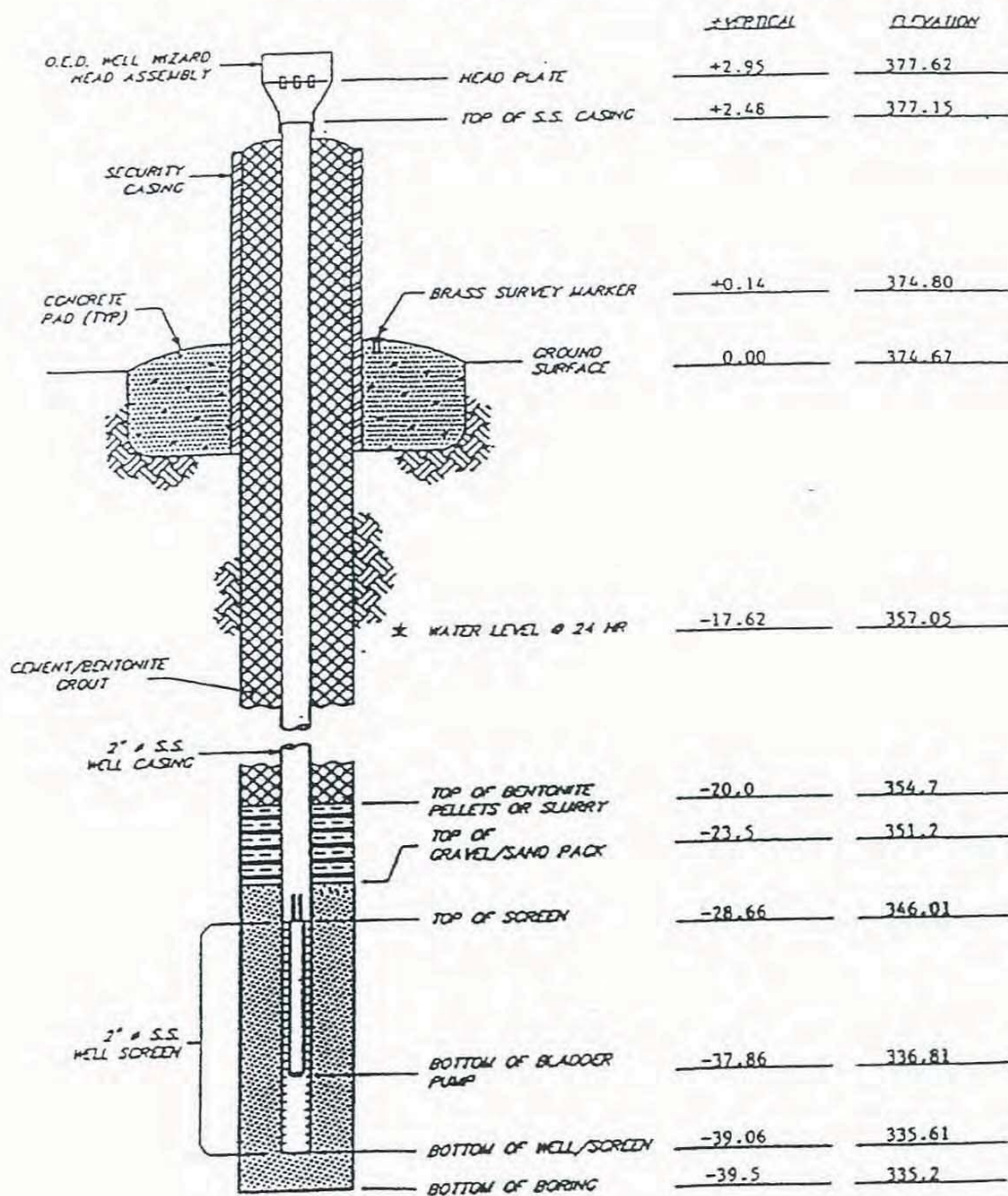
Comments: Drawing not to scale.

Four bollards were installed around each well. This is a 2D depiction of the well; therefore, you only see two bollards.

MONITORING WELL NO. 94

MONITORING WELL COORDINATES 1028.64 S 5979.52 W

INSTALLATION DATE 17 AUGUST 1986



PROJECT MARTIN MARIETTA ENERGY SYSTEMS
PADUCAH GASEOUS DIFFUSION PLANT, KENTUCKY
C-404 COMPLIANCE WELLS
PROJECT NO. ESO 16749/GWM PHASE 2

PROJECT NO. X619112
DATE 8-11-88

SURFACE ELEVATION 376.36
BOTTOM OF HOLE DEPTH 101.5 ELEV 274.86
BORING LOCATION Up-gradient cluster @ 1028.74 S. 5964.35 W
COMPLETION DATE 8-12-88

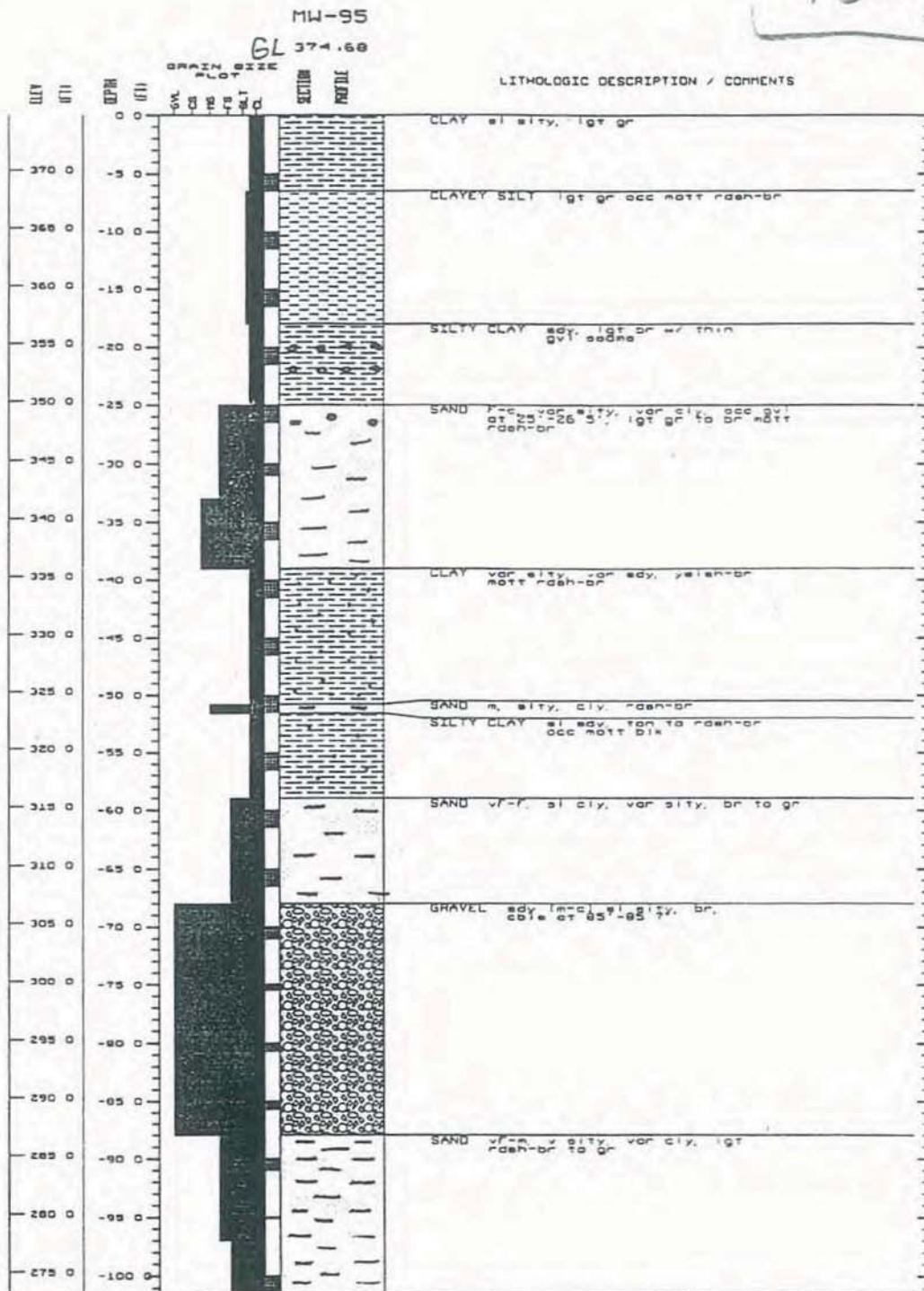
DRILLER R. Gossage
HELPER S. Ernest/S. Gaylor
DRILLED FOR ESO 16749
RIG Mobile B-53
LOGGED BY W. S. Anderson

LITHOLOGY BREAK	SAMPLE NO.	DEPTH		SAMPLE BLOW*	DESCRIPTIONS AND REMARKS
		FROM	TO		
25 18 ±	1	5.0	6.5	6-6-8	Clay, slightly silty, light gray, unstratified (Loess).
	2	10.0	11.5	5-6-7	Silt, clayey, light gray occasional mottled reddish-brown (Loess).
	3	15.0	16.5	5-7-10	Silt, clayey, light gray occasional mottled reddish-brown (Loess).
25.0 ±	4	20.0	21.5	8-9-15	Clay, very silty, very sandy, light brown with thin gravel seams (moist, wet tube).
14 39.0	5	25.0	26.5	21-27-31	Sand, fine to medium, variably silty, occasionally clayey with thin gravel seams (wet).
	6	30.0	31.0	23-50/0.5	Sand, very clayey, very silty with silt seams, light gray to brown mottled reddish-brown (moist).
	7	35.0	36.5	18-31-50/0.3	Sand, coarse to medium, occasionally fine to very fine, light brown to brown.
21 50.8	8	40.0	41.5	8-13-18	Clay, slightly silty, slightly sandy, light yellowish-brown mottled reddish-brown (very cohesive).
	9	45.0	46.5	7-12-15	Clay, silty, sandy, light yellowish-brown (cohesive).
	10	50.0	51.5	8-9-21	Clay, silty, sandy, light yellowish-brown (cohesive) (to 50.8 feet), then
51.6 ±					Sand, medium, clayey, silty, reddish-brown.
59.0	11	55.0	56.5	6-6-7	Clay, silty, slightly sandy, tan to reddish-brown occasionally mottled black.
9 68.0	12	60.0	61.5	5-14-23	Sand, fine to very fine, slightly silty, brown with occasional clay seams
	13	65.0	66.5	13-21-32	Sand, fine to very fine, variably silty with clay seams, light brown to gray
7 88.0	14	70.0	71.0	38-50/0.5	Sand, medium to coarse and gravel, brown, slightly silty.
	15	75.0	75.5	81/0.5	Probably dense gravel and sand. (No recovery.)
	16	80.0	80.7	48-50/0.2	Gravel, sandy (coarse to medium), brown.
	17	85.0	85.7	120-50/0.2	Gravel and cobbles, sandy (coarse to medium), brown.
13 100.0	18	90.0	91.0	27-39	Sand, fine to medium, occasionally very fine, very silty, variably clayey, reddish-brown.
	19	95.0	95.0	inside augers NA	Two attempts (sample of pipe-in), Sand, fine to medium, silty, brown.
	20	100.0	101.5	5-12-26	Sand, fine to very fine, very silty with clay seams brown to gray.
					Boring terminated @ 101.5 feet.

- * NUMBER OF BLOWS PER 6" INTERVALS, TO DRIVE 1-3/8 I.D., 2" O.D. SPLIT BARREL SAMPLER WITH 140 POUND HAMMER FALLING 30 INCHES
• DENOTES SAMPLES ON WHICH GRAIN SIZE ANALYSES WERE PERFORMED.

MW 95

TD=102



C-404 cluster
Loc. Inside PGDP near Virginia Ave/6th st. intersect

W 5964 - S 1029

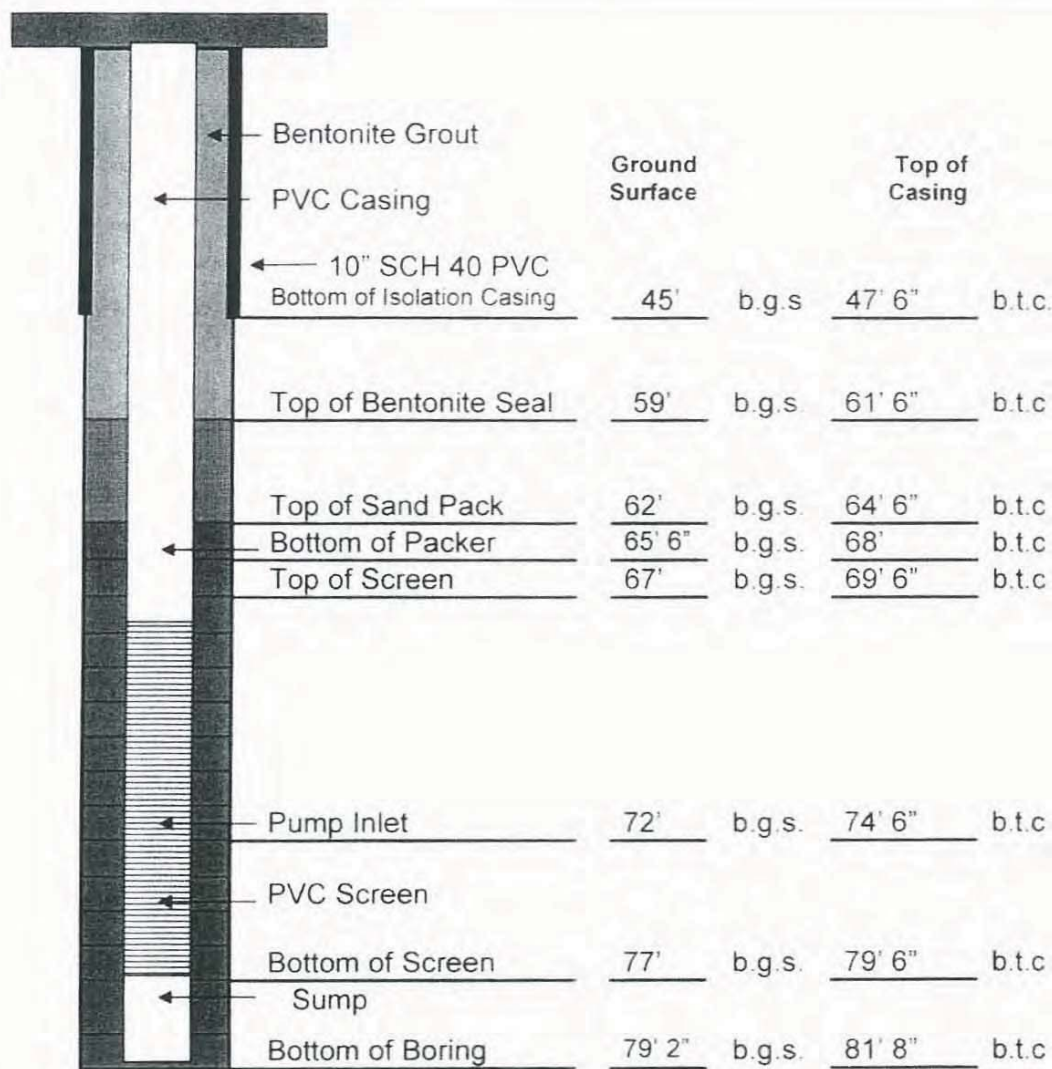
MAP B,D

Loc Near MW 46, 47
Twin to MW 93, 94

ELEV (FT)	DEPTH (FT)	LITHOLOGY	Sample REC.	LITHOLOGIC DESCRIPTION / COMMENTS
	0.0			No Sample
370.0	-5.0			Clay slightly silty, lt. gray
365.0	-10.0			Clayey Silt lt. brown with occasional red-brown mottling
360.0	-15.0			
355.0	-20.0			Sandy Clay with gravel and silt, lt. brown, moist
350.0	-25.0			Sand f-m, variably silty, with gravel interbeds, wet
345.0	-30.0			Clayey Silty Sand lt. gray to mottled brown and red-brown, moist
340.0	-35.0			Sand c-m, occasionally f-vf, lt. brown to brown
335.0	-40.0			Clay cohesive, slightly silty, slightly sandy, mottled lt. yellow-brown and red-brown
330.0	-45.0			Clay cohesive, silty, sandy, lt. yellow-brown
325.0	-50.0			Clayey Silty Sand m, red-brown
320.0	-55.0			Silty Clay slightly sandy, tan to red-brown occasionally mottled black
315.0	-60.0			
310.0	-65.0			Sand interbedded with clay, sand vf-f, slightly silty, lt. brown to gray
305.0	-70.0			Sand and Gravel sand m-c, slightly silty, brown
300.0	-75.0			
295.0	-80.0			Sandy Gravel sand m-c, brown
290.0	-85.0			
285.0	-90.0			Silty Sand f-m, variably clayey, red-brown
280.0	-95.0			Silty Sand f-m, brown (piped in @ 95 ft.)
275.0	-100.0			Silty Sand vf-f, interbedded with clay, brown to gray

MONITORING WELL CONSTRUCTION LOG

Location Name:	Paducah Gaseous Diffusion Plant	State Assigned #	8005-3263
Address:	5600 Hobbs Road	Facility Assigned #	MW-420
	West Paducah, KY 42053		



Depth to Groundwater		Total Depth of Boring (ft)	79' 2"	Total Depth of Well (ft)	79' 2"	Borehole Diameter	10" from 0 to 45'
Well Diameter	4"	Slot Size	.010	Drilling Unconsolidated	X		8" from 45' to 79' 2"
Continuous Split Spoon Sampling (LF)	0' to 79'	Random SS Samples					
Date	12/4-5/07	Completed By	Mark Gartner				
 CHASE ENVIRONMENTAL GROUP, INC. environmental engineering, remediation & consulting			Comments: Drawing not to scale				
			The 8" casing is 2' 6" above the ground surface				
			b.t.c. = below the top of casing b.g.s. = below ground surface				
			Draft				

LITHOLOGIC LOG			BORING/WELL ID MW-420		Page 1 of 2
Facility: Paducah Gaseous Diffusion Plant, Paducah, KY			Site: SWMU- C-404		
Project: BGOU RI			Client: USDOE/PRS		
Drilling Contractor: Chase Environmental, LLC			Driller: Michael Coleman/Jeff Brownfield		
Start Time/Date: 10:28 / 12-4-07			End Time/Date: 12-5-07		
Borehole Diameter (BHD): 0 TO 45' is 10" BHD & 45 to 79' is 8" BHD			Drilling Method: Multi-Case Override System		
Sampling Method: Continuous Soil Sampling			Drill Rig: Boart Longyear - SR-150		
Total Depth (Vertical): 79 feet and 2 inches			Angle: Vertical		
Logged By: Mark Gartner			Protective Level: Modified Level D		
Coordinates: E N			Kentucky Monitoring Well Tag: 8005-3263		
Depth (ft)	SAMPLE		LITHOLOGIC DESCRIPTION	GRAPHIC LOG	COMMENTS
	INTERVAL	NUMBER			
0			CLAY from 0 to 7', light brown, 7.5YR 6/3, soft, moist, gray and orange streaks with black platy organic layers		10:28 / 12-4-07
4					
8			CLAY from 7 to 20', light brown, 7.5YR 5/6, stiff, moist, gray and orange streaks with black platy organic layers		10:42
12					
16					
20			CLAY from 19 to 22', light brown, 7.5YR 5/6, stiff, moist, gray and orange streaks, black platy organic layers, with 5% sand		10:54
			SAND from 22-23', fine grained, dark red and well sorted		
24			SAND, CLAY and CHERT from 23-27', sand, poorly sorted, from fine grained to 1" across, clay, tan, firm, moist, Chert, angular and up to 1" across		
			CLAY from 27-35', light brown, (7.5YR 6/6), stiff, mottled, gray and orange streaks, with a few chert pebbles up to 1/4" across		
28					
32					
			SAND, CLAY, CHERT from 35 to 37', sand (50%), gray, fine grained, clay (40%), light brown, (7.5YR 6/6), firm, moist, chert (10%), up to 1/4" across		
36			CLAY from 37 to 45', light brown, (7.5YR 6/6), very soft, moist		11:15
40					
44			SAND and CLAY from 45 to 47', sand (60%), fine grained, reddish brown, clay (40%), light brown, (7.5YR 6/6), very soft, moist		
					11:35

LITHOLOGIC LOG				BORING/WELL ID MW-420		Page 2 of 2
Facility: Paducah Gaseous Diffusion Plant, Paducah, KY				Site: SWMU- C-404		
Project: BGOU RI				Client: USDOE/PRS		
Drilling Contractor: Chase Environmental, LLC				Driller: Michael Coleman/Jeff Brownfield		
Start Time/Date: 10:28 / 12-4-07				End Time/Date: 12-5-07		
Borehole Diameter (BHD): 0 TO 45' is 10" BHD & 45 to 79' is 8" BHD				Drilling Method: Multi-Case Override System		
Sampling Method: Continuous Soil Sampling				Drill Rig: Boart Longyear - SR-150		
Total Depth (Vertical): 79 feet and 2 inches				Angle: Vertical		
Logged By: Mark Gartner				Protective Level: Modified Level D		
Coordinates: E N				Direction (plant grid): N/A		
Depth (ft)	SAMPLE		LITHOLOGIC DESCRIPTION	GRAPHIC LOG	COMMENTS	
	INTERVAL	NUMBER				
48			CLAY from 47 to 50', light brown, (7.5YR 6/6), very soft, 50% recovery			
			SAND, 50 to 51', very fine grained, dark red, well sorted			
52			CLAY and SAND from 51 to 53', clay (60%), dark red, soft, sand (40%), very fine grained, dark red, well sorted			
			SAND, 53 to 63', light brown, fine grained, well sorted			
56					11:48	
60						
			CLAY from 63 to 67', light brown, (7.5YR 6/6), firm, moist, gray and orange steaks, with sand (5%), fine grained, light brown			
64						
			SAND to GRAVEL from 67 to 79', sand ranged from a very fine grained sand up to coarse gravel, light brown, the chert is angular to sub angular, up to 3" across and 1" in thickness.			
68					12:12	
72						
76						
					12:54 / 12-4-07	
80			Total Depth is 79 feet 2 inches. Completed on 12-4-07			
			LEGEND: CLAY			
			SAND			

APPENDIX E3

MONITORING WELL REQUIREMENTS

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CONTENTS

1. GROUNDWATER SAMPLING	E3-5
1.1 SAMPLE CHAIN-OF-CUSTODY	E3-5
1.2 TEMPERATURE CONTROL FOR SAMPLE STORAGE	E3-7
1.3 WATER LEVEL MEASUREMENTS	E3-7
1.4 GROUNDWATER SAMPLING.....	E3-9
1.5 FIELD QUALITY CONTROL	E3-12
1.6 SAMPLE TRACKING AND HANDLING GUIDANCE	E3-15
2. WELL ABANDONMENT.....	E3-16
2.1 PROCEDURES FOR WELL ABANDONMENT	E3-16
2.2 BENTONITE.....	E3-17
2.3 BENTONITE SLURRY	E3-17
3. EQUIPMENT CLEANING AND DECONTAMINATION.....	E3-17

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1. GROUNDWATER SAMPLING

1.1 SAMPLE CHAIN-OF-CUSTODY

Initiation and Completion of Chain-of-Custody Form

Chain-of-custody is required for analytical samples to provide traceability of possession from initial sample collection through sample transfer and/or final disposition. The field sampler is responsible for the proper handling and custody of the samples collected until they are properly and formally transferred to another person or the laboratory. To simplify the chain-of-custody record, as few people as possible should handle samples.

Chain-of-custody procedures are **not** required for transfer of samples between field personnel or between lab personnel in same work group.

All entries on chain-of-custody forms shall be made using black indelible ink.

Chain-of-custody forms are generated from the Paducah Project Environmental Measurements System (Paducah PEMS). In the event Paducah PEMS is not accessible and sampling is required, a Paducah PEMS-equivalent chain-of-custody shall be used.

The following steps are performed to meet chain-of-custody requirements.

1. Generate the chain-of-custody record prior to sampling with the appropriate information to uniquely identify the sample.
2. Enter the following information (prior to sampling event, if possible):
 - Matrix of sample
 - Project number or name
 - Unique sample identification number
 - Sampling description and location
 - Type of sample collected (i.e., grab or composite)
 - Number of sample containers
 - Storage and preservation requirements
 - Parameters to be analyzed
 - Sample team member
 - Name of the laboratory
 - Any pertinent information in “Remarks” or “Comments” section
3. Complete the chain-of-custody information at the time of the sampling event by recording the following information at this time:
 - Date and time sampled (military time)
 - Volume of sample (if required for specific analysis and calculations)

NOTE: “Positive control” requires one or more of the following:

- Physical possession
 - Visual control/oversight
 - Tamper prevention
 - Secured storage (i.e., lock and key)
4. Maintain positive control of samples and forms from collection until transfer to another custodian.
 5. Apply custody seals, if applicable, to each container in a manner such that it can be visibly observed if tampering has occurred.
 6. Sign the form as “relinquished by” **AND** enter the date and time.
 7. Transfer the samples and the chain-of-custody forms to another custodian or to the laboratory.
 8. Sign the form as “received by” **AND** enter the date and time.
 9. Maintain positive control of samples and forms from collection until transfer to another custodian.

Initiation and Completion of Sample Labels

Sample labels are required for analytical samples to provide identification of samples collected.

All entries on sample labels shall be made using black indelible ink.

Sample labels are generated from Paducah PEMS. In the event Paducah PEMS is not accessible and sampling is required, a Paducah PEMS-equivalent sample label shall be used.

1. Prepare the sample labels prior to sampling with the appropriate information to uniquely identify sample.
2. Enter the following information (prior to sampling event, if possible):
 - Matrix of sample
 - Project number
 - Unique sample identification number
 - Sampling description
 - Location
 - Storage and preservation requirements
 - Sample team member
 - Name of the laboratory
3. Complete the label information at the time of the sampling event by recording the following information at this time:
 - Date and time sampled (military time)

1.2 TEMPERATURE CONTROL FOR SAMPLE STORAGE

Preperformance Activities

1. Refrigeration areas will be inspected on normal working days to assure temperature requirements are met.
2. Compliance will be assumed for non-working days if the days immediately preceding and following the non-working days are in compliance.

Documentation of the Temperature for Refrigerators with Automatic Temperature Recorders

1. Place the thermometer in water or glycerin in the refrigerator when the refrigerator is installed for sample storage.
2. Position the thermometer in an area representative of the overall temperature of the refrigerator.
3. Remove the recording disc on the refrigerator according to manufacturer's instructions.
4. Note the date and time the disc was removed on the sheet and initial it.
5. File the recording disc with the project records.
6. Note date, time, and initials on a fresh disc and insert it into the recorder according to the manufacturer's instructions.
7. In the event that the temperature leaves the $\leq 6^{\circ}\text{C}$ range, the temperature will be adjusted according to the manufacturer's instructions or the samples shall be moved to another refrigeration unit.

Documentation of the Temperature for Refrigerators without Automatic Temperature Records

1. Place a thermometer inside the refrigerator, position it in an area representative of the overall temperature of the refrigerator.
2. Verify proper temperature control per CP4-ES-0043, *Temperature Control for Sample Storage*, or most current version.

1.3 WATER LEVEL MEASUREMENTS

Preperformance Activities

1. Ensure the water level meter has been decontaminated per Section 3, Equipment Cleaning and Decontamination, prior to use.
2. Check water level verification date located on the side of the water level indicator.
3. To ensure water level measurement accuracy, a steel measuring tape will be used to check each electrical measuring device (depth indicators). This test will be performed at least once per year. The steel tape end is placed at the end of the water-sensitive electrode. Compare 100 ft of steel tape alongside 100 ft of depth indicator cable. Measurements should be within ± 0.01 ft. Remove depth indicators from field service that do not meet designated tolerance. Replace old cable with new cable and repeat for accuracy.

4. The reference mark should be tied in with a vertical control point and only this reference mark should be used.
5. **IF** no reference mark is present, **THEN** establish a reference by filing a “V” notch on the north side of the well casing, being careful that cuttings do not fall into the well, **AND** note the use of this location **AND** notify the supervisor.

Taking Measurements with Electronic Water Level Indicator

Water level measurements are routinely collected by the same environmental monitoring specialist using the same equipment in groups of wells that are close in proximity.

Electric tapes are normally coiled on a hand-cranked reel unit containing batteries and a device which signals when the circuit is closed as the probe contacts water. Electrical methods are preferred over other methods, such as steel measuring tape.

An electric tape may not respond to an oil surface, causing the fluid level determined to be different from one determined using a steel tape. The difference between the two measurements depends on the amount of oil floating on the water.

Independent electric tape measurements of static water levels using the tape should agree to within ± 0.01 ft for depths of less than about 200 ft. At greater depths, independent measurements may not be as accurate. For a depth of about 500 ft, the maximum difference of independent measurement using the same tape should be within ± 0.1 ft. A steel measuring tape will be used annually (at least) to check the accuracy of the electrical measuring device.

1. **IF** the water level measurement can be made without the complicating situations described in Steps 2, 3, and 4, **THEN** proceed with Step 5. **IF NOT, THEN** proceed with Steps 2, 3, or 4, as applicable.
2. **IF** water is dripping rapidly or flowing into a well, which makes an accurate reading difficult or impossible to obtain, **THEN** add a rubber or plastic boot above or around the water level indicator probe **AND** ensure that the boot is positioned so that air entrapped by the boot will not prevent the probe from making contact with the water at the water table.
3. **IF** a well has a layer of oil floating on the water, **THEN** use an oil-water interface probe to permit detection of the surface of the uppermost fluid as well as the water level.
4. **IF** a well contains immiscible contaminants, **THEN** use special procedures for the measurement of fluid levels.
5. Check the response of the audible or visible alarm by dipping the probe in potable water to ensure that the signaling device responds to probe submergence **OR** check the alarm using a test button/switch on instruments equipped with this feature.
6. Slowly lower the electronic water level indicator probe into the well.
7. Stop lowering the probe when the alarm sounds and/or the red light illuminates.
8. Pull up on the probe until the alarm no longer sounds.
9. Stop at the instant the alarm sounds and/or the light comes on and stays on.

10. Grasp the cord with thumb and forefinger where it touches the reference mark.
11. Repeat Steps 6 through 10 until a consistent reading is obtained for at least three consecutive water level measurements. If three consistent readings cannot be obtained, then contact the field operations manager for further instruction.
12. Record the measurement from the electric tape to the nearest 0.01 ft as the depth of water level in that well.
13. Remove the measuring tape from the well.
14. Close **AND** lock the well cap.

Postperformance Activities

1. Decontaminate the electric tape between each water level event (i.e., between each well) according to Section 3, Equipment Cleaning and Decontamination.
2. Contact radiation protection to monitor all equipment for radioactivity that has been used in a contamination control zone before being released from the Paducah Site. This monitoring includes any equipment leaving the Paducah Site for maintenance or repairs. Radiation screening will be maintained by continuous field screening and through periodic wipe sampling. Additional details are provided in the site-specific health and safety plan.

1.4 GROUNDWATER SAMPLING

Preperformance Activities

1. Calibrate water quality meters for water quality parameters.
2. Prepare the necessary sample containers.
3. Prepare field quality control samples.

Methods of Sampling

The following methods of sampling are described in this section.

- Groundwater Sampling Using Bladder Pumps
- Groundwater Sampling of Electric Well Pumps (Residential Wells)
- Groundwater Sampling Using a Bailer

For operation of the pump cycle control box, refer to the operator manual as necessary.

The discharge of the water quality meter should be positioned so it drains into a beaker or an equivalent container.

Stabilization criteria are as follows: water quality parameters have stabilized within approximately 10% over the last two consecutive measurements that are three minutes apart. (Turbidity is considered stabilized if subsequent measurements agree within 10% or the measurements are less than 10 NTUs.) Collection of samples will begin only after stabilization of water quality parameters is obtained.

Groundwater Sampling Using Bladder Pumps

1. Upon arriving at the sampling site, visually inspect well before any sampling activities begin.
2. Note any damage or unusual circumstances (evidence of tampering, vandalism, etc.) on the MW Groundwater Data Form, and contact the project manager if damage or unusual circumstances are present.
3. Open the well cap or lid and note the condition of the casing and fitting.
4. Don a clean pair of latex or nitrile type gloves, retrieve the discharge tubing from the well, and connect to the wellhead.
5. If tubing comes in contact with the ground, it must be decontaminated before being put back into the well.
6. Connect discharge tubing from the wellhead to the sampling board.
7. Place insulation on the discharge tube.
8. Determine the static water level using a water level meter according to Section 1.3.
9. Record this information on the MW Groundwater Data Form.
10. Set up the pump cycle control box.
11. Connect the pump cycle control box air hose to well head air fittings.
12. Uncap the nitrogen cylinder tank or prepare the air compressor and attach the regulator; attach the air hose to the control box.
13. Position the water quality meter on the portable sampling board.
14. When micropurging, purge only the volume of water in the pump and discharge line, which is 450 mL for the pump and:
 - 40 mL for every foot of 1/2 inch discharge line, or
 - 22 mL for every foot of 3/8 inch discharge line
15. When sampling with a packer, calculate the purge volume using the following formula:

Well depth minus packer depth = the zone of isolation (sampling zone)
Zone of isolation times casing factor = purge volume
Purge volume times 3 = total purge volume
Casing factor for a 2-inch well = 0.163
Casing factor for a 4-inch well = 0.653
16. Inflate the packer, according to the operator's manual, for the three well volumes method of purging.
17. When sampling without a packer (not micropurge), calculate the purge volume using the following formula:

Well depth minus static water level = the standing water column

Standing water column times casing factor = purge volume

Purge volume times 3 = total purge volume

Casing factor for a 2" well = 0.163

Casing factor for a 4" well = 0.653

18. Record the purge volume on the MW Groundwater Data Form.
19. Open the regulator on the air compressor or nitrogen tank, turn on the pump cycle control box, and adjust the flow rate to the desired pressure output, which is 1/2 psi per foot of lift.
20. Open the valve on the sampling board so the flow is directed to the sample port.
21. Adjust the flow meter to a flow rate of 300 mL/min or less and allow 300 mL or more to flow through the sampling port.
22. Allow the purge water to run through the water quality meter flow-through cell and check for any trapped air pockets.
23. Record all necessary data on the MW Groundwater Data Form.
24. Allow the water quality meter readings to stabilize.
25. Record the initial water quality parameter readings on the MW Groundwater Data Form when the purge volume has been reached.
26. Including the initial reading, record a minimum of three measurements in three-minute intervals until stability has been achieved.
27. Before collecting the samples, label sample bottles with date, time, and sampler's initials.
28. Maintain the flow rate at 300 mL/min or less during sampling except for sampling of volatile organics which should be at a flow of 100 mL/min or less.
29. Collect samples for the required analytes in the appropriate order as specified in SW-846, *Test Methods for Evaluating Solid Waste*.
30. Collect all field quality control samples.
31. **IF** a well is purged to dryness, **THEN** return within 24 hours of initial sampling time **AND** collect one round of water quality parameters and then collect the required sample parameters. If a well goes dry during a sampling event, abandon remaining parameters and consider the well dry.

Postperformance Activities

1. Turn off all sampling equipment and water quality meters.
2. Complete the chain-of-custody forms.
3. Document the sampling events by recording the information on the MW Groundwater Data Form.
4. As generated, place all samples requiring a temperature of 4°C in a cooler with blue ice/ice.

5. Submit samples and the appropriate chain-of-custody forms to the laboratory.
6. Drain all purge water from the water quality meter, sampling board, and discharge tubing into purge water collection container. Record the amount on the MW Groundwater Data Form.
7. Decontamination of the sampling board requires 300 mL or more of analyte-free water.
8. Thoroughly decontaminate the sampling board and water level indicator **AND** record the decontamination event and time on the MW Groundwater Data Form.
9. Disconnect the pump cycle controller from the well head, replace the discharge tubing into the well, and lock the well cap.
10. Record the total amount of purge water for disposal.
11. Disposition purge water and personal protective equipment appropriately.

Order of Collection for Groundwater Samples

The preferred collection order for some of the more common groundwater analytes is as follows:

1. Volatile organics [volatile organic analytes (VOAs) or volatile organic compounds (VOCs)];
2. Dissolved gases and total organic carbon;
3. Metals and cyanide;
4. Semivolatile organics;
5. Major water quality cations and anions; and
6. Radionuclides.

The above information was modified from an updated draft version of the Technical Enforcement Guidance Document, dated November 1992. SW-846, *Test Methods for Evaluating Solid Waste*, Chapter 11, Section 11.2 refers to one preeminent Resource Conservation and Recovery Act document on groundwater monitoring activities, the *Technical Enforcement Guidance Document*, Environmental Protection Agency/530-R-93-001, finalized in September 1986, available from the Environmental Protection Agency Office of Solid Waste.

If samples are being collected at a location where it is anticipated that enough sample volume is not available, then the order of collection will be VOAs/VOCs, total metals, and then radionuclides, due to those parameters being contaminants of concern at PGDP.

1.5 FIELD QUALITY CONTROL

Follow these general steps when collecting field quality control samples.

Trip blanks and field blanks are prepared in the field laboratory or sample staging area by adding the appropriate preservative (unless pre-preserved) to the appropriate bottle and filling the bottle with organic/analyte-free water. Equipment blanks are, likewise, prepared in the field laboratory or sample staging area using organic/analyte-free water. Field duplicates and filter blanks are prepared by adding the appropriate preservative (unless pre-preserved) to the appropriate bottle, and, with the exception of duplicates, filling the bottle with analyte-free water in the field after the sample is collected.

Trip Blanks

1. Trip blanks are used to determine if contamination by VOCs has occurred during sample shipping and handling.
2. Unless specified otherwise in the site-specific sampling plan, aqueous trip blanks are used for water samples.
3. For routine monitoring activities where contamination has been proven to not be a concern, trip blanks should be collected at the frequency specified in the approved sampling and analysis plan.
4. **IF** VOCs are being analyzed, **THEN** obtain a trip blank from the field laboratory or sample staging area.
5. Place one trip blank (2-3 pre-prepared sample vials of organic-free water) in a cooler that will contain VOC samples.
6. Transport to the sampling site.
7. Request analysis for VOCs only for the trip blank. Collect other VOA samples as requested by the project and place them in the same cooler as the trip blank.
8. Analyze the trip blank for VOCs.

Field Duplicates

Field duplicates consist of two aliquots of a sample (i.e., the original sample and its duplicate) that are collected at the same time, using the same procedures, the same type of equipment, and in the same types of sample containers as the original samples. Duplicate samples also are preserved in the same manner and submitted for the same analyses as the original samples. Field duplicates are used to determine the total variability (i.e., imprecision) associated with the sampling and analysis effort.

Field duplicates should be collected at a minimum rate of one for each 20 samples.

1. Determine the number of duplicates to be obtained.
2. Collect samples following the appropriate procedure.
3. Collect field duplicates and analyze them for the same parameters as other original samples being collected.

Split Samples

Split samples, also known as field replicate samples, consist of a sample which has been aliquoted into two containers from a single container or sampling mixing container. The sample and its split sample are shipped to different laboratories, such as a field screening laboratory and a fixed-base laboratory. The analytical result generated by the fixed-base laboratory is compared to the result generated by the field screening laboratory to assess the performance of the screening laboratory. Split samples also may be shipped to two fixed-base laboratories, such as a project-support laboratory and a regulatory agency reference laboratory. The result generated by the reference laboratory is used to assess the performance of the project-support laboratory. This comparison can also be used to assess inter-laboratory precision.

The frequency of split samples varies with project objectives.

A split sample is not a composite sample unless the original sample is a composite.

Care should be taken to ensure that the same depth is used when preparing split samples.

1. Determine the number of split samples to be obtained.
2. Collect split samples following the appropriate procedure.
3. Collect split samples and analyze them for the same parameters as other samples being collected unless contaminants of concern have been identified.

Field Blanks

Field blanks are prepared in the field to evaluate the potential for contamination of a sample by ambient site contaminants from a source not associated with the sample collected (e.g., air-borne fugitive dust or organic vapors). Field blanks should be collected only in dusty air-borne environments and/or from areas where VOC contamination is present in the atmosphere and originating from a source other than the source being sampled. Field blanks should be collected at a minimum rate of one for each 20 samples collected.

1. **IF** field blanks are required, **THEN** transport organic/analyte-free water to the site **OR** prepare a bottle containing organic/analyte-free water and transport to the site to be opened during the sampling event.
2. Open the container in the field and transfer the water into a sample bottle.
3. Analyze the sample for the same parameters associated with the sampling event.

Equipment Blanks

Equipment blanks are used to determine if contaminants have been introduced by contact of the sample medium with contaminated sampling equipment.

Equipment blanks provide a QC check on the equipment decontamination procedure. Equipment blanks are required only when nondisposable or nondedicated sampling equipment is being used.

Equipment blanks should be collected at a minimum rate of one for each 20 samples collected.

1. **IF** equipment blanks are required, **THEN** obtain organic/analyte-free water to be used.
2. Pass the organic/analyte-free water over the decontaminated sampling equipment **AND** catch the water in a sample bottle, **OR** collect the water in a bowl that was decontaminated per the same procedure as the equipment and transfer to a sample bottle.
3. Analyze the sample for the same parameters as the sample collected with the equipment.

Definitions

Duplicate Samples—Two aliquots of a sample (i.e., the original sample and its duplicate) that are collected at the same time, using the same procedures, the same type of equipment, and in the same types of sample containers as the original samples. Duplicate samples also are preserved in the same manner and submitted for the same analyses as the original samples. Field duplicates are used to determine the total variability (i.e., imprecision) associated with the sampling and analysis effort.

Split Samples—Two or more separate samples taken from the same source during the same sampling event and sent to two or more different laboratories for analysis, usually a field screening laboratory and a fixed-base laboratory. Data generated by split samples can be used to judge the field screening laboratory's performance and to assess inter-laboratory precision.

Equipment Blank—A sample of analyte-free 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 also may be used as a reagent blank, as needed. Equipment blanks are required only when nondisposable or nondedicated equipment is being used.

Field Blank—A sample that serves as a check on ambient environmental contamination at the sample site. Organic/analyte-free 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 a field laboratory or sample staging area, transported to the field, and then opened. Field blanks may be used as a reagent blank, as needed.

Trip Blank—Sample used to detect contamination by VOCs during sample shipping and handling. Trip blanks are 40 mL VOA vials of analyte-free 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.

1.6 SAMPLE TRACKING AND HANDLING GUIDANCE

Sample containers are chosen, preserved, and collected as specified in Appendix E3, Table 1.

Appendix E3, Table 1. Sample Container Information

Parameter	Matrix	Holding Time From Collection	Sample Container ^a	Preservation
Volatile Organics	Water	14 days	Three 40-mL glass vials with Teflon-lined septum	HCl to pH < 2 Cool to ≤ 6°C zero headspace
Metals (other than mercury) ^b	Water	180 days	1 liter polyethylene with polyethylene closure	HNO ₃ to pH < 2, Cool to ≤ 6°C
Mercury ^b	Water	28 days	1 liter polyethylene with polyethylene closure	HNO ₃ to pH < 2, Cool to ≤ 6°C
Uranium Isotopes	Water	180 days	2 ea 1 liter polyethylene with polyethylene closure	HNO ₃ to pH < 2, Cool to ≤ 6°C
Tc-99	Water	180 days	1 liter polyethylene with polyethylene closure	HNO ₃ to pH < 2, Cool to ≤ 6°C

^a Additional volume may be needed for matrix spike/matrix spike duplicate samples. Laboratory will notify project on quantity needed for MS/MSD per batch. As a result, different containers may be used, as appropriate.

^b Samples for these parameters can occupy the same sample containers.

2. WELL ABANDONMENT

Well plugging and abandonment is carried out in wells for which there is no further use, on wells that are damaged or otherwise unusable, or on wells that must be destroyed because of missing well construction or well inspection and maintenance reports.

The criteria used to determine if a well or piezometer is a candidate for abandonment are as follows:

- There are inadequate construction or lithologic data available for the well or piezometer.
- The well or piezometer is constructed to standards that are not currently acceptable for its intended use.
- The integrity of the well or piezometer has deteriorated to a point that is no longer suitable for its intended purpose.
- The well or piezometer is suspected of yielding anomalous data indicative of a poor completion or development (i.e., abnormally high pH, unusual fluctuation in water levels, etc.).
- The well was never developed successfully and serves no useful purpose.

2.1 PROCEDURES FOR WELL ABANDONMENT

All pumps and other equipment shall be removed from inside and around the well or piezometer prior to commencing drilling operations. The well casing shall be removed by using an overshot milling tool or other suitable bit of sufficient diameter to fit over the existing well casing and its couplings. Drilling shall continue to the bottom of existing well casing and screen, or to a sufficient depth, which allows extraction of the full length of casing and screen.

After reaming operations have been completed and the well casing and screen have been removed, the hole should be filled. It is permissible to fill the RGA interval of the hole with sand. The remaining hole should be grouted using a tremie pipe. The tremie pipe shall be lowered to the bottom of the remaining hole and raised slowly as the high-solids bentonite grout is introduced. The tremie pipe shall be kept full continuously from start to finish of the grouting procedure.

Should loss of grout occur, holes should be refilled until they remain full. Twenty-four hours after grouting, the subcontractor shall place any additional grout necessary to bring the grout to within one foot of existing grade.

Deviation from these procedures may be necessary where field conditions dictate the use of an alternate or more effective method of abandonment. All deviations from this procedure shall be approved. Documentation shall include rationale for deviation for the above procedure.

The technical subcontractor is responsible for generating abandonment documentation. Field activities will be documented in the field logbook. A Record of Plugging and Abandonment Form will be completed. At the conclusion of field activities, a written report will be prepared summarizing those activities, providing a copy of the completed Record of Plugging and Abandonment Form, and containing before and after “as-built” well construction diagrams.

2.2 BENTONITE

The bentonite shall be free flowing, high swelling, sodium-based, Wyoming-type bentonite. Both powdered and pellet forms may be required.

2.3 BENTONITE SLURRY

Bentonite slurry shall be a mixture of powdered bentonite and water. The slurry shall be mixed in a grout mixer with paddle vanes and/or a recirculating pump such that lumps are minimized. The bentonite slurry will contain a minimum of 30% solids.

3. EQUIPMENT CLEANING AND DECONTAMINATION

The following sections outline steps associated with the cleaning and decontamination of equipment used in sampling groundwater monitoring wells.

If field cleaning for immediate reuse, the equipment does not have to be air-dried as described in the following procedures.

Well Sounders, Tapes, and Depth Indicators

1. Wash with soap and tap water.
2. If possible, rinse with tap water.
3. Rinse with analyte-free water.
4. Allow to air dry overnight.
5. If sampling equipment is used in a Radiological Area, Contamination Area, Soil Contamination Area, or Radiological Buffer Area, then contact a radiological controls technician to survey the equipment.
6. Seal equipment in plastic, and date.

Ice Chest and Shipping Containers

If the container is severely contaminated, it shall be cleaned as thoroughly as possible, rendered unusable, and properly disposed.

