



Department of Energy

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MAY 15 2018

Mr. Brian Begley
Federal Facility Agreement Manager
Division of Waste Management
Kentucky Department for Environmental Protection
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Frankfort, Kentucky 40601

PPPO-02-4762649-18B

Ms. Julie Corkran
Federal Facility Agreement Manager
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street
Atlanta, Georgia 30303

Dear Mr. Begley and Ms. Corkran:

**TRANSMITTAL OF THE POSTCONSTRUCTION REPORT FOR THE NORTHEAST
PLUME OPTIMIZATION AT THE PADUCAH GASEOUS DIFFUSION PLANT,
PADUCAH, KENTUCKY, DOE/LX/07-2419&D2**

References:

1. Letter from A. Webb to T. Duncan, "Submittal of Comments to the Postconstruction Report for the Northeast Plume Optimization at Paducah Gaseous Diffusion Plant, Paducah Site, Paducah, McCracken County, Kentucky, #KY8-890-008-982," dated April 2, 2018
2. Letter from J. Corkran to T. Duncan, "EPA Comments: Postconstruction Report for the Northeast Plume Optimization at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, (DOE/LX/07-2419&D1), Secondary Document, transmittal dated January 5, 2018 (PPP0-02-450111O-18B) [*sic*]," dated March 21, 2018

Please find enclosed the *Postconstruction Report for the Northeast Plume Optimization at the Paducah Gaseous Diffusion Plant, Kentucky*, DOE/LX/07-2419&D2, (PCR) for approval. This version of the PCR has been revised to address comments received from the U.S. Environmental Protection Agency on March 21, 2018, and the Kentucky Department for Environmental Protection on April 2, 2018. A redlined version of the document and comment response summaries are enclosed to assist with the review.

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

Sincerely,



Tracey Duncan
Federal Facility Agreement Manager
Portsmouth/Paducah Project Office

Enclosures:

1. Postconstruction Report for NE Plume Optimization, DOE/LX/07-2419&D2—Clean
2. Postconstruction Report for NE Plume Optimization DOE/LX/07-2419&D2—Redline
3. Comment Response Summary—EPA
4. Comment Response Summary—KDEP

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**DOE/LX/07-2419&D2
Secondary Document**

**Postconstruction Report for the
Northeast Plume Optimization at the
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**



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**DOE/LX/07-2419&D2
Secondary Document**

**Postconstruction Report for the
Northeast Plume Optimization at the
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**

Date Issued—May 2018

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

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

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ACRONYMS

amsl	above mean sea level
DOE	U.S. Department of Energy
EW	extraction well
FFA	Federal Facility Agreement
gpm	gallons per minute
HDPE	high-density polyethylene
IRA	interim remedial action
MW	monitoring well
NEP	Northeast Plume
PGDP	Paducah Gaseous Diffusion Plant
PZ	piezometer
RAWP	remedial action work plan

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1. GENERAL INTRODUCTION

The Northeast Plume (NEP) Interim Remedial Action (IRA) Optimization Project was implemented to increase trichloroethene (TCE) mass removal, to enhance control of the Northeast Plume migration at the eastern edge of the U.S. Department of Energy-owned Paducah Gaseous Diffusion Plant (PGDP) industrial facility, and to reduce further migration off-site. The project included installation of two new extraction wells (EWs) (EW234 and EW235). The wells were installed in optimized locations within and adjacent to the PGDP industrial facility. Based on EW step tests, EW234 is anticipated to operate between 100 and 200 gpm, and EW235 is anticipated to operate between 75 and 150 gpm, with a total system flow rate of no more than 300 gpm for the optimized NEP Containment System as discussed in Section 2.2.1 of the *Operation and Maintenance Plan for the Northeast Plume Containment System Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-1535&D3/R6 (O&M Plan). High density polyethylene (HDPE) piping transfers extracted groundwater to the C-765/C-765-A Treatment Facilities for treatment. The original EWs (EW331 and EW332) were taken off-line on September 2, 2017, but remain in stand-by mode, pursuant to Section 1.2 of the approved *Remedial Action Work Plan for Optimization of the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-1280&D2/R3 (RAWP). Project mobilization to install monitoring wells (MWs), including a transect of seven MWs to the east of C-400 (MW524 through MW530), began on July 12, 2016. Construction of the MW transect began on July 19, 2016, and was completed on September 21, 2016.¹ Sample results from the MW transect confirmed anticipated conditions,² leading to a second phase of the project drilling and construction. Mobilization for installation of the remaining MWs and PZs and the EWs began on March 7, 2017, and construction began on March 22, 2017. Demobilization was completed for the final drill crew on August 23, 2017, and for the construction crew on October 10, 2017. Construction of the Northeast Plume Containment System was complete on October 10, 2017. Subsequently, tests consistent with the RAWP to optimize TCE mass removal were initiated.

2. BRIEF DESCRIPTION OF HOW OUTSTANDING ITEMS NOTED IN THE PREFINAL INSPECTION WERE RESOLVED

A site walkdown was performed to identify a list of items that needed to be completed prior to project turnover to operational personnel. The items were documented and checked off as completed. The list is provided below. The project team also created an operational assessment checklist identifying major components to complete prior to turnover to operations. The checklist was signed off on by the Contractor Operations and Maintenance Manager; Project Manager; and Project, Operation, and Maintenance Manager attesting that the Northeast Plume Optimization extraction well system was ready for operation and maintenance by the Contractor Northeast Plume Operations personnel. Copies of the signed project Assessment Checklist, Assessment Plan, and Assessment Report are included in Appendix A.

¹ A piezometer (PZ) was installed adjacent to each of the two EW locations during this period.

² Refer to *Memorandum of Agreement for Resolution of Formal Dispute of the Explanation of Significant Differences to the Record of Decision for the Interim Remedial Action of the Northeast Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE/LX/07-1291&D2), and *Remedial Action Work Plan for the Optimization of the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE/LX/07-1280&D2) (DOE 2015).

Northeast Plume Optimization Project: List of Outstanding Construction Items

- None.

Northeast Plume Optimization Project: List of Add On Items

- Hydrostatic testing of the complete process line system, including the run from the equalization tank of the original EW field to the treatment units of the optimized EW system. All seven process line systems were pressure tested between June 22 and August 3, 2017. All seven process line segments passed testing criteria. Testing results are provided in Appendix B.
- Resizing of the well pump in EW235 based on step test results to accommodate lower-than-design, specific capacity of the well. The EW235 submersible pump and motor were resized to an optimized pumping range of 75-150 gpm on July 5, 2017.

3. EXPLANATIONS OF MODIFICATIONS TO THE ORIGINAL REMEDIATION DESIGN AND REMEDIAL ACTION WORK PLANS

The RAWP, provides details for EW, MW, and PZ locations. Some of these locations were modified from the original design. The relocations were documented by the Federal Facility Agreement (FFA) parties through e-mail submittals and approvals (refer to Appendix C), and as-built drawings were revised to reflect the changes. The changes that resulted in a relocation of a well by 10 ft or more are described below.

The locations of EW234 and its adjacent PZ, PZ534, were switched to position the drill rig for EW234 (taller drill rig mast than the one used to drill PZ534) an adequate distance from overhead power lines. The relocation moved EW234 30 ft to the west, but still within the targeted high-concentration core of the NEP. EW235 was moved 10 ft north, upon approval of the FFA parties, to address a site security protocol, strictly prohibiting the staging of any equipment within 10 ft of the “Limited Area” perimeter fence. Relocations of 10 ft or more are identified in Table 1.

Table 1. Relocations from Proposed Monitoring Well and Piezometer Locations

Monitoring Well/ Piezometer ID	Displacement	Reason for Relocation
MW525	10.7 ft east	Access for sample crew
MW528	12.7 ft southwest	Location adjusted to allow placement of well pads and bollards to accommodate MW527
PZ534	30.0 ft east	Switched location with EW234
EW234	30.7 ft west	Switched location with PZ534 to avoid overhead power line concern
EW235	10.0 ft north	Original location sited too close to Limited Area security fence
PZ535	14.8 ft west	Too close to ditch

Table 1. Relocations from Proposed Monitoring Well and Piezometer Locations (Continued)

Monitoring Well/ Piezometer ID	Displacement	Reason for Relocation
MW536	10.0 ft east	Too close to ditch
MW537	20.3 ft east	Too close to ditch/offset from MW536
PZ555	29.6 ft northwest	Overhead power line concern

Other MWs and PZs were relocated minimal distances (less than 10 ft) to accommodate drill rig access requirements. Figure 1 shows the location of the new wells and PZs installed for the NEP IRA Optimization Project. Figure 2 presents the Northeast Plume extraction well field with 2016 TCE Plume Map. Table 2 provides final coordinates and screen intervals for the new wells and PZs.

4. AS-BUILT DRAWINGS

A set of redlined drawings was kept during the course of construction for the purpose of documenting changes in the field. This information is valuable for maintenance of the system and for locating underground utilities. As-built drawings were produced based upon the redlined drawings generated during construction. The as-built drawings are located in the Appendix D.

5. SYNOPSIS OF THE CONSTRUCTION WORK AND CERTIFICATION THAT THE CONSTRUCTION WORK HAS BEEN COMPLETED

The NEP IRA Optimization Project was implemented to increase TCE mass removal, to enhance control of the Northeast Plume migration at the eastern edge of the PGDP industrial facility, and to reduce further migration off-site. The project included a Phase I installation of a transect of MWs and two PZs followed by a Phase II installation of additional MWs, PZs, and two new EWs (EW234 and EW235). Except where otherwise noted in Section 3 of this report, construction was completed in accordance with the approved project Remedial Action Work Plan. Also included were installation of HDPE piping to the existing C-765 treatment unit and the newly installed C-765-A treatment unit; construction of overhead feeders to provide electrical power; construction of underground communication lines; and installation of instrumentation and control hardware. The wells were installed in optimized locations within and adjacent to the PGDP industrial facility. Based on EW step test results, EW234 is anticipated to operate between 100 to 200 gpm, and EW235 is anticipated to operate between 75 and 150 gpm, with a total system flow rate of no more than 300 gpm for the optimized NEP Containment System, which is consistent with Section 2.2.1 of the O&M Plan (Step Test Data Package is included in Appendix E).³ HDPE piping transfers extracted groundwater to separate treatment units for each EW. The original EWs (EW331 and EW332) have been taken off-line, but remain in stand-by mode.

³ The design rate of the NEP Optimization EWs was 150 gpm each (for a total withdrawal of 300 gpm); however, the sustainable well yield of EW235 is approximately 100 gpm. The EW235 well pump was resized to address this limitation.

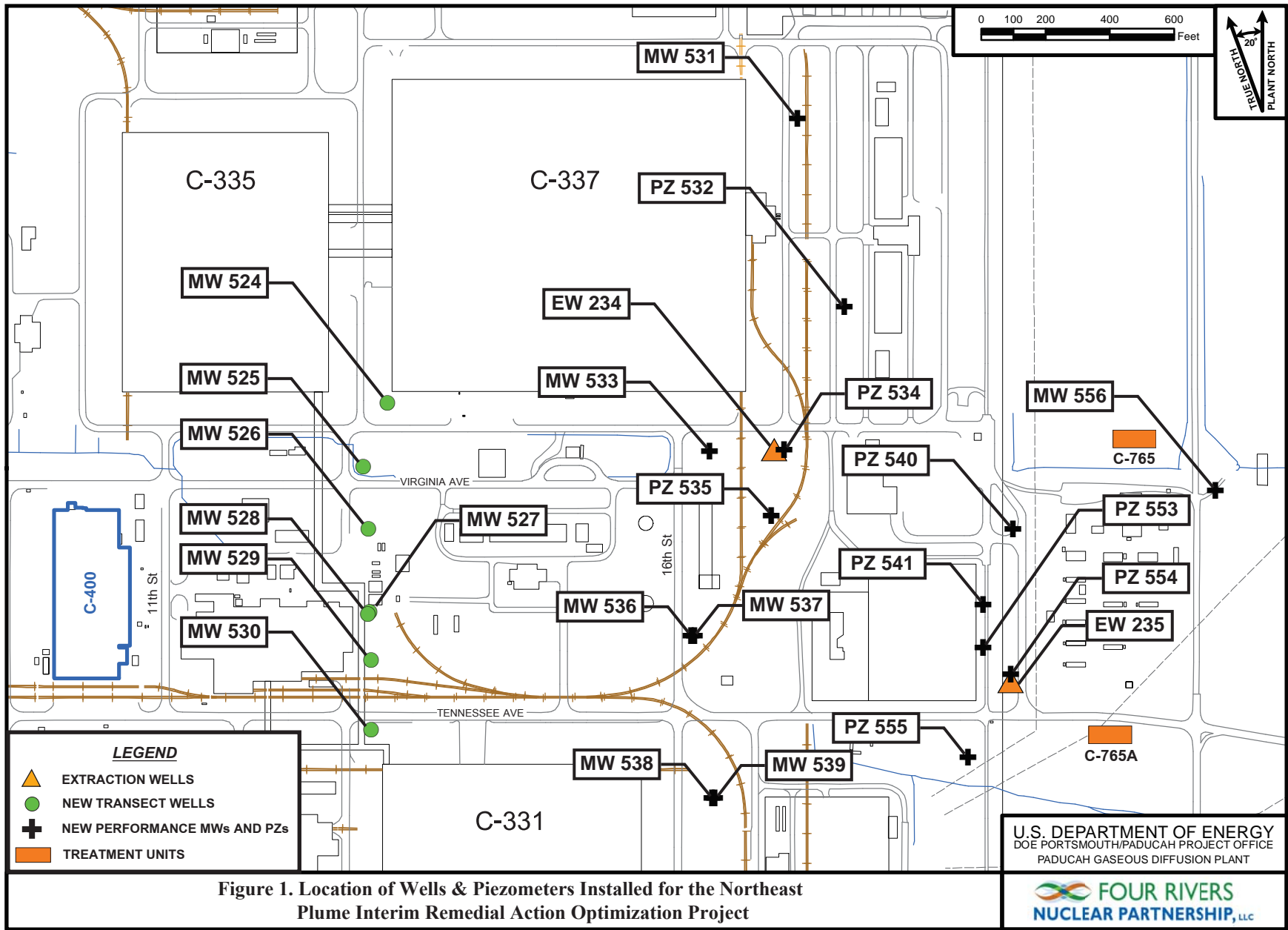


Figure 1. Location of Wells & Piezometers Installed for the Northeast Plume Interim Remedial Action Optimization Project