1. Wash interior and exterior with soap and water.
2. Rinse with clean tap water.
3. Air dry before storage.

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APPENDIX E4

SOLID WASTE MANAGEMENT UNIT/AREA OF CONCERN SUMMARY

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Table E4.1. Current Solid Waste Management Unit/Area of Concern

SWMU/AOC Number	Description
1	C-747-C Oil Land Farm
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
8	C-746-K Inactive Sanitary Landfill
9	C-746-S Residential Landfill
10	C-746-T Inert Landfill
11	C-400 TCE Leak Site
12	C-747-A UF ₄ Drum Yard
13	C-746-P Clean Scrap Yard
14	C-746-E Contaminated Scrap Yard
15	C-746-C Scrap Yard
16	C-746-D Classified Scrap Yard
17	C-616-E Sludge Lagoon [Active]
18	C-616-F Full-Flow Lagoon [Active]
19	C-410-B HF Neutralization Lagoon
20	C-410-E HF Emergency Holding Pond slab and underlying soils
21	C-611-W Sludge Lagoon [Active]
22	C-611-Y Overflow Lagoon (includes KPDES 006) [Active]
23	C-611-V Lagoon (includes KPDES 005) [Active]
24	C-750-D UST
25	C-750 1,000-gal Waste Oil Tank (UST)
26	C-400 to C-404 Underground Transfer Line
27	C-722 Acid Neutralization Tank [Active]
28	C-712 Laboratory Equalization Tank slab and underlying soils
29	C-746-B TRU Storage Area
30	C-747-A Burn Area
31	C-720 Compressor Pit Water Storage Tank slab and underlying soils
32	C-728 Clean Waste Oil Tanks slab and underlying soils [Active]
33	C-728 Motor Cleaning Facility slab and underlying soils [Active]
34	C-746-M PCB Waste Storage Area
35	C-337 PCB Waste Storage Area
36	C-337 PCB Waste Staging Area
37	C-333 PCB Waste Staging Area
38	C-615 Sewage Treatment Plant slab and underlying soils [Active]
39	C-746-B PCB Waste Storage Area
40	C-403 Neutralization Tank slab and underlying soils
41	C-410-C Neutralization Tank slab and underlying soils
42	C-616 Chromate Reduction Facility slab and underlying soils [Active]
43	C-746-B Waste Chemical Storage Area
44	C-733 Hazardous Waste Storage Area
45	C-746-R Waste Solvent Storage Area
46	C-409 Hazardous Waste Pilot Plant
46A	C-746-Q Hazardous and Low-Level Mixed Waste Storage Facility
47	C-400 Technetium Storage Tank Area
48	Gold Dissolver Storage Tank (DMSA C400-03)
49	C-400-B Waste Solution Storage Tank
50	C-400-C Nickel Stripper Evaporation Tank
51	C-400-D Lime Precipitation Tank
52	C-400 Waste Decontamination Solution Storage Tanks
53	C-400 NaOH Precipitation Unit
54	C-400 Degreaser Solvent Recovery Unit
55	C-405 Incinerator building slab and underlying soils

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
56	C-540-A PCB Waste Staging Area
57	C-541-A PCB Waste Staging Area
58	North-South Diversion Ditch (NSDD) (Outside) (includes KPDES 003)
59	NSDD (Inside)
60	C-375-E2 Effluent Ditch (KPDES 002) [Active]
61	C-375-E5 Effluent Ditch (KPDES 013) [Active]
62	C-375-S6 SW Ditch (KPDES 009) [Active]
63	C-375-W7 Oil Skimmer Ditch (KPDES 008 and KPDES 004) [Active]
64	Little Bayou Creek
65	Bayou Creek
66	C-375-E3 Effluent Ditch (KPDES 010) [Active]
67	C-375-E4 Effluent Ditch (C-340 Ditch) (KPDES 011) [Active]
68	C-375-W8 Effluent Ditch (KPDES 015) [Active]
69	C-375-W9 Effluent Ditch (KPDES 001) [Active]
70	C-333-A Vaporizer slab and underlying soils [Active]
71	C-337-A Vaporizer slab and underlying soils [Active]
72	C-200 Underground Gasoline Tanks
73	C-710 Underground Gasoline Tanks
74	C-340 PCB Transformer Spill Site
75	C-633 PCB Spill Site
76	C-632-B Sulfuric Acid Storage Tank
77	C-634-B Sulfuric Acid Storage Tank
78	C-420 PCB Spill Site
79	C-611 PCB Spill Site
80	C-540-A PCB Spill Site
81	C-541-A PCB Spill Site
82	C-531 Switchyard slab and underlying soils [Active]
83	C-533 Switchyard slab and underlying soils [Active]
84	C-535 Switchyard slab and underlying soils [Active]
85	C-537 Switchyard slab and underlying soils [Active]
86	C-631 Pumphouse and Cooling Tower Slabs and Associated Soils
87	C-633 Pumphouse and Cooling Tower Slabs and Associated Soils
88	C-635 Pumphouse and Cooling Tower Slabs and Associated Soils
89	C-637 Pumphouse and Cooling Tower slab and underlying soils
90	C-728 Petroleum Naphtha Pipe
91	UF ₆ Cylinder Drop Test Area
92	Fill Area for Dirt from the C-420 PCB Spill Site
93	Concrete Disposal Area East of Plant Security Area
94	KOW Trickling Filter and Leach Field
95	KOW Burn Area
96	C-333 Cooling Tower Scrap Wood Pile
97	C-601 Diesel Spill
98	C-400 Basement Sump
99A	C-745 Kellogg Building Site—Cylinder Yard
99B	C-745 Kellogg Building Site—Septic Tank/Leach Field
100	Fire Training Area
101	C-340 Hydraulic System
102A	Plant Storm Sewer—between the south side of the C-400 Building and Outfall 008
102B	Plant Storm Sewer associated with C-333-A, C-337-A, C-340, C-535, and C-537
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)
110	Concrete Rubble Pile (8)
111	Concrete Rubble Pile (9)

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
112	Concrete Rubble Pile (10)
113	Concrete Rubble Pile (11)
114	Concrete Rubble Pile (12)
115	Concrete Rubble Pile (13)
116	Concrete Rubble Pile (14)
117	Concrete Rubble Pile (15)
118	Concrete Rubble Pile (16)
119	Concrete Rubble Pile (17)
120	Concrete Rubble Pile (18)
121	Concrete Rubble Pile (19)
122	Concrete Rubble Pile (20)
123	Concrete Rubble Pile (21)
124	Concrete Rubble Pile (22)
125	Concrete Rubble Pile (23)
126	Concrete Rubble Pile (24)
127	Concrete Rubble Pile (25)
128	Concrete Rubble Pile (26)
129	Concrete Rubble Pile (27)
130	C-611 550-gal Gasoline UST
131	C-611 50-gal Gasoline UST
132	C-611 2,000-gal Oil UST
133	C-611 (unknown size) Grouted UST
134	C-611 1,000-gal Diesel/Gasoline Tank
135	C-333 PCB Soil Contamination (North Side)
136	C-740 TCE Spill Site
137	C-746-A Inactive PCB Transformer Sump Area
138	C-100 Southside Berms
139	C-746-A1 UST
140	C-746-A2 UST
141	C-720 Inactive TCE Degreaser
142	C-750-A 10,000-gal Gasoline Tank (UST)
143	C-750-B 10,000-gal Diesel Tank (UST)
144	C-746-A Hazardous and Mixed Waste Storage Facility
145	Residential/Inert Landfill Borrow Area (P-Landfill)
146	Concrete Rubble Pile (40)
147	Concrete Rubble Pile (41)
148	Concrete Rubble Pile (42)
149	Concrete Rubble Pile (43)
150	Concrete Rubble Pile (44)
151	Concrete Rubble Pile (45)
152	Concrete Rubble Pile (46)
153	C-331 PCB Soil Contamination (West)
154	C-331 PCB Soil Contamination (Southeast)
155	C-333 PCB Soil Contamination (West)
156	C-310 PCB Soil Contamination (West Side)
157	KOW Toluene Spill Area
158	Chilled-Water System Leak Site
159	C-746-H3 Storage Pad slab and underlying soils [Active]
160	C-745 Cylinder Yard Spoils (PCB Soils)
161	C-743-T-01 Trailer Site (Soil Backfill) [Active]
162	C-617-A Sanitary Water Line (Soil Backfill) [Active]
163	C-304 Building/HVAC Piping System (Soil Backfill)
164	KPDES Outfall Ditch 017 Flume—Soil Backfill
165	C-616-L Pipeline & Vault Soil Contamination [Active]
166	C-100 Trailer Complex Soil Contamination (East Side) [Active]
167	C-720 White Room Sump slab and underlying soils

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
168	KPDES Outfall Ditch 012 [Active]
169	C-410-E HF Vent Surge Protection Tank
170	C-729 Acetylene Building Drain Pits
171	C-617-B Lagoon [Active]
172	C-726 Sandblasting Facility slab and underlying soils [Active]
173	C-746-A Trash Sorting Facility
174	C-745-K Low-Level Storage Area
175	Concrete Rubble Pile (28)
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 [Active]
180	Outdoor Firing Range (WKWMA) [Active]
181	Outdoor Firing Range (PGDP) [Active]
182	Western Portion of Yellow Water Line
183	McGraw UST
184	Concrete Rubble Pile (29)
185	C-611-4 Horseshoe Lagoon (includes KPDES 014)
186	C-751 Fuel Facility
187	C-611 Septic System
188	C-633 Septic System
189	C-637 Septic System
190	C-337A Sewage Treatment Aeration Tank
191	C-333-A Sewage Treatment Aeration Tank
192	C-710 Acid Interceptor Pit slab and underlying soils
193	McGraw Construction Facilities (South Side Cylinder Yard Area, East of Hobbs Road)
194	McGraw Construction Facilities (South Side Leach Field Area)
195	Curlee Road Contaminated Soil Mounds
196	C-746-A Septic System
197	Concrete Rubble Pile (30)
198	C-410-D Area Soil Contamination slab and underlying soils
199	Big Bayou Creek Monitoring Station
200	Soil Contamination South of TSCA Waste Storage Facility
201	Northwest Groundwater Plume
202	Northeast Groundwater Plume
203	C-400 Discard Waste System slab and underlying soils
204	Dykes Road Historical Staging Area
205	Eastern Portion of Yellow Water Line
206	C-753-A Toxic Substances Control Act Waste Storage Building
207	C-752-A ER Waste Storage Building
208	C-746-U Solid Waste Contained Landfill
209	C-720 Compressor Shop Pit Sump slab and underlying soils
210	Southwest Groundwater Plume
211A	C-720 TCE Spill Site Northeast
211B	C-720 TCE Spill Site Southeast
212	C-745-A Radiological Contamination Area
213	OS-02
214	OS-03
215	OS-04
216	OS-05
217	OS-06
218	OS-07 slab and underlying soils
219	OS-08
220	OS-09 slab and underlying soils
221	OS-10
222	OS-11

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
223	OS-12 slab and underlying soils
224	OS-13
225A	OS-14
225B	Contaminated Soil Area Near C-533-1 DMSA OS-14
226	OS-15
227	OS-16
228	OS-17
229	OS-18
230	C-310-A-01
231	C-310-02
232	C-310-03
233	C-310-04
234	C-310-05
235	C-331-01
236	C-331-02
237	C-331-03
238	C-331-04
239	C-331-05
240	C-331-06
241	C-331-07
242	C-331-08
243	C-331-09
244	C-331-10
245	C-331-11
246	C-331-12
247	C-331-13
248	C-331-14
249	C-331-15
250	C-331-16
251	C-331-19
252	C-331-20
253	C-331-22
254	C-331-23
255	C-331-24
256	C-333-01
257	C-333-02
258	C-333-03
259	C-333-04
260	C-333-05
261	C-333-06
262	C-333-07
263	C-333-08
264	C-333-09
265	C-333-10
266	C-333-11
267	C-333-12
268	C-333-13
269	C-333-14
270	C-333-15
271	C-333-16 (West)
272	C-333-16 (East)
273	C-333-17
274	C-333-18
275	C-333-19
276	C-333-20
277	C-333-21

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
278	C-333-22
279	C-333-23
280	C-333-24
281	C-333-25
282	C-333-26
283	C-333-27
284	C-333-28
285	C-333-29
286	C-333-30
287	C-333-31
288	C-333-34
289	C-333-35
290	C-333-37
291	C-333-38
292	C-333-39
293	C-333-40
294	C-333-41
295	C-333-42
296	C-333-43
297	C-335-01
298	C-335-02
299	C-335-03
300	C-335-04
301	C-335-05
302	C-335-06
303	C-335-07
304	C-335-08
305	C-335-09
306	C-335-11
307	C-335-12
308	C-337-01
309	C-337-02
310	C-337-03
311	C-337-04
312	C-337-05
313	C-337-06
314	C-337-07
315	C-337-08
316	C-337-09
317	C-337-10
318	C-337-11
319	C-337-12
320	C-337-13
321	C-337-14
322	C-337-15
323	C-337-16
324	C-337-17
325	C-337-18
326	C-337-19
327	C-337-20
328	C-337-21
329	C-337-23
330	C-337-25
331	C-337-27
332	C-337-29
333	C-337-30

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
334	C-337-31
335	C-337-32
336	C-337-33
337	C-337-34
338	C-337-35
339	C-337-36
340	C-337-37
341	C-337-38
342	C-337-39
343	C-337-40
344	C-337-41
345	C-337-42
346	C-337-43
347	C-337-44
348	C-337-45
349	C-400-01
350	C-400-04
351	C-400-05
352	C-400-06
353	C-400-07
354	C-409-01
355	C-409-02
356	C-720-01
357	C-720-02
358	C-720-03
359	C-720-04
360	C-535
361	C-727-90 day
362	G-310-04
363	G-331-03
364	G-331-05
365	G-333-02
366	G-333-03
367	G-333-04
368	G-333-08
369	G-333-10
370	G-333-20
371	G-335-01
372	G-337-02
373	G-337-03
374	G-337-13
375	G-337-14
376	G-337-15
377	G-337-22
378	G-340-01
379	G-340-03
380	G-340-04
381	G-340-05
382	G-340-06
383	G-400-01
384	G-400-02
385	G-409-25
386	G-410-01
387	G-416-01
388	C-416 Decontamination Pad
389	G-533-01

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
390	G-535-02
391	G-537-01
392	G-540-A-01
393	G-540-A-1-02
394	G-541-A-01
395	G-600-01
396	G-611-U-01
397	G-612-01
398	G-612-02
399	G-612-A-01
400	G-635-01
401	G-710
402	G-710-04
403	G-710-20
404	G-710-24
405	G-720-22
406	G-743-T-17-01
407	G-743-T-17-02
408	G-745-B-01
410	G-746-G-01
411	G-746-G-1-01
412	G-746-G-2-01
413	G-746-G-3-01
414	G-746-F-01
415	G-746-S-01
416	G-746-X-01 (PCBs)
417	G-746-X-01 (Asbestos)
418	G-748-B-01
419	C-752-C Decontamination Facility
420	G-752-C-02
421	G-754-01
422	G-755-A-01, G-755-A-02, and G-755-A-03
423	G-755-C-01
424	G-755-T-07-01
425	G-755-T-08
426	G-755-T-2-3-01
427	G-755-T-3-1-01
428	G-755-T-3-2-01
429	S-310-04
430	S-331-02
431	S-333-12
432	S-335-09
433	S-337-11
434	S-340-01
435	S-409-100
436	S-409-20
437	S-409-40
438	S-409-60
439	S-409-80
440	S-410-05
441	S-540-A-2-01
442	S-612-01
443	S-709-01
444	S-709-02
445	S-710-05
446	S-710-06

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
447	S-710-09
448	S-710-16
449	S-710-18
450	S-710-32
451	S-710-41
452	S-710-44
453	S-710-46
454	S-743-T-17-01
455	S-755-T-16-01
456	S-755-T-16-02
457	S-755-T-16-03
458	S-755-T-2-3-01
459	S-755-T-3-1-01
460	S-755-T-3-2-01
461	S-755-T-3-2-02
462	S-755-T-3-2-03
463	C-746-A East End Smelter slab and underlying soils
464	C-746-A West End Smelter building slab and underlying soils
465	Yard Rubble Pile and Crushate Storage Area (G-Yard)
467	Concrete Cylinder Holders Storage Area on Western Kentucky Wildlife Management Area
468	Area Northwest of Outfall 015
469	C-745-J Yard
470	C-746-V Yard
471	Outside C-746-B South Storage Area
472	C-746-B Pad
473	C-746-B Pad, West
474	West of Vortec Site
475	C-745-G5-01 (Paint Enclosure)
476	Concrete Crusher
477	C-340 Metals Plant building slab and underlying soils
478	C-410/420 Feed Plant building slab and underlying soils
479	C-204 Disintegrator Building
480	C-402 Lime House building slab and underlying soils
481	C-410-A Hydrogen Holder
482	C-415 Feed Plant Storage Building slab and underlying soils
483	Nitrogen Generating Facilities slab and underlying soils
484	C-611-M Storage Tank
485	C-611-N Sanitary Water Storage
486	Rubble Pile WKWMA (approximately 116 ft off roadside)
487	Rubble Pile WKWMA (approximately 483 ft off roadside)
488	PCB Contamination Area Near the C-410 Trailer Complex
489	Septic Tank North of the C-710 Laboratory
490	McGraw Fuel Facility Waste Oil Storage Tank
491	Mercury Spill at the C-611 Water Treatment Plant Vault
492	Contaminated Soil Area, Near Outfall 010
493	Concrete Rubble Piles near Outfall 001
494	Ash Receiver Area in C-410/420
495	C-410-I Ash Receiver Shed
496	C-410 Fluorine/Hydrogen Filters (Northeast Mezzanine)
497	C-410/420 F ₂ Cell Neutralization Room Vats
498	C-410/420 Sump at Columns 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

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
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
514	C-340 Magnesium Fluoride Reject Silo
515	C-340 "Dirty" Dust Collection System
516	C-340 Derby Preparation Area Sludge Collection System
517	Rubble and Debris Erosion Control Fill Area
518	Field South of C-746-P1 Clean Scrap Yard
519	C-410 Sulfuric Acid Tank (C-634-B)
520	Scrap Material West of C-746-A
521	C-340 Saw System Degreaser
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
525	Concrete Water Tower Supports (KOW)
526	Internal Plant Drainage Ditches (includes KPDES 016)
527	C-410 GSA/SAA at Column J-6
528	GSA/SAA at the Northwest Corner of C-745-G3 Paint Enclosure
529	C-340 Powder Plant Sump at Ground Floor Level slab and underlying soils
531	Aluminum Slag Reacting Area (C-746-H4) Near the C-746-A Facility
532	Photographic Solution Treatment Area in the C-102 Building
533	TCE Spill Site from TCE Unloading Operations at C-400
534	UST #18 within SWMU 193
535	S-755-T08-01 (Satellite Accumulation Area at C-755, Trailer 8)
536	Concrete Truck Washout Area
537	S-400-001 (SAA Located Outside at the Southeast Corner of the C-400 Building)
538	S-MST-01-01 and S-MST-01-02 (Mobile Trailer 01)
539	S-MST-02-01 and S-MST-02-02 (Mobile Trailer 02)
540	S-MST-03-01 and S-MST-03-02 (Mobile Trailer 03)
541	Contaminated Soil Area South of Outfall 011
542A	G-746-B-01, S-746-B-01, S-746-B-02 (GSA/SAAs located outside C-746-A)
542B	G-746-A-01, S-746-A-01, S-746-A-02 (GSA/SAAs located outside C-746-A)
543	T-746-S-01 (90-Day Storage Area)
544	T-752-C-01 (90-Day Storage Area)
545	C-755-T-22-01 and G-755-T-22
546	PGDP Post 67 Diesel Fuel Spill Area
547	PGDP Post 38 Diesel Spill Area
548	Staging Area for Concrete Piers, Wood and Rubble North Side of C-745-B Cylinder Yard
549	Dirt/Concrete Rubble Pile near Outfall 008
550	Concrete Culvert Sections Located on the West Bank of the Ditch Leading to Outfall 001
551	C-755-GSA-23 Located at C-755 near the East Fence Line
552	C-760 90-Day Accumulation Area
553	C-331-17
554	C-331-18
555	C-331-21
556	C-337-22
557	C-337-24

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
558	C-337-26
559	C-337-28
560	C-333-16
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 NSDD north of the P-, S-, and T-Landfills
565	Rubble Area KY-19 (along Bayou Creek north of C-611 Water Treatment Plant)
566	H-340-01
567	Soil Pile K013 near Outfall 013, West of Little Bayou Creek
568	C-340 ST-90 Boxes
569	C-743-T-17 Sample Return Refrigerator
570	Sample Return Sealand
571	C-602 Coal Storage Yard
572	C-360 Toll Transfer and Sampling Building Slab and Underlying Soils
573	C-750 Garage Slab and Underlying Soils and Associated Outside Areas
574	C-709-A Acid Neutralization Vault
575	C-721 Gas Manifold Storage Slab and Underlying Soils Area

Note: Shaded cells indicate the status of the SWMU is no further action.

Table E4.2. Former Solid Waste Management Unit/Area of Concern Summary

SWMU/AOC Number	Description	Removal Date	NFA Approval By
103	Concrete Rubble Pile (1)	2/26/2026 (Mod #1)	U.S. Environmental Protection Agency (EPA) and Kentucky Division of Waste Management (KDWM) via Waste Area Grouping (WAG) 17 Record of Decision (ROD) 9/29/1997
104	Concrete Rubble Pile (2)	2/26/2026 (Mod #1)	EPA and KDWM via WAG 17 ROD 9/29/1997
409	G-745-T-01	2/26/2026 (Mod #1)	KDWM 2/14/2006
466	South of Dyke Road, Pond Area	2/26/2026 (Mod #1)	KDWM 8/17/2009
530	Soil and Debris Storage Area by C-745-T Yard	2/26/2026 (Mod #1)	KDWM 3/8/2007

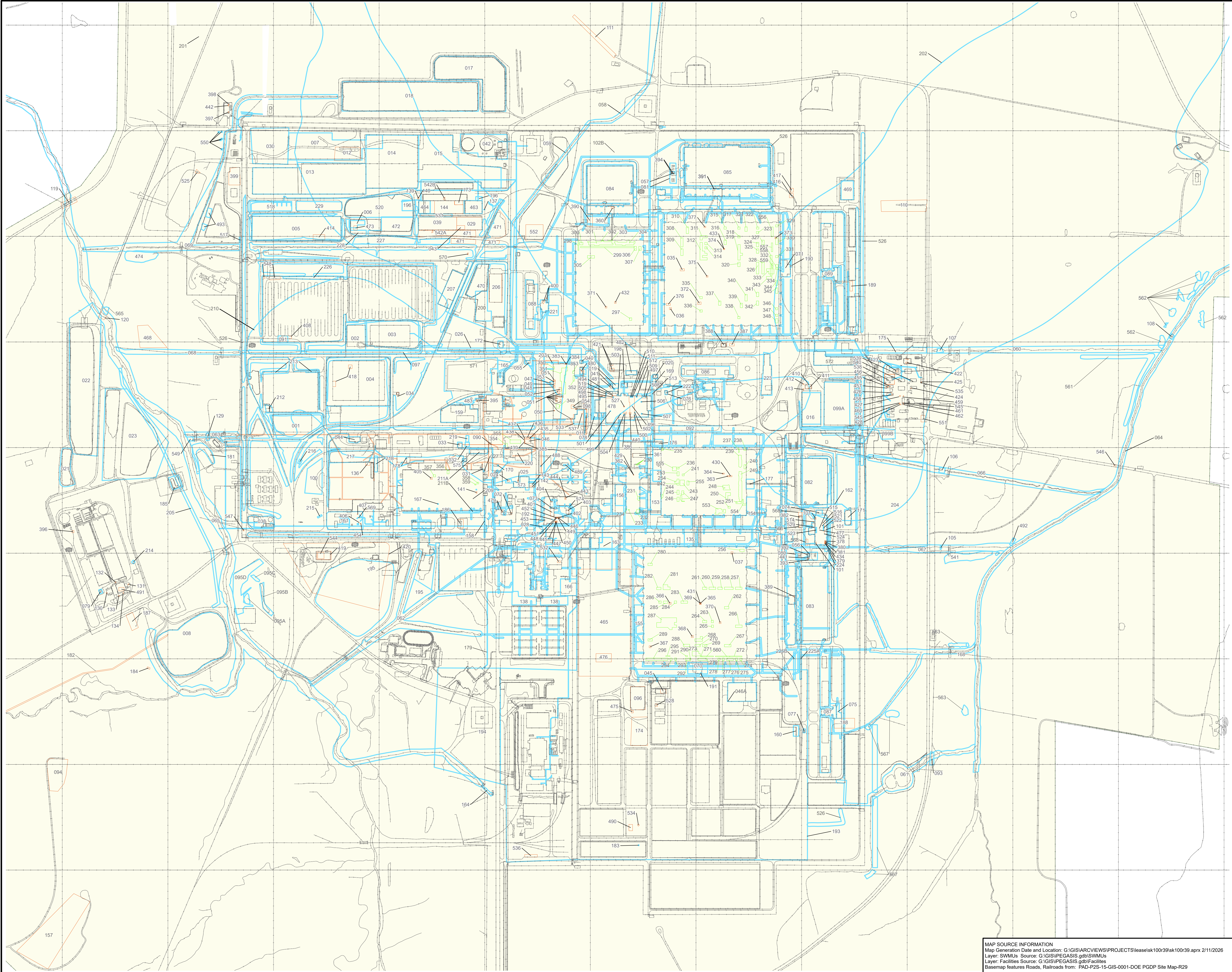
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APPENDIX E5

SOLID WASTE MANAGEMENT UNIT/AREA OF CONCERN MAP

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Paducah Site Map Showing Current SWMU Locations

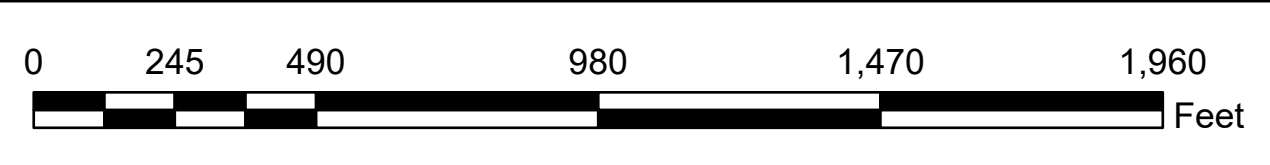
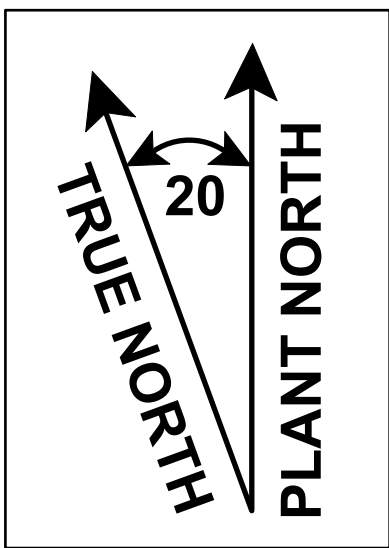


- Active
- No Further Action
- Inside DMSAs (No Further Action):
SWMUs - 230-359 and 553-560

SWMUs 058, 064, 065 and 182
extend beyond the map limits

SWMUs not shown:
009,010,109,112-118,121-128,
145-152, 180,197,199, 208, 415,
467, and 484-487, 543, 564
(outside of map boundary)

SWMUs 201 & 202 extend beyond
map limits



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



MAP SOURCE INFORMATION
Map Generation Date and Location: G:\GIS\ARC\PROJECTS\lease\sk100r39\sk100r39.aprx 2/11/2026
Layer: SWMUs Source: G:\GIS\PEGASIS\gdb\SWMUs
Layer: Facilities Source: G:\GIS\PEGASIS\gdb\Facilities
Basemap features Roads, Railroads from: PAD-P25-15-GIS-0001-DOE PGDP Site Map-R29

FIGURE No. sk100r39.aprx
DATE 2/11/2026

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PART G

**CONTINGENCY PLAN OF THE
HAZARDOUS WASTE MANAGEMENT FACILITY PERMIT
CLASS 1 MODIFICATION**

40 *CFR* § 264, Subpart D

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PART G

**CONTINGENCY PLAN
OF THE
HAZARDOUS WASTE MANAGEMENT FACILITY PERMIT
FOR THE U.S. DEPARTMENT OF ENERGY,
PADUCAH GASEOUS DIFFUSION PLANT,
PADUCAH, KENTUCKY**

Updated—February 2026

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ACRONYMS

CCF	Central Control Facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
<i>CFR</i>	<i>Code of Federal Regulations</i>
DOE	U.S. Department of Energy
FRNP	Four Rivers Nuclear Partnership, LLC
<i>KAR</i>	<i>Kentucky Administrative Regulations</i>
KDEP	Kentucky Department for Environmental Protection
KDWM	Kentucky Division of Waste Management
KEEC	Kentucky Energy and Environment Cabinet
OSHA	Occupational Safety and Health Administration
PA	public address
PGDP	Paducah Gaseous Diffusion Plant
PSS	Plant Shift Superintendent
PWS	Public Warning System
QRG	quick reference guide
RCRA	Resource Conservation and Recovery Act

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EXECUTIVE SUMMARY

This plan establishes policy and creates procedures for hazardous waste spills, containment, and countermeasures to minimize any adverse impact to the environment, to reduce safety and health hazards, and to meet standards that define the acceptable management of hazardous wastes. The standards in this plan apply to all permitted areas that treat or store hazardous waste (e.g., C-733, C-746-Q, and C-752-A).

This plan utilizes past experience and best management practices to minimize hazards to human health or the environment from fires, explosions, or any unplanned release of hazardous waste to air, soil, or surface water. The provisions of this plan are to be carried out immediately whenever there is a fire, explosion, chemical spill, or release of hazardous waste that could threaten human health or the environment resulting from the management of hazardous waste.

Information on the properties of the hazardous wastes present in the plant, the safeguards to protect personnel from exposure, and the proper handling and storage of hazardous wastes is available on-site. Copies of the Contingency Plan and the Quick Reference Guide also are available on-site.

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CONTINGENCY PLAN QUICK REFERENCE GUIDE FOR PGDP HAZARDOUS WASTE TREATMENT AND STORAGE FACILITIES: C-733, C-746-Q, AND C-752-A

Emergency Coordinator Contact Information:

Plant Shift Superintendent (PSS) emergency number at C-300 Central Control Facility: (270) 441-6333

Types/names of hazardous wastes, the potential associated hazards, and the estimated maximum amount of each waste on-site at any one time:

Name of Hazardous Waste	Associated Potential Hazards	Amount (lb)
Miscellaneous flammable liquids	Flammable	500
Miscellaneous flammable solids	Flammable	500
Miscellaneous solutions with toxic characteristics	Toxic	500
Miscellaneous solids with toxic characteristics	Heavy metals, toxic	3,165
Discarded batteries	Lead and acids	1,385
Liquids with spent solvents	Solvents	2,000
Solids with spent solvents	Solvents	5
Waste oils	Heavy metals	988
Miscellaneous acids and bases	Corrosives	600
Contaminated equipment, debris, and personal protective equipment (PPE)	Radiologically contaminated, solvents, and heavy metals	20,836
Miscellaneous liquids with spent solvents and metals	Solvents and heavy metals	6,869
Miscellaneous solids with spent solvents and metals	Solvents and heavy metals	2,000
Miscellaneous liquid laboratory waste	Corrosives, flammables, toxics, heavy metals	600
Miscellaneous solid laboratory waste	Heavy metals	600
Activated carbon	Solvents	21,020
Fuses, circuit boards, vacuum tubes	Heavy metals	6,786

Name of Hazardous Waste	Associated Potential Hazards	Amount (lb)
Equipment decontamination fluids and rinseate	Radiologically contaminated, solvents, heavy metals, and toxics	200
Light bulbs	Heavy metals	318
Sludge/Scale	Radiologically contaminated, solvents, heavy metals, and toxics	4,000
Compressed gas/Aerosols	Toxics, flammables	143
Neutralization/scrubber solution	Corrosives, toxics	600
Dry scrubber material	Toxics	600
Personal Protective Equipment	Toxics	600
Waste vacuum pump oil	Toxics	25
Contained gas	Toxics	600
Liquid mercury	Toxics	10
Stabilized millers fluorinated lubricant	Toxics	670

Identification of any hazardous wastes where exposure would require unique or special treatment by medical or hospital staff:

Hazardous wastes at the Paducah Gaseous Diffusion Plant (PGDP) have the potential to contain radioactively contaminated materials. Most of the contaminated wastes are classified as low-level radioactive waste. Paramedics are available 24 hours a day to treat personnel exposures. Additionally, agreements with area hospitals ensure that hospital staff personnel are aware of radiological contamination control procedures to protect the patients and staff.

Identification of the hazardous waste treatment, storage facilities, and routes for accessing these wastes:

See Part G-quick reference guide (QRG), Figure 1.

Identification of the hazardous waste facilities in relation to surrounding businesses, schools, and residential areas and understanding the best way to get to each facility and also evacuate citizens and workers:

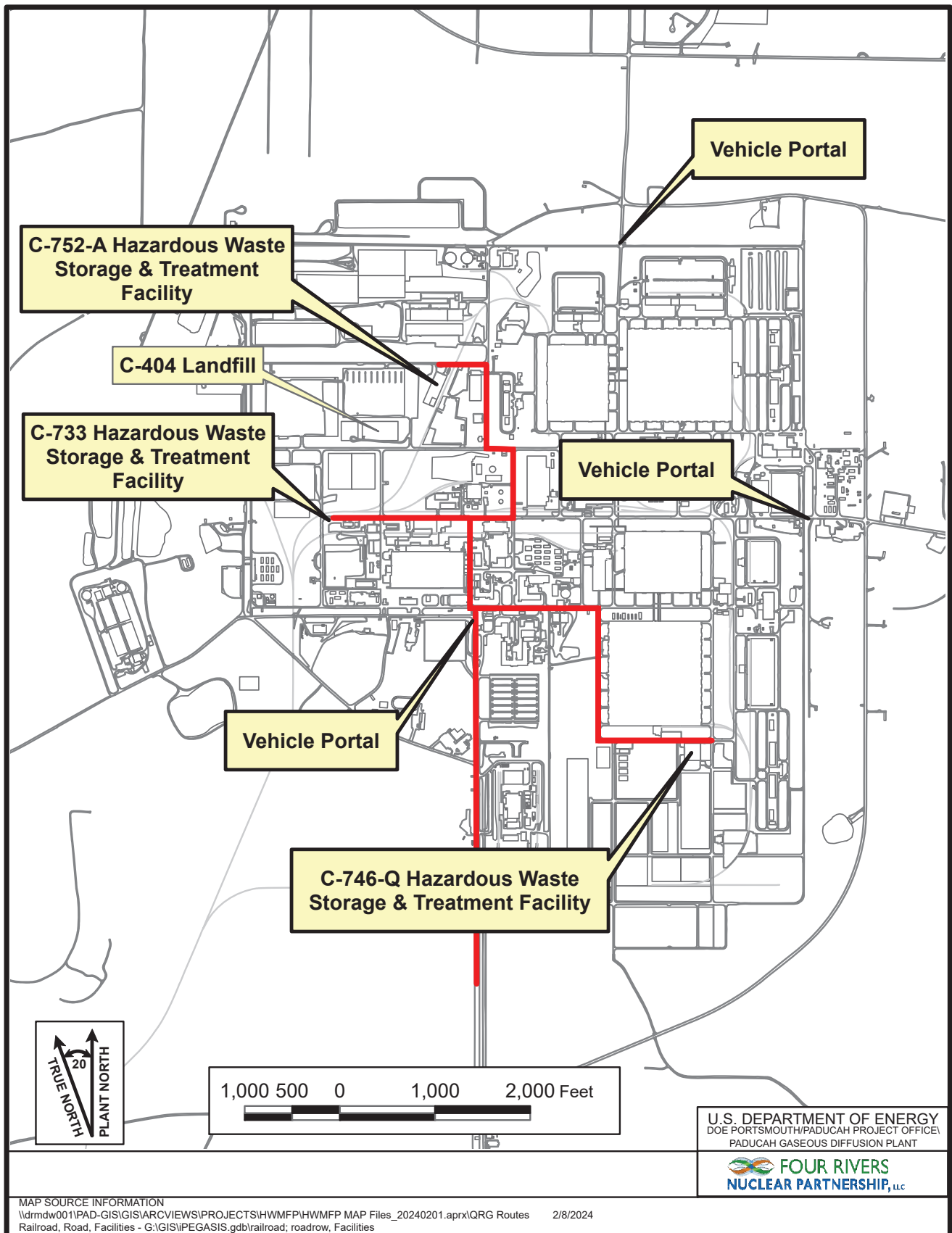
The hazardous waste treatment and storage facilities are all within the PGDP footprint. The area surrounding all sides of each hazardous waste facility is part of PGDP; therefore, there are no businesses, schools, or residential areas that would be impacted. Land use of the area surrounding PGDP can be seen in Part G-QRG, Figure 2. Based on the Emergency Management program analysis in the technical planning basis, the hazardous waste facilities have been determined not to have emergency conditions that would result in impacts outside of the immediate area; therefore, evacuation of the public would not be required.

Identification of water supply (e.g., fire hydrants and flow rate):

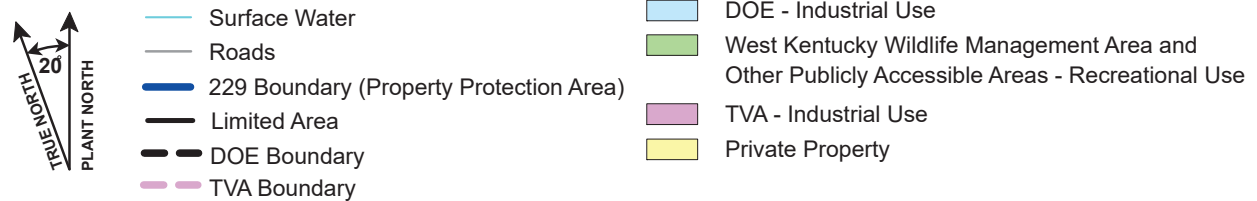
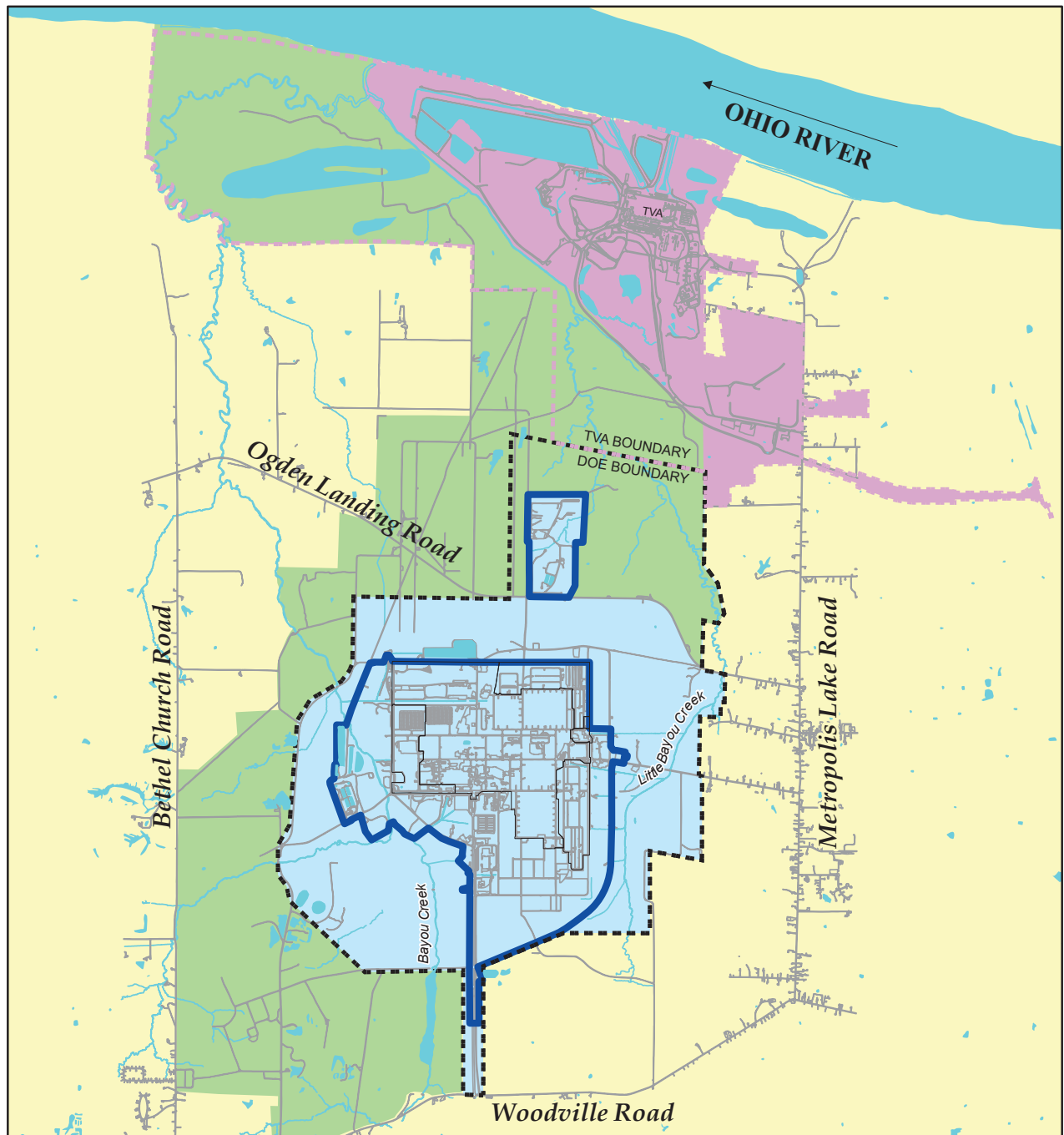
See Part G-QRG, Figure 3, for the location of the fire hydrants near the hazardous waste facilities. The flow rate for these hydrants is at least 1,000 gal per minute.

Identification of on-site notification systems:

The plant emergency alarm system consists of fire alarm boxes, fire protection/smoke detection system alarms, bells, horns, sirens, and a public address (PA) system. These systems are located throughout the plant, with the boxes being used to activate the alarm signal in the affected area. Each alarm, when activated, will transmit a signal to the fire alarm control display monitor located at the C-300 Central Control Facility and at fire services. Alarm messages include alarm descriptions and locations of alarms. The emergency alarm also may be activated from C-300. Site alarms are monitored within C-300 by a PSS, 24 hours a day. Site personnel are notified of emergency conditions via the PA system and the radio network.



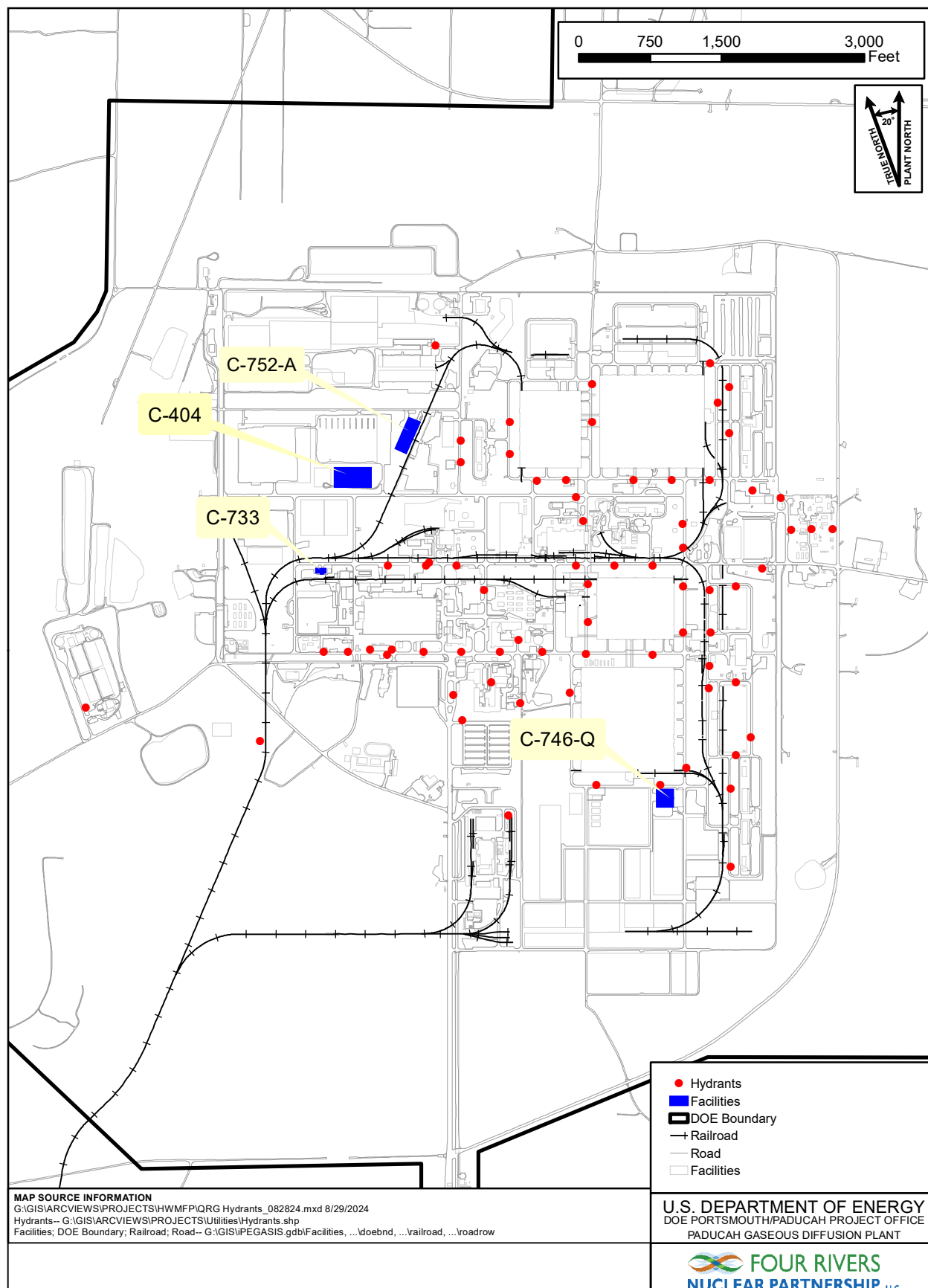
Part G-QRG, Figure 1. Routes to Hazardous Waste Storage and Treatment Facilities



MAP SOURCE INFORMATION

Map Generation Date and Location: 10/28/2025 G:\GIS\ARCVIEWS\PROJECTS\HWMFP\HWMFP MAP Files_20240201.aprx\QRG Land Use 2025
 WKWMA Boundary: G:\gis\IPEGASIS.gdb\Wildlife_Management_Areas
 DOE Property Boundary: G:\gis\IPEGASIS.gdb\doebnd
 TVA Boundary: G:\gis\IPEGASIS.gdb\tvabnd_official; 229 Boundary: G:\gis\IPEGASIS.gdb\Security_229
 Limited Area: G:\gis\IPEGASIS.gdb\limited_area;
 Industrial Area: G:\GIS\SHAPES\BOUNDS\Closed_to_Public_Access.shp (8/26/25)
 Roads: G:\gis\IPEGASIS.gdb\roadrow;
 Surface Water: G:\gis\IPEGASIS.gdb\streams and G:\gis\IPEGASIS.gdb\l_2022_21145_areawater

Part G-QRG, Figure 2. Land Use of Surrounding Area



Part G-QRG, Figure 3. Hydrants in the Vicinity of Permitted Facilities

1. INTRODUCTION

This Contingency Plan is for the Paducah Gaseous Diffusion Plant (PGDP) hazardous waste facilities, which are owned by the U.S. Department of Energy (DOE) and operated under contract by Four Rivers Nuclear Partnership, LLC (FRNP).¹ PGDP is located in McCracken County, Kentucky, near U.S. Highway 60 on a federally owned reservation. Part G, Figure 1 shows a general plan of the facility.

All Resource Conservation and Recovery Act (RCRA)-permitted treatment and storage facilities at PGDP are owned by DOE and operated by FRNP. The point of contact for DOE is as follows:

Portsmouth/Paducah Project Office Manager
U.S. Department of Energy
1017 Majestic Drive, Suite 200
Lexington, Kentucky 40513

The primary contact for hazardous waste storage and treatment activities is as follows:

Program Manager
Four Rivers Nuclear Partnership, LLC
5511 Hobbs Road
Kevil, Kentucky 42053

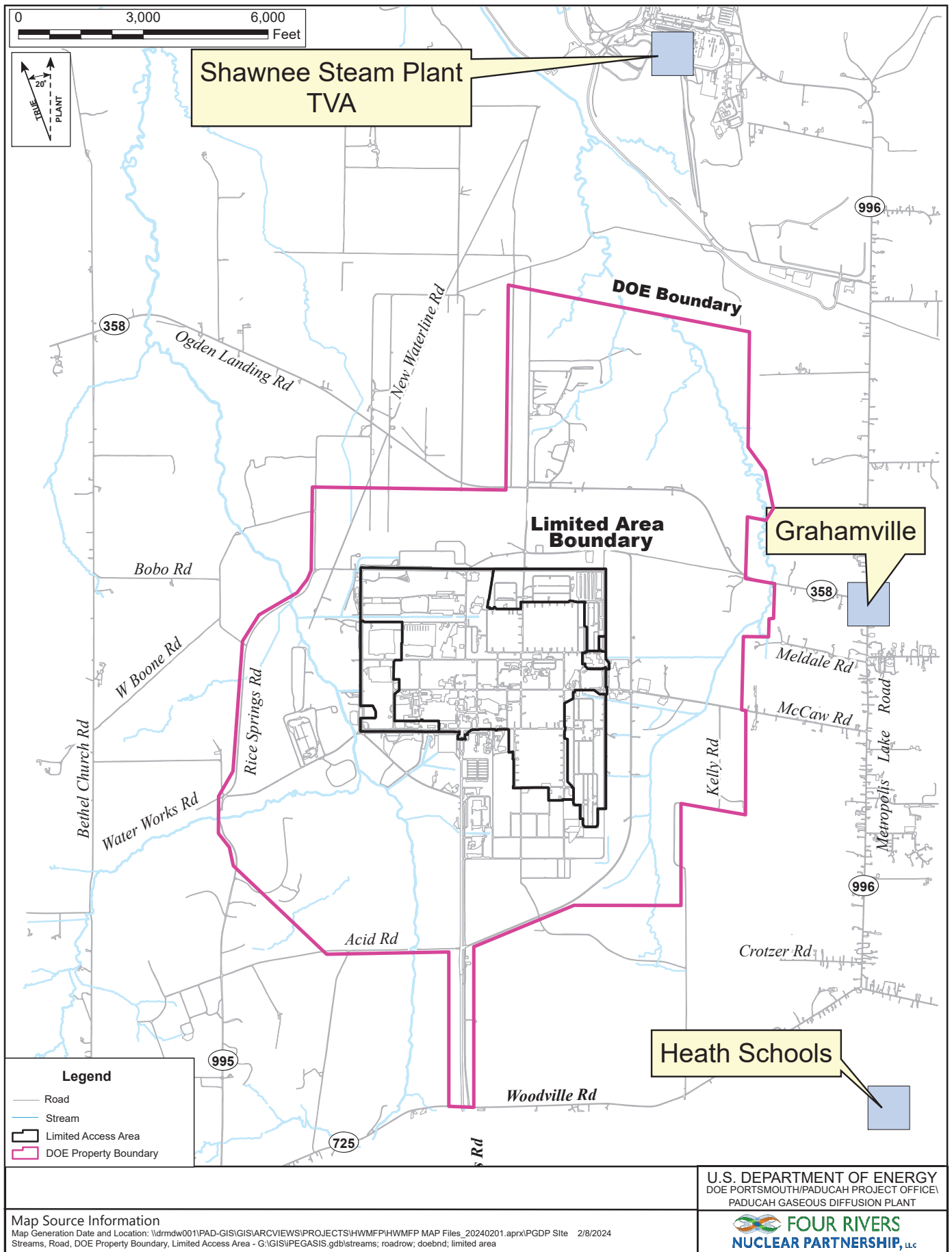
The Operations and Site Mission Support Contractor is responsible for managing the emergency management and fire protection programs at the Paducah Site. FRNP provides support and cooperation to aid in emergency responses, as needed. The RCRA emergency response organization at PGDP includes representatives from DOE and each of its contractors/subcontractors. The Plant Shift Superintendent (PSS), or designee, directs initial emergency response activities.

The on-site emergency response organization provides initial emergency response services, including firefighting, emergency medical response, hazardous material incident response, rescue, salvage, and radiological response. This service will be provided upon request or upon activation of automatic alarm located in all on-site facilities. The PSS, or designee, will contact the appropriate facility manager and emergency duty officer, or designee, if the emergency involves any RCRA-permitted facilities or DOE waste accumulation areas. The Crisis Manager assigns a recovery manager to direct the recovery phase (final stage of RCRA emergency response). FRNP maintains a designated emergency duty officer that will be available to receive notifications from the PSS and coordinate responses, as needed.

1.1 C-733 HAZARDOUS WASTE STORAGE AND TREATMENT FACILITY

The C-733 Hazardous Waste Storage and Treatment Facility is a partially sided, roofed, and diked storage area used to store spent solvents, paint wastes, mineral spirits, containers of waste chemicals, and other miscellaneous waste materials in containers. Polychlorinated biphenyl (PCB) wastes also are stored in containers at C-733. Reactive and incompatible wastes will be managed in containers with appropriate precautions. Treatment in containers by decanting and absorption can occur at this facility. Treatment methods for this facility include (1) treatment in a container by decanting and absorption and/or macroencapsulation and (2) treatment in a container, drum, or a sleeve for compaction.

¹ For purposes of this application, the acronym DOE refers to the U.S. Department of Energy Paducah Gaseous Diffusion Plant.



Part G, Figure 1. Paducah Gaseous Diffusion Plant Site

1.2 C-746-Q HAZARDOUS WASTE STORAGE AND TREATMENT FACILITY

The C-746-Q Hazardous Waste Storage and Treatment Facility is located in the western portion of the C-746-Q Building. The eastern portion of C-746-Q, known as C-746-Q1, is not permitted for RCRA storage. The building is a roofed, diked building with a concrete floor. This unit is not permitted for the storage of flammable materials, but is suitable to manage all other wastes generated at PGDP. Incompatible and reactive wastes are permitted for storage in C-746-Q. The area is delineated with the appropriate warning signs.

Fluorescent lamp-crushing units for fluorescent/miscellaneous lamps have been permitted for use in C-746-Q. Additional permitted treatment activities include batch chemical treatment of hazardous waste in containers by neutralization, precipitation, oxidation, reduction, and stabilization. Treatment methods for this facility include (1) treatment in a container by decanting and absorption and/or macroencapsulation and (2) treatment in a container, drum, or a sleeve for compaction.

1.3 C-752-A HAZARDOUS WASTE STORAGE AND TREATMENT FACILITY

The C-752-A Hazardous Waste Storage and Treatment Facility is a roofed, diked building with a concrete floor. This facility will store environmental restoration-derived waste, as well as PCBs, low-level waste, and other miscellaneous wastes. No ignitable wastes with a flashpoint less than 100°F will be stored in this building unless stored in a flammable cabinet.

A fluorescent lamp crushing unit for fluorescent/miscellaneous lamps is used in C-752-A. Permitted treatment activities include batch chemical treatment of hazardous waste in containers by neutralization, precipitation, oxidation, reduction, and stabilization. Treatment methods for this facility include (1) treatment in a container by decanting and absorption and/or macroencapsulation and (2) treatment in a container, drum, or a sleeve for compaction.

2. EMERGENCY COORDINATORS

[40 *CFR* § 264.52(d)]

The PSS is the designated individual on-site responsible for responding to all emergency conditions, as well as categorizing/classifying emergency events and establishing command/control at the incident scene. As such, the PSS is the designated Emergency Coordinator for the site. When responding to an incident scene, the PSS is acting as the Incident Commander and fulfilling the role of Crisis Manager. For the remainder of this document, the term Emergency Coordinator refers to the PSS, whether performing duties as the PSS, Incident Commander, or Crisis Manager.

If an emergency situation occurs at hazardous waste storage and treatment facilities, the person discovering the emergency contacts the PSS, who is the Emergency Coordinator under the provisions of the *Code of Federal Regulations*. A PSS is on duty 24-hours a day, seven days a week. At least one PSS is on duty at the facility at all times and can be contacted for emergencies at (270) 441-6333 at the C-300 Central Control Facility (CCF). Nonemergency calls can be made to the PSS at (270) 441-6211.

The responsibility for control of initial emergency response is vested in the PSS. All emergency plans and procedures are readily available to the PSS, who has complete authority to commit all resources in the

event of an emergency. He will remain in command of initial response activities. The appropriate facility manager and emergency duty officer, or designee, will be contacted by the PSS or designee in the event an emergency involves any RCRA-permitted facilities or accumulation areas. This notification is administrative in purpose only. The PSS is responsible for initial emergency response activities. The PSS also is authorized to activate the provisions of mutual aid agreements held with other organizations, if needed. The Emergency Coordinator is the same individual identified as the on-scene commander by Occupational Safety and Health Administration (OSHA) and as the incident commander or fire ground commander by the National Fire Protection Association. The Crisis Manager assigns a recovery manager to coordinate the final emergency response activities (recovery phase).

Contact information (e.g., address and phone number) for the PSS is listed in Part G, Table 1.

Part G, Table 1. PSS Personnel

Title	Phone	Building
PSS—emergency line	(270) 441-6333	C-300 CCF
PSS—nonemergency line	(270) 441-6211	C-300 CCF

3. IMPLEMENTATION OF THE CONTINGENCY PLAN

The decision to implement the Contingency Plan depends on whether an actual incident resulting from hazardous waste operations such as a fire, explosion, chemical spill, or release of hazardous waste threatens human health or the environment. Immediately after being notified of an emergency incident, the PSS, or designee, will proceed to the site and evaluate the situation. The PSS has the responsibility for control of initial emergency response and has the authority to commit all resources in the event of an emergency. The PSS or designee then will notify and apprise the Program Manager of the situation. DOE or its contractor makes the decision to implement the Contingency Plan and will contact the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) on-scene coordinator, as appropriate. The following are examples of incidents that could warrant implementation of the Contingency Plan.

- A fire and/or explosion involving hazardous waste occurs when any of the following exists.
 - The potential for human injury exists.
 - Toxic fumes are released.
 - The fire could spread on- or off-site and possibly ignite other flammable materials or cause heat-induced explosions.
 - The use of water and/or chemical fire suppressants could result in contaminated runoff.
 - An imminent danger exists that an explosion could ignite other hazardous waste at the facility and possibly result in the release of toxic materials.
- A spill (as defined in 401 KAR 39:005) of a hazardous waste occurs when any of the following exists.
 - The spill could result in release of flammable liquids or vapors, thus causing a fire or gas explosion hazard.

- The spill could cause the release of toxic liquids or fumes.
- The spill can be contained on-site, but the potential exists for soil or groundwater contamination.
- The spill cannot be contained on-site, resulting in off-site soil contamination and/or ground or surface water pollution.

Several ways of discovering a spill or release of chemicals are available, including routine inspections of RCRA facilities by operating personnel and detection of unusual or strong chemical odors.

4. EMERGENCY RESPONSE PROCEDURES

[40 *CFR* § 264.52(a)]

4.1 NOTIFICATION

In the event of an emergency situation, the PSS is notified either by the person discovering the emergency, his/her supervisor, or by messenger. This notification will occur by the plant phone system, cell phone, radio, emergency alarm, or messenger. The PSS, or designee, then notifies PGDP personnel (including DOE and its contractors/subcontractors) and appropriate federal, state, and local authorities. Notification of PGDP personnel will be through the use of the plant public address (PA) system, radios, or alarms. The phone system is utilized to notify DOE, its contractors/subcontractors, and outside agencies. Leaks or spills of less than a reportable quantity of hazardous waste, which are immediately cleaned, do not require notification to the Kentucky Energy and Environment Cabinet (KEEC), Kentucky Department for Environmental Protection (KDEP), and Kentucky Division of Waste Management (KDWM). If the emergency does not threaten human health or the environment outside the RCRA facility, notification of state and local authorities is not required. Notification pursuant to CERCLA spill-reporting requirements (40 *CFR* Part 302) satisfies RCRA spill-reporting requirements.

4.2 IDENTIFICATION OF HAZARDOUS WASTES

The PSS, or designee, will immediately identify the characteristics, source, amount, and area/extent of the release. The initial identification method may include a visual analysis of the material and determination of the location of the release. The contents of waste containers are labeled on the container. Records for RCRA facilities, such as inventories, waste log sheets, and the waste management database are readily accessible to aid in estimating the quantity and type of released material. If the released material cannot be readily identified, samples may be taken for chemical analysis.

4.3 HAZARD ASSESSMENT

The PSS, or designee, will assess possible hazards to human health or the environment, according to the predetermined Emergency Classification Level, that may result from direct or indirect effects of a release, fire, or explosion. The PGDP Emergency Management program department is responsible for analyzing all hazardous materials and potential accident scenarios for facilities at PGDP. If the PSS or designee determines the RCRA facility has had a release, fire, or explosion that could threaten human health or the environment outside the RCRA facility, then the PSS or designee will take the appropriate protective actions and notify local authorities, as required. If an emergency potentially may impact the public, then the PSS will provide action recommendations based on the Emergency Classification Level. The PSS, or

designee, performs mandatory notifications, including reporting the release to the DOE Paducah Site Office, DOE's contractors/subcontractors, KEEC, KDEP, KDWM, or the National Response Center (800-424-8802), as applicable. The report will include the following:

- Name and telephone number of the person making the report
- Name and address of the facility
- Time and type of incident
- Name and quantity of material(s) involved, to the extent known
- Extent of injuries, if any
- Possible hazards to human health or the environment outside the facility

4.4 CONTROL PROCEDURES

Potential RCRA accidents fall under two general classifications: (1) fire and/or explosion, and (2) spills or material release. An overview of the emergency plan notifications is outlined in Sections 4.4.1 and 4.4.2.

4.4.1 Fire and/or Explosion

Firefighting and other emergency equipment can access hazardous waste management facilities. Concrete and paved blacktop roads lead to all facilities.

PGDP fire services and plant emergency responders are maintained and prepared for immediate response to emergency situations at all times. One PSS is on duty 24 hours a day, seven days a week, and is prepared for immediate response to emergency situations.

The following actions will be taken in the event of a fire or explosion.

- The person who discovers the fire or explosion reports to the PSS or supervision as appropriate:

	PLANT TELEPHONE	CELL
C-300 CCF	333	(270) 441-6333
PSS—nonemergency	6211	(270) 441-6211
Supervisor	Site-specific	Site-specific

The most appropriate of the following methods is used to make the report:

- Radio Network Channel 16—Call Sign Alpha 1, emergency traffic
- Fire Alarm Pull Box
- Telephone—Plant or Cell Phone
- Red-Handle Phone
- Messenger to C-300 CCF
- The person who discovers the emergency also performs the following:
 - Informs other personnel in/near the RCRA facility to evacuate from the immediate danger area;
 - Notifies the proper facility authorities; and
 - Meets the Emergency Coordinator at the command post to provide a briefing.

- The Emergency Coordinator goes to the scene of the emergency and does the following:
 - Evaluates the severity of the problem;
 - Determines that emergency service groups have been summoned to the incident scene;
 - Arranges for necessary protective actions to include additional evacuation of personnel; and
 - Directs emergency service response groups.
- The person who meets the Emergency Coordinator or designee provides a detailed briefing concerning the emergency condition and includes the location of the release and type/quantity of material, if known.
- Fire services, plant emergency responders, protective force, and/or other emergency response personnel follow the instructions of the Emergency Coordinator. If an emergency response organization arrives at the scene prior to the Emergency Coordinator, the emergency response organization leader will be deemed the designee and establish command until the arrival of the emergency coordinator, at which time that person will assume the duties of Emergency Coordinator.
- The Emergency Coordinator estimates the extent of the emergency; assumes full command and control of all emergency response activities to the degree required; arranges for establishing necessary roadblocks; and, as necessary, arranges for additional support or resources. The Emergency Coordinator summons, to the scene, all necessary plant emergency responders and equipment, as needed. The Emergency Coordinator also can request assistance from outside agencies with whom mutual aid agreements have been established.
- After emergency mitigation actions have rendered the incident scene safe, the Crisis Manager, after consultation with the plant technical personnel and emergency responders, declares the termination of the emergency and arranges for the “all clear” signal to be given.

4.4.2 Spills or Material Release

- **Introduction**—This section is a guide for the actions to be taken in the event of a spill at RCRA facilities (as defined in 401 KAR 39:005). Consideration must be given to the type of hazardous chemical and to the quantity that might be released under various conditions. Minor spills or releases that occur during normal operations that are inherent to a process are not considered a spill according to the Contingency Plan. These materials will be cleaned up and handled appropriately by the operator in a timely manner.
- **Responsibilities**—The person who discovers a spill or material release is expected to notify the PSS immediately. The PSS estimates the magnitude of the problem, evacuates nearby personnel, as necessary, and initiates containment activities.

If a spill or release occurs during a waste transfer operation, immediate action will be taken to cut off the waste feed. No additional waste will be transferred until the cause of the release has been identified.

The Emergency Coordinator, or designee, assumes overall direction of emergency efforts upon his/her arrival, as the site Emergency Coordinator. He/she assesses the situation and initiates necessary emergency procedures. He/she determines the necessity for requesting additional manpower, the scope of any personnel evacuation, and makes a determination on the effect a release might have, using established Emergency Classification Levels, including effects on the general public.

The Emergency Coordinator, or designee, also determines the level of protection required for personnel entering the area in response to the emergency. The selection of personnel protective equipment, such as respirators and protective clothing, is specified in the *National Institute of Occupational Safety and Health (NIOSH) Guide to Chemical Hazards*, *U.S. Department of Transportation Emergency Response Guidebook*, Safety Data Sheets or Material Safety Data Sheets. These references are used throughout the plant. The Industrial Hygiene department has access to these current regulations and is the primary contact in this area to support the PSS.

RCRA emergency response includes collection and containment of spilled waste, whereas emergency response under OSHA is limited to the containment of spilled material. The plant emergency responders will conduct containment of a hazardous waste spill to the environment, and the Facility Manager will manage collection of the waste and residues. The Emergency Coordinator directs containment, treatment, and cleanup activities with the assistance of other plant departments, as necessary, until the spill is under control. The Facility Manager or designee will provide guidance on containment, cleanup, and regulatory requirements, as necessary. The Facility Manager, or designee, will also conduct containment and cleanup of minor spills within indoor RCRA storage and accumulation areas.

In the event of a waste spill that is not considered to be minor, facility workers will evacuate the area. The waste site workers will evacuate and the PSS will respond with the emergency responders for mitigation as per 29 *CFR* § 1910.120 (q).

Procedure:

- **Action Level No. 1: Immediate Action**

- Evacuate all personnel from the danger area.
- Stop waste feed operations, if applicable.
- Move upwind or to a safe area.
- Set up decontamination line if required.
- Put on protective clothing and equipment.
- Perform rescue and first-aid activities.
- Isolate hazard area insofar as practicable.
- Reduce vapors by best possible measures such as water spray, enclosure of area, etc.
- Stop the leak.

- **Action Level No. 2: On-Site Personnel Protective Actions**

- Determine the area in which hazardous concentrations of the hazardous chemical exists or is predicted to exist. (Use data contained in the PSS' procedures or the computer plume models for this determination.)
- Evacuate all people from this area by the quickest route, preferably crosswind, to safe areas. If there is insufficient time to evacuate the building in the path of the hazardous material plume, implement shelter-in-place protective actions. Doors and windows should be closed, and personnel should be instructed to remain inside until they are notified that concentrations outside the building have been declared safe. If possible, stop air from entering the building by shutting down ventilation systems, etc.

- **Action Level No. 3: Off-Site Personnel Protective Actions**

- If a release may potentially impact the off-site public, the Emergency Coordinator may activate the Public Warning System (PWS) sirens located at the plant boundary.
- Establish roadblocks at appropriate locations on-site to prevent traffic from entering the hazardous area.

- **Action Level No. 4: Reentry and Recovery**

- The Emergency Coordinator, or designee, will have the affected areas monitored by appropriate personnel to determine when they are safe for normal re-entry and then will take the following actions:
 - Notify all outside agencies the emergency is over. With the concurrence of these agencies, persons who have sheltered will be notified that protective actions no longer are necessary.
- Crisis Manager, or designee, shall, after the initial emergency response is over, do the following:
 - Assign a Recovery Manager.
 - Ensures that spilled material and waste residues are collected and arranges for treatment and/or disposal of waste, contaminated soil, and contaminated water.
 - Ensures continued monitoring until conditions have returned to normal.
 - Instructs site personnel to return to normal duty.

4.5 PREVENTION OF RECURRENCE OR SPREAD OF FIRES, EXPLOSIONS, OR RELEASES

Actions to prevent the recurrence or spread of fires, explosions, or releases include prompt notification, firefighting, collecting and containing released waste, and recovering or isolating containers. On-site training addresses the specific actions to be taken in an emergency. The locations of fire extinguishers and safety equipment are identified in Appendix G2 of this plan.

4.6 STORAGE AND TREATMENT OF RELEASED MATERIAL

Immediately after an emergency, the Recovery Manager, or designee, will provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility. Methods for containment, cleanup, and decontamination of container spill areas are discussed in Section 4.9. Care is taken to ensure that adequate aisle space is maintained at all times.

4.7 INCOMPATIBLE WASTES

The Facility Manager, or designee, will ensure no other waste is introduced into the affected area for treatment, storage, or disposal, until cleanup procedures are completed. Any waste or materials that may be incompatible in the affected area will be removed. Waste materials generated by the cleanup activities will be characterized to ensure proper containerization and storage. The Facility Manager, or designee, will manage all cleanup debris in permitted facilities, 90-day accumulation areas, and satellite

accumulation areas, as appropriate. The storage of cleanup debris will be handled in a manner appropriate to the type of waste. DOE will utilize additional dikes or berms or other devices to segregate incompatible materials. Containers of potential incompatible wastes are separated by as much space as possible.

4.8 POST-EMERGENCY EQUIPMENT MAINTENANCE

After an emergency, all emergency response equipment will be cleaned, inspected, and made ready for its intended use before hazardous waste operations are resumed. Cleaning procedures may include detergent and water washing, high-pressure sprays, steam-cleaning, etc. Equipment unfit for use will be replaced or repaired. A list of emergency equipment maintained in the hazardous waste storage and treatment facilities is presented in Appendix G1 of this plan. These items are inspected at a specified frequency and after an emergency to ensure equipment is maintained, present, and operational. Deficiencies will be documented and corrected immediately. The list of equipment will change as new items are added and obsolete items removed. A current inventory of equipment is maintained.

4.9 CONTAINER SPILLS AND LEAKAGE

The containers are inspected weekly for deficiencies, such as severe rusting, structural defects, and leakage. If a container exhibits any of these deficiencies, the waste will be transferred to a container in acceptable condition or recontainerized in an appropriate overpack.

4.9.1 RCRA-Permitted Facilities

C-733. A minimum 9-inch high dike with a containment volume of approximately 27,900 gal surrounds the C-733 Hazardous Waste Storage and Treatment Facility. Any spill within C-733 will be directed to an approximately 3,480 gal sump located within the diked area. The collected material then can be pumped into new containers or stored in portable 1,200 gal polyethylene containers. Waste materials will be characterized prior to containerization to ensure compatibility with the storage container and proper storage location. The storage area is stocked with extra containers and absorbent material. At least two overpacks are kept at C-733 and are available for material transfer from leaking drums. The area is stocked with absorbent materials.

In the event of a container spill or leakage to the environment, the PSS shall be notified. The plant emergency responders will conduct containment of a hazardous waste spill to the environment. The Facility Manager, or designee, will be notified of the spill and will supervise cleanup activities. For most spills, the spilled material will be absorbed with absorbent material and placed in containers. For large spills, the spilled material will be pumped into containers, with the remaining residue absorbed and placed in containers.

The containers are inspected weekly for deficiencies, such as severe rusting, structural defects, and leakage. If a container exhibits any of these deficiencies, the waste will be transferred to a container in acceptable condition or placed in an overpack. Liquids collected in the sump, including rain and snow melt, are pumped, transported to a collection container, and sampled for parameters indicative of the materials stored in C-733, before discharge to the storm sewer.

C-746-Q. The C-746-Q Hazardous Waste Storage and Treatment Facility is surrounded by a minimum 9-inch high dike and has a smaller containment area with 14 containment bays in the southwest corner of the facility. The total containment capacity of the hazardous waste facility is 39,492 gal. The area is stocked with extra containers and absorbent material. At least one overpack is kept at C-746-Q and is available for isolating a leaking drum.

In the event of a container spill or leakage to the environment, the PSS shall be notified. The plant emergency responders will conduct containment of a hazardous waste spill to the environment. The Facility Manager, or designee, will be notified of the spill and will supervise cleanup activities. For most spills, the material will be absorbed with absorbent material and will be placed into containers. For large spills, the spilled material will be pumped into containers or portable 1,200 gal polyethylene containers with the remaining residue absorbed and placed into containers. Waste materials will be characterized prior to containerization to ensure compatibility with the storage container and proper storage location.

The containers are inspected weekly for deficiencies, such as severe rusting, structural defects, and leakage. If a container exhibits any of these deficiencies, the waste will be transferred to a container in acceptable condition or placed in an overpack.

C-752-A. The C-752-A Hazardous Waste Storage and Treatment Facility is surrounded by a dike with an inner measurement of 13.5-inches high and a containment volume of approximately 408,800 gal; therefore, any spills or leakage from the containers will be contained. The storage area is stocked with extra containers and absorbent material. At least two overpacks are kept at C-752-A and are available for material transfer from leaking drums. The area is stocked with absorbent materials.

In the event of a container spill or leakage to the environment, the PSS shall be notified. The plant emergency responders will conduct containment of a hazardous waste spill to the environment. The Facility Manager, or designee, will be notified of the spill and will supervise cleanup activities. For most spills, the material will be absorbed with absorbent material and will be placed into containers. For large spills, the spilled material will be pumped into containers or portable 1,200 gal polyethylene containers with the remaining residue absorbed and placed into containers. Waste materials will be characterized prior to containerization to ensure compatibility with the storage container and proper storage location.

The containers are inspected weekly for deficiencies, such as severe rusting, structural defects, and leakage. If a container exhibits any of these deficiencies, the waste will be transferred to a container in acceptable condition or placed in an overpack.

4.10 TANK SPILLS AND LEAKAGE

There are no hazardous waste tanks or tank systems in hazardous waste facilities at PGDP.

4.11 WASTE PILE SPILLS AND LEAKAGE

There are no hazardous waste piles at PGDP.

4.12 SURFACE IMPOUNDMENTS, SPILLS, LEAKAGE, AND SUDDEN DROPS

There are no hazardous waste surface impoundments at PGDP.

4.13 LANDFILL LEAKAGE

There are no active hazardous waste landfills at PGDP. The C-404 Landfill is under post-closure care and is not expected to trigger an emergency response under this Contingency Plan. If a release is detected from the landfill, it would be addressed pursuant to the Groundwater Monitoring Plan in Part E or the Post-Closure Care requirements in Part I, Appendix I2.

4.14 CONTAINMENT BUILDING LEAKAGE

There are no hazardous waste containment buildings at PGDP.

4.15 DRIP PAD SPILLS AND LEAKAGE

There are no hazardous waste drip pads at PGDP.

5. EMERGENCY EQUIPMENT

5.1 SPILL CONTROL EQUIPMENT

As discussed in the preceding sections, spill control equipment (see Appendix G1) is maintained at the individual hazardous waste management facilities to handle small leaks and larger spills. This list will be kept up to date and revised as necessary. Two 1,200 gal polyethylene containers also are available on-site for spill control operations. The RCRA emergency equipment inspection schedule is provided in Appendix G1 of this plan.

In addition to the designated emergency equipment, other equipment that could be used in emergency activities is maintained by various operations and maintenance groups. In the event of an emergency, appropriate heavy equipment (e.g., excavator, road grader, backhoes, track hoes, dump trucks, end-loaders) is available from the site infrastructure contractor. Smaller equipment, such as pumps, forklifts, flatbed trucks, etc., is utilized throughout the plant and is available for emergency response.

5.2 FIRE CONTROL EQUIPMENT

5.2.1 Sanitary and Fire Water

Raw water is obtained from the Ohio River, treated at the C-611 Water Treatment Plant, and pumped to PGDP. The sanitary fire water system provides fire services with water at the required pressure. Water supply storage at PGDP includes an elevated storage tank (C-611-O) with a capacity of 250,000 gal, and the four C-611 basins with a combined capacity of approximately 12 million gal. The C-611 facility is the primary source of water supply. The C-611-O elevated storage tank is utilized as the secondary source. The level in the tank is monitored continuously with the low-level indicator activating signals at both the C-300 CCF and at C-611. Water is pumped from C-611 to replenish the C-611-O elevated storage tank, as necessary. The water pressure is 70 pounds-per-square-inch gauge. Fire hydrants near hazardous waste facilities are shown in drawings in Appendix G2 of this plan.

5.2.2 Fire Extinguishers

Multipurpose fire extinguishers are available for use at all hazardous waste facilities. Fire extinguisher locations are shown in Appendix G2 of this plan.

5.2.3 Plant Fire Services

In addition to the automatic fire protection systems, PGDP also is protected by fire services personnel. Stationed on-site, fire services has one 1,500 gal per minute (gpm) pumper-truck, a ladder truck capable

of reaching an elevation of 100 ft with a 1,500 gpm pump, and two emergency equipment trucks equipped with self-contained breathing apparatus and protective clothing. All fire response equipment is operated by qualified fire fighters also stationed on-site. The fire trucks and other equipment are properly maintained at all times to ensure emergency preparedness.

5.3 ALARM SYSTEMS

The plant emergency alarm system consists of fire alarm boxes, fire protection/smoke detection system alarms, bells, horns, sirens, and a PA system. The systems are located throughout the plant, with the boxes being used to activate the alarm signal in the affected area. Each alarm, when activated, will transmit a signal to the fire alarm control display monitor located at the C-300 CCF and at fire services. Alarm messages include alarm descriptions and locations of alarms. The emergency alarm also may be activated from the C-300 CCF. The PSS is in charge of the C-300 CCF and he/she may activate any alarm or make announcements over the PA system as he/she deems necessary to announce emergency instructions.

5.4 COMMUNICATION SYSTEMS

In an emergency situation, effective and rapid communication must be maintained throughout the emergency response and control organization. These are four forms of communications available at PGDP.

- (1) **Emergency Phone System**—Plant telephones are located throughout the plant. An emergency situation can be reported by dialing 333 on the plant telephones. Emergency phone calls also can be made by using other phones by dialing (270) 441-6333. Emergency calls are answered at the C-300 CCF.
- (2) **Radios**—Radios are used by the PSS, fire services members, security, and other response personnel for emergency communications. Other personnel throughout the plant use radios for routine communications. Any radio in the plant can be used to summon emergency assistance using the dedicated emergency call channel. The C-300 CCF is utilized as the base station and monitors radio communications on all radio channels used at PGDP.
- (3) **PA System**—The PA system is used to communicate emergency instructions to all personnel. The PSS is responsible for all announcements made on the PA system.
- (4) **Messenger**—A messenger may be used to notify the C-300 CCF of an emergency if it is determined to be needed or other means are unavailable.

6. COORDINATION AGREEMENT

PGDP participates in mutual emergency aid agreements with emergency response organizations in the area. The agencies included in these agreements are listed in Part G, Table 2. Copies of the Mutual Aid Agreements and letters of understanding are included in Appendix G3 of this plan.

The PSS is the designated individual on-site responsible for responding to all emergency conditions and the primary authority for all emergency response actions. Mutual aid assistance provided to PGDP is

requested by the PSS and may consist of fire and hazardous materials response and local law enforcement who can aid in traffic control on the roadways on or near the site. Area emergency medical services may aid in the transport of personnel from the plant site to off-site medical facilities.

Part G, Table 2. Mutual-Aid Agreement Agencies

Agency	Phone
Mercy Regional EMS 3551 Coleman Road Paducah, Kentucky 42001	911 (270) 443-6529
McCracken County Judge Executive 300 South Seventh Street McCracken County Courthouse Paducah, Kentucky 42003	(270) 444-4707
Mercy Health – Lourdes Hospital, LLC 1530 Lone Oak Road Paducah, Kentucky 42003	(270) 444-2444
McCracken County Sheriff's Department 301 South Sixth Street McCracken County Courthouse Paducah, Kentucky 42003	911 (270) 444-4719
Air Evac Lifeteam Program Director AE 108 1113 Medical Center Drive Mayfield, Kentucky 42066	(270) 251-8667 (Office) 1-800-247-3822 (Air Evac Communications Center)
Paducah City Police Department 1400 Broadway Street Paducah, Kentucky 42001	(270) 444-8550
Ballard County Sheriff Department 437 Ohio Street Wickliffe, Kentucky 42087	(270) 335-3561
Paducah-McCracken County Office of Emergency Management 3700 Coleman Road Paducah, Kentucky 42001	911 (270) 448-1530
West McCracken Fire District Grahamville District 9180 Ogden Landing Road West Paducah, Kentucky 42086	911 (270) 488-3112 (Station 1) (270) 488-3825
Baptist Health Paducah Hospital 2501 Kentucky Avenue Paducah, Kentucky 42003	(270) 575-2100

Injured personnel who cannot be treated satisfactorily at the PGDP medical facility will be transported via ambulance to either Mercy Health—Lourdes Hospital or Baptist Health Paducah Hospital, both located in Paducah, Kentucky. The attending Emergency Medical Technician, or personnel at the C-300 CCF, will notify the respective hospital of incoming patients. Site Paramedics may also accompany patients being transported to the hospital on an as-needed basis. They are familiar with all emergency situations and types of injuries that might occur. A copy of this Contingency Plan will be maintained at the facility and provided to those agencies with which mutual aid agreements have been established.

7. EVACUATION PLAN

All emergencies require prompt and deliberate action. Although the likelihood of a hazardous waste emergency requiring evacuation is remote, an established set of procedures will be followed in such an event. The PSS will make the determination whether to deviate from the established procedures to provide a more effective plan for bringing the situation under control, depending on the event severity. The PSS is responsible for determining which emergency situations require evacuation.

The facility employs various alarm systems with signals to initiate evacuation procedures. In addition to the alarms, the PA system is used to notify key plant personnel as to the nature of the emergency and recommended protective actions. The PA system broadcasts an override message over all plant radios using the all-call system. Total site evacuation is initiated only by the PSS.

Eight PWSs, two each at four locations, can be sounded to alert residents within a two-mile radius of the plant when deemed necessary by the PSS or designee. The PWS is used to alert the public for hazardous material releases from the plant. The “alert” tone will be initiated on the PWS when directed by the PSS. Upon activation of the PWS, the public will be instructed to seek shelter (shelter-in-place) and listen for additional messages on local media outlets.

Emergency alarms are used to signal different emergency situations, such as fires or hazardous material spills. Emergency alarms can be sounded by activating an emergency alarm pull box, clearly marked throughout the site. Employees are familiar with alarm box locations in areas where they work. Evacuation routes for the RCRA facilities are shown on the drawings in Appendix G2 of this plan.

Employees that evacuate one of the hazardous waste storage facilities due to an emergency will congregate at the designated primary assembly point. If the primary assembly point is downwind of the facility at the time of the incident, personnel will go to an alternate assembly point upwind of the facility, at a distance of at least 100 ft.

8. REQUIRED REPORTS

The occurrence reports of emergency incidents are submitted to appropriate outside agencies. The occurrence and event reports identify the time, date, and the details of these emergency incidents.

Whenever the RCRA Contingency Plan is implemented, the PSS will note, in the facility log, the time, date, and details of the incident. Within 15 days after the incident, a written report will be submitted to KDWM, which includes the following information:

- Name, address, and telephone number of the owner or operator;
- Name, address, and telephone number of PGDP;
- Date, time, and type of incident (e.g., fire, explosion);
- Name and quantity of material(s) involved;
- Extent of injuries, if any;

- An assessment of actual or potential hazards to human health or the environment, where applicable; and
- Estimated quantity and disposition of recovered material that resulted from the incident.

In the event of a hazardous waste leak or spill in excess of 1 lb from a RCRA storage facility, a report will be submitted to KDWM within 30 days of release detection, which includes the following:

- Likely route of migration of the release.
- Characteristics of the surrounding soil (soil composition, geology, hydrology, and climate).
- Results of any monitoring or sampling conducted in connection with the release, if available. If sampling of monitoring data relating to the release is not available within 30 days, the data must be submitted to the Cabinet as soon as available.
- Proximity to downgradient drinking water, surface water, and populated areas.
- Description of response action taken or planned.

APPENDIX G1

RCRA EMERGENCY EQUIPMENT INSPECTION AND TESTING SCHEDULES

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**EMERGENCY EQUIPMENT INSPECTION AND TESTING SCHEDULES
RCRA STORAGE AND TREATMENT FACILITIES**

Item	Inspect	Test	Inventory	Comments
Absorbent			W	
Over pack Drums			W	
Radios		W		Testing is not documented
Sprinkler Systems	M	1Y		C-752-A/C-733 only
Eyewashes	W			
Safety Showers	W	1Y		C-752-A only
Tyvek [®] Coveralls			W	
Gloves			W	
Booties			W	
Brooms			W	
Shovels			W	

Key

1Y - Once per calendar year

W - Once each week

M - Once each calendar month

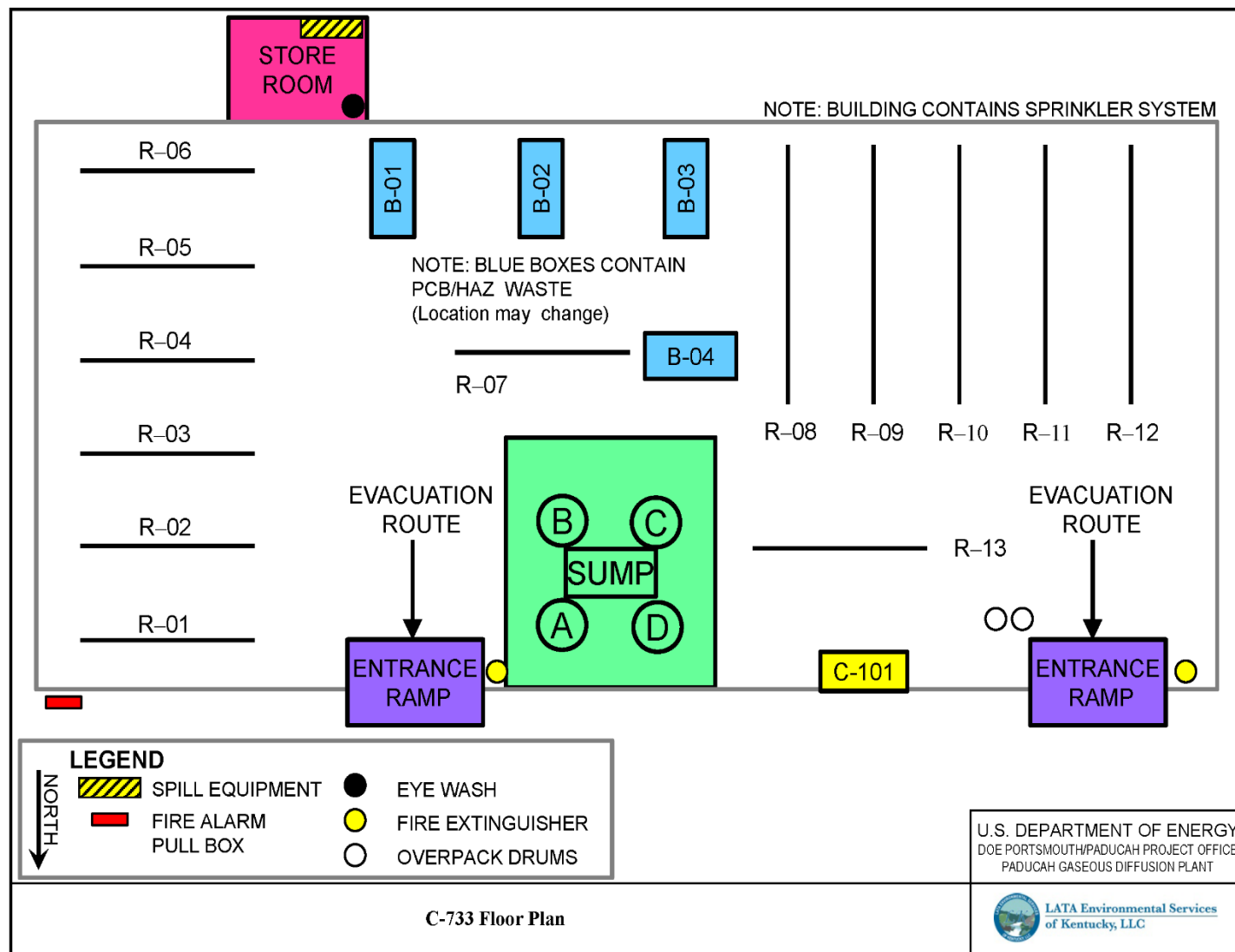
REQUIRED EMERGENCY RESPONSE AND SPILL CONTROL EQUIPMENT

Building	Equipment	Capabilities
C-733	Absorbent (loose)	Absorb and/or contain spills
	Tyvek® Coveralls	Protect against contamination
	Gloves	Protection for hands
	Booties	Protection for feet
	Overpack Drums	Containment for leaking drums
	Brooms	Cleanup of solid residue
	Shovels	Cleanup of solid residue
	Sprinkler Systems	A system for protecting a building against fire by means of overhead pipes which convey an extinguishing liquid
	Fire Extinguishers	Portable apparatus for putting out fires
	Eyewashes	Device to wash foreign objects from eyes
C-746-Q	Absorbent (loose)	Absorb and/or contain spills
	Tyvek® Coveralls	Protect against contamination
	Gloves	Protection for hands
	Booties	Protection for feet
	Overpack Drums	Containment for leaking drums
	Brooms	Cleanup of solid residue
	Shovels	Cleanup of solid residue
	Fire Extinguishers	Portable apparatus for putting out fires
	Eyewashes	Device to wash foreign objects from eyes
C-752-A	Absorbent (loose)	Absorb and/or contain spills
	Tyvek® Coveralls	Protect against contamination
	Gloves	Protection for hands
	Booties	Protection for feet
	Overpack Drums	Containment for leaking drums
	Brooms	Cleanup of solid residue
	Shovels	Cleanup of solid residue
	Sprinkler Systems	A system for protecting a building against fire by means of overhead pipes which convey an extinguishing liquid
	Fire Extinguishers	Portable apparatus for putting out fires
	Eyewashes	Device to wash foreign objects from eyes

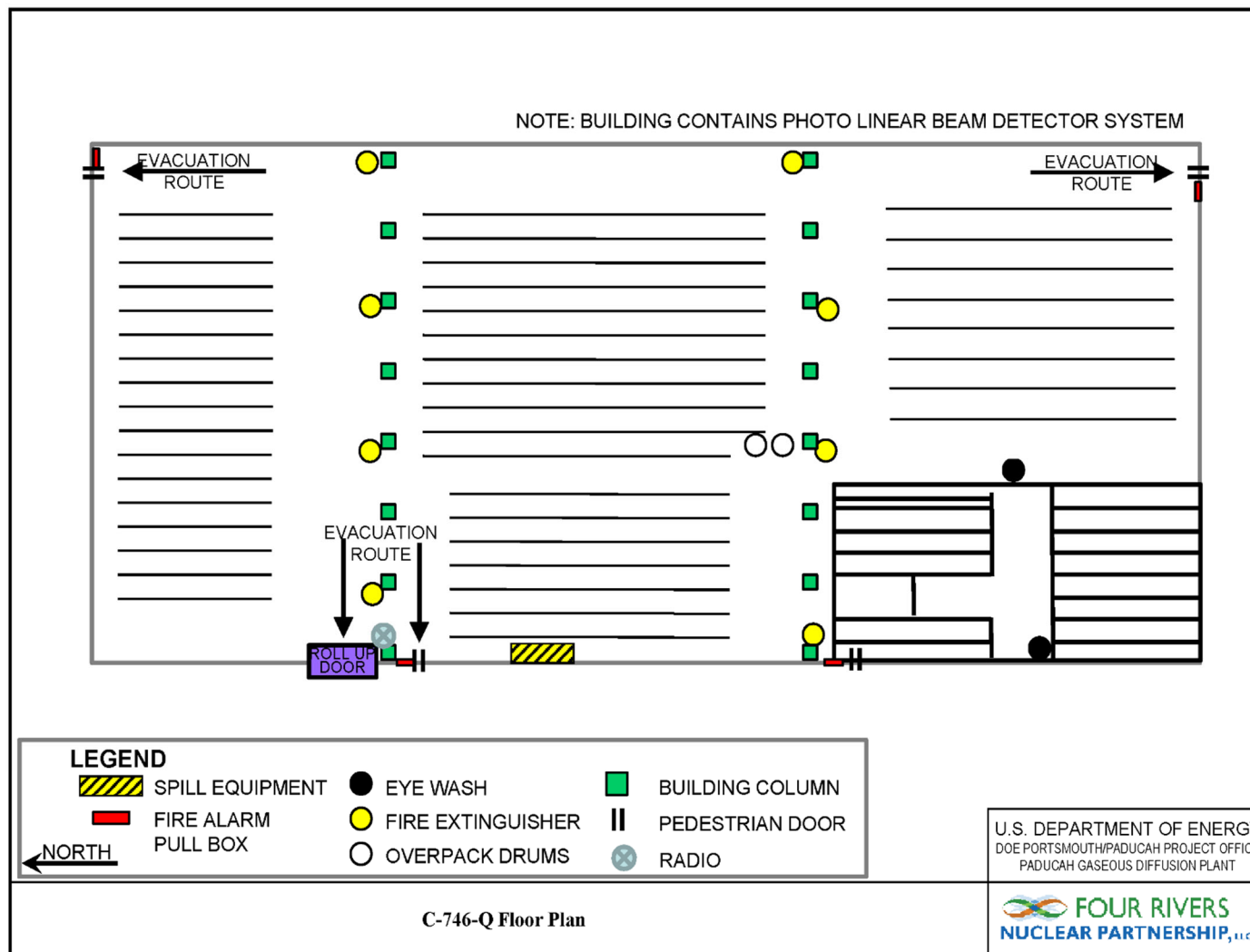
APPENDIX G2

EVACUATION ROUTES
AND
FIRE EXTINGUISHER LOCATIONS

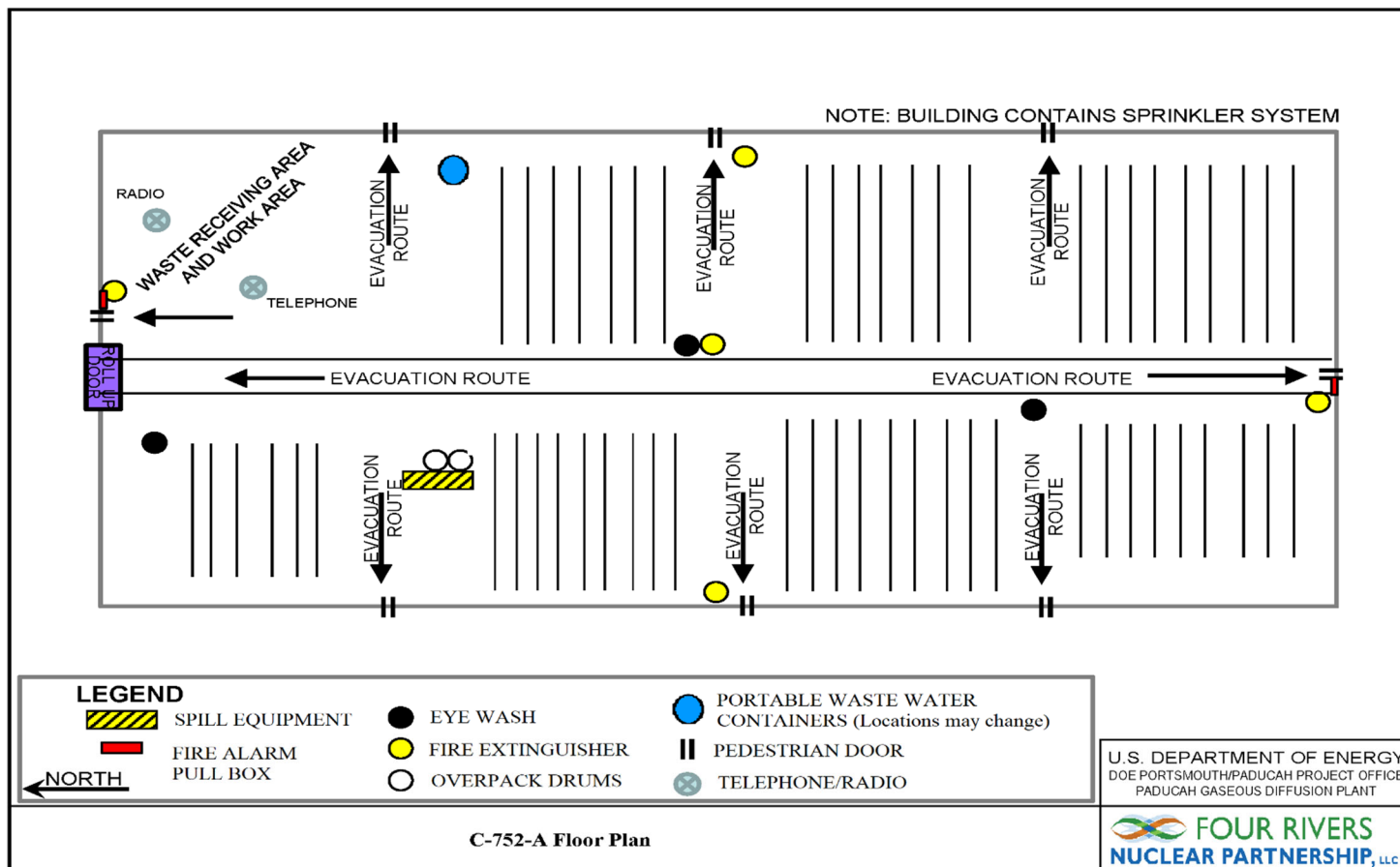
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Appendix G2, Figure 1. C-733 Floor Plan



Appendix G2, Figure 2. C-746-Q Floor Plan



Appendix G2, Figure 3. C-752-A Floor Plan

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APPENDIX G3

MUTUAL AID AGREEMENTS
AND
LETTERS OF UNDERSTANDING

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**Letters of Agreement with
Off-Site Emergency Response Assistance Organizations
Paducah Gaseous Diffusion Plant**

Table of Contents

Letter of Assistance

- Ballard County Sheriff
- McCracken County Judge Executive
- Mercy Regional Emergency Medical Services (EMS)—Ambulance
- Mercy Regional EMS—Basic Life Support/Medical First Response
- Paducah-McCracken County Office of Emergency Management

Memorandum of Agreement

- Air Evac Lifeteam
- Baptist Health Paducah Hospital
- Mercy Health—Lourdes Hospital Paducah

Memorandum of Understanding

- McCracken County Sheriff's Department
- Paducah Police Department
- West McCracken Fire District



BALLARD COUNTY SHERIFF

RONNIE GILES

sheriff@brtc.net

P.O. Box 565 – 437 Ohio Street

Wickliffe, Kentucky 42087

Phone: 270-335-3561

Fax: 270-335-3010

August 10, 2021

April Tilford, Program Manager
Emergency Management
Four Rivers Nuclear Partnership, LLC
U.S. Department of Energy Paducah Site
5511 Hobbs Road
Kevil, KY 42053

Dear Ms. Tilford:

The purpose of this letter of assistance is to confirm that the Ballard County Sheriff's Office will support the U.S. Department of Energy Paducah Site in response to a Paducah Gaseous Diffusion Plant (PGDP) alternate Emergency Operations Center (EOC) activation.