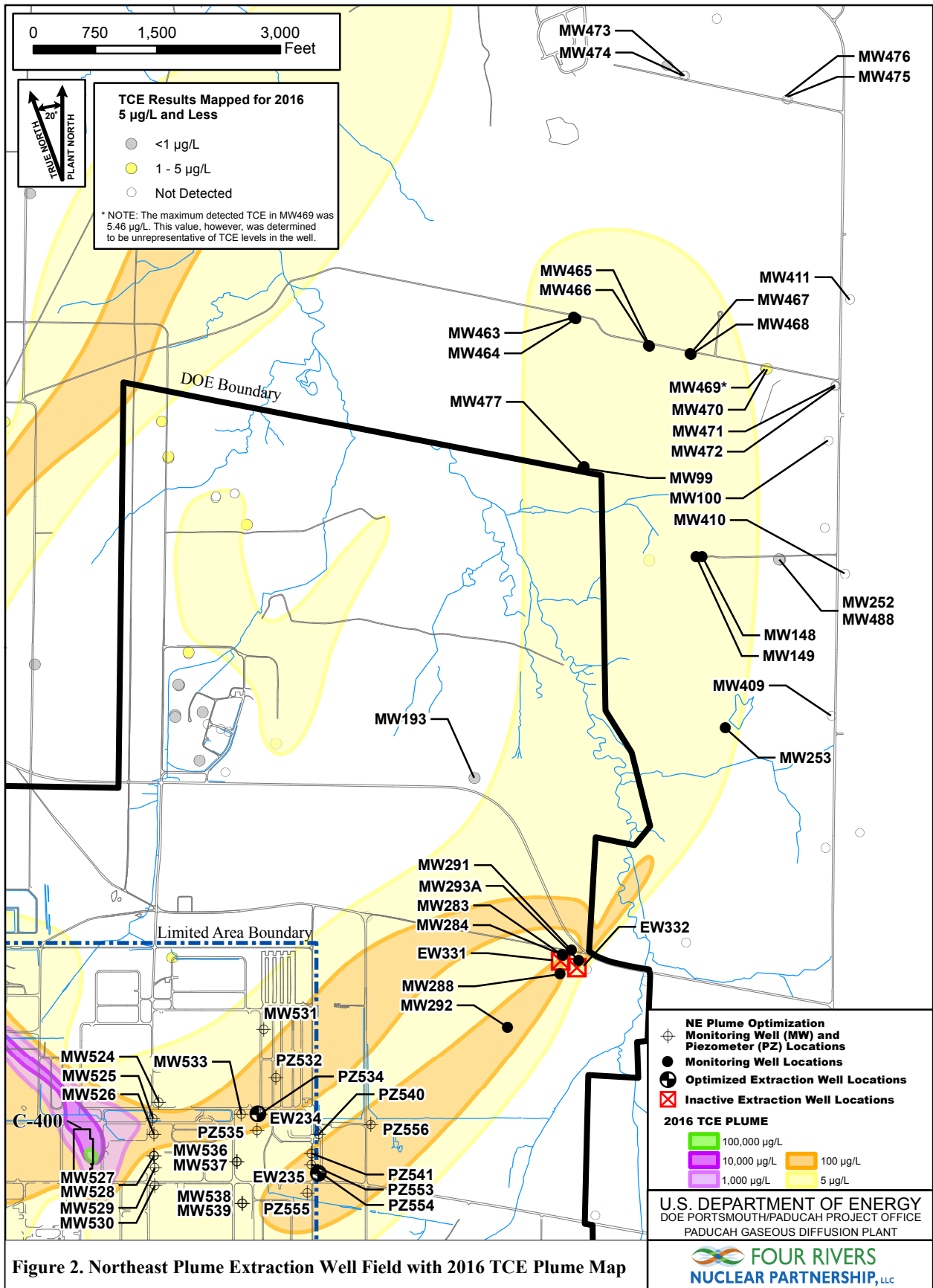


Figure 2. Northeast Plume Extraction Well Field with 2016 TCE Plume Map

NE Plume Optimization Monitoring Well (MW) and Piezometer (PZ) Locations

- Monitoring Well Locations
- Optimized Extraction Well Locations
- Inactive Extraction Well Locations

2016 TCE PLUME

 100,000 $\mu\text{g/L}$	 100 $\mu\text{g/L}$
 10,000 $\mu\text{g/L}$	 5 $\mu\text{g/L}$
 1,000 $\mu\text{g/L}$	

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DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT



**Table 2. New Wells and Piezometers Installed for the
Northeast Plume Interim Remedial Action Optimization Project**

Well/ Piezometer	Plant Coordinates*		Screen Interval		Elevation Ground Grade	Top of Inside Casing	Total Depth of Boring
	Easting	Northing	Elevation (amsl)**	Regional Gravel Aquifer Interval***	Elevation (amsl)**	Elevation (amsl)**	Elevation (amsl)**
EW234	-2110.68	-1019.85	285.6-300.6	MRGA/LRGA	381.3	N/A****	278.3
EW235	-1375.35	-1740.89	282.8-297.8	MRGA/LRGA	382.8	N/A****	276.8
MW524	-3314.77	-874.95	298.7-308.7	MRGA	379.0	381.6	294.0
MW525	-3389.27	-1075.11	300.6-310.6	MRGA	380.9	383.5	297.9
MW526	-3373.91	-1266.96	301.8-311.8	MRGA	381.4	383.8	298.8
MW527	-3369.59	-1525.32	301.6-311.4	MRGA	381.7	384.0	298.7
MW528	-3375.71	-1531.84	291.4-301.4	LRGA	381.7	384.2	282.7
MW529	-3364.05	-1675.13	288.9-298.9	LRGA	380.9	383.3	282.9
MW530	-3364.71	-1893.38	285.1-295.1	LRGA	380.9	383.6	282.9
MW531	-2038.94	9.63	267.3-277.3	LRGA	380.6	383.6	262.6
PZ532	-1892.67	-576.08	285.7-295.7	LRGA	381.9	385.2	278.9
MW533	-2312.45	-1026.16	282.0-292.0	LRGA	381.1	384.2	275.1
PZ534	-2080.02	-1020.02	283.7-293.7	LRGA	381.1	383.9	284.3
PZ535	-2119.75	-1224.77	280.9-290.9	LRGA	382.2	385.3	274.2
MW536	-2370.02	-1598.95	287.7-297.7	LRGA	382.4	385.7	283.9
MW537	-2359.67	-1599.48	277.1-287.1	LRGA	383.0	386.0	274.5
MW538	-2304.68	-2102.73	294.4-304.4	MRGA	381.6	384.9	291.4
MW539	-2295.12	-2102.56	281.4-291.4	LRGA	381.6	384.7	273.6
PZ540	-1367.83	-1266.18	279.5-289.5	LRGA	384.1	387.5	275.1
PZ541	-1460.67	-1500.54	277.0-287.0	LRGA	381.1	384.1	272.1
PZ553	-1460.86	-1635.60	279.2-289.2	LRGA	381.4	384.6	273.4
PZ554	-1374.82	-1719.25	279.2-289.2	LRGA	383.1	386.1	273.6
PZ555	-1508.32	-1976.65	280.1-290.1	LRGA	382.7	385.7	273.7
MW556	-738.35	-1146.84	278.8-288.8	LRGA	379.2	382.5	270.7

*The coordinates for monitoring wells and piezometers are for the center outside casing.

**above mean sea level

*** MRGA = Middle Regional Gravel Aquifer; LRGA = Lower Regional Gravel Aquifer

****N/A = not applicable—Extraction wells had original casings cut off below grade and a pitless adaptor and 90° elbow were attached to extraction well casings and then connected to effluent piping to treatment system. The top of the 90° elbow is approximately 3 ft below ground grade elevation.

To ensure a seamless transition from project construction to continuous operation and verification that the construction work had been completed, a determination of readiness was established, and concurrence was obtained from the Contractor Project and Operations organizations. The following summarizes the postconstruction assessment checklist that serves as documentation that construction was complete, readiness was achieved, and operations could commence. The original signed document is maintained in the project file located at the Paducah Site.

Northeast Plume Optimization Assessment Checklist

I. Plans and Procedures (current revision)

- *Health and Safety Plan for the Paducah Plumes Operations, Paducah, Kentucky, CP2-ER-0067*
- *Waste Management Plan for the Paducah Plume Operations at the Paducah Gaseous Diffusion Plant, Paducah Kentucky, CP2-ER-0012*
- *Paducah Plume Operations Maintenance, Sampling and Analysis, and Calibration and Testing Plan, CP2-ER-0046*
- *Quality Assurance Program Description for the Fluor Federal Services, Inc., Paducah Deactivation Project, Paducah, Kentucky, CP2-QA-1000*
- *Control and Use of Measuring Test Equipment for the Northwest and Northeast Plume Operations, CP4-ER-0020*
- *Environmental Monitoring Data Management Implementation Plan at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, CP2-ES-0063*
- *Startup and Normal Operation of the Northeast Plume Containment System, CP4-ER-0005*
- *Northwest/Northeast Plume Daily Operational Data Collection and Maintenance, CP4-ER-0017*
- *Normal (Short-term) Shutdown for the Northeast Plume Containment System, CP4-ER-0018*
- *Northwest and Northeast Pump and Treat Systems Federal Facility Agreement Semi-Annual Report Calculations, CP4-ER-0028*

II. Configuration Control Documents

- As-built drawings (post-start action, see Appendix D)
- Equipment listing (names and identification numbers) for all pumps, valves, sample ports, flow meters, pressure gages, leak detection devices, etc.
- Copy of all manufacturer specification sheets for each major piece of equipment
- Copy of all installation and operating instructions for each major piece of equipment

- Copy of all manufacturers' recommended calibration and maintenance requirements for each major piece of equipment
- Postconstruction report (poststart action)

III. System Tags and Pipe Labeling

- Installation of equipment and valve tags
- Installation of pipe labeling

IV. Acceptance and Functional Testing Results

- Batch testing report
- Acceptance of calibration/test reports
- Interlock test reports
- Process line system hydrostatic tests (for test results, see Appendix B)

V. Training Completion

- Required reading completion by Contractor NEP operations personnel

VI. DOE Informal Notification of Readiness

- Tour for DOE Project Manager

VII. Declaration of Readiness

The Contractor Operations and Maintenance Manager; Project Manager; and Project, Operation, and Maintenance Manager attested that the Northeast Plume Optimization extraction well system was ready for operation and maintenance by the Contractor Northeast Plume Operations personnel. Copies of the signed project Assessment Checklist, Assessment Plan, and Assessment Report are included in Appendix A.

SUMMARY OF PROJECT COST

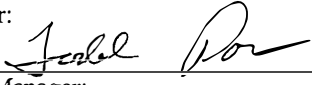
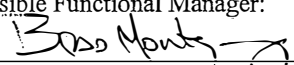
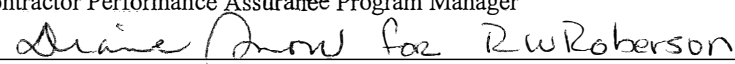
The cost for the project was \$5,850,000.⁴

⁴ Accounting of expenditures is based on an estimate governed by figures known at the time the report was written, which includes, but is not limited to, costs associated with drilling operations; infrastructure installation and construction activities; design and fabrication of mobile treatment systems; preparation of regulatory documents; waste disposal; sampling and analysis; and associated labor costs.