Upon request from the PGDP EOC Crisis Manager or EOC Director, the Ballard County Sheriff's Office will provide a deputy presence, as soon as possible, to the following location:

Alternate Emergency Operations Center
951 Kentucky Avenue
Kevil, KY 42053

Requests for deputy presence can be made by contacting the Ballard County Sheriff's Office at (270) 335-5411.

Sincerely,

Ronnie Giles
Ballard County Sheriff



Craig Z. Clymer

McCracken County Judge Executive

McCracken County Courthouse
300 Clarence Gaines Street
Paducah, KY 42003
Office (270) 444-4707
Fax (270) 444-4737

June 17, 2019

April Tilford, CEM
Emergency Management Program Manager
Four Rivers Nuclear Partnership
U. S. Department of Energy Paducah Site
5511 Hobbs Road
Kevil, KY 42053

Dear Ms. Tilford:

The purpose of this letter of assistance is to confirm that the McCracken County Office of the Judge/Executive will continue its support to the U. S. Department of Energy (DOE) Paducah Site during disasters and emergencies affecting the site. When possible during these critical incidents, McCracken County government will provide available resources to the Paducah DOE Site upon the request of the DOE site incident commander or other site authority.

Sincerely,

A handwritten signature in black ink, appearing to read "CZC", is written over the printed name and title of the signatory.

Craig Z. Clymer
McCracken County Judge Executive

CZC/vp



3551 Coleman Road
Paducah, KY 42001
Dispatch (270) 443-6529
Administration (270) 450-8050
Fax (270) 444-9128
Jeremy D. Jeffrey, Executive Director

June 2, 2021

DOE Paducah Site Emergency Management
April Tilford
5511 Hobbs Road
Kevil, KY 42053

Mrs. Tilford,

If requested and available, Mercy Regional EMS ambulance service will respond to an emergency at the U.S. Department of Energy Paducah Site to transport and treat a patient(s). Upon arriving on scene, Mercy Regional EMS shall report to the Incident Commander or his/her designee for assignments. Once Mercy Regional asset(s) receive their assignments, they shall remain dedicated to the event until its conclusion. At no time shall any resources be pulled without verbal approval by the Incident Commander.

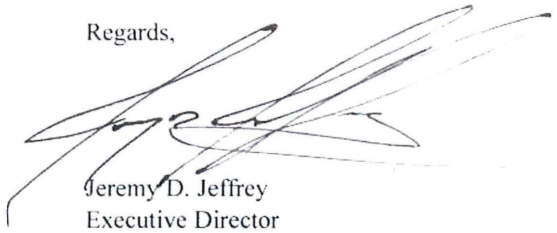
Mercy Regional EMS operates on low band VHF frequency. It is understood that during a large scale event, Mercy Regional EMS will operate on VTAC frequencies to ensure continuity and ensure safety for all personnel. In the event both these frequencies should become congested or unavailable, Mercy Regional EMS requests that any radio communication be directed through Paducah Medcom.

Currently Mercy Regional EMS has four (4) stations located in McCracken County proper. Upon request Mercy Regional EMS shall have assets on site in 8-12 minutes depending on volume at the time of request and distance.

If transport of a potentially contaminated patient(s) is needed, Mercy Regional EMS shall activate a Haz-Mat alert through Paducah Medcom and transport. This alert will notify local healthcare facilities of a potentially contaminated patient. This alert will allow for set up of decon. This alert will decrease the wait time for the patient upon arrival at either of the two (2) facilities located in McCracken County.

Should the need for transport arise, please contact Paducah Medcom at (270) 443-6529 or 911.

Regards,


Jeremy D. Jeffrey
Executive Director

Basic Life Support/Medical First Response Agreement (Affiliation Agreement)

This Agreement is hereby jointly executed by the following entities (individually the "Party" and collectively, the "Parties"):

Mercy Regional EMS
3551 Coleman Road
Paducah, KY 42001
270-443-6529

Mission Conversion Support Services
1010 Monarch Street, Suite 250
Lexington, KY 40513
270-441-6565

1. Purpose

Consistent with 202 KAR 7:545(1)(e), this mutual aid affiliation agreement (the Agreement) hereby is executed between the Parties. This Agreement establishes guidelines, parameters, roles, and responsibilities for emergency medical services (EMS) medical responses that originate from the U.S. Department of Energy (DOE) Paducah Gaseous Diffusion Plant (PGDP) to outside the PGDP in McCracken County pursuant to EMS License Number 1011.

This Agreement establishes roles, responsibilities, and guidelines for (a) Medical Direction; (b) Basic Life Support (BLS) Protocols; (c) Response Protocols; (d) Geographic Service areas; and circumstances causing dispatch; and (e) other aspects of BLS and Medical First Response in Paducah, McCracken County. However, the Agreement does not describe with specificity every potential response circumstance. The Parties jointly agree to the terms and conditions of this Agreement and further agree that either Party may terminate this Agreement thirty (30) days after written notice is provided to the nonterminating Party.

2. Terms and Conditions

(a) BLS is the provision of pre-hospital emergency medical care by certified Emergency Medical Responders (EMRs), and/or certified Emergency Medical Technicians (EMTs). BLS is medical care that exceeds the level of care provided by individuals certified only in First-Aid, Cardiopulmonary resuscitation (CPR), and/or automated external defibrillator (AED).

(b) EMS Medical Direction compliant with 202 KAR 7:801 shall be provided to Mission Conversion Services Alliance (MCSA) by Mercy Regional EMS 1011 at no cost to MCSA or its affiliated personnel. Brett F. Bechtel, MD, currently is under contract with Mercy Regional EMS 1011 as EMS Medical Director and shall serve as EMS Medical Director for FRNP in FRNP's conduct of EMS medical responses covered by this Agreement outside the DOE Paducah Site.

(c) MCSA shall use current Kentucky State EMS Protocol BLS support portions of the medical protocols (the Protocols) with the exceptions mentioned below. Use of the Protocols was approved by Brett F. Bechtel, MD. MCSA shall use the Protocols with the following exceptions: (1) Combi tube and (2) King LTD Airway.

(d) Only authorized and appropriately certified personnel employed by MCSA may function under the Protocols at the BLS level. Personnel not currently Kentucky-certified as an EMR or EMT shall not provide BLS medical services, but may perform medically necessary care consistent with current standards of First-Aid, CPR, and/or AED as established by the American Red Cross or the American Heart Association.

(e) The licensed geographic service area (the Service Area) for Mercy Regional EMS 1011 is limited to Paducah/McCracken County. PGDP shall not respond to requests for BLS First Response that originates outside the Service Area unless pursuant to an established mutual aid agreement between MCSA and another entity. MCSA has limited their response to the West McCracken Fire District.

(f) MCSA will respond outside the DOE Paducah Site, if resources are available, when appropriately requested through the Paducah/McCracken County 911 Communication Center or by Mercy Regional EMS 1011 to any Medical or Traumatic Emergency originating in the Service Area. MCSA may choose to serve only a portion of the Service Area. MCSA has limited their response to the West McCracken Fire District.

(g) If MCSA becomes aware of an incident in the Service Area prior to notification by Paducah/McCracken County 911 Communication Center or by Mercy Regional EMS 1011 (e.g., an incident near the boundary of DOE owned and licensed property), MCSA will respond immediately, if possible, and, in any case, will notify E-911.

(h) Mercy Regional EMS 1011 agrees that, when available, members of MCSA shall be invited to attend EMS Continuing Education training courses conducted by Mercy Regional EMS 1011.

(i) Documentation and/or BLS First Response medical care provided by MCSA shall be reviewed formally by Mercy Regional EMS 1011.

(j) Nothing in this Agreement constitutes privileges to perform BLS medical First Response that could constitute unlawful practice of medicine (i.e., without an appropriate certification for the level of practice performed or without provision of EMS Physician Medical Direction).

(k) This Agreement shall remain in place and be renewed automatically at the conclusion of each calendar year unless a Party makes a written modification request.

(l) Either party may terminate this agreement within thirty (30) days after written notice is provided to the other party.

(m) Modifications to this Agreement shall be in writing, dated, and signed by both Parties. Upon modification, prior Agreements become obsolete.

(n) Except for fraud, deceit, bad faith, knowing violation of law or willful misconduct, in no event shall any Party be liable for any incidental, indirect, special, punitive, economic or consequential damages, including but not limited to, loss of revenue or profits or loss of use of capital suffered or incurred by a Party as a result of this Agreement.

(o) This Agreement is entered into by the Parties for the exclusive benefit of the Parties and their successors and assigns. Except to the extent required by law, no third party has any rights under this Agreement.

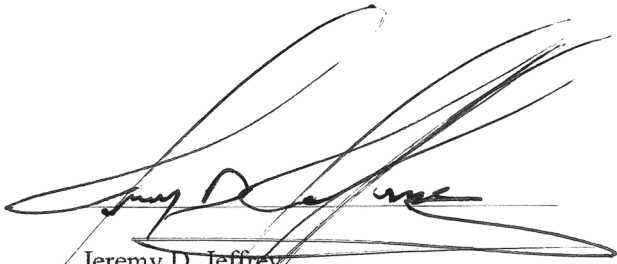
Each of the undersigned has caused this Agreement to be duly executed and delivered in its name and on its behalf, as of the day and year first written.

On Behalf of:

Mercy Regional EMS

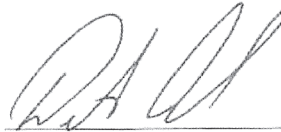
On Behalf of:

Mission Conversion Services Alliance



Jeremy D. Jeffrey
Executive Director

8/20/2025
Date



Dutch Conrad
President and Program Manager
Mission Conversion Services Alliance, LLC

8/6/25
Date



**McCRACKEN COUNTY
OFFICE OF EMERGENCY MANAGEMENT
Disaster & Emergency Services
Homeland Security**

Emergency Management Complex, 3700 Coleman Road • Paducah, KY 42001-9008
Phone (270) 448-1530 restes@mccrackencountyky.gov Fax (270) 443-0803

April 19, 2022

April Tilford, CEM
Emergency Management Program Manager
Four Rivers Nuclear Partnership, LLC
U.S. Department of Energy Paducah Site
5511 Hobbs Road
Kevil, KY 42053

Dear Ms. Tilford:

The purpose of this letter of assistance is to confirm that the Paducah-McCracken County Office of Emergency Management (OEM) will support the U.S. Department of Energy (DOE) Paducah Site during disasters and emergencies affecting the site. When possible, during these critical incidents, the Paducah-McCracken County OEM will provide available resources to the DOE Paducah Site upon the request of the site Incident Commander or other site authority. These resources include communications, warning, traffic control, and search and rescue services.

In response to a site emergency, OEM, as the local government coordinating agency, may activate the county Emergency Operations Center (EOC) and establish unified command with the site to assist and support the site with assets from other local, state and federal agencies and nongovernmental emergency organizations. Also, OEM serves as the primary contact with the Commonwealth of Kentucky Emergency Management State EOC (SEOC) and may request state and federal resources through the SEOC to mitigate the impact of a DOE Paducah Site emergency upon both on-site and off-site populations.

Sincerely,

Rob Estes
Director
Paducah-McCracken County Office of Emergency Management
3700 Coleman Road
Paducah, KY 42001-9008

MEMORANDUM OF AGREEMENT
between
Mission Conversion Services Alliance
and
Air Evac Lifeteam

I. PURPOSE

This Memorandum of Agreement (MOA) is entered into by the Mission Conversion Services Alliance (MCSA) (hereafter referred to as Paducah Gaseous Diffusion Plant (PGDP)) and Air Evac, EMS, Inc., d/b/a Air Evac Lifeteam for emergency assistance, related to the transport and treatment of injured and radiologically or chemically contaminated or potentially contaminated personnel.

II. AUTHORITY

- A. U.S. Department of Energy (DOE) Order 151.IE, *Comprehensive Emergency Management System*

III. Agreement

In accordance with the authorities delineated in Section II above, the Parties agree to the following guidelines.

- A. PGDP agrees to, in good faith, the following:

1. Maintain a central point of contact within PGDP Emergency Management Program for emergency preparedness planning, coordination, and liaison with Air Evac Lifeteam (Attachment A);
2. Develop procedures, in cooperation with Air Evac Lifeteam, for requesting routine and emergency assistance within the scope of this MOA;
3. Provide orientation sessions and information to Air Evac Lifeteam personnel, regarding PGDP radiological and chemical hazards, through briefings and site tours to ensure effective emergency response operations and support between the parties.
4. Train and brief Air Evac Lifeteam personnel authorized to perform emergency actions likely to result in occupational doses exceeding the values of the limits provided at IO *CFR* 835.202(a) on the known or anticipated hazards to which the individuals(s) will be subjected;
5. Provide support to Air Evac Lifeteam in-house training, using PGDP personnel and/or training resources (e.g., videotapes, course materials, etc.);
6. Provide Air Evac Lifeteam with the opportunity to participate in periodic drills and exercises to build proficiency and evaluate the validity and effectiveness of emergency response plans, procedures, facilities, and equipment to treat radiologically and chemically contaminated injured patients. PGDP will work cooperatively with Air

Evac Lifeteam to coordinate medical evaluations of exercises and identify, discuss, and close out any deficiencies.

7. Prepare an After-Action Report for the drills and exercises, which will be reviewed, discussed, and agreed upon by Air Evac Lifeteam and PGDP; the After-Action Report finalized within 60 days of the exercise;
8. Provide notification to Air Evac Lifeteam through the PGDP's Plant Shift Superintendent (PSS), PGDP's Fire Services Commander, or designated, trained Emergency Medical Services (EMS) personnel, as soon as possible, when radiologically or chemically contaminated or potentially contaminated, injured personnel need to be transported by air ambulance for treatment;
9. Provide a 24-hour/day, 7 days/week point of contact for coordination of inquiries or requests for assistance directed to or from Air Evac Lifeteam through the PGDP PSS or PGDP's Fire Services Commander;
10. Undertake best efforts to provide medical records necessary and applicable to emergency treatment of injured, contaminated, or potentially contaminated personnel;
11. For radiologically contaminated or potentially contaminated, injured personnel, send Radiation Protection personnel with calibrated radiation survey instruments to the receiving hospital and/or air ambulance home-base to identify and address any radiological concerns and assist and advise on radiological monitoring and decontamination efforts, as requested;
12. Coordinate with Air Evac Lifeteam all news releases, relating to Air Evac Lifeteam support to PGDP. With respect to communications respecting care of personnel by Air Evac Lifeteam, such communications shall be governed by the policies and directives of Air Evac Lifeteam;
13. To the extent an air ambulance is contaminated or contains radiologically or chemically contaminated waste materials as a result of the transport, decontamination, and treatment of radiologically and/or chemically contaminated, injured patients from the DOE PGDP. PGDP shall properly identify, manage, package, handle, remove, and/or dispose of all such radiologically or chemically contaminated waste materials, if any, in accordance with applicable federal, Commonwealth of Kentucky, and local statutes, rules, orders, regulations, and ordinances;
14. Immediately, upon request of Air Evac Lifeteam, PGDP shall decontaminate any area of the aircraft contaminated as a result of patient treatment from a radiological incident;
15. Provide all of the undertakings contemplated in the MOA in the manner and scope that follow the safety and health guidelines of Air Evac Lifeteam. In no event shall PGDP employees be required to exceed their capabilities or operate outside their job function;
16. Inform its planning, training, and response personnel of the provisions of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and its regulations and any applicable state laws and regulations concerning patient confidentiality; and

17. Meet annually with Air Evac Lifeteam staff to review this MOA and revise procedures, as necessary.

B. The Air Evac Lifeteam agrees to, in good faith, the following:

1. Maintain a central point of contact for emergency preparedness planning, coordination, training, and liaison with PGDP Emergency Management Representatives (Attachment B). When alternate destinations are considered for an injured patient via Air Evac Lifeteam's mutual aid relationships, the information provided by PGDP to Air Evac Lifeteam will be distributed by Air Evac Lifeteam to any third-party health care provider Air Evac selects;
2. Develop emergency response procedures in cooperation with PGDP for the timely treatment of injured DOE PGDP personnel, including radiologically or chemically contaminated or potentially contaminated patients from the PGDP;
3. Maintain training records, status of air ambulance personnel requiring radiological training, and coordinate with PGDP to determine how to meet air ambulance staff radiological training needs;
4. Participate with PGDP, when possible, in drills and exercises to build proficiency and evaluate the validity and effectiveness of emergency response plans, procedures, facilities, and equipment to treat injured site personnel, including radiologically and chemically contaminated patients;
5. Provide a 24-hours/day, 7 days/week point of contact for receiving notification from the PGDP- PSS or PGDP Fire Services Shift Commander regarding the need to transport injured DOE PGDP personnel, including radiologically or chemically contaminated or potentially contaminated patients;
6. Coordinate with PGDP all news releases relating to Air Evac Lifeteam support to PGDP; and
7. Meet with PGDP annually, if possible, to review this MOA and revise operating procedures, as needed.

- C. PGDP and Air Evac Lifeteam both acknowledge and agree that no monetary compensation will be paid by either party to the other under this MOA. Air Evac Lifeteam will bill directly and look solely to the transported patient and/or the patient's third-party payer (e.g., employees' health coverage) or responsible party (e.g., worker's compensation insurance coverage) for payment of all transportation, medical care, supplies, drugs or other services provided under this MOA.

IV. Implementation and Interpretation

This MOA is effective upon the latter date of the signature of the parties and shall remain effective through the duration of the DOE/MCSA prime contract, or through the termination date of any extension to DOE/MCSA prime contract, unless terminated pursuant to this MOA. In the event any particular provision(s) of this MOA is (are) rendered inoperative, the parties agree that the remaining provisions of this MOA shall survive and remain in full force and effect.

V. Termination

Notwithstanding the foregoing, this MOA may be terminated prior to normal expiration by either party for any reason by providing the other party with at least 180 days advance written notice of intent to terminate.

VI. Liability

Each party to this MOA agrees that it will be responsible for its own acts and omissions and the results thereof and shall not be responsible for the acts and/or omissions of another party and the results thereof. Each party agrees that it will assume all risk and liability to itself or its employees for any injury to persons or property resulting in any manner from conduct of its own operations and the operations of its employees under this MOA. No indemnification for any loss, claim, damage, or liability is intended or provided by any party to this MOA. The terms of this section shall survive the expiration or termination of this MOA.

VII. Signatures

This MOA may be executed in one or more counterparts, each of which shall be deemed to be a duplicate original, but all of which, taken together, shall be deemed to constitute a single instrument. Each party may sign this MOA using an electronic or handwritten signature, which is of equal effect, whether on original or electronic copies.

Signed by:

6A6D878A287D46B...
Joe Grygiel
Vice President Operations
Air Evac EMS, Inc.
O'Fallon, MO

1-21-26

Date

MARC CONRAD
(Affiliate)

Digitally signed by MARC
CONRAD (Affiliate)
Date: 2026.01.23
09:18:05 -05'00'

Dutch Conrad
President and Program Manager
Mission Conversion Services Alliance, LLC
Paducah, KY

01/23/2026

Date

ATTACHMENT A

1. EMERGENCY REQUEST CONTACT

The 24/7 point of contact for emergency requests is as follows: PGDP

Plant Shift Superintendent (PSS)

Emergency Phone Line: 270-441-6333

PSS Business Phone: 270-441-6211

2. ALTERNATE 24-HOUR POINT OF CONTACT

The alternate 24/7 point of contact for PGDP emergency requests:

PGDP Fire Services Shift Commander

Office Phone: 270-441-6031

3. PGDP EMERGENCY MANAGEMENT PROGRAM CONTACT

The point of contact for the Emergency Management Program is as follows:

Wes Hodges

PGDP Emergency Management Program Manager

Office Phone: 270-441-5753

Cell Phone: 270-816-2088

Email: Wes.Hodges@pad.pppo.gov

ATTACHMENTB

1. AIR EVAC LIFETEAM EMERGENCY REQUEST CONTACT:

The 24/7 point of contact for Air Evac Lifeteam emergency requests is as follows:

Air Evac Communication Center 1-800-247-3822

Local Calls:

G. Allen Jones, CCEMT-P
Program Director
AE 108
1113 Medical Center Drive
Mayfield, KY 42066
(270) 970-1526 Cell
(270) 251-8667 Office
(270) 251-8668 **Fax**

NOTES

The following surface activity release rates will be used, or as applicable for isotopes of concern:

- Removable Contamination: $<20 \text{ dpm}/100\text{cm}^2$ alpha and
 $<1,000\text{dpm}/100\text{cm}^2$ beta/gamma
- Total (Fixed and Removable Contamination): $<500\text{dpm}/100\text{cm}^2$ alpha and
 $<5,000 \text{ dpm}/100\text{cm}^2$ beta/gamma

Agreement
Between
Mission Conversion Services Alliance
and
Baptist Health Paducah Hospital

This Agreement is entered into by the Mission Conversion Services Alliance (MCSA) (hereafter known as Paducah Gaseous Diffusion Plant (PGDP)) and Baptist Healthcare System, Inc. d/b/a Baptist Health Paducah both collectively hereinafter referred to as the Parties.

I. Purpose

The purpose of this Agreement is to reaffirm and maintain the cooperative relationship between the Parties with particular regard to planning, response, and assistance with respect to medical treatment of injured personnel who may be radiologically or chemically contaminated as a result of an accident at the Department of Energy (DOE) Paducah Site.

It is the intent of this Agreement: (1) to identify responsibilities of the Parties in an emergency response, (2) to identify medical services to be provided; (3) to formalize emergency notification interfaces, and (4) to establish a mechanism for exchange and dissemination of information relevant to emergency planning and response.

II. Authority

Baptist Health is authorized to perform all actions outlined in this agreement as a licensed medical facility as specified under the laws of the Kentucky state law.

III. Responsibilities

With respect to planning and response for treatment of personnel who may be involved in an injury/incident as a result of incidents at the DOE PGDP, the Parties agree as follows:

- A. PGDP will promptly notify Baptist Health that assistance from the hospital may be required.
- B. PGDP will provide, as requested by Baptist Health Hospital, radiological advice and assistance at the time of an accident at the DOE Paducah Site.
- C. Baptist Health will provide appropriate personnel and facilities for tests, examinations, and treatment (including decontamination if required) on a twenty-four (24) hour per day basis, for injured personnel at the DOE PGDP, including but not limited to, those personnel who may be radiologically or chemically contaminated.
- D. Baptist Health will develop and maintain with PGDP assistance, detailed plans and procedures to be followed by the Parties in admitting and treating a radiologically or chemically contaminated patient.
- E. Baptist Health will participate, upon reasonable request by PGDP in emergency exercises designed to test the effectiveness of MCSA's emergency planning procedures.

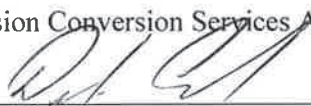
- F. Upon request by PGDP, Baptist Health will provide personnel for consultation in preparing and updating plans and procedures for medical emergencies.
- G. In the course of an injury accident as contemplated by this Agreement, the Parties will establish communications between PGDP's shift superintendent and Baptist Health Hospital director of emergency services, or their respective designees.
- H. In the course of a protracted event requiring treatment of injured individuals, communications between the Parties will be established between PGDP's crisis manager and Baptist Health Hospital president, or their respective designees.
- I. The Parties agree to coordinate, to the extent possible, all information disseminated to the public regarding the severity and magnitude of an incident at the DOE PGDP.
- J. The Parties agree to coordinate their respective emergency plans to ensure a mutual understanding of emergency action and objectives and to notify each other of applicable changes made in their respective plans.
- K. The Parties agree to periodically review the status of their plans, procedures, agreements and capabilities that may require revision and/or further development and to conduct drills and exercises involving radiological or chemical emergency response activities.
- L. Nothing in this Agreement shall be construed to affect, in any manner, the respective rights and responsibilities of the Parties under existing agreements or other applicable provisions of the law.
- M. PGDP will provide Baptist Health with the suppliers' Safety Data Sheets (SDSs) that include short versions of how-to-treat, as requested. PGDP will provide SDSs to Baptist Health, as applicable. In addition, PGDP will provide updates of SDSs as received from the manufacturer.
- N. Baptist Health will maintain, with PGDP assistance, detailed plans and procedures to be followed by the Parties in admitting and treating an individual that may have been exposed to radiation or chemical contaminants.
- O. Upon reasonable request by PGDP, Baptist Health will participate in emergency exercises designed to test the effectiveness of the PGDP's emergency planning procedures and will participate in drills and exercises designed to test emergency responses to an incident as anticipated in this Agreement.

IV. Miscellaneous

- A. PGDP agrees to indemnify and hold harmless Baptist Health Paducah Hospital, its employees, agents, and subsidiaries, for any and all liability and from any and all claims, demands, damages, actions, causes of actions, or suits of any kind or nature whatsoever resulting from exposure to radioactivity or other radioactive contamination caused by or arising out of admission of PGDP employees as patients under this Agreement, to the extent caused by PGDP negligence. This indemnification and hold harmless obligation shall apply only to the extent Baptist Health Hospital, its employees, agents, and subsidiaries are not indemnified and held harmless under the provisions of the Price Anderson Amendments Act provisions or other provisions of the Mission Conversion Services Alliance contract with the Department of Energy.
- B. This Agreement shall be construed in accordance with the laws of the Commonwealth of Kentucky.
- C. Except as provided in IV (A) above, this Agreement and the rights and obligations hereunder shall not be assigned or otherwise delegated without prior written consent of both Parties.
- D. This Agreement may be amended only by an instrument in writing signed by the Parties. This Agreement shall be reviewed every two (2) years and amended, as needed.
- E. This Agreement superseded all previous agreements between the Parties and constitutes the entire Agreement between the Parties concerning the subject matter herein. This Agreement shall continue in force until terminated, by either party, by providing the other with ninety (90) days written notice.
- F. Waiver of Breach. The waiver by either party of a breach or violation of any provision of this Agreement shall not operate as, or be construed to be, a waiver of any subsequent or other breach thereof.
- G. If any one or more of the provisions contained in this Agreement shall for any reason be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability, shall not affect any other provision hereof, and this Agreement shall be construed as if such provision had never been contained herein.

APPROVAL:

Mission Conversion Services Alliance

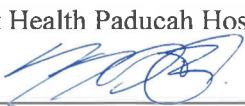
By: 

Dutch Conrad

Title: President and Program Manager

Mission Conversion Services Alliance, LLC

Baptist Health Paducah Hospital

By: 

Kenny Boyd

Title:

President

Date: **8/19/2025**

Date: **08/20/2025**

Agreement

Between

Mission Conversion Services Alliance, LLC and

Mercy Health - Lourdes Hospital LLC

This Agreement is entered into by the Mission Conversion Services Alliance, LLC (MCSA) (hereafter known as Paducah Gaseous Diffusion Plant (PGDP)) and Mercy Health - Lourdes Hospital LLC ("Hospital"), both collectively hereinafter referred to as the Parties.

I. Purpose

The purpose of this Agreement is to reaffirm and maintain the cooperative relationship between the Parties with particular regard to planning, response, and assistance with respect to medical treatment of injured personnel who may be radiologically or chemically contaminated as a result of an accident at the Department of Energy (DOE) Paducah Site.

It is the intent of this Agreement: (1) to identify responsibilities of the Parties in an emergency response, (2) to identify medical services to be provided; (3) to formalize emergency notification interfaces, and (4) to establish a mechanism for exchange and dissemination of information relevant to emergency planning and response.

II. Authority

Hospital is authorized to perform all actions outlined in this agreement as a licensed medical facility as specified under Kentucky state law.

III. Responsibilities

With respect to planning and response for treatment of personnel who may be involved in an injury/incident because of incidents at the DOE Paducah Site, the Parties agree as follows:

- A. PGDP will promptly notify Hospital that assistance from Hospital may be required.
- B. PGDP will provide, as requested by Hospital, radiological advice and assistance at the time of an accident at the DOE Paducah Site.
- C. Hospital will provide appropriate personnel and facilities for tests, examinations, and treatment (including decontamination if required) on a twenty-four (24) hour per day basis, for injured personnel at the DOE Paducah Site including, but not limited to, those personnel who may be radiologically or chemically contaminated.
- D. Hospital will develop and maintain, with PGDP assistance, detailed plans and procedures to be followed by the Parties in admitting and treating a radiologically or chemically contaminated or exposed patient.
- E. Upon mutual agreement of the parties, Hospital will participate, in emergency exercises designed to test the effectiveness of PGDP's emergency planning procedures.

- F. Upon request by PGDP, Hospital will provide personnel for consultation in preparing and updating plans and procedures for medical emergencies.
- G. In the course of an injury accident as contemplated by this Agreement, the Parties will establish communications between PGDP's shift superintendent and Hospital's director of emergency services, or their respective designees.
- H. In the course of a protracted event requiring treatment of injured individuals, communications between the Parties will be established between PGDP's crisis manager and Hospital president, or their respective designees.
- I. The Parties agree to coordinate, to the extent possible, all information disseminated to the public regarding the severity and magnitude of an incident at the DOE Paducah Site.
- J. The Parties agree to coordinate their respective emergency plans to ensure a mutual understanding of emergency action and objectives and to notify each other of applicable changes made in their respective plans.
- K. The Parties agree to periodically review the status of their plans, procedures, agreements and capabilities that may require revision and/or further development and to conduct drills and exercises involving radiological or chemical emergency response activities.
- L. Nothing in this Agreement shall be construed to affect, in any manner, the respective rights and responsibilities of the Parties under existing agreements or other applicable provisions of the law.
- M. PGDP will provide Hospital with the suppliers' Safety Data Sheets (SDSs) that include short versions of how-to-treat, as requested. PGDP will provide SDSs to Hospital, as applicable. In addition, PGDP will provide updates of SDSs as received from the manufacturer.

IV. Miscellaneous

- A. PGDP agrees to indemnify and hold harmless Hospital, its employees, agents, and subsidiaries, for any and all liability and from any and all claims, demands, damages, actions, causes of actions, or suits of any kind or nature whatsoever resulting from exposure to radioactivity or other radioactive contamination caused by or arising out of admission of PGDP employees as patients under this Agreement, to the extent caused by PGDP negligence. This indemnification and hold harmless obligation shall apply only to the extent Hospital, its employees, agents, and subsidiaries are not indemnified and held harmless under the provisions of the Price Anderson Amendments Act provisions or other provisions of the Mission Conversion Services Alliance contract with the Department of Energy.
- B. This Agreement shall be construed in accordance with the laws of the Commonwealth of Kentucky.
- C. Except as provided in IV (A) above, this Agreement and the rights and obligations hereunder shall not be assigned or otherwise delegated without prior written consent of both Parties.

- D. This Agreement may be amended only by an instrument in writing signed by the Parties. This Agreement shall be reviewed every two (2) years and amended, as needed.
- E. This Agreement superseded all previous agreements between the Parties and constitutes the entire Agreement between the Parties concerning the subject matter herein. This Agreement shall continue in force until terminated, by either party, by providing the other with ninety (90) days' written notice.
- F. Waiver of Breach. The waiver by either party of a breach or violation of any provision of this Agreement shall not operate as, or be construed to be, a waiver of any subsequent or other breach thereof.
- F. If any one or more of the provisions contained in this Agreement shall for any reason be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability, shall not affect any other provision hereof, and this Agreement shall be construed as if such provision had never been contained herein.

APPROVAL:

Mission Conversion Services Alliance, LLC

Mercy Health Lourdes Hospital LLC

By: DANNIE NICHOLSON
(Affiliate)
Dutch Conrad

Digitally signed by DANNIE
NICHOLSON (Affiliate)
Date: 2025.10.27 10:08:47
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Title: President and Program Manager
Mission Conversion Services Alliance, LLC

By: Michael J Yungmann
Michael Yungmann

Title: President

Date: 10/29/25

Date: 10/27/2025

**Memorandum of Understanding between Department of
Energy Portsmouth/Paducah Project Office and the
McCracken County Sheriff's Department**



SIGNATURE PAGE

Ryan Norman Digitally signed by Ryan Norman
Date: 2024.08.16 09:51:11 -05'00'

Approved by: Ryan Norman
Sheriff - McCracken County Sheriff's Department

MARK ALLEN Digitally signed by MARK ALLEN
Date: 2024.09.05 11:39:54 -05'00'

Approved by: Mark J. Allen
Officially Designated Federal Security Authority
Portsmouth/Paducah Project Office

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ACRONYM LIST

DOE	U.S. Department of Energy
JIC	Joint Information Center
KY	Kentucky
LEA	Law Enforcement Agency
LLEA	Local Law Enforcement Agency
MCSD	McCracken County Sheriff's Department
MOU	Memorandum of Understanding
ODFSA	Officially Designated Federal Security Authority
PF	Protective Force
PGDP	Paducah Gaseous Diffusion Plant
PPPO	Portsmouth/Paducah Project Office

I. INTRODUCTION:

This Memorandum of Understanding (MOU) is established between the U.S Department of Energy (DOE), Portsmouth/Paducah Project Office (PPPO), Officially Designated Federal Security Authority (ODFSA), and the McCracken County Sheriff's Department (MCSD) intended to formalize mutual cooperation and support from MCSD, a Local Law Enforcement Agency (LLEA), for use in development of applicable response strategies and associated joint activities, as appropriate, at the Paducah Gaseous Diffusion Plant (PGDP).

The DOE PPPO ODFSA has the responsibility to administer and conduct safeguards and security programs designed to protect DOE assets at the PGDP from theft, sabotage, and other hostile or non-hostile acts that may have adverse impacts to the PGDP project operations and/or the health and safety of the public and environment.

II. SCOPE:

To establish a cooperative agreement with the MCSD to provide timely and effective response to the DOE PGDP during specific security incidents in which PGDP Protective Force (PF) capabilities are limited and/or public law enforcement support is required.

III. AUTHORITY:

DOE PPPO ODFSA is authorized to enter into MOUs by DOE Orders which require that if local, State, or Federal Law Enforcement Agencies (LEAs) are used to protect security interests on a regular or recurring basis, cooperative agreements (e.g. MOUs) outlining the specific support to be provided must be established and documented in the appropriate security plan and reviewed annually.

The MCSD Sheriff is authorized to enter into this agreement to the extent provided.

IV. AGREEMENT:

This MOU is entered into by the DOE PPPO ODFSA, and the MCSD in McCracken County, Kentucky (KY). Individually, each entity is referred to as a "party," and collectively, the entities may be referred to as "parties."

The provisions of this MOU apply to any actual or potential PGDP security incidents that:

1. Involve a significant threat to employees (and visitors) at the PGDP or the general public;
2. Involve property under the control or jurisdiction of either the DOE or other organizations for which DOE has oversight; and
3. Involves any other incident for which a joint determination has been made by the DOE PPPO and the MCSD that the provisions of the MOU will apply.

Upon request from authorized officials the MCSD may respond in an appropriate manner to incidents at the PGDP involving:

1. Workplace violence;
2. Demonstration/Protests (planned or spontaneous);
3. Bomb threat incidents;
4. Hostage or other crisis situations (e.g., barricaded or suicidal individual): and
5. Other discovered criminal activity.

Request for support may involve the following:

1. Incident support;
2. Officer Involved Shooting;
3. Crisis Negotiators;
4. Canine Support;
5. Apprehension, Arrest and Transport (affect arrest for any/all of the conditions noted within);
6. Special Response Team;
7. Explosive Ordnance Response;
8. Traffic/Perimeter Control;
9. Unauthorized Trespassing; or
10. Destruction or Defacing of Government Property.

Joint Activities may include:

1. Annual site familiarization training in accordance with the DOE Orders,
2. Response plan development, and
3. Participation in applicable PGDP PF field and/or table top exercises.

Site access during non-emergency situations (e.g. civil process/warrant service) require prior coordination with the ODFSA to ensure proper arrangements and notifications.

V. DISCLAIMER:

The MCSD agrees that MCSD personnel responding to any incident at the PGDP will be under the direct supervision of the MCSD and will be escorted by the PGDP PF Organization. MCSD personnel will coordinate with cognizant site personnel before entering any facility.

All arrests and seizures of contraband, or other material confiscated by the MCSD as evidence shall be conducted in accordance with applicable federal, state, and local laws and ordinances.

The DOE agrees to familiarize members of the MCSD, at least once a year or as warranted by the threat intelligence and/or threat level at the time, with a tour of the PGDP. The tour will consist of the following:

1. A review on the types of threats which could activate this MOU;
2. Orientation to the facilities; and
3. An overview of the response plans and implementing procedures.

The DOE and the Sheriff of McCracken County, KY do hereby expressly waive any and all claims against each other hereto for any loss, damage, personal injury, or death occurring in consequence of the reasonable, prudent, and professional performance of this MOU.

VI. RESPONSIBILITIES:

Primary notification for support will be made to the City of Paducah, 911 Communications Services Division Dispatcher from one of the individuals listed below:

1. Official DOE PPPO, Federal Representatives, or
2. PGDP Plant Shift Superintendent
3. Officially Designated Security Authority (or designee)

In response to security incidents which could potentially involve workplace violence up to and including an active shooter(s), demonstrators/protest, bomb threats, and hostage situations, the DOE and MCSD agrees that the MCSD Organization will be the primary responding LLEA if support services are required.

The 911 Communications Services Division will receive initial notification of any incident rising to a level requiring off-site LLEA assistance. The 911 Communications Services Division will then notify MCSD of the request to provide any and/or all applicable resources to the PGDP.

The MCSD will communicate to other jurisdictional LEAs (i.e., Paducah Police Department and/or Kentucky State Police) if additional resources are required to mitigate the incident. Responding deputies/officers may become involved in tactical operations against armed adversaries, or they may be asked to assist less threatening law enforcement situations. Both missions could quickly escalate to deadly force encounters; therefore, deputies/officers will respond with all appropriate weapons/equipment.

The MCSD response will include immediately dispatching armed deputies/officers to locations developed through mutual response plan development. The MCSD responders will:

1. Establish communications (to include off-site radio communication) with the MCSD dispatchers, and other law enforcement agencies as necessary;
2. Support and/or augment the PGDP PF; and/or
3. Abide by (as practical) all incident-specific PGDP pre-established procedures.

In response to non-security incidents, DOE may activate the Joint Information Center (JIC), located at Midwest Aviation Services on 200 Hardy Roberts Drive, West Paducah. A JIC representative may contact the McCracken County Sheriff's office at 270-444-4719, to request a deputy presence. This assistance would only be requested if unauthorized personnel have attempted to enter the JIC, or are interfering with JIC operations. This would not be for routine JIC access control.

VII. TERMS, MODIFICATIONS, AND TERMINATION:

This MOU will become effective when signed by the DOE PPPO ODFSA and the McCracken County Sheriff. This MOU may be terminated by mutual agreement of the DOE and the McCracken County Sheriff. This MOU shall be reviewed and approved annually by the ODFSA and the McCracken County Sheriff as required in DOE Order 473.2A, *Protective Force Operations*. This MOU is not intended to establish an obligation to supply funding for implementation of this document by either party. Nothing in this MOU authorizes or is intended to obligate the parties to expend, exchange, or reimburse funds, services, or supplies, or transfer, or receive anything of value.

VIII. MISCELLANEOUS CONDITIONS:

This MOU in no way restricts any of the parties from participation in any activity with other public or private agencies, organizations, or individuals.

This MOU is strictly for resource management purposes for each of the parties. It is not legally enforceable and shall not be construed to create any legal obligation on the part of any party.

This MOU shall not be construed to provide a private right or cause of action for, or by, a person or entity.

Subject to the Freedom of Information Act (5 U.S.C. §552), decisions on disclosure of DOE information to the public regarding projects and programs referenced in this MOU shall be made by DOE following consultation with the affected agreeing party.

Likewise, decisions on disclosure of LLEA information will be left to each individual responding agency (i.e. tactics, technical information, investigative information, etc.)

This MOU may be amended by written agreement of the parties. This MOU may be terminated by mutual written agreement of the parties, or by any party upon 30 days written notice to the other parties.

This agreement in no way prohibits or impedes the McCracken County Sheriff or designee from exercising authority to prioritize the allocation of resources in the event of serious emergencies simultaneously occurring in other parts of McCracken County and during an emergent need for support at the PGDP.

IX. COORDINATION:

The DOE PPPO point of contact for this MOU is Mark J. Allen, PPPO Security Team Lead/Officially Designated Federal Security Authority.

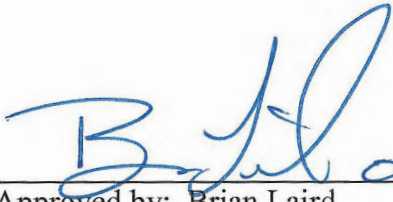
Below are points of contact regarding this MOU.

POSITION	NAME	OFFICE	MOBILE
Federal Security Representative / Officially Designated Federal Security Authority	Mark Allen	270-441-6842	270-556-6026
PPPO Manager	Joel Bradburne	859-219-4001	614-917-8506
Site Lead	April Ladd	270-441-6843	270-217-2029
Officially Designated Security Authority	Rob Dahlberg	270-441-5248	270-564-1429
Safeguards and Security Director, Four Rivers Nuclear Partnership, LLC	Eddie Gray	270-441-6436	270-559-3062
DOE Direct Contractor Security Support	Brandon Barnhill Ryan Brown	270-441-6838 270-441-5087	270-217-5907 270-217-8282
Local Law Enforcement POC	McCracken County Sheriff Ryan Norman	270-444-4719	N/A
DOE Inspector General's Office (IG) (Located in Lexington KY)	SA Larry Congleton	859-219-4045 or 859-219-4046	N/A
Facility Representative	Chris Wagner	270-441-6816	270-816-5009

**Memorandum of Understanding between Department of
Energy Portsmouth/Paducah Project Office and the
Paducah Police Department**



SIGNATURE PAGE



08/15/2024

Approved by: Brian Laird
Chief of Police
Paducah Police Department

MARK ALLEN Digitally signed by MARK ALLEN
Date: 2024.09.05 11:39:18 -05'00'

Approved by: Mark J. Allen
Officially Designated Federal Security Authority
Portsmouth/Paducah Project Office

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ACRONYM LIST

DOE	U.S. Department of Energy
KY	Kentucky
LEA	Law Enforcement Agency
LLEA	Local Law Enforcement Agency
MCSD	McCracken County Sheriff's Department
MOU	Memorandum of Understanding
ODFSA	Officially Designated Federal Security Authority
PF	Protective Force
PGDP	Paducah Gaseous Diffusion Plant
PPD	Paducah Police Department
PPPO	Portsmouth/Paducah Project Office

I. INTRODUCTION:

This Memorandum of Understanding (MOU) is established between the U.S Department of Energy (DOE), Portsmouth/Paducah Project Office (PPPO), Officially Designated Federal Security Authority (ODFSA), and the Paducah Police Department (PPD) intended to formalize mutual cooperation and support from PPD, a Local Law Enforcement Agency (LLEA), for use in development of applicable response strategies and associated joint activities, as appropriate, at the Paducah Gaseous Diffusion Plant (PGDP).

The DOE PPPO ODFSA has the responsibility to administer and conduct safeguards and security programs designed to protect DOE assets at the PGDP from theft, sabotage, and other hostile or non-hostile acts that may have adverse impacts to the PGDP project operations and/or the health and safety of the public and environment.

II. SCOPE:

To establish a cooperative agreement with the PPD to provide timely and effective response to the DOE PGDP during specific security incidents in which PGDP Protective Force (PF) capabilities are limited and/or public law enforcement support is required.

III. AUTHORITY:

DOE PPPO ODFSA is authorized to enter into MOUs by DOE Orders which require that if local, State, or Federal Law Enforcement Agencies (LEAs) are used to protect security interests on a regular or recurring basis, cooperative agreements (e.g. MOUs) outlining the specific support to be provided must be established and documented in the appropriate security plan and reviewed annually.

The PPD is authorized to enter into this agreement to the extent provided.

IV. AGREEMENT:

This MOU is entered into by the DOE PPPO ODFSA, and the PPD. Individually, each entity is referred to as a "party," and collectively, the entities may be referred to as "parties."

The provisions of this MOU apply to any actual or potential PGDP security incidents that:

1. Involve a significant threat to employees (and visitors) at the PGDP or the general public;
2. Involve property under the control or jurisdiction of either the DOE or other organizations for which DOE has oversight; and
3. Involves any other incident for which a joint determination has been made by the DOE PPPO and the PPD that the provisions of the MOU will apply.

Upon request from authorized officials the PPD may respond in an appropriate manner to incidents at the PGDP involving:

1. Workplace violence;
2. Demonstration/Protests (planned or spontaneous);
3. Bomb threat incidents;
4. Hostage or other crisis situations (e.g., barricaded or suicidal individual); and
5. Other discovered criminal activity.

Request for support may involve the following:

1. Incident support;
2. Officer Involved Shooting;
2. Crisis Negotiators;
3. Canine Support;
4. Apprehension, Arrest and Transport (affect arrest for any/all of the conditions noted within);
5. Special Response Team;
6. Explosive Ordnance Response;
7. Traffic/Perimeter Control;
8. Unauthorized Trespassing; or
9. Destruction or Defacing of Government Property.

Joint Activities may include:

1. Annual site familiarization training in accordance with the DOE Orders,
2. Response plan development, and
3. Participation in applicable PGDP field and/or table top exercises.

V. DISCLAIMER:

The PPD agrees that PPD personnel responding to any incident at the PGDP will be under the direct supervision of the PPD and will be escorted by the PGDP PF Organization. PPD personnel will coordinate with cognizant site personnel before entering any facility.

All arrests and seizures of contraband, or other material confiscated by the PPD as evidence shall be conducted in accordance with applicable federal, state, and local laws and ordinances.

The DOE agrees to familiarize members of the PPD, at least once a year or as warranted by the threat intelligence and/or threat level at the time, with a tour of the PGDP. The tour will consist of the following:

1. A review on the types of threats which could activate this MOU;
2. Orientation to the facilities; and
3. An overview of the response plans and implementing procedures.

The DOE and the PPD do hereby expressly waive any and all claims against each other hereto for any loss, damage, personal injury, or death occurring in consequence of the reasonable, prudent, and professional performance of this MOU.

VI. RESPONSIBILITIES:

Primary notification for support will be made to the City of Paducah, 911 Communications Services Division Dispatcher from one of the individuals listed below:

1. Official DOE PPPO, Federal Representatives, or
2. PGDP Plant Shift Superintendent
3. Officially Designated Security Authority (or Designee)

In response to security incidents which could potentially involve workplace violence up to and including an active shooter(s), demonstrators/protest, bomb threats, and other crisis situations, the DOE and MCSD agrees that the MCSD will be the primary responding LLEA if support services are required.

The 911 Communications Services Division will receive initial notification of any incident rising to a level requiring off-site LLEA assistance. The 911 Communications Services Division will then notify MCSD of the request to provide any and/or all applicable resources to the PGDP.

The MCSD will communicate to other jurisdictional LEAs (i.e., Paducah Police Department and/or Kentucky State Police) if additional resources are required to mitigate the incident. Responding deputies/officers may become involved in tactical operations against armed adversaries, or they may be asked to assist less threatening law enforcement situations. Both missions could quickly escalate to deadly force encounters; therefore, deputies/officers will respond with all appropriate weapons/equipment.

The MCSD response will include immediately dispatching armed deputies/officers to locations developed through mutual response plan development. The MCSD responders will:

1. Establish communications (to include off-site radio communication) with the MCSD dispatchers, and other law enforcement agencies as necessary;
2. Support and/or augment the PGDP PF; and/or
3. Abide by (as practical) all incident-specific PGDP pre-established procedures.

VII. TERMS, MODIFICATIONS, AND TERMINATION:

This MOU will become effective when signed by the DOE PPPO ODFSA and the Paducah Police Department Chief. This MOU may be terminated by mutual agreement of the DOE and the Paducah Police Department Chief. This MOU shall be reviewed and approved annually by the ODFSA and the Paducah Police Department Chief as required in DOE Order 473.2A, *Protective Force Operations*. This MOU is not intended to establish an obligation to supply funding for implementation of this document by either party. Nothing in this MOU authorizes or is intended to obligate the parties to expend, exchange, or reimburse funds, services, or supplies, or transfer, or receive anything of value.

VIII. MISCELLANEOUS CONDITIONS:

This MOU in no way restricts any of the parties from participation in any activity with other public or private agencies, organizations, or individuals.

This MOU is strictly for resource management purposes for each of the parties. It is not legally enforceable and shall not be construed to create any legal obligation on the part of any party.

This MOU shall not be construed to provide a private right or cause of action for, or by, a person or entity.

Subject to the Freedom of Information Act (5 U.S.C. §552), decisions on disclosure of DOE information to the public regarding projects and programs referenced in this MOU shall be made by DOE following consultation with the affected agreeing party.

Likewise, decisions on disclosure of LLEA information will be left to each individual responding agency (i.e. tactics, technical information, investigative information, etc.)

This MOU may be amended by written agreement of the parties. This MOU may be terminated by mutual written agreement of the parties, or by any party upon 30 days written notice to the other parties.

This agreement in no way prohibits or impedes the Paducah Police Department Chief or designee from exercising authority to prioritize the allocation of resources in the event of serious emergencies simultaneously occurring in other parts of the City of Paducah and during an emergent need for support at the PGDP.

IX. COORDINATION:

The DOE PPPO point of contact for this MOU is Mark J. Allen, PPPO Security Team Lead/Officially Designated Federal Security Authority.

Below are points of contact regarding this MOU.

POSITION	NAME	OFFICE	MOBILE
Federal Security Representative / Officially Designated Federal Security Authority	Mark Allen	270-441-6842	270-556-6026
PPPO Manager	Joel Bradburne	859-219-4001	614-917-8506
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Local Law Enforcement POC	Paducah Police Department Brian Laird - Chief of Police	270-444-8590	N/A
DOE Inspector General's Office (IG) (Located in Lexington KY)	SA Larry Congleton	859-219-4045 or 859-219-4046	N/A
Facility Representative	Chris Wagner	270-441-6816	270-816-5009

MEMORANDUM OF UNDERSTANDING FOR PROVISION OF FIRE PROTECTION SERVICES

This MEMORANDUM OF UNDERSTANDING (MOU) is between the U.S. Department of Energy (DOE) contractor, Mission Conversion Services Alliance (MCSA) and the West McCracken Fire District (District), which maintains fire protection facilities in McCracken County.

I. General Understandings

1. The purpose of this MOU is to memorialize the parties' mutual understandings regarding provision of certain services, described in paragraph 2, by the District to DOE property in western McCracken County, and the provision of certain services, described in paragraph 3, by MCSA to property within the District and outside of DOE-owned property.
2. Upon request by MCSA, the District will provide available Fire, Rescue, Emergency Medical, or other Services within the District's scope, mission, equipment, and training. If the District Officer in Charge determines that District resources are not available to assist, he or she will direct E-911 to notify other local Fire Protection Districts to respond.
3. Upon request by the District, MCSA will provide Fire, Emergency Medical Technicians, Search and Rescue, provided that those Services are available without compromising the response readiness to incidents on DOE property.
4. Where Districts other than the parties to this MOU respond to an incident on DOE property, the District will serve as the interface between MCSA and those other Districts.

II. Requesting Assistance

5. If MCSA requires assistance to respond to an incident on DOE property, the Plant Shift Superintendent (PSS) or designee shall place an E-911 call for response by the District. The District Officer in Charge will determine if assistance is available and, if not, direct E-911 to notify other local fire protection districts to respond.
6. If the District requires assistance to respond to an incident outside of DOE-owned property, E-911 will contact the PSS or dispatch Paducah Gaseous Diffusion Plant (PGDP) Fire Services. The PSS will determine if the requested assistance is available and whether providing assistance would compromise the response readiness to incidents on DOE property. See Attachment A PGDP Fire Services Dispatch Guidelines.
7. For incidents occurring outside of DOE-owned property, but DOE or MCSA personnel become aware through official or nonofficial channels, (e.g., an incident near the boundary of DOE-owned and licensed property), MCSA will respond immediately, if possible, and, in any case, will notify E-911.

MEMORANDUM OF UNDERSTANDING FOR PROVISION OF FIRE PROTECTION SERVICES

III. Incident Command

8. For incidents occurring on DOE-owned property, other than property licensed to the Kentucky Department of Fish and Wildlife Resources agency, the PSS would retain incident command.
9. For incidents on DOE-owned property that is licensed to the Kentucky Department of Fish and Wildlife Resources agency, incident command will be determined by mutual agreement between the PSS and District Officer in Charge.
10. For very large wild land fires that affect both licensed and non-licensed DOE property, the District will retain incident command, with the PSS serving as a DOE Site Incident Commander (with reporting responsibilities to the District Incident Commander) for incident response on non-licensed DOE-owned property.
11. For incidents outside of DOE property to which MCSA provides assistance to the District, the District will retain incident command.

IV. MOU Amendment/Termination

12. This MOU may be amended in writing by mutual agreements of the parties. Termination of this MOU requires the terminating party to provide 90 days written notice to the nonterminating parties. Termination notices will be communicated through contacts identified in Attachment A.

V. Implementation and Interpretation

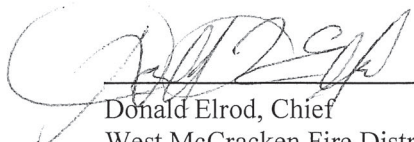
13. This MOU is effective upon the latter date of the signature of the parties and shall remain effective through 1 October 2030, or through the termination date of any extension to MCSA Contract No. 89303325DEM000122. In the event any particular provision(s) of this MOU is (are) rendered inoperative, the parties agree that the remaining provisions of this MOU shall survive and remain in full force and effect.

VI. Liability

14. Each party to this MOU agrees that it will be responsible for its own acts and omissions and the results thereof and shall not be responsible for the acts and/or omissions of another party and the results thereof. Each party agrees that it will assume all risk and liability to itself or its employees for any injury to persons or property resulting in any manner from conduct of its own operations and the operations of its employees under this MOU. No indemnification for any loss, claim, damage, or liability is intended or provided by any party to this MOU. The terms of this section shall survive the expiration or termination of this MOU.

**MEMORANDUM OF UNDERSTANDING FOR PROVISION OF
FIRE PROTECTION SERVICES**

VII. Signatures



Donald Elrod, Chief
West McCracken Fire District

Dutch Conrad

Digitally signed by Dutch Conrad
DN: CN=Dutch Conrad, E=dutch.conrad@
osmst.com
Reason: I am the author of this document
Location:
Date: 2025.09.26 09:52:14-04'00"
Foxit PDF Editor Version: 13.1.0

Dutch Conrad
Program Manager
Mission Conversion Services Alliance

**MEMORANDUM OF UNDERSTANDING FOR PROVISION OF
FIRE PROTECTION SERVICES**

**ATTACHMENT A
PGDP FIRE SERVICES DISPATCH GUIDELINES**

Structure Fire

For structure fires within the West McCracken Fire District, the E-911 Dispatcher will perform the following on the McCracken County Fire Channel.

Announce: “West McCracken, Concord, and PGDP stand by for a structure fire.”

Activate: West McCracken, Concord, PGDP Fire Services, and county General Alarm tones.

Dispatch: Location and any known information followed by nearest cross streets.

General

When PGDP Fire Services mutual aid is requested by the West McCracken Fire District for incidents other than structure fires:

Announce: PGDP stand by for mutual aid request from West McCracken.

Activate: PGDP Fire Services tones.

Dispatch: PGDP Fire Services giving incident type/aid requested and location.

**MEMORANDUM OF UNDERSTANDING FOR PROVISION OF
FIRE PROTECTION SERVICES**

ATTACHMENT B

1. MCSA EMERGENCY REQUEST CONTACT

The 24/7 point of contact for MCSA emergency requests is as follows:

MCSA Plant Shift Superintendent (PSS)

Emergency Phone Line: 270-441-6333

PSS Business Phone: 270-441-6211

2. MCSA EMERGENCY MANAGEMENT SERVICES CONTACT

The point of contact for Emergency Management Services is as follows:

April Tilford

MCSA Emergency Management Services Director

Office Phone: 270-441-6565

Cell Phone: 270-559-3450

PART A
RCRA PART A APPLICATION
HAZARDOUS WASTE MANAGEMENT FACILITY PERMIT
CLASS 1 MODIFICATION

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United States Environmental Protection Agency
RCRA SUBTITLE C SITE IDENTIFICATION FORM



1. Reason for Submittal (Select only one.)

☐	Obtaining or updating an EPA ID number for on-going regulated activities (Items 10-17 below) that will continue for a period of time.
☐	Submitting as a component of the Hazardous Waste Report for _____ (Reporting Year)
☐	Site was a TSD facility, a reverse distributor, and/or generator of $\geq 1,000$ kg of non-acute hazardous waste, > 1 kg of acute hazardous waste, or > 100 kg of acute hazardous waste spill cleanup in one or more months of the reporting year (or State equivalent LQG regulations)
☐	Notifying that regulated activity is no longer occurring at this Site
☐	Obtaining or updating an EPA ID number for conducting Electronic Manifest Broker activities
☒	Submitting a new or revised Part A (permit) Form

2. Site EPA ID Number

K	Y	8	8	9	0	0	0	8	9	8	2
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3. Site Name

United States Department of Energy - Paducah Gaseous Diffusion Plant
--

4. Site Location Address

Street Address 5600 Hobbs Road		
City, Town, or Village Kevil		County McCracken
State Kentucky	Country USA	Zip Code 42053
Latitude 37° 6' 41.95"	Longitude 88° 48' 46.09"	☐ Use Lat/Long as Primary Address

5. Site Mailing Address

☐ Same as Location Street Address

Street Address 5501 Hobbs Road		
City, Town, or Village Kevil		
State Kentucky	Country USA	Zip Code 42053

6. Site Land Type

☐ Private	☐ County	☐ District	☒ Federal	☐ Tribal	☐ Municipal	☐ State	☐ Other
----------------------------------	---------------------------------	-----------------------------------	---	---------------------------------	------------------------------------	--------------------------------	--------------------------------

7. North American Industry Classification System (NAICS) Code(s) for the Site (at least 5-digit codes)

A. (Primary) 562910	C. 562212
B. 562211	D.

8. Site Contact Person

Enter the primary site contact here and additional contacts in Appendix A.

First Name Myrna	M I E	Last Name Redfield
Title Program Manager		
Email myrna.redfield@pad.pppo.gov		
Phone 270-441-5113	Ext N/A	Fax 270-441-6103
Preferred Language English		

A. Site Contact Address☐ Same as Location Address

Street Address 5511 Hobbs Road		
City, Town, or Village Kevil		
State Kentucky	Country USA	Zip Code 42053

9. Legal Owner and Operator of the Site**A. Name of Site's Legal Owner**☐ Same as Location Address

Full Name United States Department of Energy		Date Became Owner (mm/dd/yyyy) 10/18/1950
Owner Type ☐ Private ☐ County ☐ District ☒ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other		
Street Address 5501 Hobbs Road		
City, Town, or Village Kevil		
State Kentucky	Country USA	Zip Code 42053
Email erik.olds@orem.doe.gov		
Phone 865-574-7701	Ext N/A	Fax N/A
Comments N/A		

B. Name of Site's Legal Operator☐ Same as Location Address

Full Name Four Rivers Nuclear Partnership, LLC		Date Became Operator (mm/dd/yyyy) 10/20/2017
Operator Type ☒ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other		
Street Address 5511 Hobbs Road		
City, Town, or Village Kevil		
State Kentucky	Country USA	Zip Code 42053
Email myrna.redfield@pad.pppo.gov		
Phone 270-441-5113	Ext N/A	Fax 270-441-6103
Comments The United States Department of Energy [DOE and Four Rivers Nuclear Partnership, LLC, (FRNP)] are co-operators. Please see item 18 for an explanation of the division of the operator responsibilities.		

10. Type of Regulated Waste Activity (at your site)

Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities

☒ Y ☐ N	1. Generator of Hazardous Waste—If "Yes", mark only one of the following—a, b, c	
☒	a. LQG	-Generates, in any calendar month, 1,000 kg/mo (2,200 lb/mo) or more of non-acute hazardous waste (includes quantities imported by importer site); or - Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lb/mo) of acute hazardous waste; or - Generates, in any calendar month or accumulates at any time, more than 100 kg/mo (220 lb/mo) of acute hazardous spill cleanup material.
☐	b. SQG	100 to 1,000 kg/mo (220-2,200 lb/mo) of non-acute hazardous waste and no more than 1 kg (2.2 lb) of acute hazardous waste and no more than 100 kg (220 lb) of any acute hazardous spill cleanup material.
☐	c. VSQG	Less than or equal to 100 kg/mo (220 lb/mo) of non-acute hazardous waste.
☒ Y ☐ N	Is State Generator of Hazardous Waste the same as Federal— If "No", indicate State Generator Category in the space provided.	
☐ Y ☒ N	2. Short-Term Generator (generates from a short-term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section. <i>Note: If "Yes", you MUST indicate that you are a Generator of Hazardous Waste in Item 10.A.1 above.</i>	
☒ Y ☐ N	3. Treater, Storer or Disposer of Hazardous Waste—Note: Part B of a hazardous waste permit is required for these activities.	
☐ Y ☒ N	4. Receives Hazardous Waste from Off-site	
☐ Y ☒ N	5 Recycler of Hazardous Waste	
☐	a. Recycler who stores prior to recycling	
☐	b. Recycler who does not store prior to recycling	
☐ Y ☒ N	6. Exempt Boiler and/or Industrial Furnace—If "Yes", mark all that apply.	
☐	a. Small Quantity On-site Burner Exemption	
☐	b. Smelting, Melting, and Refining Furnace Exemption	

B. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g. D001, D003, F007, U112). Use an additional page if more spaces are needed.

DXXX	FXXX	UXXX	PXXX			

C. Waste Codes for State Regulated (non-Federal) Hazardous Wastes. Please list the waste codes of the State hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

N/A						
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11. Additional Regulated Waste Activities (NOTE: Refer to your State regulations to determine if a separate permit is required.)**A. Other Waste Activities**

☒ Y ☐ N	1. Transporter of Hazardous Waste—If “Yes”, mark all that apply.
☒	a. Transporter
☐	b. Transfer Facility (at your site)
☐ Y ☒ N	2. Underground Injection Control
☐ Y ☒ N	3. United States Importer of Hazardous Waste
☐ Y ☒ N	4. Recognized Trader—If “Yes”, mark all that apply.
☐	a. Importer
☐	b. Exporter
☐ Y ☒ N	5. Importer/Exporter of Spent Lead-Acid Batteries (SLABs) under 40 CFR 266 Subpart G—If “Yes”, mark all that apply.
☐	a. Importer
☐	b. Exporter

B. Universal Waste Activities

☒ Y ☐ N	1. Large Quantity Handler of Universal Waste (you accumulate 5,000 kg or more) - If “Yes” mark all that apply. Note: Refer to your State regulations to determine what is regulated.
☒	a. Batteries
☐	b. Pesticides
☐	c. Mercury containing equipment
☒	d. Lamps
☒	e. Aerosol Cans
☐	f. Other (specify) _____
☐	g. Other (specify) _____
☐ Y ☒ N	2. Destination Facility for Universal Waste Note: A hazardous waste permit may be required for this activity.

C. Used Oil Activities

☐ Y ☒ N	1. Used Oil Transporter—If “Yes”, mark all that apply.
☐	a. Transporter
☐	b. Transfer Facility (at your site)
☐ Y ☒ N	2. Used Oil Processor and/or Re-refiner—If “Yes”, mark all that apply.
☐	a. Processor
☐	b. Re-refiner
☐ Y ☒ N	3. Off-Specification Used Oil Burner
☐ Y ☒ N	4. Used Oil Fuel Marketer—If “Yes”, mark all that apply.
☐	a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
☐	b. Marketer Who First Claims the Used Oil Meets the Specifications

D. Pharmaceutical Activities

☐ Y ☒ N	1. Operating under 40 CFR Part 266, Subpart P for the management of hazardous waste pharmaceuticals—if “Yes”, mark only one. Note: See the item-by-item instructions for definitions of healthcare facility and reverse distributor.
☐	a. Healthcare Facility
☐	b. Reverse Distributor
☐ Y ☒ N	2. Withdrawing from operating under 40 CFR Part 266, Subpart P for the management of hazardous waste pharmaceuticals. Note: You may only withdraw if you are a healthcare facility that is a VSQG for all of your hazardous waste, including hazardous waste pharmaceuticals.

12. Eligible Academic Entities with Laboratories—Notification for opting into or withdrawing from managing laboratory hazardous wastes pursuant to 40 CFR Part 262, Subpart K.

☐ Y ☒ N	A. Opting into or currently operating under 40 CFR Part 262, Subpart K for the management of hazardous wastes in laboratories— If “Yes”, mark all that apply. Note: See the item-by-item instructions for definitions of types of eligible academic entities.
☐	1. College or University
☐	2. Teaching Hospital that is owned by or has a formal written affiliation with a college or university
☐	3. Non-profit Institute that is owned by or has a formal written affiliation with a college or university
☐ Y ☒ N	B. Withdrawing from 40 CFR Part 262, Subpart K for the management of hazardous wastes in laboratories.

13. Episodic Generation

☐ Y ☒ N	Are you an SQG or VSQG generating hazardous waste from a planned or unplanned episodic event, lasting no more than 60 days, that moves you to a higher generator category. If “Yes”, you must fill out the Addendum for Episodic Generator.
--	---

14. LQG Consolidation of VSQG Hazardous Waste

☐ Y ☒ N	Are you an LQG notifying of consolidating VSQG Hazardous Waste Under the Control of the Same Person pursuant to 40 CFR 262.17(f)? If “Yes”, you must fill out the Addendum for LQG Consolidation of VSQG hazardous waste.
--	---

15. Notification of LQG Site Closure for a Central Accumulation Area (CAA) (optional) OR Entire Facility (required)

☐ Y ☒ N	LQG Site Closure of a Central Accumulation Area (CAA) or Entire Facility.
A. ☐ Central Accumulation Area (CAA) or ☐ Entire Facility	
B. Expected closure date: _____ mm/dd/yyyy	
C. Requesting new closure date: _____ mm/dd/yyyy	
D. Date closed : _____ mm/dd/yyyy	
☐	1. In compliance with the closure performance standards 40 CFR 262.17(a)(8)
☐	2. Not in compliance with the closure performance standards 40 CFR 262.17(a)(8)

16. Notification of Hazardous Secondary Material (HSM) Activity

☐ Y ☒ N	Are you notifying under 40 CFR 260.42 that you will begin managing, are managing, or will stop managing hazardous secondary material under 40 CFR 260.30, 40 CFR 261.4(a)(23), (24), (25), or (27)? If "Yes", you must fill out the Addendum to the Site Identification Form for Managing Hazardous Secondary Material.
--	---

17. Electronic Manifest Broker

☐ Y ☒ N	Are you notifying as a person, as defined in 40 CFR 260.10, electing to use the EPA electronic manifest system to obtain, complete, and transmit an electronic manifest under a contractual relationship with a hazardous waste generator?
--	--

18. Comments (include item number for each comment)

Item 9.B., continued:

Preamble to Certification Statement: Except for general policy direction and funding, which are the responsibility of DOE, effective 12:01 a.m. on October 20, 2017, FRNP is responsible for performing RCRA generator requirements on behalf of both FRNP and DOE for all activities under the scope of FRNP's Contract DE-EM0004895. For purposes of the certification described in 401 KAR 39:060, Section 5 and 40 CFR 270.11, DOE and FRNP representatives are certifying, to the best of their knowledge and belief, the truth, accuracy, and completeness of the RCRA Subtitle C Site Identification Form for their respective areas of responsibility consistent with the Co-generator Agreement dated September 13, 2017.

The U.S. Department of Energy (DOE) has signed as "owner and co-operator" and Four Rivers Nuclear Partnership, LLC, (FRNP) has signed as "operator" of the permitted facility. DOE has determined that multiple signatures best reflect the actual apportionment of responsibility under which DOE's RCRA responsibilities are for policy, programmatic, funding, and scheduling decisions and FRNP's RCRA responsibilities are for day-to-day operations, including but not limited to, the following responsibilities: waste analysis and handling, monitoring, record keeping, reporting, and contingency planning. For purposes of the certification as prescribed by 270.11(d) and 401 KAR 39:060, Section 5, DOE's and FRNP's representatives certify, to the best of their knowledge and belief, the truth, accuracy, and completeness of the document for their respective areas of responsibility.

Item 10.B., Note:

The DXXX, FXXX, UXXX, and/or PXXX codes are used for waste streams where waste codes can vary or are currently unknown. Use of these generic codes is intended to cover those waste code(s) from some or all of the identified list(s) that are applicable to the waste stream.

19. Certification I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. **Note: For the RCRA Hazardous Waste Part A permit Application, all owners and operators must sign (see 40 CFR 270.10(b) and 270.11).**

Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy)
Printed Name (First, Middle Initial Last) Theodore E. Olds	Title Acting Manager, PPPO
Email erik.olds@orem.doe.gov	
Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy)
Printed Name (First, Middle Initial Last) Myrna E. Redfield	Title Program Manager
Email myrna.redfield@pad.pppo.gov	

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT PART A FORM



1. Facility Permit Contact

First Name	Myrna	MI	E	Last Name	Redfield
Title	Program Manager				
Email	myrna.redfield@pad.pppo.gov				
Phone	270-441-5113	Ext	N/A	Fax	270-441-6103

2. Facility Permit Contact Mailing Address

Street Address	5511 Hobbs Road				
City, Town, or Village	Kevil				
State	Kentucky	Country	USA	Zip Code	42053

3. Facility Existence Date (mm/dd/yyyy)

1/1/1952

4. Other Environmental Permits

A. Permit Type	B. Permit Number												C. Description
N	K	Y	0	0	0	4	0	4	9				KY Pollutant Discharge Elimination System
E	S	W	0	7	3	0	0	0	1	4			Solid Waste Permit-Residential Landfill
E	S	W	0	7	3	0	0	0	1	5			Solid Waste Permit-Inert Landfill
E	S	W	0	7	3	0	0	0	4	5			Solid Waste Permit-Contained Landfill
E	V	2	1	0	1	1	R	2					Title V Operating Permit

5. Nature of Business

Site was formerly used for isotopic enrichment of uranium hexafluoride. Although the Paducah Gaseous Diffusion Plant (PGDP) no longer enriches uranium, the U.S. Department of Energy (DOE) and its contractors remain responsible for the management and stewardship of the facilities and remedial activities, which results in the generation of hazardous wastes. The majority of these hazardous wastes contain radioactive constituents. Waste that is both hazardous and radioactive is referred to as "mixed" waste, for which there are limited disposal options; therefore, DOE stores wastes greater than 90 days and requires RCRA-permitted facilities. In addition, this waste may require on-site or off-site treatment to facilitate proper disposal.

6. Process Codes and Design Capacities

Line Number		A. Process Code			B. Process Design Capacity		C. Process Total Number of Units	D. Unit Name
					(1) Amount	(2) Unit of Measure		
X	1	D	8	0	5	A	1	C-404LLRAD
X	2	S	0	1	306,240	G	1	C746QSTORG
X	3	T	0	4	5,000	U	1	C746QSTAB
X	4	S	0	1	110	G	2	C746QFLUCR
X	5	T	0	4	1,600	J	2	C746QFLUCR

7. Description of Hazardous Wastes (Enter codes for Items 7.A, 7.C and 7.D(1))

Line No.		A. EPA Hazardous Waste No.				B. Estimated Annual Qty of Waste	C. Unit of Measure	D. Processes										
								(1) Process Codes								(2) Process Description (if code is not entered in 7.D1))		
X	1	D	0	0	6	0	J	D	8	0								
X	2	D	0	0	8												Included With Above	
X	3	D	0	1	0												Included With Above	
X	4	D	X	X	X	0.0571	J	S	0	1								
X	5	F	X	X	X												Included With Above	
X	6	U	X	X	X												Included With Above	
X	7	D	X	X	X	0.0571	J	S	0	1								
X	8	F	X	X	X												Included With Above	
X	9	U	X	X	X												Included With Above	
1	0	D	X	X	X	0.0571	J	S	0	1	,	T	0	4				
1	1	F	X	X	X												Included With Above	

8. Map

Attach to this application a topographical map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all spring, rivers, and other surface water bodies in this map area. See instructions for precise requirements.

9. Facility Drawing

All existing facilities must include a scale drawing of the facility. See instructions for more detail.

10. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, and disposal areas; and sites of future storage, treatment, or disposal areas. See instructions for more detail.

11. Comments**Section 7. Description of Hazardous Wastes:**

The DXXX, FXXX, UXXX, and/or PXXX codes are used for waste streams where waste codes can vary or are currently unknown. Use of these generic codes is intended to cover those waste codes from some or all of the identified list(s) that are applicable to the waste stream.

United States Environmental Protection Agency
HAZARDOUS WASTE PERMIT PART A FORM CONTINUATION

6. Process Codes and Design Capacities (Continued)

Line Number	A. Process Code	B. Process Design Capacity		C. Process Total Number of Units	D. Unit Name
		(1) Amount	(2) Unit of Measure		
X6	T04	1,000	U	1	C746QSTAB
X7	T04	100	S	1	C746QCOMP/MACRO
X8	S01	496,000	G	1	C752ASTORG
X9	T04	1,000	U	1	C752ASTAB
10	T04	5,000	U	1	C752ASTAB
11	T04	100	I	1	C752ACOMP/MACRO
12	S01	110	G	2	C752AFLUCR
13	T04	1,600	J	2	C752AFLUCR
14	S01	38,500	G	1	C733STORG
15	T04	700	I	1	C733STORG
16	T04	100	I	1	C733COMP/MACRO

United States Environmental Protection Agency
HAZARDOUS WASTE PERMIT PART A FORM CONTINUATION

7. Description of Hazardous Wastes (Continued) (Enter codes for Items 7.A, 7.C and 7.D(1))

Line No.	A. EPA Hazardous Waste No.	B. Estimated Annual Qty of Waste	C. Unit of Measure	D. Processes	
				(1) Process Codes	(2) Process Description (if code is not entered in 7.D1)
12	UXXX				Included With Above
13	DXXX	0.361	J	S01, T04	
14	FXXX				Included With Above
15	UXXX				Included With Above
16	DXXX	0.158	J	S01	
17	DXXX	0.228	J	S01	
18	FXXX				Included With Above
19	UXXX				Included With Above
20	DXXX	0.000571	J	S01	
21	FXXX				Included With Above
22	DXXX	0.112	J	S01	
23	DXXX	0.0685	J	S01, T04	
24	DXXX	0	J	S01	
25	FXXX				Included With Above
26	UXXX				Included With Above
27	PXXX				Included With Above
28	DXXX	2.38	J	S01	
29	FXXX				Included With Above
30	UXXX				Included With Above
31	PXXX				Included With Above
32	DXXX	0.784	J	S01	
33	FXXX				Included With Above
34	U228				Included With Above
35	DXXX	0.228	J	S01	
36	FXXX				Included With Above
37	UXXX				Included With Above
38	DXXX	0.0685	J	S01, T04	
39	FXXX				Included With Above
40	UXXX				Included With Above
41	PXXX				Included With Above
42	DXXX	0.0685	J	S01, T04	
43	UXXX				Included With Above

Kentucky Department for Environmental Protection
Division of Waste Management
Hazardous Waste Branch
300 Sower Boulevard, Frankfort, KY 40601
(502) 564-6716

Part A Application Addendum
(EPA Form 8700-23)

FOR OFFICIAL USE ONLY.
DO NOT WRITE IN THIS SPACE.

	FEE SUBMITTED: \$____ (See instructions to determine your fee)		
I. Reason for Submittal (see instructions)	Reason for Submittal: ☐ FIRST SUBMITTAL – Must be accompanied by the completed forms EPA 8700-12 and Addendum DWM-7037A. ☒ REVISION – Identify the classification of the revision. See instructions for when a revised application should be submitted. ☐ Class 1 not requiring approval ☒ Class 1 requiring approval ☐ Class 2 ☐ Class 3 ☐ RENEWAL – See instructions for when a renewal application should be submitted. ☐ STANDARDIZED PERMIT – See instructions for the eligibility of a standardized permit.		
II. ID Numbers	A. EPA ID Number: KY8-890-008-982		B. AGENCY INTEREST Number: 3059
III. Existing and New Facilities	Existing Facilities, the date operation began or construction commenced: (mm/dd/yyyy) <u>01/01/1952</u> New Facilities, the date operation is expected to begin: (mm/dd/yyyy) <u> / / </u>		
IV. Contact Email Address	Facility Contact Email address: <u>myrna.redfield@pad.pppo.gov</u>		
V. Facility Operator (2)	Name of Facility Operator 2 (see Instructions):		
VI. Type of Operator (2)	Type of Operator 2: ☒ Federal (F) ☐ State (S) ☐ County (C) ☐ Indian (I) ☐ Municipal (M) ☐ District (D) ☐ Private (P) ☐ Other (O) Specify:		
VII. Operator Mailing Address (2)	Operator 2 Street Address or P.O. Box: 5501 Hobbs Road City: Kevil State: Kentucky County: McCracken Zip Code: 42053 Facility Operator 2 Telephone Number: (270) 441-6000 Phone Number Extension: New Operator Assumed Responsibility for Facility on this Date: (mm/dd/yyyy) <u>01/01/1952</u>		
VIII. Facility Operator (3)	Name of Facility Operator 3 (see Instructions):		
IX. Type of Operator (3)	Type of Operator 3: ☐ Federal (F) ☐ State (S) ☐ County (C) ☐ Indian (I) ☐ Municipal (M) ☐ District (D) ☐ Private (P) ☐ Other (O) Specify:		
X. Operator Mailing Address (3)	Operator 3 Street Address or P.O. Box: City: State: County: Zip Code: Facility Operator 3 Telephone Number: Phone Number Extension: New Operator Assumed Responsibility for Facility on this Date: (mm/dd/yyyy) <u> / / </u>		

EPA ID Number: KY8 – 890–008–982

Agency Interest Number: 3059

XI. PROCESS DESCRIPTION: (See Instructions)

a. Commercial Indicator	b. Unique Unit or Group Name	c. Legal Status Code	d. Operating Status Code(s)	e. Description of Process
4	C404LLRAD	PC	CP	Low-level radioactive waste burial ground. Waste lines # 1
4	C746QSTORG	PI	OP	Hazardous and mixed waste storage. Waste lines # 4, 5, 7, 8, 10-30
4	C746QSTAB	PI	OP	Treatment by neutralization, oxidation, reduction, precipitation, and stabilization in containers. Waste lines # 4, 5, 7, 8, 10-30
4	C746QFLUCR	PI	OP	Storage of crushed bulbs in 55-gallon containers. Waste lines #20
4	C746QFLUCR	PI	OP	Fluorescent/miscellaneous lamp crushing – treatment by absorption and size reduction. Waste lines # 20
4	C746QSTAB	PI	OP	Treatment by decanting and absorption in containers. Waste lines # 4, 7, 10, 11, 13, 15, 19, 21, 23, 24
4	C746QCOMP/MACRO	PI	CN	Treatment by compaction and/or macroencapsulation. Waste lines # 4, 5, 7, 8, 10-30
4	C752ASTORG	PI	OP	Hazardous and mixed waste storage. Waste lines # 4, 5, 7, 8, 10-30
4	C752ASTAB	PI	OP	Treatment by decanting and absorption in containers. Waste lines # 4, 7, 10, 11, 13, 15, 19, 21, 23, 24
4	C752ASTAB	PI	OP	Treatment by neutralization, oxidation, reduction, precipitation, and stabilization in containers. Waste lines #4, 5, 7, 8, 10-30

A-14

EPA ID Number: KY8 - 890 - 008 - 982			Agency Interest Number: 3059	
XI. PROCESS DESCRIPTION: (See Instructions)				
a. Commercial Indicator	b. Unique Unit or Group Name	c. Legal Status Code	d. Operating Status Code(s)	e. Description of Process
4	C752ACOMP/MACRO	PI	OP	Treatment by compaction and/or macroencapsulation. Waste lines # 4, 5, 7, 8, 10-30
4	C752AFLUCR	PI		Storage of crushed bulbs in 55-gallon containers. Waste lines # 20
4	C752AFLUCR	PI	OP	Fluorescent/miscellaneous lamp crushing - treatment by absorption and size reduction. Waste lines # 20
4	C7333STORG	PI	OP	Container storage. Waste lines # 2, 3, 9, 22, 27, 30
4	C733STORG	PI	OP	Treatment by decanting and absorption in containers. Waste lines # 2, 9, 27, 30
4	C733COMP/MACRO	PI	OP	Treatment by compaction and/or macroencapsulation. Waste lines # 2, 3, 9, 22, 27, 30

A-15

EPA ID Number: KY8-890 - 008- 982

Agency Interest Number: 3059

XII. WASTE STREAM DESCRIPTION (See Instructions)

a. Line Number	b. Waste Stream Number	c. Waste Description
1, 2, 3	1	Gold dissolver precipitate (D006, D008, and/or D010)
4, 5, 6	2	Miscellaneous flammable materials—liquids (DXXX, FXXX and/or UXXX)
7, 8, 9	3	Miscellaneous flammable materials—solids (DXXX, FXXX, and/or UXXX)
10, 11, 12	4	Miscellaneous solutions exhibiting toxicity characteristics (DXXX, FXXX, and/or UXXX)
13, 14, 15	5	Miscellaneous solids exhibiting toxicity characteristics (DXXX, FXXX, and/or UXXX)
16	6	Discarded batteries (DXXX)
17, 18, 19	7	Liquids contaminated with spent solvents (DXXX, FXXX, and/or UXXX)
20, 21	8	Solids contaminated with spent solvents (DXXX and/or FXXX)
22	9	Waste oils (DXXX)
23	10	Miscellaneous acids and bases (DXXX)
24, 25, 26, 27	11	Liquid waste generated as a result of contingency plan implementation (DXXX, FXXX, UXXX, and/or PXXX)
28, 29, 30, 31	12	Contaminated Equipment/debris/PPE (DXXX, FXXX, UXXX, and/or PXXX)
32, 33, 34	13	Miscellaneous liquids contaminated with spent solvents and metals—liquids (DXXX, FXXX and/or U228)
35, 36, 37	14	Miscellaneous solids containing spent solvents and metals— solids (DXXX, FXXX, and/or UXXX)
38, 39, 40, 41	15	Miscellaneous laboratory wastes—liquids (DXXX, FXXX, UXXX, and/or PXXX)
42, 43, 44	16	Miscellaneous laboratory wastes—solids (DXXX, UXXX, and/or PXXX)
45, 46, 47	17	Activated carbon (DXXX, FXXX, and/or UXXX)
48, 49, 50, 51, 52, 53, 54, 55, 56, 57	18	Fuses/circuit boards/vacuum tubes (D001, D003, D004, D005, D006, D007, D008, D009, D010, and/or D011)
58, 59, 60, 61	19	Equipment decontamination fluid and rinseate (DXXX, FXXX, UXXX, and/or PXXX)

EPA ID Number: KY8 - 890-008-982

Agency Interest Number: 3059

XII. WASTE STREAM DESCRIPTION (See Instructions)

a. Line Number	b. Waste Stream Number	c. Waste Description
62	20	Light bulbs (DXXX)
63, 64, 65	21	Sludges/scale (DXXX, FXXX, and/or UXXX)
66, 67, 68	22	Compressed gas/aerosols (DXXX, FXXX, and/or UXXX)
69, 70	23	Spent electroplating solution (DXXX and/or F007)
71, 72, 73, 74, 75	24	Neutralization/scrubber solution (D002, D006, D007, D008, and/or P056)
76	25	Dry scrubber material (P056)
77	26	Personal protection equipment waste (P056)
78	27	Waste vacuum pump oil (P056)
79, 80, 81	28	Contained gas (DXXX, UXXX, and/or PXXX)
82	29	Liquid Mercury (D009)
83, 84	30	Stabilized Millers Fluorinated Lubricant (D004, D006)

The DXXX, FXXX, UXXX, and/or PXXX codes are used for waste streams where waste codes can vary or are currently unknown. Use of these generic codes is intended to cover those waste codes from some or all of the identified list(s) that are applicable to the waste stream.

EPA ID Number: KY8 - 890-008 -982		Agency Interest Number: 3059	
XIII. Facility Status	☒ Waste is NOT received from off-site ☐ Accepts waste from any off-site source(s) [A] ☐ Accepts waste from only a restricted group of off-site sources [R]: Specify:		
XIV. Facility Owner Certification	If the facility owner is also the facility operator, please skip this section and complete item XV below. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. NAME (PRINT OR TYPE) SIGNATURE DATE		
XV. Operator Certification	I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. Theodore E. Olds, Acting Manager Portsmouth/Paducah Project Office Co-Director SIGNATURE DATE		
XVI. Land Owner Certification	I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. Theodore E. Olds, Acting Manager Portsmouth/Paducah Project Office SIGNATURE DATE		

CERTIFICATION PREAMBLE
U.S. DEPARTMENT OF ENERGY (DOE) AND
FOUR RIVERS NUCLEAR PARTNERSHIP, LLC (FRNP)

Document Identification: **Part A of the Kentucky Hazardous Waste Permit Application,
KY8-890-008-982, Agency Interest No. 3059**

The U.S. Department of Energy (DOE) has signed as “owner and co-operator” and Four Rivers Nuclear Partnership, LLC, (FRNP) has signed as “operator” of the permitted facility. DOE has determined that multiple signatures best reflect the actual apportionment of responsibility under which DOE’s RCRA responsibilities are for policy, programmatic, funding, and scheduling decisions and FRNP’s RCRA responsibilities are for day-to-day operations, including but not limited to, the following responsibilities: waste analysis and handling, monitoring, record keeping, reporting, and contingency planning. For purposes of the certification, as prescribed by 40 *CFR* Section 270.11(d) and adopted by 401 *KAR* 39:060, Section 5, DOE’s and FRNP’s representatives certify, to the best of their knowledge and belief, the truth, accuracy, and completeness of the application for their respective areas of responsibility.

Attachment 1

Hazardous Wastes Generated at PGDP

Waste Stream Number	Description of Waste	EPA Waste Number(s)	Approximate Annual Generator Rate (lb/year)
1	Gold dissolver precipitate	D006, D008, and/or D010	0
2	Miscellaneous flammable materials—liquids*	DXXX, FXXX and/or UXXX	500
3	Miscellaneous flammable materials—solids*	DXXX, FXXX, and/or UXXX	500
4	Miscellaneous solutions exhibiting toxicity characteristics*	DXXX, FXXX, and/or UXXX	500
5	Miscellaneous solids exhibiting toxicity characteristics*	DXXX, FXXX, and/or UXXX	3,165
6	Discarded batteries*	DXXX	1,385
7	Liquids contaminated with spent solvents*	DXXX, FXXX, and/or UXXX	2,000
8	Solids contaminated with spent solvents*	DXXX and/or FXXX	5
9	Waste oils*	DXXX	988
10	Miscellaneous acids and bases*	DXXX	600
11	Liquid waste generated as a result of contingency plan implementation*	DXXX, FXXX, UXXX, and/or PXXX	0
12	Contaminated equipment/debris/personal protective equipment (PPE)*	DXXX, FXXX, UXXX, and/or PXXX	20,836
13	Miscellaneous liquids contaminated with spent solvents and metals—liquids*	DXXX, FXXX and/or U228	6,869
14	Miscellaneous solids containing spent solvents and metals—solids*	DXXX, FXXX, and/or UXXX	2,000
15	Miscellaneous laboratory wastes—liquids*	DXXX, FXXX, UXXX, and/or PXXX	600
16	Miscellaneous laboratory wastes—solids*	DXXX, UXXX, and/or PXXX	600
17	Activated carbon*	DXXX, FXXX, and/or UXXX	21,020

Attachment 1

Hazardous Wastes Generated at PGDP (Continued)

Waste Stream Number	Description of Waste	EPA Waste Number(s)	Approximate Annual Generator Rate (lb/year)
18	Fuses/circuit boards/vacuum tubes	D001, D003, D004, D005, D006, D007, D008, D009, D010, and/or D011	6,786
19	Equipment decontamination fluid and rinseate*	DXXX, FXXX, UXXX, and/or PXXX	200
20	Light bulbs*	DXXX	318
21	Sludges/scale*	DXXX, FXXX, and/or UXXX	4,000
22	Compressed gas/aerosols*	DXXX, FXXX, and/or UXXX	143
23	Spent electroplating solution*	DXXX and/or F007	0
24	Neutralization/scrubber solution	D002, D006, D007, D008, and/or P056	600
25	Dry scrubber material	P056	600
26	PPE waste	P056	600
27	Waste vacuum pump oil	P056	25
28	Contained gas*	DXXX, UXXX, and/or PXXX	600
29	Liquid mercury	D009	10
30	Stabilized millers fluorinated lubricant	D004, D006	670

*The DXXX, FXXX, UXXX, and/or PXXX codes are used for waste streams where waste codes can vary or are currently unknown. Use of these generic codes is intended to cover those waste codes from some or all of the identified list(s) that are applicable to the waste stream.