APPENDIX A

**ASSESSMENT CHECKLIST, ASSESSMENT PLAN, AND
ASSESSMENT REPORT**

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ASSESSMENT REPORT	
Title/Activity: Evaluation of Optimized Northeast Plume Containment System (NEPCS) construction & preparations to begin operations.	Assessment Number: MA-FY18-0006
Organization: LSRS Project Operations & Maintenance	Location(s): C-765, C-765-A Auxiliary Treatment Units & Extraction Wells 234 and 235.
Start Date: 10/2/2017	Completion Date: 10/11/2017
Assessment Team Members: Todd Powers, Brian Lowrance, Brad Montgomery	
<p>Distribution List (minimum is Responsible Director, Waste Certification Official if NNSS Waste Certification Program related, and Responsible Functional Manager from assessed organization)</p> <p>Myrna Redfield Bruce Ford J.D. Sohl Craig Jones Brad Montgomery Brian Lowrance Todd Powers</p>	
<p>Executive Summary: The assessment team determined the NE Plume Optimization construction activities have been completed in accordance with the Regulatory Documentation for the work (Remedial Action Work Plan, Explanation of Significant Differences, and the Operation and Maintenance Plan. The team also determined the work control documents (procedures, health and safety plan, Job Hazard Analyses, etc.) and training of personnel are in place to allow for start up of the systems. Specific operations personnel (craft and front-line supervision) who will be operating the system have been involved in development and validation of procedures. Three procedures that are not required for start up are in development and nearing completion, with target completion prior to FFS to Four Rivers Nuclear Partnership. These procedures define preventative maintenance, data evaluation for the Federal Facilities Agreement semi-annual report, and calibration of Measuring & Test Equipment and Installed Process Instrumentation. A copy of the completed checklist for the assessment is attached.</p>	
Issue Types found:	Quantity Found
Finding	0
Observations	0
Process Improvements	0
Proficiency	0
Signatures	
Assessment Team Leader: 	Date: 10/12/17
Responsible Functional Manager: 	Date: 10/12/17
Contractor Performance Assurance Program Manager 	Date: 10/16/17

Assessment Checklist					
Title/Activity: Northeast Plume Optimization – Verification of Readiness to Initiate Operations			Assessment Number: MA-FY18-0006		
Organization: Environmental Restoration			Location(s): Northeast Plume Containment System		
Item #	Line of Inquiry	Result	Sat	Unsat	N/A
1	Are procedures in place and available to support for the first day of fully operational status for the optimized operations? Have procedures been validated and approved for use?	<p>Four procedures have been revised to reflect the optimized system and are required for the first day of fully operational status.</p> <ul style="list-style-type: none"> • CP2-ER-0067/R1 - <i>Health and Safety Plan for the Paducah Plumes Operations Paducah, Kentucky</i> • CP4-ER-0017/R2 <i>Northwest/Northeast Plume Daily Operational Data Collection and Maintenance</i> • <i>Startup and Normal Operation of the Northeast Plume Containment System (CP4-ER-0005/R1)</i> • <i>Normal (Short-term) Shutdown for the Northeast Plume Containment System (CP4-ER-0018/R1)</i> <p>Evidence included in attachment #1.</p>	X		
2	Are involved personnel current in required training for their required duties?	<p>FLS and Operating personnel's TPDs document they are current in required training for their duties. Organizational chart also included. Assessment team reviewed training history for the Operating employees, and determined current. Also reviewed the training delinquencies report developed by the EM Training Coordinator, indicating no delinquencies relevant to NE Plume Operation.</p> <p>Evidence included in attachment #2.</p>	X		
3	Are involved personnel trained in operation of the new equipment and systems, and on the newly revised procedures?	<p>Evidence of required reading of procedures, where FLS and operations personnel have been involved in the procedure development process, performed procedure validation, etc. is available.</p> <p>Evidence included in attachment #3.</p>	X		

4	Are support groups (Engineering, Rad Con, Emergency Response, Safety, PSS, Fire Protection, etc.) aware new operation is being initiated with new facilities being put on line?	Email sent to support groups with a summary of optimized operation, map showing locations, and offered to provide a walk down to allow groups to see facilities. Email verification from support groups is available. No requests from support groups have been requested, however walk down(s) can still be scheduled after system is fully operational, as necessary. Evidence included in attachment #4.	X		
5	Is a current JHA in place, approved, and available for use?	(2) JHAs being used for current NE Plume Operations are applicable, approved, and available for use. JHAs for use are JHA-9698, JHA for FPDP Site Safety Orientation, General Employee Training, Office/Administrative Personnel, General tours & Inspections, "General Safety JHA", and JHA 10844, Maintenance, Operations and Testing for the Northwest and Northeast Plume and Water Treatment Operations. Evidence included in attachment #5.	X		
6	Are required permits and plans current, in place, and ready for use?	O&M Plan, ESD, & RAWP for system approved by EPA and KY. RWP not required (per email from RADCON), but RADCON will need to be involved if there is a breach of the system to perform surveillance and monitoring. Latest revision of HASP (CP2-ER-0067/R1, <i>Health and Safety Plan for the Paducah Plumes Operations Paducah, Kentucky</i>) reflects the optimized system. Evidence included in attachment #6.	X		
7	Has verification of construction/start-up testing of system been completed in accordance with O&M Plan, RAWP, and ESD? Has functionality of the system, as required from the O&M Plan (interlock/alarm testing, system achieves required treatment standards, necessary flows can be achieved, no leaks, etc.) been performed, completed, results verified by	The assessor verified that the following items have been performed, completed results verified by testing personnel and documented appropriately: Construction checklists completed. Batch testing results are available	X		

	testing personnel, and documented appropriately?	documenting the system performance meets requirements. Electrical inspection reports are completed Electrical Test Reports/hydrostatic reports completed Evidence included in attachment #7.			
8	Has Property been notified to classify the optimized system as "operational" in the FIMS database?	Yes, email from Property is available. Evidence included in attachment #8.	X		
9	Has operational sampling been coordinated with SMO?	Yes, SOW is assigned and analytical lab coordinated. Evidence included in attachment #9.	X		
10	Has (4) quarters of Transect Well data confirmed that operations of the new EWs can commence in accordance with the MOA, ESD, RAWP, and O&M Plan?	Yes. Transect well data was reviewed by the assessment is consistent with anticipated concentrations. Data is maintained in the OREIS system, and provided graphically with the anticipated concentrations established by the Federal Facility Agreement Parties in Attachment 10.	X		
11	Has C-614 and EWs been placed in stand-by?	Yes. Evidence included in attachment #11.	X		
12	Has pipe labeling, signs, postings, etc. been applied to the new system?	Assessor walked down the system and verified. See Attachment 12 for evidence.	X		
13	Have As-built drawings been completed?	Yes. Drawings have been as-built and stamped, as appropriate and verified complete by assessor. See Attachment 13 for evidence.	X		
14	Has M&TE/calibration information used during construction activities been documented appropriately?	Calibration documentation for M&TE utilized during construction was reviewed and documented appropriately. See Attachment 14 for documentation records.	X		
15	Are processes in place to ensure process instrumentation calibration and/or preventative maintenance has been provided to maintenance for inclusion in the appropriate programs (MTE, PM Database, etc.), as applicable?	Following procedures are being modified to address preventative maintenance, calibration of IPI, calculations for reporting of data, etc. <ul style="list-style-type: none"> • CP4-ER-0016/R0 - <i>Monthly, Quarterly, and Annual Maintenance at the C-612 Northwest Plume Groundwater System</i> • CP4-ER-0020/R0 - <i>Control and Use of Measuring and Testing</i> 	X		

		<i>Equipment for the Northwest and Northeast Plume Operations</i> <ul style="list-style-type: none"> • CP4-ER-0028/R0 - <i>Northwest and Northeast Pump and Treat Systems Federal Facility Agreement Semi-Annual Report Calculations</i> • CP2-ER-0046/R1 - <i>Paducah Plume Operations Maintenance, Sampling and Analysis, and Calibration and Testing Plan</i> 			
16	Has walk down with FPDP and/or DOE been completed? Due to potential scheduling conflicts, walk down(s) can be scheduled after system is declared fully operational.	Walkdown completed with representative of FPDP. See Attachment 16 for evidence.	X		

Completed by:

Todd Powers

Todd Powers, LSRS Northeast Plume Project Manager

10/12/17

Date

BK Lowrance

Brian Lowrance, LSRS Operations & Maintenance Manager

10-13-17

Date

Brad Montgomery

Brad Montgomery, LSRS Projects & Operations Manager

10/12/17

Date

Assessment Plan

Assessment #: MA-FY18-0006

Assigned Personnel: Brad Montgomery, Brian Lowrance, Todd Powers

Purpose: Evaluate Optimized Northeast Plume Containment System (NEPCS) construction & preparations to begin operations.

Scope: Scope of this assessment will include the evaluation of physical condition of the NEPCS, review of system testing and start up evaluations, procedures and work controls necessary to start operations, and preparations for operational data collection. The condition of procedures and work controls not needed for system start up, (e.g. those necessary for preventative maintenance, long-term data reporting and evaluation, etc. will be assessed to verify they are on schedule to be in place as needed.

Schedule: Assessment activities began with documentation review & facility inspections during the week of October 2, 2017, and will be completed by October 10, 2017.

Documentation to Review: 1) NEPCS Operating Procedures; 2) NEPCS maintenance procedure drafts; 3) NEPCS Operation & Maintenance Plans; 4) NEPCS Construction Testing Plans; 5) JHA and Health & Safety Plan; 6) TPDs and Training Records. Other documents may be reviewed as appropriate during the assessment.

Expected assessment techniques to be used: (e.g., observation, interviews, etc.). Assessment techniques include facility walk downs & inspections; review of start-up testing plans, operating procedures, Health and Safety Plans and JHA's; discussions with NE Plume Optimization Project construction lead and operating personnel; and communication with support groups verbally or via email.

Assessed Manager's Concurrence:



Signature

10-10-17

Date

APPENDIX B
HYDROSTATIC TEST

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TEST REPORT

Job Number <i>LSR-SC-055</i>	Building Number <i>Treatment Trailer C-765-A</i>	Location <i>48 parking lot</i>
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Equipment Identification/System Component Description
6" PVC EFFLUENT Line From C-765-A TRAILER To discharge Line

M&TE Description and Identification Number <i>TRANSCAT - 0-300 S/A 8403 (MUC-69)</i>	Calibration Due Date <i>Feb 17 - 2019</i>
---	--

Test Description
25 LB INCREMENTS TO REACH 200 PSI

25 25 psi	7:00 - 7:05	<p><i>Hydrostatic Test WITH WATER</i></p> <p><i>Held Final pressure Test For 20 minutes</i></p>
50	7:05 - 7:10	
75	7:10 - 7:15	
100	7:15 - 7:20	
125	7:20 - 7:25	
150	7:25 - 7:30	
175	7:35 - 7:40	
200	7:40 - 8:00 AM	

Prepared by: <i>Tim Garmy / J. D. Damm</i>	Date <i>6-29-17</i>
---	------------------------

Test Start Approval by Customer <i>JM Sent</i>	Date <i>6-29-17</i>
---	------------------------

Test Witness By Customer Yes No

Customer Signature *N/A* Date: *N/A*

Test Results: Satisfactory Unsatisfactory

Murtco Representative: *J. D. Damm* *6-29-17*
Signature Date

Customer: *JM Sent* *6-29-17*
Signature Date

TEST REPORT

Job Number

LSR-SC055

Building Number

Treatment Trailer 765-A

Location

48 Parking lot

Equipment Identification/System Component Description

6" HDPE piping From 765-A Trailer To Extraction Well 235

M&TE Description and Identification Number

TRANSCAT-O-300 S/N 8403 (MUR69)

Calibration Due Date

Feb 17 2018

Test Description

Filled Line WITH WATER TO ALLOW STABILIZATION FOR GROUND TEMPERATURE
PURGED LINE OF AIR FOR TESTING 6-26-17
HYDROED LINE TO 200 PSI AND ADD MAKE-UP WATER FOR
FOUR HOURS BEFORE 1 HOUR TEST
STARTED TEST AT 11:AM AT 190 PSI
ENDED TEST AT 12:PM AT 188 PSI

Total Test Time - 5hrs

TEST PERFORMED BY Tim Canale / J. Doble
TEST WITNESSED BY ERIC MILLER / Eric Miller

Prepared by:

Tim Canale / J. Doble

Date

6-27-17

Test Start Approval by Customer

Jul Sexton / Jeff Sexton

Date

6-27-17

Test Witness By Customer

Yes No

Customer Signature

Jul Sexton

Date:

6-28-17

Test Results:

Satisfactory Unsatisfactory

Murco Representative:

J. Doble
Signature

6-28-17

Date

Customer:

Jul Sexton
Signature

6-29-17

Date

TEST REPORT

Job Number <i>LSR-SC055</i>	Building Number	Location <i>EW 234</i>
Equipment Identification/System Component Description <i>6" HDPE piping From EW234 well To Tie in point outside plant</i>		
M&TE Description and Identification Number <i>TRASCAT-O-300 s/n 8403 mva69</i>	Calibration Due Date <i>Feb 17-2018</i>	
Test Description <i>Filled Line water To allow water stabilization For Groundwater Temperature 6-29-17. Purged Line of AIR For Testing Hydroed Line To 200 psi and Add make up water For Four Hours Before 1 Hour Test</i> <i>STARTED TEST AT 11am AT 190psi</i> <i>Ended TEST AT 12pm AT 184psi</i> <i>TOTAL TEST Time 5 Hrs</i> <i>TEST Performed By J. Danhe</i> <i>WITNESSED BY Eric Dulla</i>		
Prepared by: <i>Tom Grumble / J. Danhe</i>	Date <i>7-6-17</i>	
Test Start Approval by Customer <i>[Signature]</i>	Date <i>7-6-17</i>	
Test Witness By Customer	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Customer Signature	Date:	
Test Results: <input checked="" type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory		
Murco Representative: <i>J. Danhe</i>	<i>7-6-17</i>	
	Signature	Date
Customer: <i>[Signature]</i>	<i>7-6-17</i>	
	Signature	Date