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ATTACHMENT A1

MAPS

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INSERT PART A-1 MAPS

ATTACHMENT A2
PHOTOGRAPHS

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09/24/2024 14:42

September 24, 2024
C-404 Low-Level Radioactive Burial Ground Southeast Facing Northwest
Process Code: D80

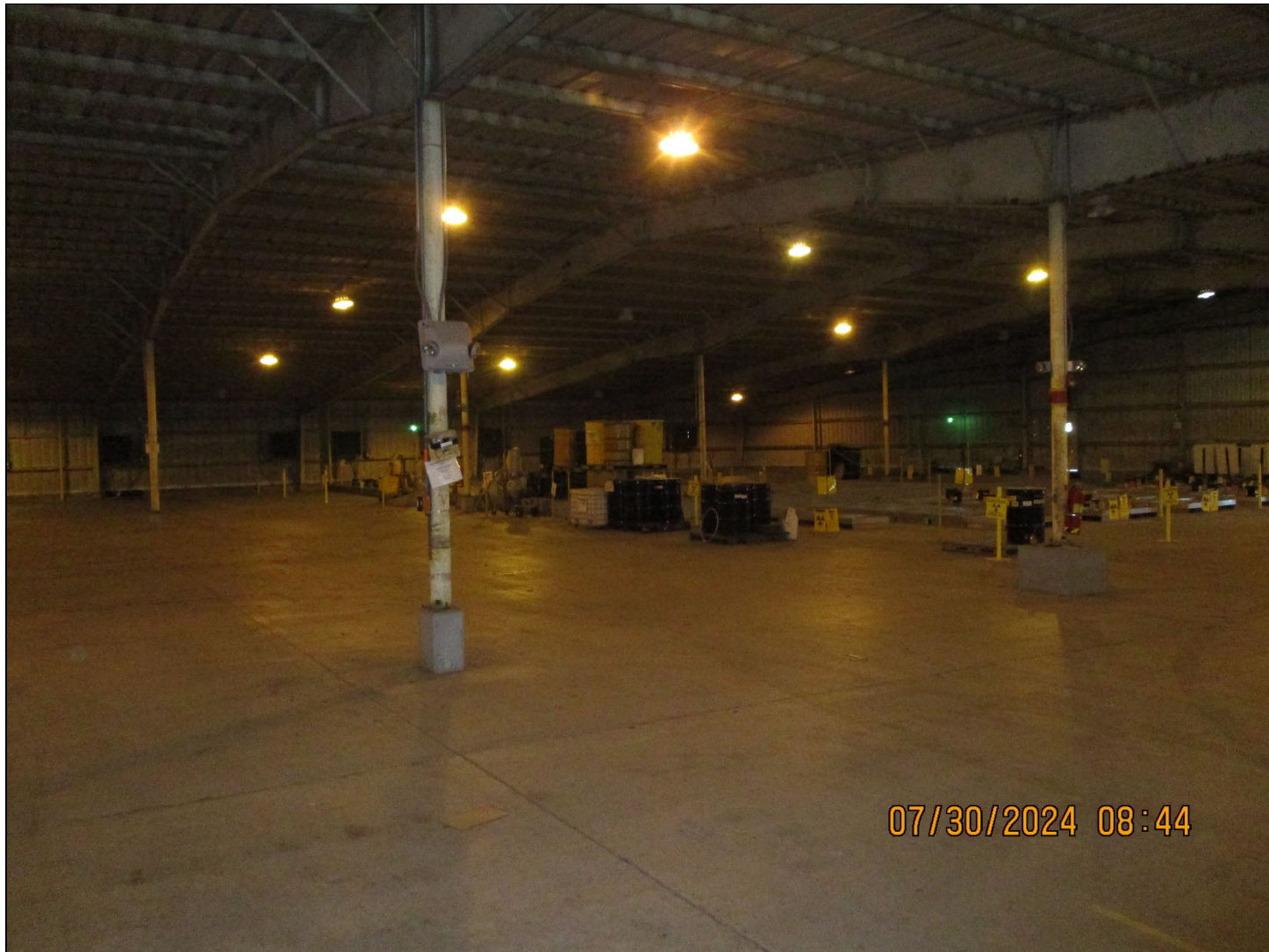


September 18, 2024
C-404 Low-Level Radioactive Burial Ground Northwest Facing East
Process Code: D80

Deleted: Southeast Facing Northwest



July 30, 2024
C-746-Q Hazardous and Mixed Waste Storage and Treatment Facility (Outside), West Side Facing East
Process Codes: S01,T04



July, 30, 2024
C-746-Q Hazardous and Mixed Waste Storage and Treatment Facility (Inside), North Side Facing South
Process Codes: S01,T04



July, 30, 2024
C-752-A Hazardous Waste Storage and Treatment Facility (Outside), North Side Facing South
Process Codes: S01,T04



July, 30, 2024
C-752-A Hazardous Waste Storage and Treatment Facility (inside), North Entrance Facing South
Process Codes: S01,T04



July, 30, 2024
C-733 Hazardous Waste Storage Area (Outside), North Side Facing South
Process Codes: S01,T04



July, 30, 2024
C-733 Hazardous Waste Storage Area (Inside), East Side Facing West
Process Codes: S01,T04

PART E

C-404 GROUNDWATER MONITORING
HAZARDOUS WASTE MANAGEMENT FACILITY PERMIT
CLASS 1 MODIFICATION

40 *CFR* Part 264, Subpart F

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ACRONYMS

AOC	area of concern
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
<i>CFR</i>	<i>Code of Federal Regulations</i>
CMS	corrective measures study
DOE	U.S. Department of Energy
EEC	Energy and Environment Cabinet
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
FS	feasibility study
HWBM	Hazardous Waste Branch Manager
HWMFP	Hazardous Waste Management Facility Permit
IM	interim measures
<i>KAR</i>	<i>Kentucky Revised Statutes</i>
KDWM	Kentucky Division of Waste Management
MSL	mean sea level
MW	monitoring well
N/A	not applicable
PGDP	Paducah Gaseous Diffusion Plant
PL	prediction limit
RA	removal action
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RGA	Regional Gravel Aquifer
RI	remedial investigation
SAR	SWMU assessment report
SE	site evaluation
SMP	site management plan
SWMU	solid waste management unit
UCRS	Upper Continental Recharge System

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1. INTRODUCTION

1.1 C-404 GROUNDWATER MONITORING

The C-404 Low-Level Radioactive Waste Burial Ground (C-404) was closed under the closure requirements for landfills containing hazardous waste. The postclosure permit for this facility was incorporated into the hazardous waste management permit for Paducah Gaseous Diffusion Plant (PGDP) in 1992. Groundwater monitoring is required for this landfill. This part of the application describes the groundwater monitoring at the C-404 Landfill.

1.2 C-404 SITE HISTORY AND DESCRIPTION

The C-404 Low-Level Radioactive Burial Ground is located in the west-central portion of PGDP (see Attachment A1, Figure 1). The C-404 unit originally was constructed in the early 1950s as a rectangular aboveground surface impoundment with a floor area of approximately 53,000 ft² (387 ft by 137 ft). The floor of the surface impoundment was constructed of well-tamped earth, and clay dikes provided liquid containment to an operating depth of approximately 6 ft.

From 1952 through 1957, the surface impoundment was operated as a neutralization/sedimentation treatment facility for uranium-contaminated wastewater generated at the C-400 facility. Liquid wastes from the C-400 facility were pumped through an underground steel pipe to the eastern end of the impoundment. A weir at the southwest corner of the impoundment decanted the treated wastewater for discharge. Use of the surface impoundment for treatment of wastewater was terminated in 1957 upon installation of a treatment system at the C-400 facility. At that time, all free liquids were removed from the C-404 impoundment.

From 1957 through 1976, the impoundment was used for the bulk disposal of uranium-contaminated solid waste. The surface impoundment was filled with bulk solid wastes to within 1–2 ft of the top of the original dikes. The facility then was covered with compacted earth to the top of the original dikes and sloped to facilitate runoff. The exit weir was converted to an enclosed concrete basin for use as a leachate collection sump. Since covering the surface impoundment, leachate accumulations in the collection sump have amounted to approximately 2,000 gal per year. This leachate is transferred to portable tanks and placed in storage for appropriate treatment and/or disposition.

In 1977, the placement of bulk and containerized uranium-contaminated solid wastes on top of the previously filled area began. As these wastes were placed on the upper portion of the facility, they were covered with earth. In 1983, the eastern quarter of the site was covered with a clay cap that extends over the out-slope of the dike.

One of the types of containerized solid wastes disposed of in the upper portion of the facility is gold dissolver precipitate, a solid waste containing no free liquid. During a routine testing program, the gold dissolver precipitate disposed of in early 1986 was found to be hazardous based upon the Extraction Procedure Toxicity test. The constituents of concern are lead and cadmium and, to a lesser extent, selenium. The C-404 disposal site was never intended for use as a hazardous waste disposal site and was not included in PGDP's Resource Conservation and Recovery Act (RCRA) permitting process. In May 1986, following the discovery of the presence of characteristic hazardous waste in the C-404 Landfill, disposal of wastes at the site was terminated. Though only a minor portion of the solid waste in the site was found to be hazardous, the decision was made to close the site as a hazardous waste landfill pursuant to the applicable state and federal regulations.

The U.S. Department of Energy (DOE) submitted a Postclosure Permit Application for this unit in 1989. The Hazardous Waste Management Permit incorporated the closure and monitoring requirements for this unit in 1992. The C-404 Low-Level Radioactive Burial Ground was never intended for the burial of hazardous waste and, therefore, does not meet the design requirements as specified in 40 *CFR* § 264.301 *et seq.*

2. SITE GEOLOGY AND HYDROGEOLOGY

PGDP, located in the Jackson Purchase region of western Kentucky, lies within the northern tip of the Mississippi Embayment portion of the Gulf Coastal Plain Province. The stratigraphic sequence in the region consists of Cretaceous, Tertiary, and Quaternary sediments unconformably overlying Paleozoic bedrock (see Part B, Figure 3). The *Report of the Paducah Gaseous Diffusion Plant Groundwater Investigation Phase III* (Clausen 1992) discusses geology and hydrogeology of PGDP in detail. Additional information regarding the geology and hydrogeology at PGDP is covered in the *Northeast Plume Preliminary Characterization Summary Report* (Garner 1995). A number of geological investigations performed in recent years further have refined the basic geological understanding of PGDP. Below is a summary of the PGDP geology and hydrogeology.

2.1 GEOLOGY

Paleozoic bedrock located below PGDP consists of Mississippian age limestone. The Upper Cretaceous McNairy Formation and the overlying Paleocene Clayton Formation, hereafter referred to collectively as the McNairy Formation, which consists of interbedded and interlensing sand, silt, and clay, overlies the site bedrock. Data indicate that sand may account for 40–50% of this formation near the site. The Porters Creek Clay is Paleocene in age and occurs in the southern portions of the site. It consists of dark-gray-to-black clay with varying amounts of silt; and fine-grained micaceous, commonly glauconitic sand. The Eocene Sands, consisting of interbedded and interlensing sand, silt, and clay, overlie the Porters Creek Clay in the extreme southern portion of the PGDP.

Pliocene, and Pleistocene continental deposits unconformably overlie Cretaceous through Eocene strata at PGDP. The Continental Deposits extend from the southern end of the PGDP to the Ohio River, and overlay an unconformable surface at the base of the deposits that exhibits steps or terraces. The Continental Deposits have been divided into a basal gravel facies (Lower Continental Deposits) and an upper, fine-grained clastic facies (Upper Continental Deposits).

The lower continental deposits consist of chert gravel in a matrix of poorly sorted sand and silt. A Pliocene facies, ranging in thickness from 0–30 ft and averaging less than 10 ft, exists in the southern portions of the site, occurring on the upper surfaces of a buried terrace at elevations greater than 350 ft above mean sea level (MSL). A second gravel facies, ranging in thickness from 15–20 ft, exists in southeastern and eastern portions of the site, occurring on an erosional surface at approximately 320–345-ft elevation. The third and most prominent of the three gravel facies beneath the site consists of Pleistocene deposits, which occur north of a buried terrace face on an erosional surface with elevations varying from approximately 245–310 ft. This thicker sequence of Pleistocene Continental Deposits represents a valley fill that overall comprises a thick, fining upward sequence. The upper surface of these gravel deposits occurs at an average elevation of 310 ft with an average thickness of approximately 30 ft. Thicker deposits, up to 50 ft, exist in deeper scoured channels which trend east-west across the site.

The Upper Continental Deposits primarily consist of clayey silt, with thin zones of sand and occasional gravel, and vary in thickness from approximately 15–55 ft. These deposits have been differentiated into three general lithofacies based on grain-size distributions: (1) clay and silt sediments, (2) sand sediments, and (3) gravel sediments. Sand- and gravel-dominated lithofacies exist at different elevations throughout the upper continental deposits; however, most occur at consistent elevations. Sand and gravel lithofacies appear relatively discontinuous in cross-section, but may be more connected in three dimensions. Eolian origin loess, consisting of yellowish-brown silt and clayey silt, overlies the continental deposits at the site and varies in thickness from approximately 5–25 ft with an average of approximately 15 ft. Holocene alluvial deposits occur at lower elevations within the Ohio River floodplain north of PGDP.

2.2 HYDROGEOLOGY

The local groundwater flow system at PGDP occurs within four specific components: the terrace gravels, the Upper Continental Recharge System (UCRS), the Regional Gravel Aquifer (RGA), and the McNairy Flow System [Report of the Paducah Gaseous Diffusion Plant Groundwater Investigation Phase III (Clausen 1992)]. The components are defined as follows:

- (1) Terrace Gravels—This component consists of Pliocene-aged gravel deposits found at elevations higher than 350 ft in the southern portion of the PGDP. This feature is not expressed in the vicinity of C-404. These deposits usually lack sufficient thickness and saturation to constitute an aquifer. Alluvial channels intersecting the terrace may provide groundwater underflow to recharge the RGA.
- (2) UCRS—The UCRS consists of three distinct hydrogeologic units: HU 1, HU 2, and HU 3. The uppermost unit, HU 1, is the overlying loess that blankets the entire site. HU 2, the second unit, consists of discontinuous sand and gravel lenses with groundwater flow ultimately downward to recharge the RGA. The lowermost unit, HU 3, consists predominantly of clay, silt, or clayey silt. Composition of HU 3 may vary, but it appears to form a partial confining layer due to relatively low hydraulic conductivity. The sand and gravel lithofacies appear relatively discontinuous in cross-section but may be more connected in three dimensions. The most prevalent sand and gravel deposits occur at an elevation of approximately 345–351 ft with less prevalent deposits occurring at an elevation of 337–341 ft. Groundwater flows downward into the RGA from the UCRS in the vicinity of PGDP.
- (3) RGA—This component consists primarily of the lower continental deposits HU 5 of the Quaternary sand and gravel facies, but also includes sands of the hydrogeologic unit HU 4 and coarse-grained upper McNairy sediments in direct contact with the lower continental deposits, and Holocene alluvium found adjacent to the Ohio River, which are of sufficient thickness and saturation to constitute an aquifer. These deposits commonly are thicker than the Pliocene terrace gravel deposits with an average thickness of 30 ft and range up to 50 ft along an axis that trends east-west through the site. The RGA is the uppermost aquifer used locally.
- (4) McNairy Flow System—This component consists of the interbedded and interlensing sand, silt, and clay of the McNairy Formation. The top of the McNairy Formation occurs at a depth of approximately 90 ft below ground surface. Sand facies account for 40–50% of the total formation thickness of approximately 225 ft.

Topographically-controlled recharge and discharge areas to the south and north, respectively, bound the local groundwater flow system. Recharge within the Eocene sands has resulted in a groundwater divide located southwest of the PGDP. The main recharge area for the RGA is located nearer to the site and occurs as percolation through the UCRS. From the PGDP, groundwater flows northward toward the Ohio River, which is the local base level for the system. Flow originates south of the PGDP within the Eocene sands

and subsequently moves into the Pliocene terrace gravels that separate the Eocene sands from the RGA. Groundwater within the Pliocene gravels either discharges to local streams or flows into the RGA, which eventually discharges to the Ohio River.

Differences in permeability and aquifer thickness affect the hydraulic gradient. Toward the southern part of the site, the RGA is either truncated or thins and grades laterally into the Pliocene terrace gravels. The restriction results in a high gradient and probably causes groundwater in the Pliocene terrace gravels to discharge to adjoining streams. In the north central portion of the site, the lower gradients are a result of the thickened Pleistocene sequence containing high fractions of coarse sand and gravel. Northward, near the Ohio River, the hydraulic gradient increases as a result of either a thinner section of the RGA and Holocene alluvium or the low permeability of bottom sediments in the Ohio River.

The major pathway of groundwater flow is within the RGA, which dominates the flow regime. Conceptually, a larger hydraulic conductivity in the aquifer than in the overlying sediments produces high vertical gradients in the aquitard and low horizontal gradients in the aquifer (Freeze and Witherspoon 1967).

The conceptual model of the RGA flow system is based on the results of a three-dimensional computer model of PGDP. The RGA receives recharge via underflow from the Pliocene terrace gravels to the south and percolation through the UCRS. The discontinuous nature of sands and gravels in the UCRS and the large vertical gradient require groundwater flow in the UCRS to be oriented downward. Indeed, measured hydraulic gradients and results from analytical and numerical analyses suggest that most of the water entering the shallow system flows vertically into the RGA. Some horizontal flow in the UCRS likely occurs, but, near the site, it is probably insignificant because of the lateral discontinuity of shallow sand and gravel lenses. Groundwater flow in the RGA is to the north and discharges into the Ohio River. Hydraulic conductivities of the RGA commonly range between 100–1000 ft/d. Existing regional maps show the RGA thin or absent beneath the Ohio River, suggesting that flow under the river is unlikely.

2.3 AN EVALUATION OF SUBSURFACE GEOLOGIC FORMATIONS AND SURFACE TOPOGRAPHY FOR SOLUTION OR KARST FEATURES

Based on the known subsurface geology at PGDP, the only rock units that are susceptible to solution (karst forming) processes are Mississippian limestones, which lie at a depth approximately 330–350 ft below the surface. For this reason, no sinkholes are evident within the PGDP area.

3. TOPOGRAPHIC MAP

United States Geological Survey quadrangle map is presented in Attachment A1, Figure 2. Site generated topographic maps of the area are presented in Part B, Appendix B1, Maps 1 through 5. Part E, Figure 1 depicts the boundaries for the C-404 Landfill and the monitoring wells (MWs) for this unit on a topographic map.

Part E, Figure 1. Monitoring Wells

4. GROUNDWATER MONITORING SYSTEM

[40 *CFR* § 264.97 and 40 *CFR* § 264.90(b)(3)]

The C-404 Low-Level Radioactive Waste Burial Ground was closed in 1991 under the closure requirements for landfills. The postclosure permit for this facility was incorporated into the hazardous waste management permit for the PGDP in 1992. Groundwater monitoring is required for this landfill but not for the hazardous waste storage facilities. This part addresses the requirements for groundwater monitoring at the C-404 Landfill.

The groundwater monitoring plan for the C-404 Low-Level Radioactive Waste Burial Ground originally provided for the installation of four MW clusters. The locations were determined when the groundwater flow direction in the RGA was verified. The Kentucky Division of Waste Management (KDWM) approved the locations prior to installation of the wells. Each well cluster consisted of two wells screened at depths in the RGA such that detection of waste constituents within the vertical limits of the RGA was assured. One well at each of these location was screened in the UCRS.

In 2008, the MW network was redesigned based on groundwater monitoring results and the *Well Plan for Addition of Wells for C-404 Monitoring Well Network, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, PRS/PROJ/0028, July 2007 (Well Plan) to better orient the groundwater monitoring system relative to groundwater flow directions. The redesigned MW network is described in Section 4.6, Description of Wells.

4.1 UPPERMOST AQUIFER

[40 *CFR* § 270.14(c)(2)]

At the C-404 Landfill, the RGA is the uppermost aquifer. The McNairy Formation occupies the interval between the bottom of the RGA and the top of the Mississippian limestones and consists predominantly of fine sand and silt facies.

Saturated sand lenses within the silt and clay facies in the UCRS at the C-404 Landfill historically have demonstrated low and inconsistent yield characteristics, which limit the usefulness of samples from these wells.

4.2 BOUNDARIES OF THE UPPERMOST AQUIFER

The top of the RGA at C-404 varies between 61–65 ft below the surface at an elevation ranging from 307–310 ft MSL. The thickness of the aquifer varies from 20–22-ft thick with the bottom of the aquifer at an elevation ranging from approximately 285 ft to 290 ft MSL. The RGA is continuous locally at C-404 as well as regionally at PGDP.

4.3 UNDERLYING INTERCONNECTIONS BETWEEN UPPERMOST AQUIFER AND LOWER AQUIFER

[40 *CFR* § 270.14(c)(2)]

The McNairy Formation occurs between the lower boundary of the RGA and the top of Mississippian limestones at a depth approximately 400 ft below the surface. The much lower hydraulic conductivity of the fine sands, silts, and clays of the McNairy Formation is a significant contrast with the high hydraulic conductivity of the sand and gravel units of the RGA. As a result, little communication exists between the two units and the McNairy Formation serves as a lower confining unit to the RGA, with a thickness of approximately 300 ft, which effectively prevents downward migration of groundwater to underlying rock units.

4.4 HYDRAULIC DOWNGRAIENT LIMITS

The hydraulic downgradient limit of the RGA is the Ohio River 4 miles to the north.

4.5 POINT OF COMPLIANCE

[40 CFR § 264.95]

The point of compliance for the C-404 site is identified to be the vertical plane at the synthetic liner anchor trench that surrounds the unit. This trench is constructed near the edge of the closure cap. The uppermost aquifer below the regulated unit is the RGA.

The compliance wells were constructed within the uppermost aquifer (RGA). The well numbers are MW84A, MW87A, and MW90A. These wells should detect a release from the unit to the uppermost aquifer.

4.6 DESCRIPTION OF WELLS

[40 CFR § 264.97]

Nine wells currently are used as part of the groundwater monitoring network for the C-404 Landfill. Part E, Table 1 lists the MWs for the C-404 Landfill groundwater monitoring network. The current MWs are shown in Part E, Figure 1. Well construction diagrams are contained in Appendix E2.

Several additional wells are located in the vicinity of the C-404 are routinely monitored, but currently are not used as part of the detection monitoring program. These wells (e.g., MW67, MW76, MW86, MW89, MW92, MW95A, MW226, MW227, MW333, MW337, MW338, MW414, MW416, MW548, MW549, MW550, MW551) also support groundwater flow and direction measurements in the vicinity of the C-404 Landfill.

Part E, Table 1. Monitoring Wells for C-404 Hazardous Waste Landfill

Downgradient		Upgradient (Background Wells)	
Upper RGA	UCRS	Upper RGA	UCRS
MW84A	MW85	MW93A	MW94
MW87A	MW88	MW420	
MW90A	MW91A		

4.6.1 Replacement Wells

Replacement wells will be installed as needed to maintain the monitoring program. Wells deleted from the compliance monitoring program and substandard RCRA MWs no longer in use and not used in the environmental monitoring program will be plugged and abandoned in accordance with Appendix E3, Section 2. The Hazardous Waste Branch Manager (HWBM) may approve an alternate method for well decommissioning. Well plugging and abandonment methods and certification will be submitted to the HWBM within 30 days from the date the wells are removed from the monitoring program if the wells are determined to have no further uses (environmental surveillance monitoring and/or water level monitoring).

DOE will install a replacement well for any well that no longer meets the requirements in 40 *CFR* § 264.97. Replacement wells will be designated by the letter “A” following the well number. In the event that an “A” series well is deleted from the monitoring system, the replacement well will be designated as a “B” series and follows C, D, E, etc., for any individual MW that is replaced.

DOE will submit a plan to the HWBM for installation of any replacement wells. The plan will be submitted within 30 days from the date the replacement well is proposed to be installed. The plan will consist of the following items:

- (1) Location(s) of each proposed MW(s);
- (2) Methods and equipment that will be used to install the proposed MW(s);
- (3) Materials and construction details of each MW;
- (4) The proposed methods for developing the newly installed MW(s); and
- (5) Schedules for installation and development.

DOE will submit to the HWBM within 90 days a report of the surveyed elevation and the well construction details and specifications upon completion of any new MW construction, including well development and surveying.

5. DETECTION MONITORING

[40 *CFR* § 264.97]

5.1 SAMPLING AND ANALYSIS PROCEDURES

Specific activities and/or requirements related to groundwater monitoring and MWs are provided in this section.

Groundwater flow rate and direction will be determined annually. Groundwater monitoring is conducted on a semiannual basis and will continue throughout the compliance period (40 years from permit initiation of compliance monitoring in October 1988). Monitoring and testing data will be maintained in the operating record until closure of the facility. The groundwater monitoring results are submitted on forms approved by the Kentucky Energy and Environment Cabinet (EEC).

Water level measurements will be made in all MWs prior to evacuation or collection of samples. The depth to groundwater is measured to an accuracy of 0.01 ft using a water level indicator. The groundwater surface elevation is calculated and recorded in conjunction with each groundwater monitoring event. See Appendix E3, Section 1.3, Water Level Measurements, for additional information on the process of how water level measurements are collected and how equipment decontamination, between each well, is handled. Water level measurements will be collected at the wells of the C-404 MW network, listed in Section 4.6.

Field parameters [pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential (Eh), and turbidity] are measured using a water quality meter. Other field parameters, such as depth to water and barometric pressure, are measured prior to sampling. Measurements of the field parameters are documented using the groundwater sample data forms (similar to the example in Part E, Figure 2) prior to collection of the groundwater samples. Water quality stabilization criteria are met prior to sampling analytical parameters for the C-404 MWs. Appendix E3, Section 1.4, Groundwater Sampling, summarizes the acceptance criteria. Once stabilization has occurred, samples are collected in certified clean sample containers. Sample containers are chosen and preserved according to requirements in Appendix E3, Section 1.6. Clean pairs of protective disposable gloves are utilized during all phases of groundwater sampling.

Collection of field quality control samples (e.g., equipment blanks, field blanks, trip blanks) are done according to Appendix E3, Section 1.5, Field Quality Control. With prior approval from the KDWM, equivalent water specifications are acceptable for field quality control samples. Trip blanks accompany the sample containers for volatile organics and are analyzed for organics identified in Part E, Table 2.

Samples are collected in the following preferred order:

- (1) Samples to be analyzed for volatile organics.
- (2) Samples to be analyzed for total metals.
- (3) Samples to be analyzed for radionuclides.

MW GROUNDWATER DATA FORM

LOCATION: _____		FREQUENCY: _____		DATE: _____	
ARRIVAL TIME: _____		SAMPLE TIME: _____		DEPARTURE TIME: _____	
PROJECT ID: _____		LCOC NUMBER(S): _____			
SAMPLE ID(S): _____		TRIP BLANK: _____			
SAMPLED BY: _____					
WELL DEPTH (ft): _____		POINT DATUM: _____		PURGE VOLUME (L): _____	
WATER LEVEL (START) (ft): _____		WATER LEVEL (END) (ft): _____		BAROMETRIC PRESSURE (inches/Hg): _____	
PURGE START TIME: _____		PURGE END TIME: _____			

Time	Conductivity		D.O. (mg/L)	Temp (deg F)	pH (S.U.)	Eh (approx) (mV)	ORP (mV)	Turbidity (NTU)
	(mS/cm)	(µmhos/cm)						
							N/A	

EQUIPMENT INFORMATION

DISPLAY #: _____ TRANSMITTER #: _____

SAMPLE BOX #: _____ DEPTH INDICATOR #: _____ DI WATER SOURCE: _____

EQUIPMENT DECONTAMINATION DESCRIPTION:

Decon sample control box with 600mL of DI water and decon water level with DI wipe.

FIELD COMMENTS AND OBSERVATIONS:

SIGNATURE: _____ DATE: _____

Data Form Verification

SIGNATURE: _____ DATE: _____

PEMS Entry Initials: _____ DATE: _____

MW Groundwater Data Form generated from PEMS database.

*This form represents the type of information gathered. Changes may be made as necessary without modification of this permit application.

Part E, Figure 2. Example Groundwater Data Form

Samples are preserved in accordance with the procedures in Appendix E3. Samples are analyzed according to the procedures specified in 40 *CFR* § 264 Appendix IX and in Part E, Table 2, for the constituents listed. Alternative SW-846 methods may be substituted with prior written approval from the KDWM. The analytical methods utilized are specified in SW-846 3rd edition (or most recent edition as approved by the Commonwealth of Kentucky).

Part E, Table 2. C-404 Landfill Analyses and Laboratory Methods

Analyte Type	Constituent Type	Analysis	Analytical Method**
METAL	HAZARDOUS	Arsenic	6020
METAL	HAZARDOUS	Cadmium	6020
METAL	HAZARDOUS	Chromium	6020
METAL	HAZARDOUS	Lead	6020
METAL	HAZARDOUS	Mercury	7470
METAL	HAZARDOUS	Selenium	6020
METAL	RADIONUCLIDE	Uranium	6020
RADS	RADIONUCLIDE	Technetium-99 (total)	Liquid Scintillation
RADS	RADIONUCLIDE	Uranium 234 Uranium 235 Uranium 238	Alpha Spectroscopy
VOA	HAZARDOUS	Trichloroethene (TCE)	8260

*Liquid Scintillation—no SW-846 Method is available for analysis of technetium-99. Analytical chemistry, volume 28, page 1651 (1956).

**Newer methods approved by EPA under SW-846 or ASTM may be used.

The analytical laboratory also will report spike recovery data for each applicable series of groundwater samples collected. At least one duplicate sample will be collected and analyzed according to the methods specified in Part E, Table 2, each time the groundwater quality is determined at the compliance point. Samples are tracked and controlled using the chain of custody requirements specified in Appendix E3, Section 1.1.

5.2 STATISTICAL PROCEDURES

[40 *CFR* § 264.97(h)(5)]

DOE will perform statistical analysis of C-404 groundwater MW data. The statistical analysis will be performed in accordance with the procedures found in the U.S. Environmental Protection Agency (EPA) guidance document, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*, now referred to as Unified Guidance (EPA 2009). In accordance with 40 *CFR* § 264.97(h)(5), the statistical testing methods that will be utilized on C-404 groundwater monitoring data are discussed in the following paragraphs.

Prediction limits (PLs) will be the statistical analysis method for C-404 groundwater data, without a retesting strategy, as found in Section 18 of the Unified Guidance. The method will utilize the current data set and 20 previous data sets.

The percentage of nondetects (censored data) of the data set determines how censored data are treated in determining PLs.

- If less than 15% of the background observations are nondetects, then these will be replaced with one-half of the method reporting limit prior to running the analysis.
- If more than 15% but less than 50% of the background data are less than the detection limit, then the data's sample mean and sample standard deviation are adjusted according to the method of Cohen, Aitchison, or Kaplan-Meier.
- If more than 50% of the background data are less than the detection limit, then a nonparametric PL will be computed. Poisson-based PLs are available as an alternative method when greater than 90% of the background data are less than the detection limit.

The data will be tested for statistical outliers using Dixon's and Rosner's outlier evaluation methods. Potential outliers will be evaluated for potential sources of error or evidence that the data point is not representative. Nonrepresentative data points may be excluded from the statistical analysis based on professional judgment. After testing for and exclusion of statistical outliers, the data set will be evaluated for normality distribution using the Shapiro-Wilk or Shapiro-Francia testing methods. If normality of the data set is confirmed, or can be confirmed by transforming the data, parametric PLs will be performed. If normality of the raw or transformed data set cannot be confirmed, nonparametric PLs will be computed.

Groundwater data collected from background MWs will be used to construct a concentration limit PL, which is then compared to one or more observations from a compliance well. The acceptable range of concentrations includes all values no greater than the PL. The appropriate prediction interval will generally have the form [0, PL], with the upper limit PL as the comparison of importance (EPA 2009).

If the PL indicates no statistically significant difference between concentrations in downgradient wells and concentrations in background wells, then there are no indications of statistically significant impacts on the groundwater from the C-404 Landfill.

If the PLs method identifies a statistically significant difference between concentrations in downgradient wells and concentrations in background wells, then the data will be evaluated further to determine if the concentrations in downgradient and vicinity wells are consistent with the findings of the 2007 Alternate Source Demonstration (ASD) (*Revised C-404 Landfill Statistically Significant Increase Source Demonstration*, PRS-ENM-0031/R2, transmitted via DOE correspondence, PPPO-02-506-07, August 1, 2007).

5.3 PROCEDURES FOR ESTABLISHING BACKGROUND

[40 *CFR* § 264.97(h)(5)]

Background water quality data for the original C-404 Landfill MWs has been established from all upgradient MWs for the constituents listed in Part E, Table 2 during the initial year of closure activities. The background data was based on one complete year of data. The initial background concentration was based on four consecutive quarters of data pursuant to 40 *CFR* § 264.97(h)(5). Subsequent background values are calculated continuously (rolling average) on a semiannual basis.

For the statistical analysis of C-404 Landfill groundwater monitoring data, background values are calculated continuously (rolling average) on a semiannual basis utilizing 20 previous data sets and the

current data set. In the statistical procedures discussed in Section 5.2, analytical data from compliance point wells are compared to the PLs calculated from both background wells. For the nonparametric PL statistical analysis to be valid and in accordance with EPA Unified Guidance document, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (EPA 2009), each well must have 19 data sets and a current data set.

5.4 MONITORING PROGRAM AND DATA EVALUATION

DOE will determine whether a confirmed statistically significant exceedance/increase of one of the constituents listed in Part E, Table 2, has occurred over the background values for each time the groundwater quality is determined at the compliance point in accordance with Section 5.2. The measured concentration at each compliance monitoring point will be compared statistically.

DOE will monitor for all hazardous constituents in Part E, Table 2, of this permit during the compliance period. The compliance period is 40 years. The compliance period began when the detection monitoring program was initiated in accordance with 40 *CFR* § 264.96 on October 11, 1988, and will end on October 11, 2028 (unless the C-404 Hazardous Waste Landfill has moved into a Corrective Action Program).

5.5 RECORDKEEPING AND REPORTING

DOE will enter all monitoring, testing, and analytical data obtained in the operating record. The data will include all computations, calculated means, variances, and results of the statistical tests under 40 *CFR* § 264.97(j).

The established background values and the calculation and computation necessary to determine background values will be submitted to the HWBM. DOE will submit the analytical and statistical results in accordance with the schedule shown in Part E, Table 3. The annual evaluation of groundwater flow rate and direction will be submitted by November 30 of each year of the postclosure period.

Part E, Table 3. Schedule for Submitting Sampling Results

Samples to be Collected During the Months of:	Results Due to the Division by:
January–March	May 30
July–September	November 30

**6. CONFIRMED STATISTICALLY SIGNIFICANT
EXCEEDANCE/INCREASE**

Part E, Table 2 identifies the analytes to be measured by constituent type (i.e., hazardous or radionuclide). If it is determined that there has been a confirmed statistically significant exceedance, as defined in Section 5.2, for any hazardous constituents in any compliance point wells, all applicable steps for hazardous constituents will be followed [40 *CFR* § 264.98(g)]. If it is determined that there has been a confirmed statistically significant increase, as defined in Section 5.2, for any of the radionuclide constituents in any compliance point wells, all applicable steps for radionuclide constituents will be followed.

- (1) For any constituent, the HWBM will be notified in writing within seven days, indicating what constituents have shown statistically significant evidence of contamination;
- (2) If the statistically significant evidence of contamination is of a hazardous constituent, the groundwater wells will be sampled immediately¹ to determine the concentration of all constituents identified in 40 *CFR* § 264 Appendix IX or a site-specific subset of constituents, based on the discretion of the HWBM. If the statistically significant evidence of contamination is of a radionuclide constituent, the groundwater wells will be resampled for radionuclides only;
- (3) For any constituents found in the analysis in Step (2), the groundwater wells may be resampled within one month or at an alternative site-specific schedule approved by the HWBM for those constituents detected. If the results of the second analysis confirm the initial results, then these constituents will form the basis for compliance monitoring. If the wells are not resampled within one month or at an alternate schedule, the constituents found during the initial analysis will form the basis for compliance monitoring;
- (4) An application for a permit modification will be submitted to the HWBM within 90 days to establish a compliance monitoring program that meets the requirements of 40 *CFR* § 264.99, unless the constituent which has been confirmed as having a statistically significant increase at any point of compliance well(s) is a radionuclide. If a radionuclide has a confirmed statistically significant increase, DOE will establish a compliance monitoring program in accordance with Section 7.1 of this part: Step (1).a., Step (2), Step (2).b., Step (3), Step (6), and Step (7); and,
- (5) For hazardous constituents, an engineering feasibility plan for a corrective action or all data necessary to justify an alternate concentration limit, as governed by 40 *CFR* 264.98(g)(5), will be submitted to the HWBM within 180 days. This condition is not applicable when a statistically significant increase has been confirmed for a radionuclide.

Alternatively, if DOE determines, pursuant to Section 5.4, there is a statistically significant exceedance/increase at the compliance point for any of the constituents specified in Part E, Table 2, DOE may demonstrate that a source other than a regulated unit caused the increase or that the increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater, in accordance with 40 *CFR* §§ 264.98(g)(6).

- (1) In making a demonstration, DOE must notify the HWBM in writing within seven days of determining statistically significant evidence of contamination at the compliance point that DOE intends to make this demonstration;
- (2) Within 90 days, submit a report to the HWBM that demonstrates that a source other than a regulated unit caused the contamination or that the contamination resulted from error in sampling, analysis, or evaluation;
- (3) Within 90 days, submit to the HWBM an application for a permit modification to make any appropriate changes to the detection monitoring program; and
- (4) Continue to monitor in accordance with the detection monitoring program.

¹ For purposes of this section of the permit application, the term “immediately” means within a reasonable amount of time. The amount of time will also be dependent upon whether or not a site-specific subset of constituents is requested and the amount of time taken for the HWBM to respond to that request.

The Hazardous Waste Management Facility Permit (HWMFP) allows also for demonstrating that the exceedance is consistent with the 2007 Alternate Source Demonstration, which demonstrated that the C-404 Landfill was not the source of the historical, statistically significant background exceedance of TCE in MW84. Furthermore, the HWMFP allows for demonstrations consistent with the 2007 ASD (*Revised C-404 Landfill Statistically Significant Increase Source Demonstration*, PRS-ENM-0031/R2, transmitted via DOE correspondence, PPPO-02-506-07, August 1, 2007) to be submitted within the semiannual report.

7. GROUNDWATER COMPLIANCE MONITORING FOR THE C-404 HAZARDOUS WASTE LANDFILL

If it is determined that there is a confirmed statistically significant exceedance as defined in Section 5.2 for the hazardous constituents listed in Section 5.1, a Compliance Monitoring Program will be initiated within 180 days of the confirmed statistical exceedance. If there has been a confirmed statistically significant increase for a radionuclide constituent, then DOE will implement a Compliance Monitoring Program in accordance with Section 7.1 of this Part: Step (1) a., Step (2); Step (2) b; Step (3); Step (6); and Step (7).

7.1 COMPLIANCE MONITORING PROGRAM

If compliance monitoring is implemented, DOE will monitor wells to ensure that the regulated unit is in compliance with the groundwater protection standard and 40 *CFR* § 264.99. The hazardous constituents and the concentration limits presented in Part E, Table 4 comprise the groundwater protection standard. Additional hazardous constituent concentrations will be determined pursuant to Section 7.

Part E, Table 4. Concentration Limits

Parameter	Chemical Abstract Number	Concentration Limits (mg/L)
Arsenic	7440-38-2	0.05
Cadmium	7440-43-9	0.005
Chromium	7440-47-3	0.10
Lead	7439-92-1	0.05
Selenium	7782-49-2	0.05
Mercury	7439-97-6	0.002
TCE	79-01-6	0.005
Technetium-99	Not applicable (N/A)	*
Uranium-234	N/A	*
Uranium-235	N/A	*
Uranium-238	N/A	*
Uranium	N/A	*

*There are no concentration limits for radionuclides.

- (1) If compliance monitoring is implemented, DOE will monitor for all hazardous constituents in Part E, Table 4 during the compliance period. The compliance period is the number of years equal to the active life of the waste management area including any waste management activity prior to issuance of the postclosure permit. This compliance period is 40 years. The compliance monitoring period will begin when the compliance monitoring program is initiated.
 - a. Beginning with the calendar quarter following the month for which a statistically significant increase was reported for a radionuclide, DOE will begin quarterly monitoring for the radionuclides

and will report the results to the EEC in accordance with Part E, Table 5. At the end of one year of quarterly monitoring, DOE will submit a report to the HWBM that identifies the groundwater fate and transport of the radionuclides. DOE may request that the frequency of the monitoring be modified after one year of quarterly monitoring.

Part E, Table 5. Schedule for Submitting Sampling Results

Samples to be Collected During the Month of:	Results Due to the Division by:
October–March	May 30
April–September	November 30

- (2) DOE will, in accordance with 40 *CFR* § 264.95 and § 264.99, determine groundwater quality upgradient and at the compliance point, as described in Section 5.3 as follows:
 - a. DOE will determine groundwater quality throughout the postclosure care period pursuant to 40 *CFR* § 264.117. These determinations will be made semiannually, from at least one sample for each MW described in Part E, Table 1 and in accordance with 40 *CFR* § 264.97 and 40 *CFR* § 264.99.
 - b. DOE will express the groundwater quality at each MW in a form necessary for the determination of statistically significant exceedances in accordance with Section 5.2.
- (3) Compliance monitoring required in Section 7.1—Step (1) and Step (1).a—will consist of collecting, preserving, transporting, and analyzing samples from each upgradient and downgradient MW in Part E, Table 1 for those constituents listed in Part E, Table 4.
- (4) DOE will, in accordance with 40 *CFR* § 264.99(e), determine the groundwater flow rate and direction in the uppermost aquifer at least annually.
- (5) DOE will analyze samples from all MWs at the compliance point for all constituents contained in 40 *CFR* Part 264 Appendix IX, at least annually, to determine if additional hazardous constituents are present in the uppermost aquifer. If DOE finds additional hazardous constituents present, excluding those constituents in Part E, Table 4, their concentrations will be reported to the HWBM in writing within seven days of analysis, and they will be added to the monitoring list of Part E, Table 4 through permit modification.
- (6) DOE will perform a statistical comparison on a semiannual basis as specified in Section 5.4 pursuant to the reporting schedule in Part E, Table 5.
- (7) DOE will submit the analytical and statistical results required in accordance with the following schedule presented in Part E, Table 5.
- (8) If there has been a confirmed statistically significant exceedance above the groundwater protection standards established in Part E, Table 4, the DOE will do the following, pursuant to 40 *CFR* § 264.99(h):
 - a. Notify the HWBM in writing within seven days.
 - b. Submit to the HWBM an application for a permit modification to establish a corrective action program meeting the requirements of 40 *CFR* § 264.100 within 180 days or within 90 days if an

engineering feasibility study has been submitted previously to the HWBM. This requirement is not applicable when a statistically significant increase has been confirmed for a radionuclide.

- c. If it is demonstrated successfully that a source other than the regulated unit caused the increase or that the increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in the groundwater, as specified by 40 *CFR* § 264.99(i), a permit modification application will be submitted within 90 days for any appropriate changes to the compliance monitoring program.

8. CORRECTIVE ACTION FOR REGULATED UNITS

The C-404 Landfill currently is in detection monitoring and currently is not required to establish a RCRA corrective action plan under 40 *CFR* § 264.100; however, EEC, DOE, and EPA (Region 4) have indicated an intention in the Federal Facility Agreement (FFA) for PGDP to coordinate DOE's Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) response obligations with the corrective measures/actions required by Kentucky's hazardous waste statutes and regulations. Accordingly, the C-404 Landfill has been included in the Burial Ground Operable Unit under the FFA. If corrective action is necessary, any remedial actions taken under the FFA will be coordinated with the corrective action program under this administrative regulation.

DOE will begin corrective action within a reasonable time period after the groundwater protection standard is exceeded. The corrective action program will include establishing and implementing a groundwater monitoring program to demonstrate the effectiveness of the corrective action program. Such a monitoring program may be based on the requirements for a compliance monitoring program under Section E7 and will be as effective as that program in determining compliance with the groundwater protection standard and in determining the success of a corrective action program.

In addition to the other requirements of the corrective action program, DOE will conduct a corrective action program to remove or treat in place any hazardous constituents listed in Part E, Table 4 that exceed concentration limits in groundwater:

- (1) Between the compliance point and the downgradient property boundary; and
- (2) Beyond the facility boundary, where necessary to protect human health and the environment, unless DOE demonstrates to the satisfaction of the EEC that, despite DOE's best efforts, DOE was unable to obtain the necessary permission to undertake such action. DOE is not relieved of all responsibility to cleanup a release that has migrated beyond the facility boundary where off-site access is denied. On-site measures to address such releases will be determined on a case-by-case basis.

Corrective action measures under this subsection may be terminated upon approval of the EEC once the concentration of hazardous constituents listed in Part E, Table 4 is reduced to levels below their respective concentration limits.

DOE will continue corrective action measures during the compliance period to the extent necessary to ensure that the groundwater protection standard is not exceeded. If DOE is conducting corrective action at the end of the compliance period, DOE will continue that corrective action for as long as necessary to achieve compliance with the groundwater protection standard. DOE may terminate corrective action measures taken beyond the period equal to the active life of the waste management area (including the closure period) if DOE can demonstrate to the satisfaction of the EEC based on data from the groundwater

monitoring program that the groundwater protection standard has not been exceeded for a period of three consecutive years. DOE will submit a report to the EEC on the effectiveness of the corrective action program at least semiannually.

If DOE determines that the corrective action program no longer satisfies the requirements of 40 *CFR* § 264.100, DOE will, within 90 days, submit an application for a permit modification to make any appropriate changes to the program.

Alternative requirements for groundwater monitoring and corrective action for releases to groundwater may be used under 40 *CFR* § 264.90(f), if the KDWM determines the alternative requirements will protect human health and the environment.

9. CORRECTIVE ACTION FOR SWMUs AND AOCs

The EEC, DOE, and EPA (Region 4) have indicated an intention in the FFA for the PGDP to coordinate DOE's CERCLA response obligations with the corrective measures/actions required by Kentucky's hazardous waste statutes and regulations. Several solid waste management units (SWMUs), areas of concern (AOCs), and operable units have been identified and investigated under CERCLA. New SWMUs and AOCs are continually being identified at the PGDP. Information regarding these units is provided to the KDWM in an SWMU assessment report (SAR) and in investigation reports submitted under the FFA. Accordingly, these SWMUs are included in appropriate operable units for investigation and corrective actions under the FFA.

Appendix E4 lists SWMUs and AOCs that have been identified at PGDP. Table E4.1 lists the current SWMUs and AOCs at PGDP. Table E4.2 lists former SWMUs and AOCs at PGDP that were removed from the permit. These former SWMUs were deemed not to present a danger to human health or the environment and were granted no further action status. Appendix E5 presents a map, which depicts the location of the current SWMUs/AOCs.

SWMUs/AOCs, which have not been sufficiently addressed, will be addressed by a RCRA facility investigation (RFI)/remedial investigation (RI) or corrective measures study (CMS)/feasibility study (FS) in accordance with this section.

For purposes of compliance with the corrective action requirements of the HWMFP described below, these activities will include RCRA actions and their CERCLA counterparts.

9.1 NOTIFICATION AND ASSESSMENT REQUIREMENTS FOR NEWLY IDENTIFIED SWMUs AND AOCs

DOE will prioritize any newly identified SWMUs/AOCs based on the threat that they present to human health and the environment. DOE will assign the new SWMU/AOC to an operable unit that best reflects the priority of the SWMUs/AOCs. DOE will notify the HWBM and recommend assigning the SWMUs/AOCs to an operable unit either within the SAR or within 30 days of approval of the SAR.

9.1.1 Notification of Discovery of SWMU or AOC

DOE will notify the HWBM in writing, within 15 calendar days of discovery, of any additional SWMUs or AOCs [excluding any newly-designated SWMUs or AOCs that are associated with a facility being evaluated under a site evaluation (SE) in Appendix 4 of the site management plan (SMP)] that are discovered under any conditions consistent with the FFA. The notification will include, at a minimum, the location of the units and all available information pertaining to the nature of the release (e.g., media affected, hazardous constituents released, magnitude of release). If the HWBM determines that further investigations are required, then the permit will be modified. The requirements for notifications of Appendix 4 facilities are in the current, approved SMP.

9.1.2 Submittal of an Integrated Site Evaluation Report

DOE will prepare and submit to the HWBM, within 90 calendar days of the notification, an integrated SE report that will consist of an integrated removal/remedial SE and SWMU assessment report [hereinafter referred to as an integrated SE report] for each new SWMU identified at the facility consistent with the FFA. The requirements for the submittal of an integrated SE report of Appendix 4 facilities in the SMP will be in accordance with condition of the Permit. At a minimum, the integrated SE report will provide the following information:

1. Location of unit(s) on a topographic map of appropriate scale as required under 40 *CFR* Part 270, Subpart B;
2. Designation of type and function of unit(s);
3. General dimensions, capacities, and structural description of unit(s) (supply any available plans/drawings);
4. Dates that the unit(s) was operated;
5. Specification of all wastes that have been managed at/in the unit(s) to the extent available (include any available data on constituents in the wastes); and
6. All available information pertaining to any release of hazardous waste or hazardous constituents from such unit(s) (to include groundwater data, soil analysis, air, and/or surface water data).