TEST REPORT

Job Number <i>LSR-SC-055</i>	Building Number <i>TREATMENT TRAILER C-765-A</i>	Location <i>48. PARKING LOT</i>																																
Equipment Identification/System Component Description <i>6" PVC INFLUENT LINE TO 765-A TREATMENT TANK</i>																																		
M&TE Description and Identification Number <i>TRANSCAT-D-300 S/N 8403 (MUR-69)</i>		Calibration Due Date <i>FEB. 17 2018</i>																																
Test Description <i>25 LB INCREMENTS TO REACH 200 PSI</i>																																		
<table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;"><i>25 PSI</i></td><td style="width: 15%;"><i>6:51</i></td><td style="width: 15%;"><i>TO</i></td><td style="width: 15%;"><i>7:01</i></td></tr> <tr><td><i>50 PSI</i></td><td><i>7:02</i></td><td><i>TO</i></td><td><i>7:12</i></td></tr> <tr><td><i>75 PSI</i></td><td><i>7:13</i></td><td><i>TO</i></td><td><i>7:33</i></td></tr> <tr><td><i>100 PSI</i></td><td><i>7:23</i></td><td><i>TO</i></td><td><i>7:34</i></td></tr> <tr><td><i>125 PSI</i></td><td><i>7:35</i></td><td><i>TO</i></td><td><i>7:45</i></td></tr> <tr><td><i>150 PSI</i></td><td><i>7:46</i></td><td><i>TO</i></td><td><i>7:56</i></td></tr> <tr><td><i>175 PSI</i></td><td><i>8:17</i></td><td><i>TO</i></td><td><i>8:27</i></td></tr> <tr><td><i>200 PSI</i></td><td><i>8:28</i></td><td><i>TO</i></td><td><i>8:38</i></td></tr> </table>		<i>25 PSI</i>	<i>6:51</i>	<i>TO</i>	<i>7:01</i>	<i>50 PSI</i>	<i>7:02</i>	<i>TO</i>	<i>7:12</i>	<i>75 PSI</i>	<i>7:13</i>	<i>TO</i>	<i>7:33</i>	<i>100 PSI</i>	<i>7:23</i>	<i>TO</i>	<i>7:34</i>	<i>125 PSI</i>	<i>7:35</i>	<i>TO</i>	<i>7:45</i>	<i>150 PSI</i>	<i>7:46</i>	<i>TO</i>	<i>7:56</i>	<i>175 PSI</i>	<i>8:17</i>	<i>TO</i>	<i>8:27</i>	<i>200 PSI</i>	<i>8:28</i>	<i>TO</i>	<i>8:38</i>	<i>HYDROSTATIC TESTING WITH WATER</i>
<i>25 PSI</i>	<i>6:51</i>	<i>TO</i>	<i>7:01</i>																															
<i>50 PSI</i>	<i>7:02</i>	<i>TO</i>	<i>7:12</i>																															
<i>75 PSI</i>	<i>7:13</i>	<i>TO</i>	<i>7:33</i>																															
<i>100 PSI</i>	<i>7:23</i>	<i>TO</i>	<i>7:34</i>																															
<i>125 PSI</i>	<i>7:35</i>	<i>TO</i>	<i>7:45</i>																															
<i>150 PSI</i>	<i>7:46</i>	<i>TO</i>	<i>7:56</i>																															
<i>175 PSI</i>	<i>8:17</i>	<i>TO</i>	<i>8:27</i>																															
<i>200 PSI</i>	<i>8:28</i>	<i>TO</i>	<i>8:38</i>																															
Prepared by: <i>Tim Canale</i>		Date <i>6-22-17</i>																																
Test Start Approval by Customer <i>Jeff Seaton</i>		Date <i>6-22-17</i>																																
Test Witness By Customer <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																		
Customer Signature		Date:																																
Test Results: <input checked="" type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory																																		
Murtco Representative: <i>John Shelley</i>		<i>6-22-17</i>																																
Signature		Date																																
Customer: <i>Jim Seaton</i>		<i>6-22-17</i>																																
Signature		Date																																

TEST REPORT

Job Number LSR-SC-055	Building Number TREATMENT TRAILER C-765-A	Location 48-PARKING LOT
--------------------------	--	----------------------------

Equipment Identification/System Component Description
4" PVC INFLUENT LINE inside VAULT AT EXTRACTION well #235

M&TE Description and Identification Number TRASCAT-0-300 S/A 8403 (MUR-69)	Calibration Due Date Feb-17-2018
---	-------------------------------------

Test Description
25 PSI To reach 200psi
25 psi 7:15 TO 725
50 psi 7:25 TO 735
75 psi 735 TO 745
100 psi 745 TO 755
125 psi 755 TO 805
150 psi 805 TO 815
175 psi 815 TO 825
200 psi 825 TO 8:40
Held TEST For 15 minutes AT 200psi

Prepared by: Tim Bamsli J. Dulle	Date 7-19-17
-------------------------------------	-----------------

Test Start Approval by Customer Jim Scott	Date 7-19-17
--	-----------------

Test Witness By Customer Yes No

Customer Signature Jim Scott Date: 7-19-17

Test Results: Satisfactory Unsatisfactory

Murtco Representative: J. Dulle 7-19-17
Signature Date

Customer: Jim Scott 7-19-17
Signature Date

TEST REPORT

Job Number <i>LSR-SC-055</i>	Building Number <i>TREATMENT TRAILOR C-765-4</i>	Location <i>48 PARKING LOT</i>
---------------------------------	---	-----------------------------------

Equipment Identification/System Component Description
4" PVC Inflow Line inside VAULT AT EXTRACTION well #234

M&TE Description and Identification Number <i>TRANSCAT-0-300 S/N 8403 (MUR-69)</i>	Calibration Due Date <i>Feb 17-2018</i>
---	--

Test Description

25 psi To Reach 200psi

<i>25 psi</i>	<i>9:00</i>	<i>TO</i>	<i>9:10</i>
<i>50 psi</i>	<i>9:10</i>	<i>TO</i>	<i>9:20</i>
<i>75 psi</i>	<i>9:20</i>	<i>TO</i>	<i>9:30</i>
<i>100 psi</i>	<i>9:30</i>	<i>TO</i>	<i>9:40</i>
<i>125 psi</i>	<i>9:40</i>	<i>TO</i>	<i>9:50</i>
<i>150 psi</i>	<i>9:50</i>	<i>TO</i>	<i>10:00</i>
<i>175 psi</i>	<i>10:00</i>	<i>TO</i>	<i>10:10</i>
<i>200 psi</i>	<i>10:10</i>	<i>TO</i>	<i>10:25</i>

Hold TEST FOR 15 minutes AT 200psi

Prepared by: <i>Tim Bamsle / J. Dable</i>	Date <i>7-19-17</i>
--	------------------------

Test Start Approval by Customer <i>J. Dable</i>	Date <i>7-19-17</i>
--	------------------------

Test Witness By Customer Yes No

Customer Signature <i>J. Dable</i>	Date: <i>7-19-17</i>
---------------------------------------	----------------------

Test Results: Satisfactory Unsatisfactory

Murtco Representative: <i>J. Dable</i>	<i>7-19-17</i>
Signature	Date

Customer: <i>J. Dable</i>	<i>7-19-17</i>
Signature	Date

TEST REPORT

Job Number LSR-5C-055	Building Number	Location EW 234
---------------------------------	-----------------	---------------------------

Equipment Identification/System Component Description

614 well - Removed Flow meter & Installed spool piece
 Removed Flow control & Installed Blind Flange
 CUT & Capped 1" Drain Line AT 614 well

C-765 Trailer - Removed 6" pipe outside Trailer & Butterfly valve and installed Blind Flange
 WITH Bleeder To bleed air From system For Hydro

EW-234 well - Installed Blind with BALL valve For Location To Hydro system

637 Cooling Tower - Removed 10' section of pipe and installed 6" Blind Flange
 WITH Bleeder valve To bleed air From system For Testing

M&TE Description and Identification Number TRANSCAT-O-300 s/n 8403 mura69	Calibration Due Date Feb 17, 2018
---	---

Test Description **8-2-17 Filled Line WITH water & Bled air**

8-3-17 Achieved **200 PSI AT 10:AM** AFTER Hydroing system For 2 Hours To get To 200psi

8-3-17 MAINTAINED 200PSI For 4 Hours. **12:00 pm.**

Dropped pressure To 190 PSI AT 2:00pm To Begin 1 Hour TEST. WITH A 5% Loss Allowed.

3:00pm Test over WITH A loss of 0 PSI.

TEST PASSED

Prepared by: Tim Gumbel / J. DeLuca	Date 8-2-17
---	-----------------------

Test Start Approval by Customer Jeff Seaton / J. Seaton	Date 8-2-17
---	-----------------------

Test Witness By Customer Yes No

Customer Signature Chris Biebel	Date: 8/3/17
---	---------------------

Test Results: Satisfactory Unsatisfactory

Murtco Representative: J. DeLuca Signature	8-3-17 Date
--	-----------------------

Customer: J. Seaton Signature	8-3-17 Date
---	-----------------------

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APPENDIX C

WELL RELOCATION APPROVAL E-MAILS

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From: Corkran, Julie
To: [Dollins, Dave](mailto:Dollins.Dave)
Cc: [Begley, Brian \(EEC\)](mailto:Brian.Begley@ky.gov); [Montgomery, Brad](mailto:Brad.Montgomery@FFSPaducah.com); [Garner, Nathan \(CHS-PH\)](mailto:Nathan.Garner@ky.gov); [Brewer, Gaye \(EEC\)](mailto:Gaye.Brewer@ky.gov); [Clark, Bill \(EEC\)](mailto:Bill.Clark@ky.gov); [Powers, Todd](mailto:Todd.Powers@FFSPaducah.com); [Jones, Craig](mailto:Craig.Jones@FFSPaducah.com); [Ford, Bruce](mailto:Bruce.Ford@FFSPaducah.com); [Redfield, Myrna](mailto:Myrna.Redfield@FFSPaducah.com); [Davis, Ken](mailto:Ken.Davis@FFSPaducah.com)
Subject: Re: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in
Date: Tuesday, November 22, 2016 5:22:48 PM

EPA approves the proposal to move the subject extraction well.

Sent from my iPhone

On Nov 22, 2016, at 2:54 PM, Dollins, Dave <Dave.Dollins@lex.doe.gov> wrote:

Thanks Brian!

From: Begley, Brian (EEC) [<mailto:Brian.Begley@ky.gov>]
Sent: Tuesday, November 22, 2016 1:39 PM
To: Dollins, Dave <Dave.Dollins@lex.doe.gov>; Corkran, Julie <Corkran.Julie@epa.gov>; Montgomery, Brad <Brad.Montgomery@FFSPaducah.com>; Garner, Nathan (CHS-PH) <Nathan.Garner@ky.gov>; Brewer, Gaye (EEC) <Gaye.Brewer@ky.gov>; Clark, Bill (EEC) <Bill.Clark@ky.gov>
Cc: Powers, Todd <Todd.Powers@FFSPaducah.com>; Jones, Craig <Craig.Jones@FFSPaducah.com>; Ford, Bruce <Bruce.Ford@FFSPaducah.com>; Redfield, Myrna <Myrna.Redfield@FFSPaducah.com>; Montgomery, Brad <Brad.Montgomery@FFSPaducah.com>; Davis, Ken <Ken.Davis@FFSPaducah.com>
Subject: RE: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in

Thanks Dave,

Kentucky approves the 10-ft relocation of the EW.

Brian Begley, PG

Registered Geologist Supervisor

KY Federal Facilities Agreement Manager

Energy and Environment Cabinet

Division of Waste Management

Hazardous Waste Branch

Paducah Gaseous Diffusion Plant Section

300 Sower Blvd., Frankfort, KY 40601

Brian.Begley@KY.GOV

office: (502) 782-6317

From: Dollins, Dave [<mailto:Dave.Dollins@lex.doe.gov>]
Sent: Tuesday, November 22, 2016 2:24 PM
To: Begley, Brian (EEC); Corkran, Julie; Montgomery, Brad; Garner, Nathan (CHS-PH); Brewer, Gaye (EEC); Clark, Bill (EEC)
Cc: Powers, Todd; Jones, Craig; Ford, Bruce; Redfield, Myrna; Montgomery, Brad; Davis, Ken
Subject: RE: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in
Importance: High

Brian and Julie –

The request is to relocate EW235 10 ft. north to address a security concern. This relocation north would result in the two EWs being slightly closer together, but would not make an appreciable difference in the groundwater extraction well and/or plume containment.

Dave

From: Begley, Brian (EEC) [<mailto:Brian.Begley@ky.gov>]

Sent: Tuesday, November 22, 2016 12:50 PM

To: Dollins, Dave <Dave.Dollins@lex.doe.gov>; Corkran, Julie <Corkran.Julie@epa.gov>; Montgomery, Brad <Brad.Montgomery@FFSPaducah.com>; Garner, Nathan (CHS-PH) <Nathan.Garner@ky.gov>; Brewer, Gaye (EEC) <Gaye.Brewer@ky.gov>; Clark, Bill (EEC) <BillJ.Clark@ky.gov>

Cc: Powers, Todd <Todd.Powers@FFSPaducah.com>; Jones, Craig <Craig.Jones@FFSPaducah.com>; Ford, Bruce <Bruce.Ford@FFSPaducah.com>; Redfield, Myrna <Myrna.Redfield@FFSPaducah.com>; Montgomery, Brad <Brad.Montgomery@FFSPaducah.com>

Subject: RE: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in

Dave,

I told Julie that I left you a voice message on November 14th regarding the proposed 10ft change to the NE Plume extraction wells. I wanted to know if the wells would be 10ft closer together or farther apart with the proposed change.

-Brian

From: Dollins, Dave [<mailto:Dave.Dollins@lex.doe.gov>]

Sent: Tuesday, November 22, 2016 1:42 PM

To: Corkran, Julie; Montgomery, Brad; Begley, Brian (EEC); Garner, Nathan (CHS-PH); Brewer, Gaye (EEC); Clark, Bill (EEC)

Cc: Begley, Brian (EEC); Powers, Todd; Jones, Craig; Ford, Bruce; Redfield, Myrna; Montgomery, Brad

Subject: RE: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in

Julie, I've been out several days sick, however, I'm not aware of the additional information that you are referring to. Can you all help us understand what more is required?

Thanks

Dave

From: Corkran, Julie [<mailto:Corkran.Julie@epa.gov>]

Sent: Monday, November 21, 2016 11:08 AM

To: Dollins, Dave <Dave.Dollins@lex.doe.gov>; Montgomery, Brad <Brad.Montgomery@FFSPaducah.com>; 'Brian Begley' <brian.begley@ky.gov>; nathan.garner@ky.gov; gaye.brewer@ky.gov; Clark, Bill (EEC) <BillJ.Clark@ky.gov>

Subject: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in

Dave:

In speaking with Brian, I understand that he reached out to you for more specific information regarding the DOE proposal (mentioned during the last weekly GW call) to

move one of the two new EWs to address potential safety concerns during drilling.
Have DOE/FLUOR had a chance to respond to Brian so that EPA and KY can provide a
response to DOE's request?

Please advise.

Thanks,

Julie

Julie L. Corkran, Ph.D. | Senior Remedial Project Manager

USEPA Region 4 | Atlanta Federal Center 9T25

61 Forsyth Street SW | Atlanta GA 30303-8960

Office: 404.562.8547 | Fax: 404.562.8518 | corkran.julie@epa.gov

From: Begley, Brian (EEC)
To: [Corkran, Julie](#); [Dollins, Dave](#); [Brewer, Gaye \(EEC\)](#)
Cc: [Powers, Todd](#); [Taylor, Tracy \(PPPO/CONTR\)](#); [Redfield, Myrna](#); [Richards, Jon M.](#); [Ahsanuzzaman, Noman](#); [Davis, Eva](#); [Garner, Nathan \(CHS-PH\)](#); [Stephanie Brock](#); [Jones, Craig](#)
Subject: RE: Request for minor relocations of NE Optimization wells
Date: Thursday, June 23, 2016 1:46:48 PM

All,

KY concurs with the relocations of NE Optimization project proposed below.

Brian Begley, PG

Registered Geologist Supervisor

Please Note New Phone & Address (as of 6-22-16)

Energy and Environment Cabinet
Division of Waste Management
Hazardous Waste Branch
Paducah Gaseous Diffusion Plant Section
300 Sower Blvd., Frankfort, KY 40601

Brian.Begley@KY.GOV

office: (502) 782-6317

From: Corkran, Julie [mailto:Corkran.Julie@epa.gov]

Sent: Thursday, June 23, 2016 2:43 PM

To: Dollins, Dave; Begley, Brian (EEC); Brewer, Gaye (EEC)

Cc: Powers, Todd; Taylor, Tracy (PPPO/CONTR); Redfield, Myrna; Richards, Jon M.; Ahsanuzzaman, Noman; Davis, Eva

Subject: RE: Request for minor relocations of NE Optimization wells

Noman and Jon have advised that they are in agreement with DOE's proposed alternate locations for the NE Plume P&T Optimization wells.

Julie

Julie L. Corkran, Ph.D. | Senior Remedial Project Manager

USEPA Region 4 | Atlanta Federal Center 9T25

61 Forsyth Street SW | Atlanta GA 30303-8960

Office: 404.562.8547 | Fax: 404.562.8518 | corkran.julie@epa.gov

From: Corkran, Julie

Sent: Wednesday, June 22, 2016 5:32 PM

To: Dollins, Dave ; brian.begley@ky.gov; 'Gaye.Brewer@ky.gov' (Gaye.Brewer@ky.gov)

Cc: Powers, Todd ; Taylor, Tracy (PPPO/CONTR) ; Redfield, Myrna ; Richards, Jon M. ; Ahsanuzzaman, Noman ; Davis, Eva

Subject: Re: Request for minor relocations of NE Optimization wells

I am in an all-day VTC tomorrow and not available for this discussion.

I have copied Jon, Noman and Eva on this note in case they can call in and support DOE and KY discussions.

If no one from EPA is available, EPA defers to KY in order to keep the project on target.

If resolution cannot be reached tomorrow, I am available on Monday of next week for a call.

thanks,

Julie

From: Dollins, Dave <Dave.Dollins@lex.doe.gov>

Sent: Wednesday, June 22, 2016 4:25:04 PM

To: Corkran, Julie; brian.begley@ky.gov; 'Gaye.Brewer@ky.gov' (Gaye.Brewer@ky.gov)

Cc: Powers, Todd; Taylor, Tracy (PPPO/CONTR); Redfield, Myrna

Subject: Request for minor relocations of NE Optimization wells

Julie/Brian,

The Northeast Optimization Project team is requesting concurrence/approval for minor relocations within the well network. These adjustments are being requested due to safety concerns and/or ease of well installation identified during walk downs with the drilling subcontractor. We can discuss this request further tomorrow during the weekly GWOU call, if needed.

See the attached figure to assist in your review of this request.

The wells to be relocated and supporting rationale are provided below.

- Swap planned location of Piezometer well 534 (PZ-534) and Extraction Well 234 (EW-234) to eliminate electrical hazard associated with proximity of drill rig mast and high voltage overhead power line(s).
- PZ555 – Relocate approximately 20 ft. northwest to eliminate electrical hazard associated with proximity of drill rig mast and high voltage overhead transmission line(s).
- PZ535 – Relocate approximately 10-15 ft. westward to ensure level ground is available at the drilling location.
- MW531 – Relocate approximately 10 ft. westward to ensure level ground is available at the drilling location.

The installed locations of the well network will be captured on as-built drawings and documented in the Post Construction Report.

Let me know if any additional information is required to address any questions/concerns. If these relocations are acceptable, then a response to this email documenting your concurrence/approval will be appreciated.

Thanks in advance

Dave

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APPENDIX D

AS-BUILT DRAWINGS (ON CD)

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APPENDIX D
AS-BUILT DRAWINGS (ON CD)

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APPENDIX E
STEP TEST SUMMARY

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**Northeast Plume Optimization Project
Extraction Well Pumping Step-Drawdown Tests**

Well construction details and aquifer depths

Well Construction/Aquifer Depth	EW234	EW235
Depth (ft below temporary reference point) of static water level at beginning of pumping step-drawdown test	50.45	51.63
Depth (ft bgs) of top of HU5 Gravel Interval (top of aquifer)	79.00	83.60
Depth (ft bgs) of top of well screen	80.70	85.00
Depth (ft bgs) of base of well screen	95.70	100.00
Depth (ft bgs) of base of HU5 Gravel Interval (base of aquifer)	96.80	102.90

Pumping Step-Drawdown Test

The EW234 step test was performed on June 19, 2017 (pumping from 07:35 to 11:37) and the EW235 step test was performed on June 20, 2017 (pumping from 11:47 to 15:47).

Pumping test measurements

Measurement	EW234			EW235		
	Average Pumping Rate (gpm)	Stage Drawdown (ft)	Final Depth of Water (ft)	Average Pumping Rate (gpm)	Stage Drawdown (ft)	Final Depth of Water (ft)
Static water level	0.00	NA	50.45	0.00	NA	51.63
1 st pumping stage	49.61	1.10	51.55	50.29	6.33	57.96
2 nd pumping stage	101.00	1.39	52.94	99.43	7.23	65.19
3 rd pumping stage	149.83	1.38	54.32	147.62	8.23	73.42
4 th pumping stage	198.18	1.63	55.95	196.00	14.04	87.46

NA = not applicable

Pumping Step-Test Distances (ft from EW)

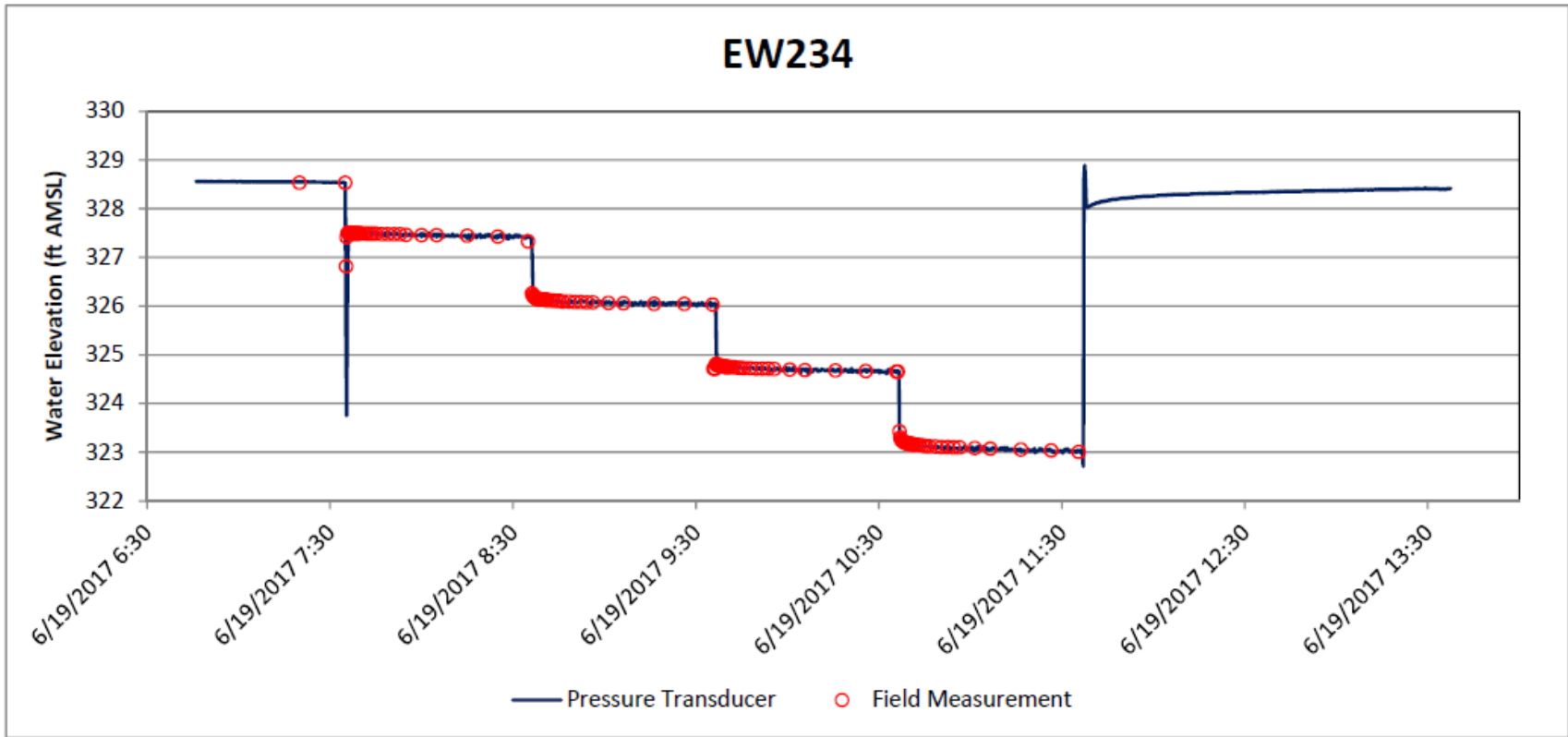
EW234 Step Test			EW235 Step Test	
Nearby Piezometer PZ534	Distal Piezometer PZ540		Nearby Piezometer PZ554	Distal Piezometer PZ540
30.66	782.62		21.56	474.76



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DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