9.1.3 Notification and Submittal of an Integrated Site Evaluation Report [in Accordance with Section IX, Site Evaluation(s) of the FFA] for Newly Designated SWMUs or AOCs Associated with a Deactivated Facility Being Evaluated Under a Site Evaluation in Appendix 4 of the SMP

DOE will notify the HWBM in the integrated SE report referenced in Section 9.1.2, within 120 days after completion of deactivation of any facility with any SWMUs or AOCs discovered during the deactivation process. The integrated SE report will include, at a minimum, the location of the newly discovered SWMUs or AOCs and all available information pertaining to the nature of the release (e.g., media affected, hazardous constituents released, magnitude of release). If the HWBM determines that further investigations are required, then the permit will be modified.

9.2 RCRA FACILITY INVESTIGATION (RFI)

DOE will prepare and submit RFI work plans to the HWBM. For the investigation, units have been prioritized and assembled into operable units. The RFI work plan(s) will be developed to meet the requirements of the HWMFP.

In many instances, operable units contain both SWMUs/AOCs requiring an RFI and SWMUs/AOCs already being addressed under the FFA.

The RFI work plan(s) will meet all requirements, as applicable. The work plan(s) will include schedules of implementation and completion of specific actions necessary to determine the nature and extent of releases and the potential pathways of contaminant releases to the air, land, surface water, and groundwater. DOE will provide sufficient justification and/or documentation that a release is not probable if a unit or a media/pathway associated with a unit (groundwater, surface water, soil, subsurface gas, or air) is not included in the RFI work plan(s). Such deletions of a unit, media or pathway from the RFI(s) are subject to the approval of the HWBM. DOE will provide sufficient written justification for any omissions or deviations from the minimum requirements. Such omissions or deviations are subject to the approval of the HWBM. In addition, the scope of the RFI work plan(s) will include all investigations necessary to ensure compliance.

9.3 INTERIM MEASURES/REMOVAL ACTION

Upon notification by the HWBM, DOE will prepare and submit an interim measures (IM)/removal action (RA) work plan for any SWMU or AOC that the HWBM determines poses a current or potential threat to human health or the environment. The IM/RA is necessary in order to minimize or prevent the further migration of contaminants and limit human and environmental exposure to contaminants while long-term corrective action remedies are evaluated and, if necessary, implemented. The IM/RA work plan will be submitted within 90 calendar days of such notification. Such interim measures may be conducted concurrently with investigations required under the terms of this permit. The IM/RA work plan will ensure that the interim measures are designed to mitigate any current or potential threat(s) to human health or the environment and is consistent with and integrated into any long-term solution at the facility. The IM/RA work plan will include the interim measures objectives, procedures for implementation (including any designs, plans, or specifications), and schedules for implementation. DOE will notify the HWBM as soon as possible of any planned changes, reductions, or additions to the IM/RA work plan.

9.4 CORRECTIVE MEASURES STUDY/FEASIBILITY STUDY

DOE will submit a CMS/FS for those units requiring a CMS/FS within 180 calendar days of notification by the HWBM that a CMS/FS is required. The CMS/FS will meet all requirements, as applicable. The CMS/FS will include schedules of implementation and completion of specific actions necessary to complete the study. DOE will provide sufficient justification and/or documentation for any unit deleted from the CMS/FS. Such deletion of a unit is subject to the approval of the HWBM. DOE will provide sufficient written justification for any omissions or deviations from the minimum requirements. Such omissions or deviations are subject to the approval of the HWBM.

9.5 REMEDY APPROVAL AND PERMIT MODIFICATION

A remedy will be selected from the remedial alternatives evaluated in the CMS/FS. It will be based at a minimum on protection of human health and the environment, as per specific site conditions, existing regulations, and guidance. The selected remedy may include any interim measures implemented to date.

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APPENDIX EI

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APPENDIX E2
WELL CONSTRUCTION DIAGRAMS

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WELL CONSTRUCTION DIAGRAMS AND BORING LOGS

The ground elevation on some boring logs is higher than the ground elevation on the corresponding well construction diagrams. This is due to the fact that a gravel platform was utilized on some boring/well locations to allow operation of the drilling rig in the sloped toe of C-404 closure cap. Boring depths were measured relative to the top of the gravel platform. The top of ground subsequent to removal of the gravel platform is the ground zero elevation indicated on the well construction diagrams. One boring log is included for multiple cluster wells installed in close proximity.

The elevations of C-404 monitoring wells (MWs) are resurveyed, as needed, to ensure groundwater flow and direction calculations are accurate. The results of the resurveys are kept on site and supersede the elevations in the well construction diagrams.

The following well construction diagrams and maps document the materials used in the MWs, the locations of the wells, and the depths and heights of well screens and casings. Depths are presented in ft; diameters are presented in inches. The elevations are relative to mean sea level.

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APPENDIX E3
MONITORING WELL REQUIREMENTS

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1. GROUNDWATER SAMPLING

1.1 SAMPLE CHAIN-OF-CUSTODY

Initiation and Completion of Chain-of-Custody Form

Chain-of-custody is required for analytical samples to provide traceability of possession from initial sample collection through sample transfer and/or final disposition. The field sampler is responsible for the proper handling and custody of the samples collected until they are properly and formally transferred to another person or the laboratory. To simplify the chain-of-custody record, as few people as possible should handle samples.

Chain-of-custody procedures are **not** required for transfer of samples between field personnel or between lab personnel in same work group.

All entries on chain-of-custody forms shall be made using black indelible ink.

Chain-of-custody forms are generated from the Paducah Project Environmental Measurements System (Paducah PEMS). In the event Paducah PEMS is not accessible and sampling is required, a Paducah PEMS-equivalent chain-of-custody shall be used.

The following steps are performed to meet chain-of-custody requirements.

1. Generate the chain-of-custody record prior to sampling with the appropriate information to uniquely identify the sample.
2. Enter the following information (prior to sampling event, if possible):
 - Matrix of sample
 - Project number or name
 - Unique sample identification number
 - Sampling description and location
 - Type of sample collected (i.e., grab or composite)
 - Number of sample containers
 - Storage and preservation requirements
 - Parameters to be analyzed
 - Sample team member
 - Name of the laboratory
 - Any pertinent information in "Remarks" or "Comments" section
3. Complete the chain-of-custody information at the time of the sampling event by recording the following information at this time:
 - Date and time sampled (military time)
 - Volume of sample (if required for specific analysis and calculations)

NOTE: “Positive control” requires one or more of the following:

- Physical possession
 - Visual control/oversight
 - Tamper prevention
 - Secured storage (i.e., lock and key)
4. Maintain positive control of samples and forms from collection until transfer to another custodian.
 5. Apply custody seals, if applicable, to each container in a manner such that it can be visibly observed if tampering has occurred.
 6. Sign the form as “relinquished by” **AND** enter the date and time.
 7. Transfer the samples and the chain-of-custody forms to another custodian or to the laboratory.
 8. Sign the form as “received by” **AND** enter the date and time.
 9. Maintain positive control of samples and forms from collection until transfer to another custodian.

Initiation and Completion of Sample Labels

Sample labels are required for analytical samples to provide identification of samples collected.

All entries on sample labels shall be made using black indelible ink.

Sample labels are generated from Paducah PEMS. In the event Paducah PEMS is not accessible and sampling is required, a Paducah PEMS-equivalent sample label shall be used.

1. Prepare the sample labels prior to sampling with the appropriate information to uniquely identify sample.
2. Enter the following information (prior to sampling event, if possible):
 - Matrix of sample
 - Project number
 - Unique sample identification number
 - Sampling description
 - Location
 - Storage and preservation requirements
 - Sample team member
 - Name of the laboratory
3. Complete the label information at the time of the sampling event by recording the following information at this time:
 - Date and time sampled (military time)

1.2 TEMPERATURE CONTROL FOR SAMPLE STORAGE

Preperformance Activities

1. Refrigeration areas will be inspected on normal working days to assure temperature requirements are met.
2. Compliance will be assumed for non-working days if the days immediately preceding and following the non-working days are in compliance.

Documentation of the Temperature for Refrigerators with Automatic Temperature Recorders

1. Place the thermometer in water or glycerin in the refrigerator when the refrigerator is installed for sample storage.
2. Position the thermometer in an area representative of the overall temperature of the refrigerator.
3. Remove the recording disc on the refrigerator according to manufacturer's instructions.
4. Note the date and time the disc was removed on the sheet and initial it.
5. File the recording disc with the project records.
6. Note date, time, and initials on a fresh disc and insert it into the recorder according to the manufacturer's instructions.
7. In the event that the temperature leaves the $\leq 6^{\circ}\text{C}$ range, the temperature will be adjusted according to the manufacturer's instructions or the samples shall be moved to another refrigeration unit.

Documentation of the Temperature for Refrigerators without Automatic Temperature Records

1. Place a thermometer inside the refrigerator, position it in an area representative of the overall temperature of the refrigerator.
2. Verify proper temperature control per CP4-ES-0043, *Temperature Control for Sample Storage*, or most current version.

1.3 WATER LEVEL MEASUREMENTS

Preperformance Activities

1. Ensure the water level meter has been decontaminated per Section 3, Equipment Cleaning and Decontamination, prior to use.
2. Check water level verification date located on the side of the water level indicator.
3. To ensure water level measurement accuracy, a steel measuring tape will be used to check each electrical measuring device (depth indicators). This test will be performed at least once per year. The steel tape end is placed at the end of the water-sensitive electrode. Compare 100 ft of steel tape alongside 100 ft of depth indicator cable. Measurements should be within ± 0.01 ft. Remove depth indicators from field service that do not meet designated tolerance. Replace old cable with new cable and repeat for accuracy.

4. The reference mark should be tied in with a vertical control point and only this reference mark should be used.
5. **IF** no reference mark is present, **THEN** establish a reference by filing a “V” notch on the north side of the well casing, being careful that cuttings do not fall into the well, **AND** note the use of this location **AND** notify the supervisor.

Taking Measurements with Electronic Water Level Indicator

Water level measurements are routinely collected by the same environmental monitoring specialist using the same equipment in groups of wells that are close in proximity.

Electric tapes are normally coiled on a hand-cranked reel unit containing batteries and a device which signals when the circuit is closed as the probe contacts water. Electrical methods are preferred over other methods, such as steel measuring tape.

An electric tape may not respond to an oil surface, causing the fluid level determined to be different from one determined using a steel tape. The difference between the two measurements depends on the amount of oil floating on the water.

Independent electric tape measurements of static water levels using the tape should agree to within ± 0.01 ft for depths of less than about 200 ft. At greater depths, independent measurements may not be as accurate. For a depth of about 500 ft, the maximum difference of independent measurement using the same tape should be within ± 0.1 ft. A steel measuring tape will be used annually (at least) to check the accuracy of the electrical measuring device.

1. **IF** the water level measurement can be made without the complicating situations described in Steps 2, 3, and 4, **THEN** proceed with Step 5. **IF NOT, THEN** proceed with Steps 2, 3, or 4, as applicable.
2. **IF** water is dripping rapidly or flowing into a well, which makes an accurate reading difficult or impossible to obtain, **THEN** add a rubber or plastic boot above or around the water level indicator probe **AND** ensure that the boot is positioned so that air entrapped by the boot will not prevent the probe from making contact with the water at the water table.
3. **IF** a well has a layer of oil floating on the water, **THEN** use an oil-water interface probe to permit detection of the surface of the uppermost fluid as well as the water level.
4. **IF** a well contains immiscible contaminants, **THEN** use special procedures for the measurement of fluid levels.
5. Check the response of the audible or visible alarm by dipping the probe in potable water to ensure that the signaling device responds to probe submergence **OR** check the alarm using a test button/switch on instruments equipped with this feature.
6. Slowly lower the electronic water level indicator probe into the well.
7. Stop lowering the probe when the alarm sounds and/or the red light illuminates.
8. Pull up on the probe until the alarm no longer sounds.
9. Stop at the instant the alarm sounds and/or the light comes on and stays on.

10. Grasp the cord with thumb and forefinger where it touches the reference mark.
11. Repeat Steps 6 through 10 until a consistent reading is obtained for at least three consecutive water level measurements. If three consistent readings cannot be obtained, then contact the field operations manager for further instruction.
12. Record the measurement from the electric tape to the nearest 0.01 ft as the depth of water level in that well.
13. Remove the measuring tape from the well.
14. Close **AND** lock the well cap.

Postperformance Activities

1. Decontaminate the electric tape between each water level event (i.e., between each well) according to Section 3, Equipment Cleaning and Decontamination.
2. Contact radiation protection to monitor all equipment for radioactivity that has been used in a contamination control zone before being released from the Paducah Site. This monitoring includes any equipment leaving the Paducah Site for maintenance or repairs. Radiation screening will be maintained by continuous field screening and through periodic wipe sampling. Additional details are provided in the site-specific health and safety plan.

1.4 GROUNDWATER SAMPLING

Preperformance Activities

1. Calibrate water quality meters for water quality parameters.
2. Prepare the necessary sample containers.
3. Prepare field quality control samples.

Methods of Sampling

The following methods of sampling are described in this section.

- Groundwater Sampling Using Bladder Pumps
- Groundwater Sampling of Electric Well Pumps (Residential Wells)
- Groundwater Sampling Using a Bailer

For operation of the pump cycle control box, refer to the operator manual as necessary.

The discharge of the water quality meter should be positioned so it drains into a beaker or an equivalent container.

Stabilization criteria are as follows: water quality parameters have stabilized within approximately 10% over the last two consecutive measurements that are three minutes apart. (Turbidity is considered stabilized if subsequent measurements agree within 10% or the measurements are less than 10 NTUs.) Collection of samples will begin only after stabilization of water quality parameters is obtained.

Groundwater Sampling Using Bladder Pumps

1. Upon arriving at the sampling site, visually inspect well before any sampling activities begin.
2. Note any damage or unusual circumstances (evidence of tampering, vandalism, etc.) on the MW Groundwater Data Form, and contact the project manager if damage or unusual circumstances are present.
3. Open the well cap or lid and note the condition of the casing and fitting.
4. Don a clean pair of latex or nitrile type gloves, retrieve the discharge tubing from the well, and connect to the wellhead.
5. If tubing comes in contact with the ground, it must be decontaminated before being put back into the well.
6. Connect discharge tubing from the wellhead to the sampling board.
7. Place insulation on the discharge tube.
8. Determine the static water level using a water level meter according to Section 1.3.
9. Record this information on the MW Groundwater Data Form.
10. Set up the pump cycle control box.
11. Connect the pump cycle control box air hose to well head air fittings.
12. Uncap the nitrogen cylinder tank or prepare the air compressor and attach the regulator; attach the air hose to the control box.
13. Position the water quality meter on the portable sampling board.
14. When micropurging, purge only the volume of water in the pump and discharge line, which is 450 mL for the pump and:
 - 40 mL for every foot of 1/2 inch discharge line, or
 - 22 mL for every foot of 3/8 inch discharge line
15. When sampling with a packer, calculate the purge volume using the following formula:

Well depth minus packer depth = the zone of isolation (sampling zone)
Zone of isolation times casing factor = purge volume
Purge volume times 3 = total purge volume
Casing factor for a 2-inch well = 0.163
Casing factor for a 4-inch well = 0.653
16. Inflate the packer, according to the operator's manual, for the three well volumes method of purging.
17. When sampling without a packer (not micropurge), calculate the purge volume using the following formula:

Well depth minus static water level = the standing water column
Standing water column times casing factor = purge volume
Purge volume times 3 = total purge volume
Casing factor for a 2" well = 0.163
Casing factor for a 4" well = 0.653

18. Record the purge volume on the MW Groundwater Data Form.
19. Open the regulator on the air compressor or nitrogen tank, turn on the pump cycle control box, and adjust the flow rate to the desired pressure output, which is 1/2 psi per foot of lift.
20. Open the valve on the sampling board so the flow is directed to the sample port.
21. Adjust the flow meter to a flow rate of 300 mL/min or less and allow 300 mL or more to flow through the sampling port.
22. Allow the purge water to run through the water quality meter flow-through cell and check for any trapped air pockets.
23. Record all necessary data on the MW Groundwater Data Form.
24. Allow the water quality meter readings to stabilize.
25. Record the initial water quality parameter readings on the MW Groundwater Data Form when the purge volume has been reached.
26. Including the initial reading, record a minimum of three measurements in three-minute intervals until stability has been achieved.
27. Before collecting the samples, label sample bottles with date, time, and sampler's initials.
28. Maintain the flow rate at 300 mL/min or less during sampling except for sampling of volatile organics which should be at a flow of 100 mL/min or less.
29. Collect samples for the required analytes in the appropriate order as specified in SW-846, *Test Methods for Evaluating Solid Waste*.
30. Collect all field quality control samples.
31. **IF** a well is purged to dryness, **THEN** return within 24 hours of initial sampling time **AND** collect one round of water quality parameters and then collect the required sample parameters. If a well goes dry during a sampling event, abandon remaining parameters and consider the well dry.

Postperformance Activities

1. Turn off all sampling equipment and water quality meters.
2. Complete the chain-of-custody forms.
3. Document the sampling events by recording the information on the MW Groundwater Data Form.
4. As generated, place all samples requiring a temperature of 4°C in a cooler with blue ice/ice.

5. Submit samples and the appropriate chain-of-custody forms to the laboratory.
6. Drain all purge water from the water quality meter, sampling board, and discharge tubing into purge water collection container. Record the amount on the MW Groundwater Data Form.
7. Decontamination of the sampling board requires 300 mL or more of analyte-free water.
8. Thoroughly decontaminate the sampling board and water level indicator **AND** record the decontamination event and time on the MW Groundwater Data Form.
9. Disconnect the pump cycle controller from the well head, replace the discharge tubing into the well, and lock the well cap.
10. Record the total amount of purge water for disposal.
11. Disposition purge water and personal protective equipment appropriately.

Order of Collection for Groundwater Samples

The preferred collection order for some of the more common groundwater analytes is as follows:

1. Volatile organics [volatile organic analytes (VOAs) or volatile organic compounds (VOCs)];
2. Dissolved gases and total organic carbon;
3. Metals and cyanide;
4. Semivolatile organics;
5. Major water quality cations and anions; and
6. Radionuclides.

The above information was modified from an updated draft version of the Technical Enforcement Guidance Document, dated November 1992. SW-846, *Test Methods for Evaluating Solid Waste*, Chapter 11, Section 11.2 refers to one preeminent Resource Conservation and Recovery Act document on groundwater monitoring activities, the *Technical Enforcement Guidance Document*, Environmental Protection Agency/530-R-93-001, finalized in September 1986, available from the Environmental Protection Agency Office of Solid Waste.

If samples are being collected at a location where it is anticipated that enough sample volume is not available, then the order of collection will be VOAs/VOCs, total metals, and then radionuclides, due to those parameters being contaminants of concern at PGDP.

1.5 FIELD QUALITY CONTROL

Follow these general steps when collecting field quality control samples.

Trip blanks and field blanks are prepared in the field laboratory or sample staging area by adding the appropriate preservative (unless pre-preserved) to the appropriate bottle and filling the bottle with organic/analyte-free water. Equipment blanks are, likewise, prepared in the field laboratory or sample staging area using organic/analyte-free water. Field duplicates and filter blanks are prepared by adding the appropriate preservative (unless pre-preserved) to the appropriate bottle, and, with the exception of duplicates, filling the bottle with analyte-free water in the field after the sample is collected.

Trip Blanks

1. Trip blanks are used to determine if contamination by VOCs has occurred during sample shipping and handling.
2. Unless specified otherwise in the site-specific sampling plan, aqueous trip blanks are used for water samples.
3. For routine monitoring activities where contamination has been proven to not be a concern, trip blanks should be collected at the frequency specified in the approved sampling and analysis plan.
4. **IF** VOCs are being analyzed, **THEN** obtain a trip blank from the field laboratory or sample staging area.
5. Place one trip blank (2-3 pre-prepared sample vials of organic-free water) in a cooler that will contain VOC samples.
6. Transport to the sampling site.
7. Request analysis for VOCs only for the trip blank. Collect other VOA samples as requested by the project and place them in the same cooler as the trip blank.
8. Analyze the trip blank for VOCs.

Field Duplicates

Field duplicates consist of two aliquots of a sample (i.e., the original sample and its duplicate) that are collected at the same time, using the same procedures, the same type of equipment, and in the same types of sample containers as the original samples. Duplicate samples also are preserved in the same manner and submitted for the same analyses as the original samples. Field duplicates are used to determine the total variability (i.e., imprecision) associated with the sampling and analysis effort.

Field duplicates should be collected at a minimum rate of one for each 20 samples.

1. Determine the number of duplicates to be obtained.
2. Collect samples following the appropriate procedure.
3. Collect field duplicates and analyze them for the same parameters as other original samples being collected.

Split Samples

Split samples, also known as field replicate samples, consist of a sample which has been aliquoted into two containers from a single container or sampling mixing container. The sample and its split sample are shipped to different laboratories, such as a field screening laboratory and a fixed-base laboratory. The analytical result generated by the fixed-base laboratory is compared to the result generated by the field screening laboratory to assess the performance of the screening laboratory. Split samples also may be shipped to two fixed-base laboratories, such as a project-support laboratory and a regulatory agency reference laboratory. The result generated by the reference laboratory is used to assess the performance of the project-support laboratory. This comparison can also be used to assess inter-laboratory precision.

The frequency of split samples varies with project objectives.

A split sample is not a composite sample unless the original sample is a composite.

Care should be taken to ensure that the same depth is used when preparing split samples.

1. Determine the number of split samples to be obtained.
2. Collect split samples following the appropriate procedure.
3. Collect split samples and analyze them for the same parameters as other samples being collected unless contaminants of concern have been identified.

Field Blanks

Field blanks are prepared in the field to evaluate the potential for contamination of a sample by ambient site contaminants from a source not associated with the sample collected (e.g., air-borne fugitive dust or organic vapors). Field blanks should be collected only in dusty air-borne environments and/or from areas where VOC contamination is present in the atmosphere and originating from a source other than the source being sampled. Field blanks should be collected at a minimum rate of one for each 20 samples collected.

1. **IF** field blanks are required, **THEN** transport organic/analyte-free water to the site **OR** prepare a bottle containing organic/analyte-free water and transport to the site to be opened during the sampling event.
2. Open the container in the field and transfer the water into a sample bottle.
3. Analyze the sample for the same parameters associated with the sampling event.

Equipment Blanks

Equipment blanks are used to determine if contaminants have been introduced by contact of the sample medium with contaminated sampling equipment.

Equipment blanks provide a QC check on the equipment decontamination procedure. Equipment blanks are required only when nondisposable or nondedicated sampling equipment is being used.

Equipment blanks should be collected at a minimum rate of one for each 20 samples collected.

1. **IF** equipment blanks are required, **THEN** obtain organic/analyte-free water to be used.
2. Pass the organic/analyte-free water over the decontaminated sampling equipment **AND** catch the water in a sample bottle, **OR** collect the water in a bowl that was decontaminated per the same procedure as the equipment and transfer to a sample bottle.
3. Analyze the sample for the same parameters as the sample collected with the equipment.

Definitions

Duplicate Samples—Two aliquots of a sample (i.e., the original sample and its duplicate) that are collected at the same time, using the same procedures, the same type of equipment, and in the same types of sample containers as the original samples. Duplicate samples also are preserved in the same manner and submitted for the same analyses as the original samples. Field duplicates are used to determine the total variability (i.e., imprecision) associated with the sampling and analysis effort.

Split Samples—Two or more separate samples taken from the same source during the same sampling event and sent to two or more different laboratories for analysis, usually a field screening laboratory and a fixed-base laboratory. Data generated by split samples can be used to judge the field screening laboratory's performance and to assess inter-laboratory precision.

Equipment Blank—A sample of analyte-free 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 also may be used as a reagent blank, as needed. Equipment blanks are required only when nondisposable or nondedicated equipment is being used.

Field Blank—A sample that serves as a check on ambient environmental contamination at the sample site. Organic/analyte-free 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 a field laboratory or sample staging area, transported to the field, and then opened. Field blanks may be used as a reagent blank, as needed.

Trip Blank—Sample used to detect contamination by VOCs during sample shipping and handling. Trip blanks are 40 mL VOA vials of analyte-free 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.

1.6 SAMPLE TRACKING AND HANDLING GUIDANCE

Sample containers are chosen, preserved, and collected as specified in Appendix E3, Table 1.

Appendix E3, Table 1. Sample Container Information

Parameter	Matrix	Holding Time From Collection	Sample Container ^a	Preservation
Volatile Organics	Water	14 days	Three 40-mL glass vials with Teflon-lined septum	HCl to pH < 2 Cool to ≤ 6°C zero headspace
Metals (other than mercury) ^b	Water	180 days	1 liter polyethylene with polyethylene closure	HNO ₃ to pH < 2, Cool to ≤ 6°C
Mercury ^b	Water	28 days	1 liter polyethylene with polyethylene closure	HNO ₃ to pH < 2, Cool to ≤ 6°C
Uranium Isotopes	Water	180 days	2 ea 1 liter polyethylene with polyethylene closure	HNO ₃ to pH < 2, Cool to ≤ 6°C
Tc-99	Water	180 days	1 liter polyethylene with polyethylene closure	HNO ₃ to pH < 2, Cool to ≤ 6°C

^a Additional volume may be needed for matrix spike/matrix spike duplicate samples. Laboratory will notify project on quantity needed for MS/MSD per batch. As a result, different containers may be used, as appropriate.

^b Samples for these parameters can occupy the same sample containers.

2. WELL ABANDONMENT

Well plugging and abandonment is carried out in wells for which there is no further use, on wells that are damaged or otherwise unusable, or on wells that must be destroyed because of missing well construction or well inspection and maintenance reports.

The criteria used to determine if a well or piezometer is a candidate for abandonment are as follows:

- There are inadequate construction or lithologic data available for the well or piezometer.
- The well or piezometer is constructed to standards that are not currently acceptable for its intended use.
- The integrity of the well or piezometer has deteriorated to a point that is no longer suitable for its intended purpose.
- The well or piezometer is suspected of yielding anomalous data indicative of a poor completion or development (i.e., abnormally high pH, unusual fluctuation in water levels, etc.).
- The well was never developed successfully and serves no useful purpose.

2.1 PROCEDURES FOR WELL ABANDONMENT

All pumps and other equipment shall be removed from inside and around the well or piezometer prior to commencing drilling operations. The well casing shall be removed by using an overshot milling tool or other suitable bit of sufficient diameter to fit over the existing well casing and its couplings. Drilling shall continue to the bottom of existing well casing and screen, or to a sufficient depth, which allows extraction of the full length of casing and screen

After reaming operations have been completed and the well casing and screen have been removed, the hole should be filled. It is permissible to fill the RGA interval of the hole with sand. The remaining hole should be grouted using a tremie pipe. The tremie pipe shall be lowered to the bottom of the remaining hole and raised slowly as the high-solids bentonite grout is introduced. The tremie pipe shall be kept full continuously from start to finish of the grouting procedure.

Should loss of grout occur, holes should be refilled until they remain full. Twenty-four hours after grouting, the subcontractor shall place any additional grout necessary to bring the grout to within one foot of existing grade.

Deviation from these procedures may be necessary where field conditions dictate the use of an alternate or more effective method of abandonment. All deviations from this procedure shall be approved. Documentation shall include rationale for deviation for the above procedure.

The technical subcontractor is responsible for generating abandonment documentation. Field activities will be documented in the field logbook. A Record of Plugging and Abandonment Form will be completed. At the conclusion of field activities, a written report will be prepared summarizing those activities, providing a copy of the completed Record of Plugging and Abandonment Form, and containing before and after "as-built" well construction diagrams.

2.2 BENTONITE

The bentonite shall be free flowing, high swelling, sodium-based, Wyoming-type bentonite. Both powdered and pellet forms may be required.

2.3 BENTONITE SLURRY

Bentonite slurry shall be a mixture of powdered bentonite and water. The slurry shall be mixed in a grout mixer with paddle vanes and/or a recirculating pump such that lumps are minimized. The bentonite slurry will contain a minimum of 30% solids.

3. EQUIPMENT CLEANING AND DECONTAMINATION

The following sections outline steps associated with the cleaning and decontamination of equipment used in sampling groundwater monitoring wells.

If field cleaning for immediate reuse, the equipment does not have to be air-dried as described in the following procedures.

Well Sounders, Tapes, and Depth Indicators

1. Wash with soap and tap water.
2. If possible, rinse with tap water.
3. Rinse with analyte-free water.
4. Allow to air dry overnight.
5. If sampling equipment is used in a Radiological Area, Contamination Area, Soil Contamination Area, or Radiological Buffer Area, then contact a radiological controls technician to survey the equipment.
6. Seal equipment in plastic, and date.

Ice Chest and Shipping Containers

If the container is severely contaminated, it shall be cleaned as thoroughly as possible, rendered unusable, and properly disposed.

1. Wash interior and exterior with soap and water.
2. Rinse with clean tap water.
3. Air dry before storage.

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APPENDIX E4

SOLID WASTE MANAGEMENT UNIT/AREA OF CONCERN SUMMARY

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Table E4.1. Current Solid Waste Management Unit/Area of Concern

<u>SWMU/AOC Number</u>	<u>Description</u>
1	C-747-C Oil Land Farm
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
8	C-746-K Inactive Sanitary Landfill
9	C-746-S Residential Landfill
10	C-746-T Inert Landfill
11	C-400 TCE Leak Site
12	C-747-A UF ₄ Drum Yard
13	C-746-P Clean Scrap Yard
14	C-746-E Contaminated Scrap Yard
15	C-746-C Scrap Yard
16	C-746-D Classified Scrap Yard
17	C-616-E Sludge Lagoon [Active]
18	C-616-F Full-Flow Lagoon [Active]
19	C-410-B HF Neutralization Lagoon
20	C-410-E HF Emergency Holding Pond slab and underlying soils
21	C-611-W Sludge Lagoon [Active]
22	C-611-Y Overflow Lagoon (includes KPDES 006) [Active]
23	C-611-V Lagoon (includes KPDES 005) [Active]
24	C-750-D UST
25	C-750 1,000-gal Waste Oil Tank (UST)
26	C-400 to C-404 Underground Transfer Line
27	C-722 Acid Neutralization Tank [Active]
28	C-712 Laboratory Equalization Tank slab and underlying soils
29	C-746-B TRU Storage Area
30	C-747-A Burn Area
31	C-720 Compressor Pit Water Storage Tank slab and underlying soils
32	C-728 Clean Waste Oil Tanks slab and underlying soils [Active]
33	C-728 Motor Cleaning Facility slab and underlying soils [Active]
34	C-746-M PCB Waste Storage Area
35	C-337 PCB Waste Storage Area
36	C-337 PCB Waste Staging Area
37	C-333 PCB Waste Staging Area
38	C-615 Sewage Treatment Plant slab and underlying soils [Active]
39	C-746-B PCB Waste Storage Area
40	C-403 Neutralization Tank slab and underlying soils
41	C-410-C Neutralization Tank slab and underlying soils
42	C-616 Chromate Reduction Facility slab and underlying soils [Active]
43	C-746-B Waste Chemical Storage Area
44	C-733 Hazardous Waste Storage Area
45	C-746-R Waste Solvent Storage Area
46	C-409 Hazardous Waste Pilot Plant
46A	C-746-Q Hazardous and Low-Level Mixed Waste Storage Facility
47	C-400 Technetium Storage Tank Area
48	Gold Dissolver Storage Tank (DMSA C400-03)
49	C-400-B Waste Solution Storage Tank
50	C-400-C Nickel Stripper Evaporation Tank
51	C-400-D Lime Precipitation Tank
52	C-400 Waste Decontamination Solution Storage Tanks
53	C-400 NaOH Precipitation Unit
54	C-400 Degreaser Solvent Recovery Unit
55	C-405 Incinerator building slab and underlying soils

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

<u>SWMU/AOC Number</u>	<u>Description</u>
56	C-540-A PCB Waste Staging Area
57	C-541-A PCB Waste Staging Area
58	North-South Diversion Ditch (NSDD) (Outside) (includes KPDES 003)
59	NSDD (Inside)
60	C-375-E2 Effluent Ditch (KPDES 002) [Active]
61	C-375-E5 Effluent Ditch (KPDES 013) [Active]
62	C-375-S6 SW Ditch (KPDES 009) [Active]
63	C-375-W7 Oil Skimmer Ditch (KPDES 008 and KPDES 004) [Active]
64	Little Bayou Creek
65	Bayou Creek
66	C-375-E3 Effluent Ditch (KPDES 010) [Active]
67	C-375-E4 Effluent Ditch (C-340 Ditch) (KPDES 011) [Active]
68	C-375-W8 Effluent Ditch (KPDES 015) [Active]
69	C-375-W9 Effluent Ditch (KPDES 001) [Active]
70	C-333-A Vaporizer slab and underlying soils [Active]
71	C-337-A Vaporizer slab and underlying soils [Active]
72	C-200 Underground Gasoline Tanks
73	C-710 Underground Gasoline Tanks
74	C-340 PCB Transformer Spill Site
75	C-633 PCB Spill Site
76	C-632-B Sulfuric Acid Storage Tank
77	C-634-B Sulfuric Acid Storage Tank
78	C-420 PCB Spill Site
79	C-611 PCB Spill Site
80	C-540-A PCB Spill Site
81	C-541-A PCB Spill Site
82	C-531 Switchyard slab and underlying soils [Active]
83	C-533 Switchyard slab and underlying soils [Active]
84	C-535 Switchyard slab and underlying soils [Active]
85	C-537 Switchyard slab and underlying soils [Active]
86	C-631 Pumphouse and Cooling Tower Slabs and Associated Soils
87	C-633 Pumphouse and Cooling Tower Slabs and Associated Soils
88	C-635 Pumphouse and Cooling Tower Slabs and Associated Soils
89	C-637 Pumphouse and Cooling Tower slab and underlying soils
90	C-728 Petroleum Naphtha Pipe
91	UFG Cylinder Drop Test Area
92	Fill Area for Dirt from the C-420 PCB Spill Site
93	Concrete Disposal Area East of Plant Security Area
94	KOW Trickling Filter and Leach Field
95	KOW Burn Area
96	C-333 Cooling Tower Scrap Wood Pile
97	C-601 Diesel Spill
98	C-400 Basement Sump
99A	C-745 Kellogg Building Site—Cylinder Yard
99B	C-745 Kellogg Building Site—Septic Tank/Leach Field
100	Fire Training Area
101	C-340 Hydraulic System
102A	Plant Storm Sewer—between the south side of the C-400 Building and Outfall 008
102B	Plant Storm Sewer associated with C-333-A, C-337-A, C-340, C-535, and C-537
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)
110	Concrete Rubble Pile (8)
111	Concrete Rubble Pile (9)

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

<u>SWMU/AOC Number</u>	<u>Description</u>
112	Concrete Rubble Pile (10)
113	Concrete Rubble Pile (11)
114	Concrete Rubble Pile (12)
115	Concrete Rubble Pile (13)
116	Concrete Rubble Pile (14)
117	Concrete Rubble Pile (15)
118	Concrete Rubble Pile (16)
119	Concrete Rubble Pile (17)
120	Concrete Rubble Pile (18)
121	Concrete Rubble Pile (19)
122	Concrete Rubble Pile (20)
123	Concrete Rubble Pile (21)
124	Concrete Rubble Pile (22)
125	Concrete Rubble Pile (23)
126	Concrete Rubble Pile (24)
127	Concrete Rubble Pile (25)
128	Concrete Rubble Pile (26)
129	Concrete Rubble Pile (27)
130	C-611 550-gal Gasoline UST
131	C-611 50-gal Gasoline UST
132	C-611 2,000-gal Oil UST
133	C-611 (unknown size) Grouted UST
134	C-611 1,000-gal Diesel/Gasoline Tank
135	C-333 PCB Soil Contamination (North Side)
136	C-740 TCE Spill Site
137	C-746-A Inactive PCB Transformer Sump Area
138	C-100 Southside Berms
139	C-746-A1 UST
140	C-746-A2 UST
141	C-720 Inactive TCE Degreaser
142	C-750-A 10,000-gal Gasoline Tank (UST)
143	C-750-B 10,000-gal Diesel Tank (UST)
144	C-746-A Hazardous and Mixed Waste Storage Facility
145	Residential/Inert Landfill Borrow Area (P-Landfill)
146	Concrete Rubble Pile (40)
147	Concrete Rubble Pile (41)
148	Concrete Rubble Pile (42)
149	Concrete Rubble Pile (43)
150	Concrete Rubble Pile (44)
151	Concrete Rubble Pile (45)
152	Concrete Rubble Pile (46)
153	C-331 PCB Soil Contamination (West)
154	C-331 PCB Soil Contamination (Southeast)
155	C-333 PCB Soil Contamination (West)
156	C-310 PCB Soil Contamination (West Side)
157	KOW Toluene Spill Area
158	Chilled-Water System Leak Site
159	C-746-H3 Storage Pad slab and underlying soils [Active]
160	C-745 Cylinder Yard Spoils (PCB Soils)
161	C-743-T-01 Trailer Site (Soil Backfill) [Active]
162	C-617-A Sanitary Water Line (Soil Backfill) [Active]
163	C-304 Building/HVAC Piping System (Soil Backfill)
164	KPDES Outfall Ditch 017 Flume—Soil Backfill
165	C-616-L Pipeline & Vault Soil Contamination [Active]
166	C-100 Trailer Complex Soil Contamination (East Side) [Active]
167	C-720 White Room Sump slab and underlying soils

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

<u>SWMU/AOC Number</u>	<u>Description</u>
168	KPDES Outfall Ditch 012 [Active]
169	C-410-E HF Vent Surge Protection Tank
170	C-729 Acetylene Building Drain Pits
171	C-617-B Lagoon [Active]
172	C-726 Sandblasting Facility slab and underlying soils [Active]
173	C-746-A Trash Sorting Facility
174	C-745-K Low-Level Storage Area
175	Concrete Rubble Pile (28)
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 [Active]
180	Outdoor Firing Range (WKWMA) [Active]
181	Outdoor Firing Range (PGDP) [Active]
182	Western Portion of Yellow Water Line
183	McGraw UST
184	Concrete Rubble Pile (29)
185	C-611-4 Horseshoe Lagoon (includes KPDES 014)
186	C-751 Fuel Facility
187	C-611 Septic System
188	C-633 Septic System
189	C-637 Septic System
190	C-337A Sewage Treatment Aeration Tank
191	C-333-A Sewage Treatment Aeration Tank
192	C-710 Acid Interceptor Pit slab and underlying soils
193	McGraw Construction Facilities (South Side Cylinder Yard Area, East of Hobbs Road)
194	McGraw Construction Facilities (South Side Leach Field Area)
195	Curlee Road Contaminated Soil Mounds
196	C-746-A Septic System
197	Concrete Rubble Pile (30)
198	C-410-D Area Soil Contamination slab and underlying soils
199	Big Bayou Creek Monitoring Station
200	Soil Contamination South of TSCA Waste Storage Facility
201	Northwest Groundwater Plume
202	Northeast Groundwater Plume
203	C-400 Discard Waste System slab and underlying soils
204	Dykes Road Historical Staging Area
205	Eastern Portion of Yellow Water Line
206	C-753-A Toxic Substances Control Act Waste Storage Building
207	C-752-A ER Waste Storage Building
208	C-746-U Solid Waste Contained Landfill
209	C-720 Compressor Shop Pit Sump slab and underlying soils
210	Southwest Groundwater Plume
211A	C-720 TCE Spill Site Northeast
211B	C-720 TCE Spill Site Southeast
212	C-745-A Radiological Contamination Area
213	OS-02
214	OS-03
215	OS-04
216	OS-05
217	OS-06
218	OS-07 slab and underlying soils
219	OS-08
220	OS-09 slab and underlying soils
221	OS-10
222	OS-11

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

<u>SWMU/AOC Number</u>	<u>Description</u>
223	OS-12 slab and underlying soils
224	OS-13
225A	OS-14
225B	Contaminated Soil Area Near C-533-1 DMSA OS-14
226	OS-15
227	OS-16
228	OS-17
229	OS-18
230	C-310-A-01
231	C-310-02
232	C-310-03
233	C-310-04
234	C-310-05
235	C-331-01
236	C-331-02
237	C-331-03
238	C-331-04
239	C-331-05
240	C-331-06
241	C-331-07
242	C-331-08
243	C-331-09
244	C-331-10
245	C-331-11
246	C-331-12
247	C-331-13
248	C-331-14
249	C-331-15
250	C-331-16
251	C-331-19
252	C-331-20
253	C-331-22
254	C-331-23
255	C-331-24
256	C-333-01
257	C-333-02
258	C-333-03
259	C-333-04
260	C-333-05
261	C-333-06
262	C-333-07
263	C-333-08
264	C-333-09
265	C-333-10
266	C-333-11
267	C-333-12
268	C-333-13
269	C-333-14
270	C-333-15
271	C-333-16 (West)
272	C-333-16 (East)
273	C-333-17
274	C-333-18
275	C-333-19
276	C-333-20
277	C-333-21

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
278	C-333-22
279	C-333-23
280	C-333-24
281	C-333-25
282	C-333-26
283	C-333-27
284	C-333-28
285	C-333-29
286	C-333-30
287	C-333-31
288	C-333-34
289	C-333-35
290	C-333-37
291	C-333-38
292	C-333-39
293	C-333-40
294	C-333-41
295	C-333-42
296	C-333-43
297	C-335-01
298	C-335-02
299	C-335-03
300	C-335-04
301	C-335-05
302	C-335-06
303	C-335-07
304	C-335-08
305	C-335-09
306	C-335-11
307	C-335-12
308	C-337-01
309	C-337-02
310	C-337-03
311	C-337-04
312	C-337-05
313	C-337-06
314	C-337-07
315	C-337-08
316	C-337-09
317	C-337-10
318	C-337-11
319	C-337-12
320	C-337-13
321	C-337-14
322	C-337-15
323	C-337-16
324	C-337-17
325	C-337-18
326	C-337-19
327	C-337-20
328	C-337-21
329	C-337-23
330	C-337-25
331	C-337-27
332	C-337-29
333	C-337-30

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
334	C-337-31
335	C-337-32
336	C-337-33
337	C-337-34
338	C-337-35
339	C-337-36
340	C-337-37
341	C-337-38
342	C-337-39
343	C-337-40
344	C-337-41
345	C-337-42
346	C-337-43
347	C-337-44
348	C-337-45
349	C-400-01
350	C-400-04
351	C-400-05
352	C-400-06
353	C-400-07
354	C-409-01
355	C-409-02
356	C-720-01
357	C-720-02
358	C-720-03
359	C-720-04
360	C-535
361	C-727-90 day
362	G-310-04
363	G-331-03
364	G-331-05
365	G-333-02
366	G-333-03
367	G-333-04
368	G-333-08
369	G-333-10
370	G-333-20
371	G-335-01
372	G-337-02
373	G-337-03
374	G-337-13
375	G-337-14
376	G-337-15
377	G-337-22
378	G-340-01
379	G-340-03
380	G-340-04
381	G-340-05
382	G-340-06
383	G-400-01
384	G-400-02
385	G-409-25
386	G-410-01
387	G-416-01
388	C-416 Decontamination Pad
389	G-533-01

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
390	G-535-02
391	G-537-01
392	G-540-A-01
393	G-540-A-1-02
394	G-541-A-01
395	G-600-01
396	G-611-U-01
397	G-612-01
398	G-612-02
399	G-612-A-01
400	G-635-01
401	G-710
402	G-710-04
403	G-710-20
404	G-710-24
405	G-720-22
406	G-743-T-17-01
407	G-743-T-17-02
408	G-745-B-01
410	G-746-G-01
411	G-746-G-1-01
412	G-746-G-2-01
413	G-746-G-3-01
414	G-746-F-01
415	G-746-S-01
416	G-746-X-01 (PCBs)
417	G-746-X-01 (Asbestos)
418	G-748-B-01
419	C-752-C Decontamination Facility
420	G-752-C-02
421	G-754-01
422	G-755-A-01, G-755-A-02, and G-755-A-03
423	G-755-C-01
424	G-755-T-07-01
425	G-755-T-08
426	G-755-T-2-3-01
427	G-755-T-3-1-01
428	G-755-T-3-2-01
429	S-310-04
430	S-331-02
431	S-333-12
432	S-335-09
433	S-337-11
434	S-340-01
435	S-409-100
436	S-409-20
437	S-409-40
438	S-409-60
439	S-409-80
440	S-410-05
441	S-540-A-2-01
442	S-612-01
443	S-709-01
444	S-709-02
445	S-710-05
446	S-710-06

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
447	S-710-09
448	S-710-16
449	S-710-18
450	S-710-32
451	S-710-41
452	S-710-44
453	S-710-46
454	S-743-T-17-01
455	S-755-T-16-01
456	S-755-T-16-02
457	S-755-T-16-03
458	S-755-T-2-3-01
459	S-755-T-3-1-01
460	S-755-T-3-2-01
461	S-755-T-3-2-02
462	S-755-T-3-2-03
463	C-746-A East End Smelter slab and underlying soils
464	C-746-A West End Smelter building slab and underlying soils
465	Yard Rubble Pile and Crushate Storage Area (G-Yard)
467	Concrete Cylinder Holders Storage Area on Western Kentucky Wildlife Management Area
468	Area Northwest of Outfall 015
469	C-745-J Yard
470	C-746-V Yard
471	Outside C-746-B South Storage Area
472	C-746-B Pad
473	C-746-B Pad, West
474	West of Vortec Site
475	C-745-G5-01 (Paint Enclosure)
476	Concrete Crusher
477	C-340 Metals Plant building slab and underlying soils
478	C-410/420 Feed Plant building slab and underlying soils
479	C-204 Disintegrator Building
480	C-402 Lime House building slab and underlying soils
481	C-410-A Hydrogen Holder
482	C-415 Feed Plant Storage Building slab and underlying soils
483	Nitrogen Generating Facilities slab and underlying soils
484	C-611-M Storage Tank
485	C-611-N Sanitary Water Storage
486	Rubble Pile WKWMA (approximately 116 ft off roadside)
487	Rubble Pile WKWMA (approximately 483 ft off roadside)
488	PCB Contamination Area Near the C-410 Trailer Complex
489	Septic Tank North of the C-710 Laboratory
490	McGraw Fuel Facility Waste Oil Storage Tank
491	Mercury Spill at the C-611 Water Treatment Plant Vault
492	Contaminated Soil Area, Near Outfall 010
493	Concrete Rubble Piles near Outfall 001
494	Ash Receiver Area in C-410/420
495	C-410-I Ash Receiver Shed
496	C-410 Fluorine/Hydrogen Filters (Northeast Mezzanine)
497	C-410/420 F ₂ Cell Neutralization Room Vats
498	C-410/420 Sump at Columns 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

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
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
514	C-340 Magnesium Fluoride Reject Silo
515	C-340 "Dirty" Dust Collection System
516	C-340 Derby Preparation Area Sludge Collection System
517	Rubble and Debris Erosion Control Fill Area
518	Field South of C-746-P1 Clean Scrap Yard
519	C-410 Sulfuric Acid Tank (C-634-B)
520	Scrap Material West of C-746-A
521	C-340 Saw System Degreaser
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
525	Concrete Water Tower Supports (KOW)
526	Internal Plant Drainage Ditches (includes KPDES 016)
527	C-410 GSA/SAA at Column J-6
528	GSA/SAA at the Northwest Corner of C-745-G3 Paint Enclosure
529	C-340 Powder Plant Sump at Ground Floor Level slab and underlying soils
531	Aluminum Slag Reacting Area (C-746-H4) Near the C-746-A Facility
532	Photographic Solution Treatment Area in the C-102 Building
533	TCE Spill Site from TCE Unloading Operations at C-400
534	UST #18 within SWMU 193
535	S-755-T08-01 (Satellite Accumulation Area at C-755, Trailer 8)
536	Concrete Truck Washout Area
537	S-400-001 (SAA Located Outside at the Southeast Corner of the C-400 Building)
538	S-MST-01-01 and S-MST-01-02 (Mobile Trailer 01)
539	S-MST-02-01 and S-MST-02-02 (Mobile Trailer 02)
540	S-MST-03-01 and S-MST-03-02 (Mobile Trailer 03)
541	Contaminated Soil Area South of Outfall 011
542A	G-746-B-01, S-746-B-01, S-746-B-02 (GSA/SAA's located outside C-746-A)
542B	G-746-A-01, S-746-A-01, S-746-A-02 (GSA/SAA's located outside C-746-A)
543	T-746-S-01 (90-Day Storage Area)
544	T-752-C-01 (90-Day Storage Area)
545	C-755-T-22-01 and G-755-T-22
546	PGDP Post 67 Diesel Fuel Spill Area
547	PGDP Post 38 Diesel Spill Area
548	Staging Area for Concrete Piers, Wood and Rubble North Side of C-745-B Cylinder Yard
549	Dirt/Concrete Rubble Pile near Outfall 008
550	Concrete Culvert Sections Located on the West Bank of the Ditch Leading to Outfall 001
551	C-755-GSA-23 Located at C-755 near the East Fence Line
552	C-760 90-Day Accumulation Area
553	C-331-17
554	C-331-18
555	C-331-21
556	C-337-22
557	C-337-24

Table E4.1. Current Solid Waste Management Unit/Area of Concern (Continued)

SWMU/AOC Number	Description
558	C-337-26
559	C-337-28
560	C-333-16
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 NSDD north of the P-, S-, and T-Landfills
565	Rubble Area KY-19 (along Bayou Creek north of C-611 Water Treatment Plant)
566	H-340-01
567	Soil Pile K013 near Outfall 013, West of Little Bayou Creek
568	C-340 ST-90 Boxes
569	C-743-T-17 Sample Return Refrigerator
570	Sample Return Sealand
571	C-602 Coal Storage Yard
572	C-360 Toll Transfer and Sampling Building Slab and Underlying Soils
573	C-750 Garage Slab and Underlying Soils and Associated Outside Areas
574	C-709-A Acid Neutralization Vault
575	C-721 Gas Manifold Storage Slab and Underlying Soils Area

Note: Shaded cells indicate the status of the SWMU is no further action.