Northeast Plume Optimization Well and Piezometer Installations

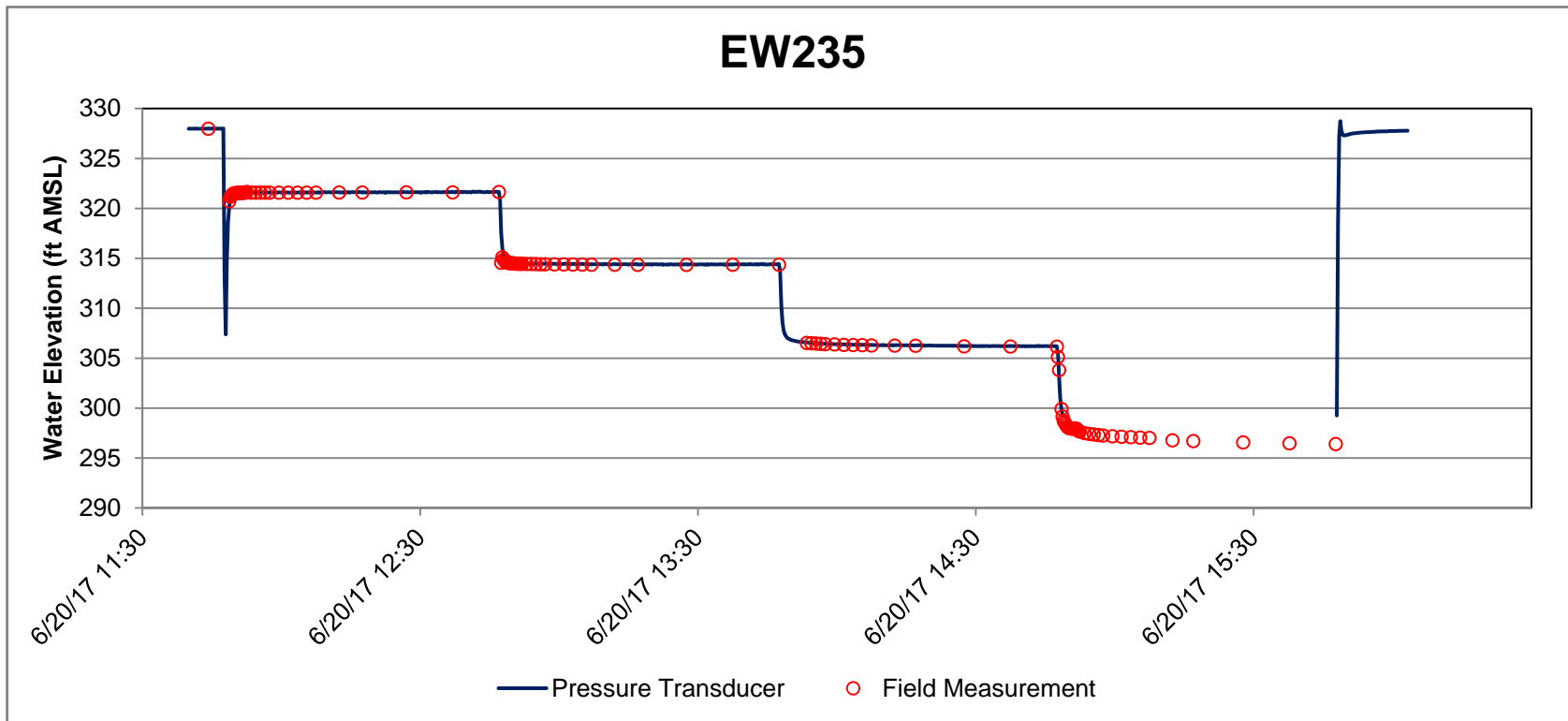




U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

Plot of Water Level Measurements from EW234 Step Test

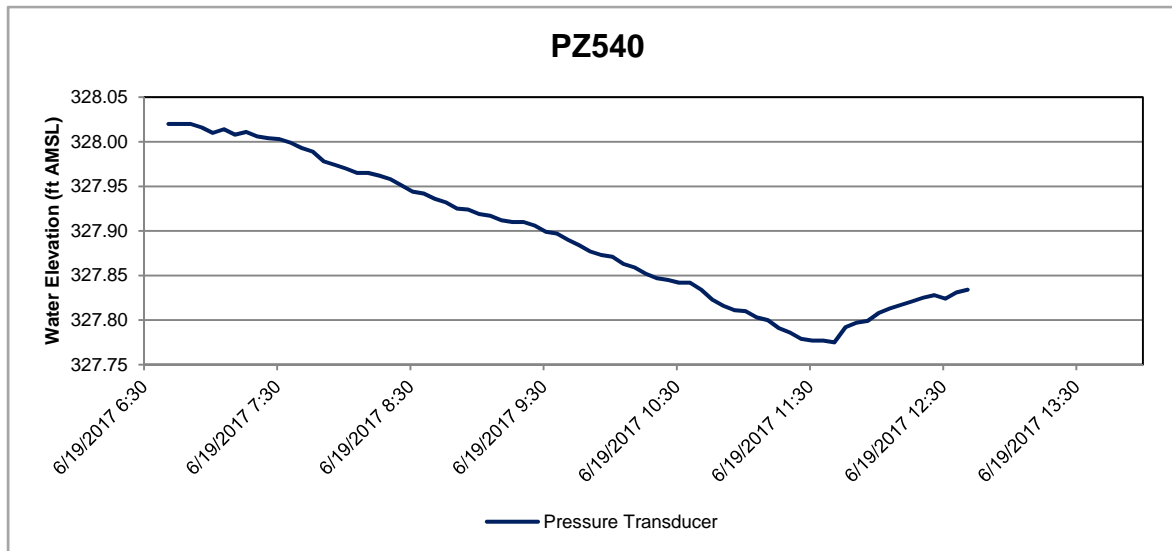
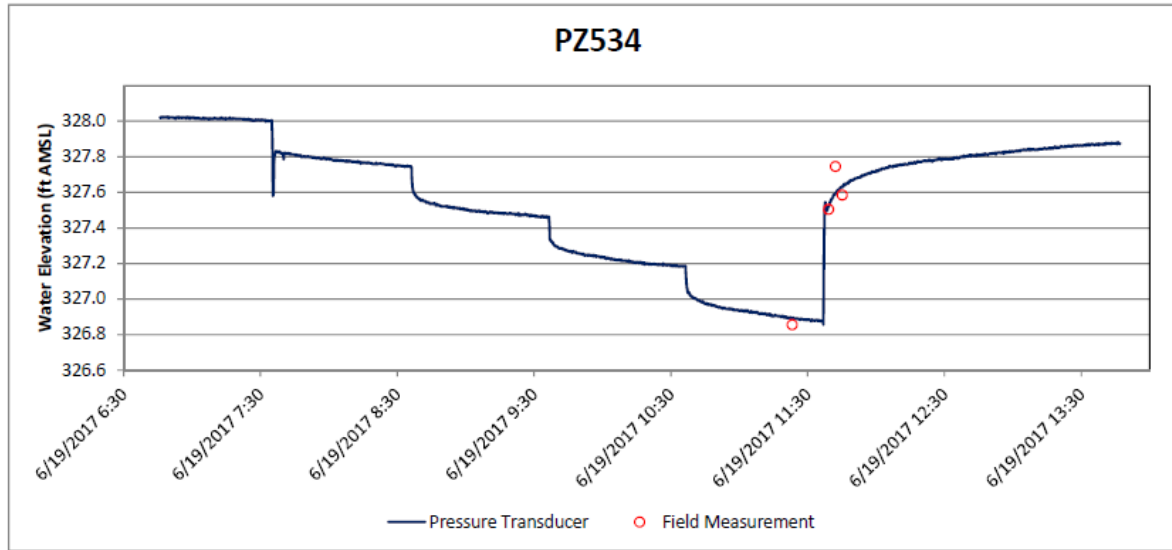




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PADUCAH GASEOUS DIFFUSION PLANT

Plot of Water Level Measurements from EW235 Step Test

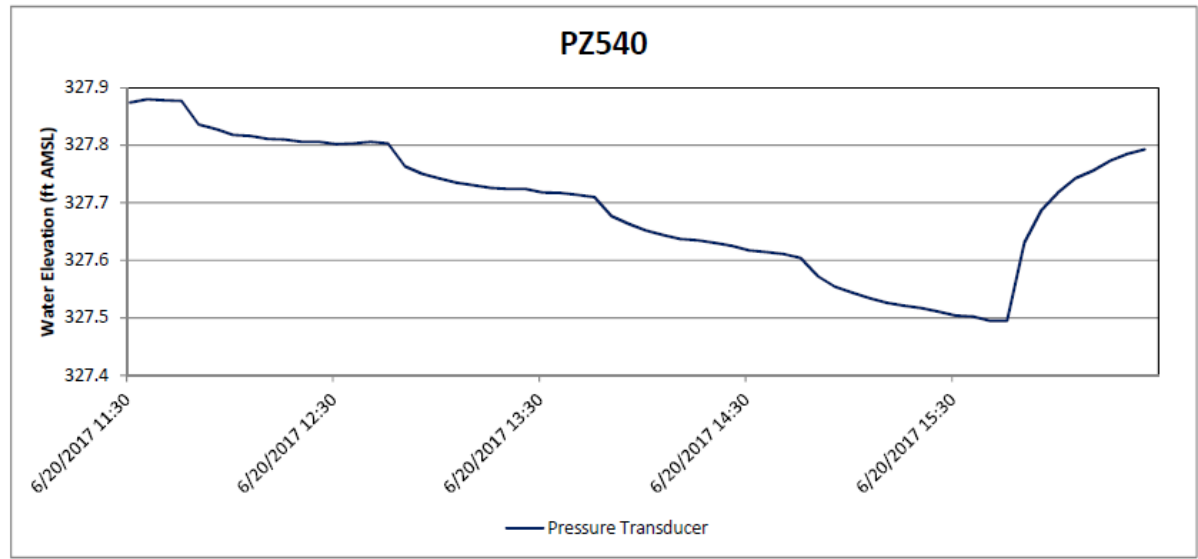
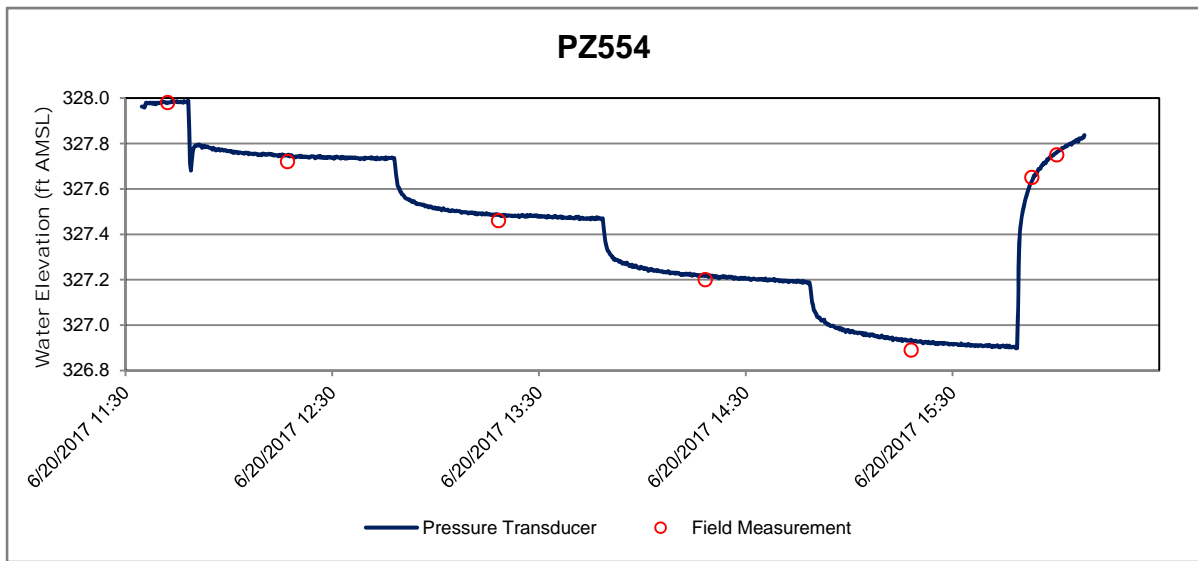




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PADUCAH GASEOUS DIFFUSION PLANT

**Water Level Trends of EW234 Step Test
on adjacent Piezometer PZ534 and Distant Background Piezometer PZ540**





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PADUCAH GASEOUS DIFFUSION PLANT

**Water Level Trends of EW235 Step Test
on adjacent Piezometer PZ554 and Distant Background Piezometer PZ540**



**Postconstruction Report for the
Northeast Plume Optimization at the
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**



CLEARED FOR PUBLIC RELEASE

DOE/LX/07-2419&~~D2~~
Secondary Document

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**Postconstruction Report for the
Northeast Plume Optimization at the
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**

Date Issued—~~May 2018~~

Deleted: December 2017

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

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

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ACRONYMS

<u>amsl</u>	<u>above mean sea level</u>
DOE	U.S. Department of Energy
EW	extraction well
FFA	Federal Facility Agreement
gpm	gallons per minute
HDPE	high-density polyethylene
IRA	interim remedial action
MW	monitoring well
NEP	Northeast Plume
PGDP	Paducah Gaseous Diffusion Plant
PZ	piezometer
RAWP	remedial action work plan

Comment [A2]: Addresses KDEP SC7

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1. GENERAL INTRODUCTION

The Northeast Plume (NEP) Interim Remedial Action (IRA) Optimization Project was implemented to increase trichloroethene (TCE) mass removal, to enhance control of the Northeast Plume migration at the eastern edge of the U.S. Department of Energy-owned Paducah Gaseous Diffusion Plant (PGDP) industrial facility, and to reduce further migration off-site. The project included installation of two new extraction wells (EWs) (EW234 and EW235). The wells were installed in optimized locations within and adjacent to the PGDP industrial facility. Based on EW step tests, EW234 is anticipated to operate between 100 and 200 gpm, and EW235 is anticipated to operate between 75 and 150 gpm, with a total system flow rate of no more than 300 gpm for the optimized NEP Containment System as discussed in Section 2.2.1 of the Operation and Maintenance Plan for the Northeast Plume Containment System Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1535&D3/R6 (O&M Plan). High density polyethylene (HDPE) piping transfers extracted groundwater to the C-765/C-765-A Treatment Facilities for treatment. The original EWs (EW331 and EW332) were taken off-line on September 2, 2017, but remain in stand-by mode, pursuant to Section 1.2 of the approved Remedial Action Work Plan for Optimization of the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/LX/07-1280&D2/R3 (RAWP). Project mobilization to install monitoring wells (MWs), including a transect of seven MWs to the east of C-400 (MW524 through MW530), began on July 12, 2016. Construction of the MW transect began on July 19, 2016, and was completed on September 21, 2016.¹ Sample results from the MW transect confirmed anticipated conditions,² leading to a second phase of the project drilling and construction. Mobilization for installation of the remaining MWs and PZs and the EWs began on March 7, 2017, and construction began on March 22, 2017. Demobilization was completed for the final drill crew on August 23, 2017, and for the construction crew on October 10, 2017. Construction of the Northeast Plume Containment System was complete on October 10, 2017. Subsequently, tests consistent with the RAWP to optimize TCE mass removal were initiated.

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Comment [A3]: Addresses KDEP SC2

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Comment [A4]: Addresses KDEP SC1

Comment [A5]: Changed to be consistent with terminology used in the MOA.

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Comment [A6]: Addresses KDEP SC3

Comment [A7]: Addresses KDEP SC1

2. BRIEF DESCRIPTION OF HOW OUTSTANDING ITEMS NOTED IN THE PREFINAL INSPECTION WERE RESOLVED

A site walkdown was performed to identify a list of items that needed to be completed prior to project turnover to operational personnel. The items were documented and checked off as completed. The list is provided below. The project team also created an operational assessment checklist identifying major components to complete prior to turnover to operations. The checklist was signed off on by the Contractor Operations and Maintenance Manager; Project Manager; and Project, Operation, and Maintenance Manager, attesting that the Northeast Plume Optimization extraction well system was ready for operation and maintenance by the Contractor Northeast Plume Operations personnel. Copies of the signed project Assessment Checklist, Assessment Plan, and Assessment Report are included in Appendix A.

Comment [A8]: Addresses EPA GC1 and KDEP SC9

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Comment [A9]: Addresses EPA GC1 and KDEP SC9

¹ A piezometer (PZ) was installed adjacent to each of the two EW locations during this period.

² Refer to Memorandum of Agreement for Resolution of Formal Dispute of the Explanation of Significant Differences to the Record of Decision for the Interim Remedial Action of the Northeast Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-1291&D2), and Remedial Action Work Plan for the Optimization of the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-1280&D2) (DOE 2015).

Northeast Plume Optimization Project: List of Outstanding Construction Items

Comment [A10]: KDEP SC4

- None.

Northeast Plume Optimization Project: List of Add On Items

- Hydrostatic testing of the complete process line system, including the run from the equalization tank of the original EW field to the treatment units of the optimized EW system. All seven process line systems were pressure tested between June 22 and August 3, 2017. All seven process line segments passed testing criteria. Testing results are provided in Appendix B.
- Resizing of the well pump in EW235 based on step test results to accommodate lower-than-design, specific capacity of the well. The EW235 submersible pump and motor were resized to an optimized pumping range of 75-150 gpm on July 5, 2017.

Comment [A11]: Addresses EPA SC1 and KDEP SC4

Comment [A12]: Addresses EPA SC1 and KDEP SC4

3. EXPLANATIONS OF MODIFICATIONS TO THE ORIGINAL REMEDIATION DESIGN AND REMEDIAL ACTION WORK PLANS

The RAWP provides details for EW, MW, and PZ locations. Some of these locations were modified from the original design. The relocations were documented by the Federal Facility Agreement (FFA) parties through e-mail submittals and approvals (refer to Appendix C), and as-built drawings were revised to reflect the changes. The changes that resulted in a relocation of a well by 10 ft or more are described below.

Comment [A13]: Addresses KDEP SC1

Deleted: Remedial Action Work Plan for Optimization of the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/LX/07-1280&D2/R3

Comment [A14]: Addresses EPA SC2

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The locations of EW234 and its adjacent PZ, PZ534, were switched to position the drill rig for EW234 (taller drill rig mast than the one used to drill PZ534) an adequate distance from overhead power lines. The relocation moved EW234 30 ft to the west, but still within the targeted high-concentration core of the NEP. EW235 was moved 10 ft north, upon approval of the FFA parties, to address a site security protocol, strictly prohibiting the staging of any equipment within 10 ft of the "Limited Area" perimeter fence. Relocations of 10 ft or more are identified in Table 1.

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Comment [A15]: Addresses KDEP SC5

Table 1. Relocations from Proposed Monitoring Well and Piezometer Locations

Monitoring Well/ Piezometer ID	Displacement	Reason for Relocation
MW525	10.7 ft east	Access for sample crew
MW528	12.7 ft southwest	<u>Location adjusted to allow placement of well pads and bollards to accommodate MW527</u>
PZ534	30.0 ft east	Switched location with EW234
<u>EW234</u>	<u>30.7 ft west</u>	<u>Switched location with PZ534 to avoid overhead power line concern</u>
<u>EW235</u>	<u>10.0 ft north</u>	<u>Original location sited too close to Limited Area security fence</u>
PZ535	14.8 ft west	Too close to ditch

Deleted: Offset from MW527

Comment [A16]: Addresses EPA SC4

Comment [A17]: Addresses KDEP SC5

Comment [A18]: Addresses EPA SC3 and KDEP SC6

Table 1. Relocations from Proposed Monitoring Well and Piezometer Locations (Continued)

<u>Monitoring Well/ Piezometer ID</u>	<u>Displacement</u>	<u>Reason for Relocation</u>
MW536	10.0 ft east	Too close to ditch
MW537	20.3 ft east	Too close to ditch/offset from MW536
PZ555	29.6 ft northwest	Overhead power line concern

Other MWs and PZs were relocated minimal distances (less than 10 ft) to accommodate drill rig access requirements. Figure 1 shows the location of the new wells and PZs installed for the NEP IRA Optimization Project. [Figure 2 presents the Northeast Plume extraction well field with 2016 TCE Plume Map.](#) Table 2 provides final coordinates and screen intervals for the new wells and PZs.

Comment [A19]: Addresses EPA GC3

4. AS-BUILT DRAWINGS

A set of redlined drawings was kept during the course of construction for the purpose of documenting changes in the field. This information is valuable for maintenance of the system and for locating underground utilities. As-built drawings were produced based upon the redlined drawings generated during construction. The as-built drawings are located in the [Appendix D.](#)

Comment [A20]: Conforming change. Added multiple appendices.

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Piezometer

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5. SYNOPSIS OF THE CONSTRUCTION WORK AND CERTIFICATION THAT THE CONSTRUCTION WORK HAS BEEN COMPLETED

The NEP IRA Optimization Project was implemented to increase TCE mass removal, to enhance control of the Northeast Plume migration at the eastern edge of the PGDP industrial facility, and to reduce further migration off-site. The project included a Phase I installation of a transect of MWs and two PZs followed by a Phase II installation of additional MWs, PZs, and two new EWs (EW234 and EW235). Except where otherwise noted in Section 3 of this report, construction was completed in accordance with the approved project Remedial Action Work Plan. Also included were installation of HDPE piping to the existing C-765 treatment unit and the newly installed C-765-A treatment unit; construction of overhead feeders to provide electrical power; construction of underground communication lines; and installation of instrumentation and control hardware. The wells were installed in optimized locations within and adjacent to the PGDP industrial facility. Based on EW step test results, EW234 is anticipated to operate between 100 to 200 gpm, and EW235 is anticipated to operate between 75 and 150 gpm, with a total system flow rate of no more than 300 gpm for the optimized NEP Containment System, [which is consistent with Section 2.2.1 of the O&M Plan \(Step Test Data Package is included in Appendix E\).](#)³ HDPE piping transfers extracted groundwater to separate treatment units for each EW. The original EWs (EW331 and EW332) have been taken off-line, but remain in stand-by mode.

Comment [A21]: Addresses KDEP SC2

Comment [A22]: Addresses EPA GC2

³ The design rate of the NEP Optimization EWs was 150 gpm each (for a total withdrawal of 300 gpm); however, the sustainable well yield of EW235 is approximately 100 gpm. The EW235 well pump was resized to address this limitation.

Figure 1. Location of Wells and Piezometers Installed for the Northeast Plume Interim Remedial Action Optimization Project

Deleted: readiness checklist that serves as documentation that construction was complete, readiness was achieved, and operations could commence. The original signed document is maintained in the project file located at the Paducah Site.¶

Figure 2. Northeast Plume Extraction Well Field with 2016 TCE Plume Map

Comment [A23]: Addresses EPA GC3

**Table 2. New Wells and Piezometers Installed for the
Northeast Plume Interim Remedial Action Optimization Project**

Well/ Piezometer	Plant Coordinates*		Screen Interval		<u>Elevation Ground Grade</u>	<u>Top of Inside Casing</u>	<u>Total Depth of Boring</u>
	Easting	Northing	Elevation (amsl)**	Regional Gravel Aquifer Interval***	<u>Elevation (amsl)**</u>	<u>Elevation (amsl)**</u>	<u>Elevation (amsl)**</u>
EW234	-2110.68	-1019.85	285.6-300.6	MRGA/LRGA	<u>381.3</u>	<u>N/A****</u>	<u>278.3</u>
EW235	-1375.35	-1740.89	282.8-297.8	MRGA/LRGA	<u>382.8</u>	<u>N/A****</u>	<u>276.8</u>
MW524	-3314.77	-874.95	298.7-308.7	MRGA	<u>379.0</u>	<u>381.6</u>	<u>294.0</u>
MW525	-3389.27	-1075.11	300.6-310.6	MRGA	<u>380.9</u>	<u>383.5</u>	<u>297.9</u>
MW526	-3373.91	-1266.96	301.8-311.8	MRGA	<u>381.4</u>	<u>383.8</u>	<u>298.8</u>
MW527	-3369.59	-1525.32	301.6-311.4	MRGA	<u>381.7</u>	<u>384.0</u>	<u>298.7</u>
MW528	-3375.71	-1531.84	291.4-301.4	LRGA	<u>381.7</u>	<u>384.2</u>	<u>282.7</u>
MW529	-3364.05	-1675.13	288.9-298.9	LRGA	<u>380.9</u>	<u>383.3</u>	<u>282.9</u>
MW530	-3364.71	-1893.38	285.1-295.1	LRGA	<u>380.9</u>	<u>383.6</u>	<u>282.9</u>
MW531	-2038.94	9.63	267.3-277.3	LRGA	<u>380.6</u>	<u>383.6</u>	<u>262.6</u>
PZ532	-1892.67	-576.08	285.7-295.7	LRGA	<u>381.9</u>	<u>385.2</u>	<u>278.9</u>
MW533	-2312.45	-1026.16	282.0-292.0	LRGA	<u>381.1</u>	<u>384.2</u>	<u>275.1</u>
PZ534	-2080.02	-1020.02	283.7-293.7	LRGA	<u>381.1</u>	<u>383.9</u>	<u>284.3</u>
PZ535	-2119.75	-1224.77	280.9-290.9	LRGA	<u>382.2</u>	<u>385.3</u>	<u>274.2</u>
MW536	-2370.02	-1598.95	287.7-297.7	LRGA	<u>382.4</u>	<u>385.7</u>	<u>283.9</u>
MW537	-2359.67	-1599.48	277.1-287.1	LRGA	<u>383.0</u>	<u>386.0</u>	<u>274.5</u>
MW538	-2304.68	-2102.73	294.4-304.4	MRGA	<u>381.6</u>	<u>384.9</u>	<u>291.4</u>
MW539	-2295.12	-2102.56	281.4-291.4	LRGA	<u>381.6</u>	<u>384.7</u>	<u>273.6</u>
PZ540	-1367.83	-1266.18	279.5-289.5	LRGA	<u>384.1</u>	<u>387.5</u>	<u>275.1</u>
PZ541	-1460.67	-1500.54	277.0-287.0	LRGA	<u>381.1</u>	<u>384.1</u>	<u>272.1</u>
PZ553	-1460.86	-1635.60	279.2-289.2	LRGA	<u>381.4</u>	<u>384.6</u>	<u>273.4</u>
PZ554	-1374.82	-1719.25	279.2-289.2	LRGA	<u>383.1</u>	<u>386.1</u>	<u>273.6</u>
PZ555	-1508.32	-1976.65	280.1-290.1	LRGA	<u>382.7</u>	<u>385.7</u>	<u>273.7</u>
MW556	-738.35	-1146.84	278.8-288.8	LRGA	<u>379.2</u>	<u>382.5</u>	<u>270.7</u>

Comment [A24]: Addresses EPA GC4
Addresses KDEP SC7

Comment [A25]: Addresses KDEP SC8

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Comment [A26]: Addresses KDEP SC8

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*The coordinates for monitoring wells and piezometers are for the center outside casing.