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Table E4.2. Former Solid Waste Management Unit/Area of Concern Summary

SWMU/AOC Number	Description	Removal Date	NFA Approval By
103	Concrete Rubble Pile (1)	2/26/2026 (Mod #1)	U.S. Environmental Protection Agency (EPA) and Kentucky Division of Waste Management (KDWM) via Waste Area Grouping (WAG) 17 Record of Decision (ROD) 9/29/1997
104	Concrete Rubble Pile (2)	2/26/2026 (Mod #1)	EPA and KDWM via WAG 17 ROD 9/29/1997
409	G-745-T-01	2/26/2026 (Mod #1)	KDWM 2/14/2006
466	South of Dyke Road, Pond Area	2/26/2026 (Mod #1)	KDWM 8/17/2009
530	Soil and Debris Storage Area by C-745-T Yard	2/26/2026 (Mod #1)	KDWM 3/8/2007

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APPENDIX E5
SOLID WASTE MANAGEMENT UNIT/AREA OF CONCERN MAP

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PART G

CONTINGENCY PLAN OF THE

HAZARDOUS WASTE MANAGEMENT FACILITY PERMIT

CLASS 1 MODIFICATION

40 CFR § 264, Subpart D

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PART G
CONTINGENCY PLAN
OF THE
HAZARDOUS WASTE MANAGEMENT FACILITY PERMIT
FOR THE U.S. DEPARTMENT OF ENERGY,
PADUCAH GASEOUS DIFFUSION PLANT,
PADUCAH, KENTUCKY

Updated—February 2026

Deleted: October 2024

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ACRONYMS

CCF	Central Control Facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
<i>CFR</i>	<i>Code of Federal Regulations</i>
DOE	U.S. Department of Energy
FRNP	Four Rivers Nuclear Partnership, LLC
<i>KAR</i>	<i>Kentucky Administrative Regulations</i>
KDEP	Kentucky Department for Environmental Protection
KDWM	Kentucky Division of Waste Management
KEEC	Kentucky Energy and Environment Cabinet
OSHA	Occupational Safety and Health Administration
PA	public address
PGDP	Paducah Gaseous Diffusion Plant
PSS	Plant Shift Superintendent
PWS	Public Warning System
QRG	quick reference guide
RCRA	Resource Conservation and Recovery Act

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EXECUTIVE SUMMARY

This plan establishes policy and creates procedures for hazardous waste spills, containment, and countermeasures to minimize any adverse impact to the environment, to reduce safety and health hazards, and to meet standards that define the acceptable management of hazardous wastes. The standards in this plan apply to all permitted areas that treat or store hazardous waste (e.g., C-733, C-746-Q, and C-752-A).

This plan utilizes past experience and best management practices to minimize hazards to human health or the environment from fires, explosions, or any unplanned release of hazardous waste to air, soil, or surface water. The provisions of this plan are to be carried out immediately whenever there is a fire, explosion, chemical spill, or release of hazardous waste that could threaten human health or the environment resulting from the management of hazardous waste.

Information on the properties of the hazardous wastes present in the plant, the safeguards to protect personnel from exposure, and the proper handling and storage of hazardous wastes is available on-site. Copies of the Contingency Plan and the Quick Reference Guide also are available on-site.

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**CONTINGENCY PLAN QUICK REFERENCE GUIDE
FOR PGDP HAZARDOUS WASTE TREATMENT
AND STORAGE FACILITIES: C-733, C-746-Q, AND C-752-A**

Emergency Coordinator Contact Information:

Plant Shift Superintendent (PSS) emergency number at C-300 Central Control Facility: (270) 441-6333

Types/names of hazardous wastes, the potential associated hazards, and the estimated maximum amount of each waste on-site at any one time:

Name of Hazardous Waste	Associated Potential Hazards	Amount (lb)
Miscellaneous flammable liquids	Flammable	500
Miscellaneous flammable solids	Flammable	500
Miscellaneous solutions with toxic characteristics	Toxic	500
Miscellaneous solids with toxic characteristics	Heavy metals, toxic	3,165
Discarded batteries	Lead and acids	1,385
Liquids with spent solvents	Solvents	2,000
Solids with spent solvents	Solvents	5
Waste oils	Heavy metals	988
Miscellaneous acids and bases	Corrosives	600
Contaminated equipment, debris, and personal protective equipment (PPE)	Radiologically contaminated, solvents, and heavy metals	20,836
Miscellaneous liquids with spent solvents and metals	Solvents and heavy metals	6,869
Miscellaneous solids with spent solvents and metals	Solvents and heavy metals	2,000
Miscellaneous liquid laboratory waste	Corrosives, flammables, toxics, heavy metals	600
Miscellaneous solid laboratory waste	Heavy metals	600
Activated carbon	Solvents	21,020
Fuses, circuit boards, vacuum tubes	Heavy metals	6,786

Name of Hazardous Waste	Associated Potential Hazards	Amount (lb)
Equipment decontamination fluids and rinseate	Radiologically contaminated, solvents, heavy metals, and toxics	200
Light bulbs	Heavy metals	318
Sludge/Scale	Radiologically contaminated, solvents, heavy metals, and toxics	4,000
Compressed gas/Aerosols	Toxics, flammables	143
Neutralization/scrubber solution	Corrosives, toxics	600
Dry scrubber material	Toxics	600
Personal Protective Equipment	Toxics	600
Waste vacuum pump oil	Toxics	25
Contained gas	Toxics	600
Liquid mercury	Toxics	10
Stabilized millers fluorinated lubricant	Toxics	670

Identification of any hazardous wastes where exposure would require unique or special treatment by medical or hospital staff:

Hazardous wastes at the Paducah Gaseous Diffusion Plant (PGDP) have the potential to contain radioactively contaminated materials. Most of the contaminated wastes are classified as low-level radioactive waste. Paramedics are available, 24 hours a day to treat personnel exposures. Additionally, agreements with area hospitals ensure that hospital staff personnel are aware of radiological contamination control procedures to protect the patients and staff.

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Identification of the hazardous waste treatment, storage facilities, and routes for accessing these wastes:

See Part G-quick reference guide (QRG), Figure 1.

Identification of the hazardous waste facilities in relation to surrounding businesses, schools, and residential areas and understanding the best way to get to each facility and also evacuate citizens and workers:

The hazardous waste treatment and storage facilities are all within the PGDP footprint. The area surrounding all sides of each hazardous waste facility is part of PGDP; therefore, there are no businesses, schools, or residential areas that would be impacted. Land use of the area surrounding PGDP can be seen in Part G-QRG, Figure 2. Based on the Emergency Management program analysis in the technical planning basis, the hazardous waste facilities have been determined not to have emergency conditions that would result in impacts outside of the immediate area; therefore, evacuation of the public would not be required.

Identification of water supply (e.g., fire hydrants and flow rate):

See Part G-QRG, Figure 3, for the location of the fire hydrants near the hazardous waste facilities. The flow rate for these hydrants is at least 1,000 gal per minute.

Identification of on-site notification systems:

The plant emergency alarm system consists of fire alarm boxes, fire protection/smoke detection system alarms, bells, horns, sirens, and a public address (PA) system. These systems are located throughout the plant, with the boxes being used to activate the alarm signal in the affected area. Each alarm, when activated, will transmit a signal to the fire alarm control display monitor located at the C-300 Central Control Facility and at fire services. Alarm messages include alarm descriptions and locations of alarms. The emergency alarm also may be activated from C-300. Site alarms are monitored within C-300 by a PSS, 24 hours a day. Site personnel are notified of emergency conditions via the PA system and the radio network.

Part G-QRG, Figure 1. Routes to Hazardous Waste Storage and Treatment Facilities

Part G-QRG, Figure 2. Land Use of Surrounding Area

Part G-QRG, Figure 3. Hydrants in the Vicinity of Permitted Facilities

1. INTRODUCTION

This Contingency Plan is for the Paducah Gaseous Diffusion Plant (PGDP) hazardous waste facilities, which are owned by the U.S. Department of Energy (DOE) and operated under contract by Four Rivers Nuclear Partnership, LLC (FRNP).¹ PGDP is located in McCracken County, Kentucky, near U.S. Highway 60 on a federally owned reservation. Part G, Figure 1 shows a general plan of the facility.

All Resource Conservation and Recovery Act (RCRA)-permitted treatment and storage facilities at PGDP are owned by DOE and operated by FRNP. The point of contact for DOE is as follows:

Portsmouth/Paducah Project Office Manager
U.S. Department of Energy
1017 Majestic Drive, Suite 200
Lexington, Kentucky 40513

The primary contact for hazardous waste storage and treatment activities is as follows:

Program Manager
Four Rivers Nuclear Partnership, LLC
5511 Hobbs Road
Kevil, Kentucky 42053

The Operations and Site Mission Support Contractor is responsible for managing the emergency management and fire protection programs at the Paducah Site. FRNP provides support and cooperation to aid in emergency responses, as needed. The RCRA emergency response organization at PGDP includes representatives from DOE and each of its contractors/subcontractors. The Plant Shift Superintendent (PSS), or designee, directs initial emergency response activities.

The on-site emergency response organization provides initial emergency response services, including firefighting, emergency medical response, hazardous material incident response, rescue, salvage, and radiological response. This service will be provided upon request or upon activation of automatic alarm located in all on-site facilities. The PSS, or designee, will contact the appropriate facility manager and emergency duty officer, or designee, if the emergency involves any RCRA-permitted facilities or DOE waste accumulation areas. The Crisis Manager assigns a recovery manager to direct the recovery phase (final stage of RCRA emergency response). FRNP maintains a designated emergency duty officer that will be available to receive notifications from the PSS and coordinate responses, as needed.

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1.1 C-733 HAZARDOUS WASTE STORAGE AND TREATMENT FACILITY

The C-733 Hazardous Waste Storage and Treatment Facility is a partially sided, roofed, and diked storage area used to store spent solvents, paint wastes, mineral spirits, containers of waste chemicals, and other miscellaneous waste materials in containers. Polychlorinated biphenyl (PCB) wastes also are stored in containers at C-733. Reactive and incompatible wastes will be managed in containers with appropriate precautions. Treatment in containers by decanting and absorption can occur at this facility. Treatment methods for this facility include (1) treatment in a container by decanting and absorption and/or macroencapsulation and (2) treatment in a container, drum, or a sleeve for compaction.

¹ For purposes of this application, the acronym DOE refers to the U.S. Department of Energy Paducah Gaseous Diffusion Plant.

Part G, Figure 1. Paducah Gaseous Diffusion Plant Site

1.2 C-746-Q HAZARDOUS WASTE STORAGE AND TREATMENT FACILITY

The C-746-Q Hazardous Waste Storage and Treatment Facility is located in the western portion of the C-746-Q Building. The eastern portion of C-746-Q, known as C-746-Q1, is not permitted for RCRA storage. The building is a roofed, diked building with a concrete floor. This unit is not permitted for the storage of flammable materials, but is suitable to manage all other wastes generated at PGDP. Incompatible and reactive wastes are permitted for storage in C-746-Q. The area is delineated with the appropriate warning signs.

Fluorescent lamp-crushing units for fluorescent/miscellaneous lamps have been permitted for use in C-746-Q. Additional permitted treatment activities include batch chemical treatment of hazardous waste in containers by neutralization, precipitation, oxidation, reduction, and stabilization. Treatment methods for this facility include (1) treatment in a container by decanting and absorption and/or macroencapsulation and (2) treatment in a container, drum, or a sleeve for compaction.

1.3 C-752-A HAZARDOUS WASTE STORAGE AND TREATMENT FACILITY

The C-752-A Hazardous Waste Storage and Treatment Facility is a roofed, diked building with a concrete floor. This facility will store environmental restoration-derived waste, as well as PCBs, low-level waste, and other miscellaneous wastes. No ignitable wastes with a flashpoint less than 100°F will be stored in this building unless stored in a flammable cabinet.

A fluorescent lamp crushing unit for fluorescent/miscellaneous lamps is used in C-752-A. Permitted treatment activities include batch chemical treatment of hazardous waste in containers by neutralization, precipitation, oxidation, reduction, and stabilization. Treatment methods for this facility include (1) treatment in a container by decanting and absorption and/or macroencapsulation and (2) treatment in a container, drum, or a sleeve for compaction.

2. EMERGENCY COORDINATORS

[40 *CFR* § 264.52(d)]

The PSS is the designated individual on-site responsible for responding to all emergency conditions, as well as categorizing/classifying emergency events and establishing command/control at the incident scene. As such, the PSS is the designated Emergency Coordinator for the site. When responding to an incident scene, the PSS is acting as the Incident Commander and fulfilling the role of Crisis Manager. For the remainder of this document, the term Emergency Coordinator refers to the PSS, whether performing duties as the PSS, Incident Commander, or Crisis Manager.

If an emergency situation occurs at hazardous waste storage and treatment facilities, the person discovering the emergency contacts the PSS, who is the Emergency Coordinator under the provisions of the *Code of Federal Regulations*. A PSS is on duty 24-hours a day, seven days a week. At least one PSS is on duty at the facility at all times and can be contacted for emergencies at (270) 441-6333 at the C-300 Central Control Facility (CCF). Nonemergency calls can be made to the PSS at (270) 441-6211.

The responsibility for control of initial emergency response is vested in the PSS. All emergency plans and procedures are readily available to the PSS, who has complete authority to commit all resources in the

event of an emergency. He will remain in command of initial response activities. The appropriate facility manager and emergency duty officer, or designee, will be contacted by the PSS or designee in the event an emergency involves any RCRA-permitted facilities or accumulation areas. This notification is administrative in purpose only. The PSS is responsible for initial emergency response activities. The PSS also is authorized to activate the provisions of mutual aid agreements held with other organizations, if needed. The Emergency Coordinator is the same individual identified as the on-scene commander by Occupational Safety and Health Administration (OSHA) and as the incident commander or fire ground commander by the National Fire Protection Association. The Crisis Manager assigns a recovery manager to coordinate the final emergency response activities (recovery phase).

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Contact information (e.g., address and phone number) for the PSS is listed in Part G, Table 1.

Part G, Table 1. PSS Personnel

Title	Phone	Building
PSS—emergency line	(270) 441-6333	C-300 CCF
PSS—nonemergency line	(270) 441-6211	C-300 CCF

3. IMPLEMENTATION OF THE CONTINGENCY PLAN

The decision to implement the Contingency Plan depends on whether an actual incident resulting from hazardous waste operations such as a fire, explosion, chemical spill, or release of hazardous waste threatens human health or the environment. Immediately after being notified of an emergency incident, the PSS, or designee, will proceed to the site and evaluate the situation. The PSS has the responsibility for control of initial emergency response and has the authority to commit all resources in the event of an emergency. The PSS or designee then will notify and apprise the Program Manager of the situation. DOE or its contractor makes the decision to implement the Contingency Plan and will contact the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) on-scene coordinator, as appropriate. The following are examples of incidents that could warrant implementation of the Contingency Plan.

- A fire and/or explosion involving hazardous waste occurs when any of the following exists.
 - The potential for human injury exists.
 - Toxic fumes are released.
 - The fire could spread on- or off-site and possibly ignite other flammable materials or cause heat-induced explosions.
 - The use of water and/or chemical fire suppressants could result in contaminated runoff.
 - An imminent danger exists that an explosion could ignite other hazardous waste at the facility and possibly result in the release of toxic materials.
- A spill (as defined in 401 KAR 39:005) of a hazardous waste occurs when any of the following exists.
 - The spill could result in release of flammable liquids or vapors, thus causing a fire or gas explosion hazard.

- The spill could cause the release of toxic liquids or fumes.
- The spill can be contained on-site, but the potential exists for soil or groundwater contamination.
- The spill cannot be contained on-site, resulting in off-site soil contamination and/or ground or surface water pollution.

Several ways of discovering a spill or release of chemicals are available, including routine inspections of RCRA facilities by operating personnel and detection of unusual or strong chemical odors.

4. EMERGENCY RESPONSE PROCEDURES

[40 *CFR* § 264.52(a)]

4.1 NOTIFICATION

In the event of an emergency situation, the PSS is notified either by the person discovering the emergency, his/her supervisor, or by messenger. This notification will occur by the plant phone system, cell phone, radio, emergency alarm, or messenger. The PSS, or designee, then notifies PGDP personnel (including DOE and its contractors/subcontractors) and appropriate federal, state, and local authorities. Notification of PGDP personnel will be through the use of the plant public address (PA) system, radios, or alarms. The phone system is utilized to notify DOE, its contractors/subcontractors, and outside agencies. Leaks or spills of less than a reportable quantity of hazardous waste, which are immediately cleaned, do not require notification to the Kentucky Energy and Environment Cabinet (KEEC), Kentucky Department for Environmental Protection (KDEP), and Kentucky Division of Waste Management (KDWM). If the emergency does not threaten human health or the environment outside the RCRA facility, notification of state and local authorities is not required. Notification pursuant to CERCLA spill-reporting requirements (40 *CFR* Part 302) satisfies RCRA spill-reporting requirements.

4.2 IDENTIFICATION OF HAZARDOUS WASTES

The PSS, or designee, will immediately identify the characteristics, source, amount, and area/extent of the release. The initial identification method may include a visual analysis of the material and determination of the location of the release. The contents of waste containers are labeled on the container. Records for RCRA facilities, such as inventories, waste log sheets, and the waste management database are readily accessible to aid in estimating the quantity and type of released material. If the released material cannot be readily identified, samples may be taken for chemical analysis.

4.3 HAZARD ASSESSMENT

The PSS, or designee, will assess possible hazards to human health or the environment, according to the predetermined Emergency Classification Level, that may result from direct or indirect effects of a release, fire, or explosion. The PGDP Emergency Management program department is responsible for analyzing all hazardous materials and potential accident scenarios for facilities at PGDP. If the PSS or designee determines the RCRA facility has had a release, fire, or explosion that could threaten human health or the environment outside the RCRA facility, then the PSS or designee will take the appropriate protective actions and notify local authorities, as required. If an emergency potentially may impact the public, then the PSS will provide action recommendations based on the Emergency Classification Level. The PSS, or

designee, performs mandatory notifications, including reporting the release to the DOE Paducah Site Office, DOE's contractors/subcontractors, KEEC, KDEP, KDWM, or the National Response Center (800-424-8802), as applicable. The report will include the following:

- Name and telephone number of the person making the report
- Name and address of the facility
- Time and type of incident
- Name and quantity of material(s) involved, to the extent known
- Extent of injuries, if any
- Possible hazards to human health or the environment outside the facility

4.4 CONTROL PROCEDURES

Potential RCRA accidents fall under two general classifications: (1) fire and/or explosion, and (2) spills or material release. An overview of the emergency plan notifications is outlined in Sections 4.4.1 and 4.4.2.

4.4.1 Fire and/or Explosion

Firefighting and other emergency equipment can access hazardous waste management facilities. Concrete and paved blacktop roads lead to all facilities.

PGDP fire services and plant emergency responders are maintained and prepared for immediate response to emergency situations at all times. One PSS is on duty 24 hours a day, seven days a week, and is prepared for immediate response to emergency situations.

The following actions will be taken in the event of a fire or explosion.

- The person who discovers the fire or explosion reports to the PSS or supervision as appropriate:

	PLANT TELEPHONE	CELL
C-300 CCF	333	(270) 441-6333
PSS—nonemergency	6211	(270) 441-6211
Supervisor	Site-specific	Site-specific

The most appropriate of the following methods is used to make the report:

- Radio Network Channel 16—Call Sign Alpha 1, emergency traffic
 - Fire Alarm Pull Box
 - Telephone—Plant or Cell Phone
 - Red-Handle Phone
 - Messenger to C-300 CCF
- The person who discovers the emergency also performs the following:
 - Informs other personnel in/near the RCRA facility to evacuate from the immediate danger area;
 - Notifies the proper facility authorities; and
 - Meets the Emergency Coordinator at the command post to provide a briefing.

- The Emergency Coordinator goes to the scene of the emergency and does the following:
 - Evaluates the severity of the problem;
 - Determines that emergency service groups have been summoned to the incident scene;
 - Arranges for necessary protective actions to include additional evacuation of personnel; and
 - Directs emergency service response groups.
- The person who meets the Emergency Coordinator or designee provides a detailed briefing concerning the emergency condition and includes the location of the release and type/quantity of material, if known.
- Fire services, plant emergency responders, protective force, and/or other emergency response personnel follow the instructions of the Emergency Coordinator. If an emergency response organization arrives at the scene prior to the Emergency Coordinator, the emergency response organization leader will be deemed the designee and establish command until the arrival of the emergency coordinator, at which time that person will assume the duties of Emergency Coordinator.
- The Emergency Coordinator estimates the extent of the emergency; assumes full command and control of all emergency response activities to the degree required; arranges for establishing necessary roadblocks; and, as necessary, arranges for additional support or resources. The Emergency Coordinator summons, to the scene, all necessary plant emergency responders and equipment, as needed. The Emergency Coordinator also can request assistance from outside agencies with whom mutual aid agreements have been established.
- After emergency mitigation actions have rendered the incident scene safe, the Crisis Manager, after consultation with the plant technical personnel and emergency responders, declares the termination of the emergency and arranges for the “all clear” signal to be given.

4.4.2 Spills or Material Release

- **Introduction**—This section is a guide for the actions to be taken in the event of a spill at RCRA facilities (as defined in 401 *KAR* 39:005). Consideration must be given to the type of hazardous chemical and to the quantity that might be released under various conditions. Minor spills or releases that occur during normal operations that are inherent to a process are not considered a spill according to the Contingency Plan. These materials will be cleaned up and handled appropriately by the operator in a timely manner.
- **Responsibilities**—The person who discovers a spill or material release is expected to notify the PSS immediately. The PSS estimates the magnitude of the problem, evacuates nearby personnel, as necessary, and initiates containment activities.

If a spill or release occurs during a waste transfer operation, immediate action will be taken to cut off the waste feed. No additional waste will be transferred until the cause of the release has been identified.

The Emergency Coordinator, or designee, assumes overall direction of emergency efforts upon his/her arrival, as the site Emergency Coordinator. He/she assesses the situation and initiates necessary emergency procedures. He/she determines the necessity for requesting additional manpower, the scope of any personnel evacuation, and makes a determination on the effect a release might have, using established Emergency Classification Levels, including effects on the general public.

The Emergency Coordinator, or designee, also determines the level of protection required for personnel entering the area in response to the emergency. The selection of personnel protective equipment, such as respirators and protective clothing, is specified in the *National Institute of Occupational Safety and Health (NIOSH) Guide to Chemical Hazards*, *U.S. Department of Transportation Emergency Response Guidebook*, Safety Data Sheets or Material Safety Data Sheets. These references are used throughout the plant. The Industrial Hygiene department has access to these current regulations and is the primary contact in this area to support the PSS.

RCRA emergency response includes collection and containment of spilled waste, whereas emergency response under OSHA is limited to the containment of spilled material. The plant emergency responders will conduct containment of a hazardous waste spill to the environment, and the Facility Manager will manage collection of the waste and residues. The Emergency Coordinator directs containment, treatment, and cleanup activities with the assistance of other plant departments, as necessary, until the spill is under control. The Facility Manager or designee will provide guidance on containment, cleanup, and regulatory requirements, as necessary. The Facility Manager, or designee, will also conduct containment and cleanup of minor spills within indoor RCRA storage and accumulation areas.

In the event of a waste spill that is not considered to be minor, facility workers will evacuate the area. The waste site workers will evacuate and the PSS will respond with the emergency responders for mitigation as per 29 *CFR* § 1910.120 (q).

Procedure:

- **Action Level No. 1: Immediate Action**

- Evacuate all personnel from the danger area.
- Stop waste feed operations, if applicable.
- Move upwind or to a safe area.
- Set up decontamination line if required.
- Put on protective clothing and equipment.
- Perform rescue and first-aid activities.
- Isolate hazard area insofar as practicable.
- Reduce vapors by best possible measures such as water spray, enclosure of area, etc.
- Stop the leak.

- **Action Level No. 2: On-Site Personnel Protective Actions**

- Determine the area in which hazardous concentrations of the hazardous chemical exists or is predicted to exist. (Use data contained in the PSS' procedures or the computer plume models for this determination.)
- Evacuate all people from this area by the quickest route, preferably crosswind, to safe areas. If there is insufficient time to evacuate the building in the path of the hazardous material plume, implement shelter-in-place protective actions. Doors and windows should be closed, and personnel should be instructed to remain inside until they are notified that concentrations outside the building have been declared safe. If possible, stop air from entering the building by shutting down ventilation systems, etc.

- **Action Level No. 3: Off-Site Personnel Protective Actions**

- If a release may potentially impact the off-site public, the Emergency Coordinator may activate the Public Warning System (PWS) sirens located at the plant boundary.
- Establish roadblocks at appropriate locations on-site to prevent traffic from entering the hazardous area.

- **Action Level No. 4: Reentry and Recovery**

- The Emergency Coordinator, or designee, will have the affected areas monitored by appropriate personnel to determine when they are safe for normal re-entry and then will take the following actions:
 - Notify all outside agencies the emergency is over. With the concurrence of these agencies, persons who have sheltered will be notified that protective actions no longer are necessary.
- Crisis Manager, or designee, shall, after the initial emergency response is over, do the following:
 - Assign a Recovery Manager.
 - Ensures that spilled material and waste residues are collected and arranges for treatment and/or disposal of waste, contaminated soil, and contaminated water.
 - Ensures continued monitoring until conditions have returned to normal.
 - Instructs site personnel to return to normal duty.

4.5 PREVENTION OF RECURRENCE OR SPREAD OF FIRES, EXPLOSIONS, OR RELEASES

Actions to prevent the recurrence or spread of fires, explosions, or releases include prompt notification, firefighting, collecting and containing released waste, and recovering or isolating containers. On-site training addresses the specific actions to be taken in an emergency. The locations of fire extinguishers and safety equipment are identified in Appendix G2 of this plan.

4.6 STORAGE AND TREATMENT OF RELEASED MATERIAL

Immediately after an emergency, the Recovery Manager, or designee, will provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility. Methods for containment, cleanup, and decontamination of container spill areas are discussed in Section 4.9. Care is taken to ensure that adequate aisle space is maintained at all times.

4.7 INCOMPATIBLE WASTES

The Facility Manager, or designee, will ensure no other waste is introduced into the affected area for treatment, storage, or disposal, until cleanup procedures are completed. Any waste or materials that may be incompatible in the affected area will be removed. Waste materials generated by the cleanup activities will be characterized to ensure proper containerization and storage. The Facility Manager, or designee, will manage all cleanup debris in permitted facilities, 90-day accumulation areas, and satellite

accumulation areas, as appropriate. The storage of cleanup debris will be handled in a manner appropriate to the type of waste. DOE will utilize additional dikes or berms or other devices to segregate incompatible materials. Containers of potential incompatible wastes are separated by as much space as possible.

4.8 POST-EMERGENCY EQUIPMENT MAINTENANCE

After an emergency, all emergency response equipment will be cleaned, inspected, and made ready for its intended use before hazardous waste operations are resumed. Cleaning procedures may include detergent and water washing, high-pressure sprays, steam-cleaning, etc. Equipment unfit for use will be replaced or repaired. A list of emergency equipment maintained in the hazardous waste storage and treatment facilities is presented in Appendix G1 of this plan. These items are inspected at a specified frequency and after an emergency to ensure equipment is maintained, present, and operational. Deficiencies will be documented and corrected immediately. The list of equipment will change as new items are added and obsolete items removed. A current inventory of equipment is maintained.

4.9 CONTAINER SPILLS AND LEAKAGE

The containers are inspected weekly for deficiencies, such as severe rusting, structural defects, and leakage. If a container exhibits any of these deficiencies, the waste will be transferred to a container in acceptable condition or recontainerized in an appropriate overpack.

4.9.1 RCRA-Permitted Facilities

C-733. A minimum 9-inch high dike with a containment volume of approximately 27,900 gal surrounds the C-733 Hazardous Waste Storage and Treatment Facility. Any spill within C-733 will be directed to an approximately 3,480 gal sump located within the diked area. The collected material then can be pumped into new containers or stored in portable 1,200 gal polyethylene containers. Waste materials will be characterized prior to containerization to ensure compatibility with the storage container and proper storage location. The storage area is stocked with extra containers and absorbent material. At least two overpacks are kept at C-733 and are available for material transfer from leaking drums. The area is stocked with absorbent materials.

In the event of a container spill or leakage to the environment, the PSS shall be notified. The plant emergency responders will conduct containment of a hazardous waste spill to the environment. The Facility Manager, or designee, will be notified of the spill and will supervise cleanup activities. For most spills, the spilled material will be absorbed with absorbent material and placed in containers. For large spills, the spilled material will be pumped into containers, with the remaining residue absorbed and placed in containers.

The containers are inspected weekly for deficiencies, such as severe rusting, structural defects, and leakage. If a container exhibits any of these deficiencies, the waste will be transferred to a container in acceptable condition or placed in an overpack. Liquids collected in the sump, including rain and snow melt, are pumped, transported to a collection container, and sampled for parameters indicative of the materials stored in C-733, before discharge to the storm sewer.

C-746-Q. The C-746-Q Hazardous Waste Storage and Treatment Facility is surrounded by a minimum 9-inch high dike and has a smaller containment area with 14 containment bays in the southwest corner of the facility. The total containment capacity of the hazardous waste facility is 39,492 gal. The area is stocked with extra containers and absorbent material. At least one overpack is kept at C-746-Q and is available for isolating a leaking drum.

In the event of a container spill or leakage to the environment, the PSS shall be notified. The plant emergency responders will conduct containment of a hazardous waste spill to the environment. The Facility Manager, or designee, will be notified of the spill and will supervise cleanup activities. For most spills, the material will be absorbed with absorbent material and will be placed into containers. For large spills, the spilled material will be pumped into containers or portable 1,200 gal polyethylene containers with the remaining residue absorbed and placed into containers. Waste materials will be characterized prior to containerization to ensure compatibility with the storage container and proper storage location.

The containers are inspected weekly for deficiencies, such as severe rusting, structural defects, and leakage. If a container exhibits any of these deficiencies, the waste will be transferred to a container in acceptable condition or placed in an overpack.

C-752-A. The C-752-A Hazardous Waste Storage and Treatment Facility is surrounded by a dike with an inner measurement of 13.5-inches high and a containment volume of approximately 408,800 gal; therefore, any spills or leakage from the containers will be contained. The storage area is stocked with extra containers and absorbent material. At least two overpacks are kept at C-752-A and are available for material transfer from leaking drums. The area is stocked with absorbent materials.

In the event of a container spill or leakage to the environment, the PSS shall be notified. The plant emergency responders will conduct containment of a hazardous waste spill to the environment. The Facility Manager, or designee, will be notified of the spill and will supervise cleanup activities. For most spills, the material will be absorbed with absorbent material and will be placed into containers. For large spills, the spilled material will be pumped into containers or portable 1,200 gal polyethylene containers with the remaining residue absorbed and placed into containers. Waste materials will be characterized prior to containerization to ensure compatibility with the storage container and proper storage location.

The containers are inspected weekly for deficiencies, such as severe rusting, structural defects, and leakage. If a container exhibits any of these deficiencies, the waste will be transferred to a container in acceptable condition or placed in an overpack.

4.10 TANK SPILLS AND LEAKAGE

There are no hazardous waste tanks or tank systems in hazardous waste facilities at PGDP.

4.11 WASTE PILE SPILLS AND LEAKAGE

There are no hazardous waste piles at PGDP.

4.12 SURFACE IMPOUNDMENTS, SPILLS, LEAKAGE, AND SUDDEN DROPS

There are no hazardous waste surface impoundments at PGDP.

4.13 LANDFILL LEAKAGE

There are no active hazardous waste landfills at PGDP. The C-404 Landfill is under post-closure care and is not expected to trigger an emergency response under this Contingency Plan. If a release is detected from the landfill, it would be addressed pursuant to the Groundwater Monitoring Plan in Part E or the Post-Closure Care requirements in Part I, Appendix I2.

4.14 CONTAINMENT BUILDING LEAKAGE

There are no hazardous waste containment buildings at PGDP.

4.15 DRIP PAD SPILLS AND LEAKAGE

There are no hazardous waste drip pads at PGDP.

5. EMERGENCY EQUIPMENT

5.1 SPILL CONTROL EQUIPMENT

As discussed in the preceding sections, spill control equipment (see Appendix G1) is maintained at the individual hazardous waste management facilities to handle small leaks and larger spills. This list will be kept up to date and revised as necessary. Two 1,200 gal polyethylene containers also are available on-site for spill control operations. The RCRA emergency equipment inspection schedule is provided in Appendix G1 of this plan.

In addition to the designated emergency equipment, other equipment that could be used in emergency activities is maintained by various operations and maintenance groups. In the event of an emergency, appropriate heavy equipment (e.g., excavator, road grader, backhoes, track hoes, dump trucks, end-loaders) is available from the site infrastructure contractor. Smaller equipment, such as pumps, forklifts, flatbed trucks, etc., is utilized throughout the plant and is available for emergency response.

5.2 FIRE CONTROL EQUIPMENT

5.2.1 Sanitary and Fire Water

Raw water is obtained from the Ohio River, treated at the C-611 Water Treatment Plant, and pumped to PGDP. The sanitary fire water system provides fire services with water at the required pressure. Water supply storage at PGDP includes an elevated storage tank (C-611-O) with a capacity of 250,000 gal, and the four C-611 basins with a combined capacity of approximately 12 million gal. The C-611 facility is the primary source of water supply. The C-611-O elevated storage tank is utilized as the secondary source. The level in the tank is monitored continuously with the low-level indicator activating signals at both the C-300 CCF and at C-611. Water is pumped from C-611 to replenish the C-611-O elevated storage tank, as necessary. The water pressure is 70 pounds-per-square-inch gauge. Fire hydrants near hazardous waste facilities are shown in drawings in Appendix G2 of this plan.

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5.2.2 Fire Extinguishers

Multipurpose fire extinguishers are available for use at all hazardous waste facilities. Fire extinguisher locations are shown in Appendix G2 of this plan.

5.2.3 Plant Fire Services

In addition to the automatic fire protection systems, PGDP also is protected by fire services personnel. Stationed on-site, fire services has one 1,500 gal per minute (gpm) pumper-truck, a ladder truck capable

of reaching an elevation of 100 ft with a 1,500 gpm pump, and two emergency equipment trucks equipped with self-contained breathing apparatus and protective clothing. All fire response equipment is operated by qualified fire fighters also stationed on-site. The fire trucks and other equipment are properly maintained at all times to ensure emergency preparedness.

5.3 ALARM SYSTEMS

The plant emergency alarm system consists of fire alarm boxes, fire protection/smoke detection system alarms, bells, horns, sirens, and a PA system. The systems are located throughout the plant, with the boxes being used to activate the alarm signal in the affected area. Each alarm, when activated, will transmit a signal to the fire alarm control display monitor located at the C-300 CCF and at fire services. Alarm messages include alarm descriptions and locations of alarms. The emergency alarm also may be activated from the C-300 CCF. The PSS is in charge of the C-300 CCF and he/she may activate any alarm or make announcements over the PA system as he/she deems necessary to announce emergency instructions.

5.4 COMMUNICATION SYSTEMS

In an emergency situation, effective and rapid communication must be maintained throughout the emergency response and control organization. These are four forms of communications available at PGDP.

- (1) **Emergency Phone System**—Plant telephones are located throughout the plant. An emergency situation can be reported by dialing 333 on the plant telephones. Emergency phone calls also can be made by using other phones by dialing (270) 441-6333. Emergency calls are answered at the C-300 CCF.
- (2) **Radios**—Radios are used by the PSS, fire services members, security, and other response personnel for emergency communications. Other personnel throughout the plant use radios for routine communications. Any radio in the plant can be used to summon emergency assistance using the dedicated emergency call channel. The C-300 CCF is utilized as the base station and monitors radio communications on all radio channels used at PGDP.
- (3) **PA System**—The PA system is used to communicate emergency instructions to all personnel. The PSS is responsible for all announcements made on the PA system.
- (4) **Messenger**—A messenger may be used to notify the C-300 CCF of an emergency if it is determined to be needed or other means are unavailable.

6. COORDINATION AGREEMENT

PGDP participates in mutual emergency aid agreements with emergency response organizations in the area. The agencies included in these agreements are listed in Part G, Table 2. Copies of the Mutual Aid Agreements and letters of understanding are included in Appendix G3 of this plan.

The PSS is the designated individual on-site responsible for responding to all emergency conditions and the primary authority for all emergency response actions. Mutual aid assistance provided to PGDP is

requested by the PSS and may consist of fire and hazardous materials response and local law enforcement who can aid in traffic control on the roadways on or near the site. Area emergency medical services may aid in the transport of personnel from the plant site to off-site medical facilities.

Part G, Table 2. Mutual-Aid Agreement Agencies

Agency	Phone
Mercy Regional EMS 3551 Coleman Road Paducah, Kentucky 42001	911 (270) 443-6529
McCracken County Judge Executive 300 South Seventh Street McCracken County Courthouse Paducah, Kentucky 42003	(270) 444-4707
Mercy Health – Lourdes Hospital, LLC 1530 Lone Oak Road Paducah, Kentucky 42003	(270) 444-2444
McCracken County Sheriff's Department 301 South Sixth Street McCracken County Courthouse Paducah, Kentucky 42003	911 (270) 444-4719
Air Evac Lifeteam Program Director AE 108 1113 Medical Center Drive Mayfield, Kentucky 42066	(270) 251-8667 (Office) 1-800-247-3822 (Air Evac Communications Center)
Paducah City Police Department 1400 Broadway Street Paducah, Kentucky 42001	(270) 444-8550
Ballard County Sheriff Department 437 Ohio Street Wickliffe, Kentucky 42087	(270) 335-3561
Paducah-McCracken County Office of Emergency Management 3700 Coleman Road Paducah, Kentucky 42001	911 (270) 448-1530
West McCracken Fire District Grahamville District 9180 Ogden Landing Road West Paducah, Kentucky 42086	911 (270) 488-3112 (Station 1) (270) 488-3825
Baptist Health Paducah Hospital 2501 Kentucky Avenue Paducah, Kentucky 42003	(270) 575-2100

Deleted: Paducah Communications Services¶
1400 Broadway Street¶
Paducah, Kentucky 42001

... [1]

Injured personnel who cannot be treated satisfactorily at the PGDP medical facility will be transported via ambulance to either Mercy Health—Lourdes Hospital or Baptist Health Paducah Hospital, both located in Paducah, Kentucky. The attending Emergency Medical Technician, or personnel at the C-300 CCF, will notify the respective hospital of incoming patients. Site Paramedics may also accompany patients being transported to the hospital on an as-needed basis. They are familiar with all emergency situations and types of injuries that might occur. A copy of this Contingency Plan will be maintained at the facility and provided to those agencies with which mutual aid agreements have been established.

7. EVACUATION PLAN

All emergencies require prompt and deliberate action. Although the likelihood of a hazardous waste emergency requiring evacuation is remote, an established set of procedures will be followed in such an event. The PSS will make the determination whether to deviate from the established procedures to provide a more effective plan for bringing the situation under control, depending on the event severity. The PSS is responsible for determining which emergency situations require evacuation.

The facility employs various alarm systems with signals to initiate evacuation procedures. In addition to the alarms, the PA system is used to notify key plant personnel as to the nature of the emergency and recommended protective actions. The PA system broadcasts an override message over all plant radios using the all-call system. Total site evacuation is initiated only by the PSS.

Eight PWSs, two each at four locations, can be sounded to alert residents within a two-mile radius of the plant when deemed necessary by the PSS or designee. The PWS is used to alert the public for hazardous material releases from the plant. The “alert” tone will be initiated on the PWS when directed by the PSS. Upon activation of the PWS, the public will be instructed to seek shelter (shelter-in-place) and listen for additional messages on local media outlets.

Emergency alarms are used to signal different emergency situations, such as fires or hazardous material spills. Emergency alarms can be sounded by activating an emergency alarm pull box, clearly marked throughout the site. Employees are familiar with alarm box locations in areas where they work. Evacuation routes for the RCRA facilities are shown on the drawings in Appendix G2 of this plan.

Employees that evacuate one of the hazardous waste storage facilities due to an emergency will congregate at the designated primary assembly point. If the primary assembly point is downwind of the facility at the time of the incident, personnel will go to an alternate assembly point upwind of the facility, at a distance of at least 100 ft.

8. REQUIRED REPORTS

The occurrence reports of emergency incidents are submitted to appropriate outside agencies. The occurrence and event reports identify the time, date, and the details of these emergency incidents.

Whenever the RCRA Contingency Plan is implemented, the PSS will note, in the facility log, the time, date, and details of the incident. Within 15 days after the incident, a written report will be submitted to KDWM, which includes the following information:

- Name, address, and telephone number of the owner or operator;
- Name, address, and telephone number of PGDP;
- Date, time, and type of incident (e.g., fire, explosion);
- Name and quantity of material(s) involved;
- Extent of injuries, if any;

- An assessment of actual or potential hazards to human health or the environment, where applicable; and
- Estimated quantity and disposition of recovered material that resulted from the incident.

In the event of a hazardous waste leak or spill in excess of 1 lb from a RCRA storage facility, a report will be submitted to KDWM within 30 days of release detection, which includes the following:

- Likely route of migration of the release.
- Characteristics of the surrounding soil (soil composition, geology, hydrology, and climate).
- Results of any monitoring or sampling conducted in connection with the release, if available. If sampling of monitoring data relating to the release is not available within 30 days, the data must be submitted to the Cabinet as soon as available.
- Proximity to downgradient drinking water, surface water, and populated areas.
- Description of response action taken or planned.

APPENDIX G1

**RCRA EMERGENCY EQUIPMENT
INSPECTION AND TESTING SCHEDULES**

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**EMERGENCY EQUIPMENT INSPECTION AND TESTING SCHEDULES
RCRA STORAGE AND TREATMENT FACILITIES**

Item	Inspect	Test	Inventory	Comments
Absorbent			W	
Over pack Drums			W	
Radios		W		Testing is not documented
Sprinkler Systems	M	1Y		C-752-A/C-733 only
Eyewashes	W			
Safety Showers	W	<u>1Y</u>		C-752-A only
Tyvek® Coveralls			W	
Gloves			W	
Booties			W	
Brooms			W	
Shovels			W	

Key

1Y - Once per calendar year

W - Once each week

M - Once each calendar month

REQUIRED EMERGENCY RESPONSE AND SPILL CONTROL EQUIPMENT

Building	Equipment	Capabilities
C-733	Absorbent (loose)	Absorb and/or contain spills
	Tyvek® Coveralls	Protect against contamination
	Gloves	Protection for hands
	Booties	Protection for feet
	Overpack Drums	Containment for leaking drums
	Brooms	Cleanup of solid residue
	Shovels	Cleanup of solid residue
	Sprinkler Systems	A system for protecting a building against fire by means of overhead pipes which convey an extinguishing liquid
	Fire Extinguishers	Portable apparatus for putting out fires
	Eyewashes	Device to wash foreign objects from eyes
C-746-Q	Absorbent (loose)	Absorb and/or contain spills
	Tyvek® Coveralls	Protect against contamination
	Gloves	Protection for hands
	Booties	Protection for feet
	Overpack Drums	Containment for leaking drums
	Brooms	Cleanup of solid residue
	Shovels	Cleanup of solid residue
	Fire Extinguishers	Portable apparatus for putting out fires
	Eyewashes	Device to wash foreign objects from eyes
C-752-A	Absorbent (loose)	Absorb and/or contain spills
	Tyvek® Coveralls	Protect against contamination
	Gloves	Protection for hands
	Booties	Protection for feet
	Overpack Drums	Containment for leaking drums
	Brooms	Cleanup of solid residue
	Shovels	Cleanup of solid residue
	Sprinkler Systems	A system for protecting a building against fire by means of overhead pipes which convey an extinguishing liquid
	Fire Extinguishers	Portable apparatus for putting out fires
	Eyewashes	Device to wash foreign objects from eyes

APPENDIX G2

**EVACUATION ROUTES
AND
FIRE EXTINGUISHER LOCATIONS**

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APPENDIX G3

**MUTUAL AID AGREEMENTS
AND
LETTERS OF UNDERSTANDING**

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PADUCAH SITE

NOTIFICATION OF PERMIT CLASS 1 MODIFICATION APPLICATION FOR HAZARDOUS WASTE MANAGEMENT FACILITY PERMIT NO. KY8-890-008-982

Dear Concerned Citizen:

The U.S. Department of Energy (DOE) Portsmouth/Paducah Project Office (PPPO) and Four Rivers Nuclear Partnership, LLC, (FRNP) notified the Kentucky Division of Waste Management (KDWM) of a Class 1 modification for Hazardous Waste Management Facility Permit No. KY8-890-008-982.

This modification application was submitted on March 26, 2026, and reflects the following:

- Updated application forms on the newest available version;
- Updated figures, maps, and solid waste management unit tables;
- Updated the contingency plan to match the new emergency management and fire protection programs; and
- Updated the mutual aid agreements.

A copy of the modification is available at the DOE Environmental Information Center (EIC), 5100 Alben Barkley Drive, Paducah, Kentucky, in the Emerging Technology Center, Room 221.

The EIC is open from 8:00 a.m. to 12:00 p.m., Monday through Friday and can be reached by calling (270) 554-3004.

You are receiving this notification because you previously requested to be on the facility mailing list maintained by KDWM. If you no longer wish to be included on this list, please contact Leo Williamson , KDWM, at (502) 782-6478 or email leo.williamson@ky.gov.

For more information, please contact Dylan Nichols (FRNP) at (270) 441-5301 or PPPO Public Affairs (DOE) at (859) 219-4035.