**above mean sea level

***MRGA = Middle Regional Gravel Aquifer; LRGA = Lower Regional Gravel Aquifer

****N/A = not applicable—Extraction wells had original casings cut off below grade and a pitless adaptor and 90° elbow were attached to extraction well casings and then connected to effluent piping to treatment system. The top of the 90° elbow is approximately 3 ft below ground grade elevation.

Comment [A27]: Addresses KDEP SC7

Deleted: RGA = Regional Gravel Aquifer

To ensure a seamless transition from project construction to continuous operation and **verification** that the construction work had been completed, a determination of readiness was established, and concurrence was obtained from the Contractor Project and Operations organizations. The following summarizes the postconstruction assessment checklist that serves as documentation that construction was complete, readiness was achieved, and operations could commence. The original signed document is maintained in the project file located at the Paducah Site.

Comment [A28]: Addresses EPA GC1

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Northeast Plume Optimization Assessment Checklist

Comment [A29]: Addresses EPA GC1 and KDEP SC9

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I. Plans and Procedures (current revision)

- *Health and Safety Plan for the Paducah Plumes Operations, Paducah, Kentucky*, CP2-ER-0067
- *Waste Management Plan for the Paducah Plume Operations at the Paducah Gaseous Diffusion Plant, Paducah Kentucky*, CP2-ER-0012
- *Paducah Plume Operations Maintenance, Sampling and Analysis, and Calibration and Testing Plan*, CP2-ER-0046
- *Quality Assurance Program Description for the Fluor Federal Services, Inc., Paducah Deactivation Project, Paducah, Kentucky*, CP2-QA-1000
- *Control and Use of Measuring Test Equipment for the Northwest and Northeast Plume Operations*, CP4-ER-0020
- *Environmental Monitoring Data Management Implementation Plan at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, CP2-ES-0063
- *Startup and Normal Operation of the Northeast Plume Containment System*, CP4-ER-0005
- *Northwest/Northeast Plume Daily Operational Data Collection and Maintenance*, CP4-ER-0017
- *Normal (Short-term) Shutdown for the Northeast Plume Containment System*, CP4-ER-0018
- *Northwest and Northeast Pump and Treat Systems Federal Facility Agreement Semi-Annual Report Calculations*, CP4-ER-0028

II. Configuration Control Documents

- As-built drawings (post-start action, see **Appendix D**)
- Equipment listing (names and identification numbers) for all pumps, valves, sample ports, flow meters, pressure gages, leak detection devices, etc.
- Copy of all manufacturer specification sheets for each major piece of equipment
- Copy of all installation and operating instructions for each major piece of equipment

Comment [A30]: Conforming change. Added multiple appendices.

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- Copy of all manufacturers' recommended calibration and maintenance requirements for each major piece of equipment
- Postconstruction report (poststart action)

III. System Tags and Pipe Labeling

- Installation of equipment and valve tags
- Installation of pipe labeling

IV. Acceptance and Functional Testing Results

- Batch testing report
- Acceptance of calibration/test reports
- Interlock test reports
- Process line system hydrostatic tests (for test results, see Appendix B)

Comment [A31]: Addresses EPA SC1

V. Training Completion

- Required reading completion by Contractor NEP operations personnel

VI. DOE Informal Notification of Readiness

- Tour for DOE Project Manager

VII. Declaration of Readiness

The Contractor Operations and Maintenance Manager; Project Manager; and Project, Operation, and Maintenance Manager attested that the Northeast Plume Optimization extraction well system was ready for operation and maintenance by the Contractor Northeast Plume Operations personnel. Copies of the signed project Assessment Checklist, Assessment Plan, and Assessment Report are included in Appendix A.

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Comment [A32]: Addresses KDEP SC9

Comment [A33]: Addresses EPA GC1

SUMMARY OF PROJECT COST

The cost for the project was \$5,850,000.⁴

Comment [A34]: Addresses KDEP SC10

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APPENDIX¶

⁴ Accounting of expenditures is based on an estimate governed by figures known at the time the report was written, which includes, but is not limited to, costs associated with drilling operations; infrastructure installation and construction activities; design and fabrication of mobile treatment systems; preparation of regulatory documents; waste disposal; sampling and analysis; and associated labor costs.

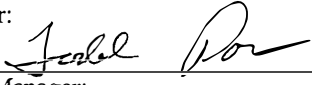
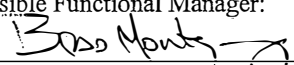
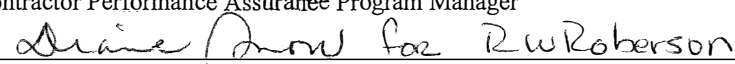
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APPENDIX A

**ASSESSMENT CHECKLIST, ASSESSMENT PLAN, AND
ASSESSMENT REPORT**

Comment [A36]: Addresses EPA GC1 and KDEP SC9

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ASSESSMENT REPORT	
Title/Activity: Evaluation of Optimized Northeast Plume Containment System (NEPCS) construction & preparations to begin operations.	Assessment Number: MA-FY18-0006
Organization: LSRS Project Operations & Maintenance	Location(s): C-765, C-765-A Auxiliary Treatment Units & Extraction Wells 234 and 235.
Start Date: 10/2/2017	Completion Date: 10/11/2017
Assessment Team Members: Todd Powers, Brian Lowrance, Brad Montgomery	
<p>Distribution List (minimum is Responsible Director, Waste Certification Official if NNSS Waste Certification Program related, and Responsible Functional Manager from assessed organization)</p> <p>Myrna Redfield Bruce Ford J.D. Sohl Craig Jones Brad Montgomery Brian Lowrance Todd Powers</p>	
<p>Executive Summary: The assessment team determined the NE Plume Optimization construction activities have been completed in accordance with the Regulatory Documentation for the work (Remedial Action Work Plan, Explanation of Significant Differences, and the Operation and Maintenance Plan. The team also determined the work control documents (procedures, health and safety plan, Job Hazard Analyses, etc.) and training of personnel are in place to allow for start up of the systems. Specific operations personnel (craft and front-line supervision) who will be operating the system have been involved in development and validation of procedures. Three procedures that are not required for start up are in development and nearing completion, with target completion prior to FFS to Four Rivers Nuclear Partnership. These procedures define preventative maintenance, data evaluation for the Federal Facilities Agreement semi-annual report, and calibration of Measuring & Test Equipment and Installed Process Instrumentation. A copy of the completed checklist for the assessment is attached.</p>	
Issue Types found:	Quantity Found
Finding	0
Observations	0
Process Improvements	0
Proficiency	0
Signatures	
Assessment Team Leader: 	Date: 10/12/17
Responsible Functional Manager: 	Date: 10/12/17
Contractor Performance Assurance Program Manager 	Date: 10/16/17

Assessment Checklist					
Title/Activity: Northeast Plume Optimization – Verification of Readiness to Initiate Operations			Assessment Number: MA-FY18-0006		
Organization: Environmental Restoration			Location(s): Northeast Plume Containment System		
Item #	Line of Inquiry	Result	Sat	Unsat	N/A
1	Are procedures in place and available to support for the first day of fully operational status for the optimized operations? Have procedures been validated and approved for use?	<p>Four procedures have been revised to reflect the optimized system and are required for the first day of fully operational status.</p> <ul style="list-style-type: none"> • CP2-ER-0067/R1 - <i>Health and Safety Plan for the Paducah Plumes Operations Paducah, Kentucky</i> • CP4-ER-0017/R2 <i>Northwest/Northeast Plume Daily Operational Data Collection and Maintenance</i> • <i>Startup and Normal Operation of the Northeast Plume Containment System (CP4-ER-0005/R1)</i> • <i>Normal (Short-term) Shutdown for the Northeast Plume Containment System (CP4-ER-0018/R1)</i> <p>Evidence included in attachment #1.</p>	X		
2	Are involved personnel current in required training for their required duties?	<p>FLS and Operating personnel's TPDs document they are current in required training for their duties. Organizational chart also included. Assessment team reviewed training history for the Operating employees, and determined current. Also reviewed the training delinquencies report developed by the EM Training Coordinator, indicating no delinquencies relevant to NE Plume Operation.</p> <p>Evidence included in attachment #2.</p>	X		
3	Are involved personnel trained in operation of the new equipment and systems, and on the newly revised procedures?	<p>Evidence of required reading of procedures, where FLS and operations personnel have been involved in the procedure development process, performed procedure validation, etc. is available.</p> <p>Evidence included in attachment #3.</p>	X		

4	Are support groups (Engineering, Rad Con, Emergency Response, Safety, PSS, Fire Protection, etc.) aware new operation is being initiated with new facilities being put on line?	Email sent to support groups with a summary of optimized operation, map showing locations, and offered to provide a walk down to allow groups to see facilities. Email verification from support groups is available. No requests from support groups have been requested, however walk down(s) can still be scheduled after system is fully operational, as necessary. Evidence included in attachment #4.	X		
5	Is a current JHA in place, approved, and available for use?	(2) JHAs being used for current NE Plume Operations are applicable, approved, and available for use. JHAs for use are JHA-9698, JHA for FPDP Site Safety Orientation, General Employee Training, Office/Administrative Personnel, General tours & Inspections, "General Safety JHA", and JHA 10844, Maintenance, Operations and Testing for the Northwest and Northeast Plume and Water Treatment Operations. Evidence included in attachment #5.	X		
6	Are required permits and plans current, in place, and ready for use?	O&M Plan, ESD, & RAWP for system approved by EPA and KY. RWP not required (per email from RADCON), but RADCON will need to be involved if there is a breach of the system to perform surveillance and monitoring. Latest revision of HASP (CP2-ER-0067/R1, <i>Health and Safety Plan for the Paducah Plumes Operations Paducah, Kentucky</i>) reflects the optimized system. Evidence included in attachment #6.	X		
7	Has verification of construction/start-up testing of system been completed in accordance with O&M Plan, RAWP, and ESD? Has functionality of the system, as required from the O&M Plan (interlock/alarm testing, system achieves required treatment standards, necessary flows can be achieved, no leaks, etc.) been performed, completed, results verified by	The assessor verified that the following items have been performed, completed results verified by testing personnel and documented appropriately: Construction checklists completed. Batch testing results are available	X		

	testing personnel, and documented appropriately?	documenting the system performance meets requirements. Electrical inspection reports are completed Electrical Test Reports/hydrostatic reports completed Evidence included in attachment #7.			
8	Has Property been notified to classify the optimized system as “operational” in the FIMS database?	Yes, email from Property is available. Evidence included in attachment #8.	X		
9	Has operational sampling been coordinated with SMO?	Yes, SOW is assigned and analytical lab coordinated. Evidence included in attachment #9.	X		
10	Has (4) quarters of Transect Well data confirmed that operations of the new EWs can commence in accordance with the MOA, ESD, RAWP, and O&M Plan?	Yes. Transect well data was reviewed by the assessment is consistent with anticipated concentrations. Data is maintained in the OREIS system, and provided graphically with the anticipated concentrations established by the Federal Facility Agreement Parties in Attachment 10.	X		
11	Has C-614 and EWs been placed in stand-by?	Yes. Evidence included in attachment #11.	X		
12	Has pipe labeling, signs, postings, etc. been applied to the new system?	Assessor walked down the system and verified. See Attachment 12 for evidence.	X		
13	Have As-built drawings been completed?	Yes. Drawings have been as-built and stamped, as appropriate and verified complete by assessor. See Attachment 13 for evidence.	X		
14	Has M&TE/calibration information used during construction activities been documented appropriately?	Calibration documentation for M&TE utilized during construction was reviewed and documented appropriately. See Attachment 14 for documentation records.	X		
15	Are processes in place to ensure process instrumentation calibration and/or preventative maintenance has been provided to maintenance for inclusion in the appropriate programs (MTE, PM Database, etc.), as applicable?	Following procedures are being modified to address preventative maintenance, calibration of IPI, calculations for reporting of data, etc. <ul style="list-style-type: none"> • CP4-ER-0016/R0 - <i>Monthly, Quarterly, and Annual Maintenance at the C-612 Northwest Plume Groundwater System</i> • CP4-ER-0020/R0 - <i>Control and Use of Measuring and Testing</i> 	X		

		<i>Equipment for the Northwest and Northeast Plume Operations</i> <ul style="list-style-type: none"> • CP4-ER-0028/R0 - <i>Northwest and Northeast Pump and Treat Systems Federal Facility Agreement Semi-Annual Report Calculations</i> • CP2-ER-0046/R1 - <i>Paducah Plume Operations Maintenance, Sampling and Analysis, and Calibration and Testing Plan</i> 			
16	Has walk down with FPDP and/or DOE been completed? Due to potential scheduling conflicts, walk down(s) can be scheduled after system is declared fully operational.	Walkdown completed with representative of FPDP. See Attachment 16 for evidence.	X		

Completed by:

Todd Powers

Todd Powers, LSRS Northeast Plume Project Manager

10/12/17

Date

BK Lowrance

Brian Lowrance, LSRS Operations & Maintenance Manager

10-13-17

Date

Brad Montgomery

Brad Montgomery, LSRS Projects & Operations Manager

10/12/17

Date

Assessment Plan

Assessment #: MA-FY18-0006

Assigned Personnel: Brad Montgomery, Brian Lowrance, Todd Powers

Purpose: Evaluate Optimized Northeast Plume Containment System (NEPCS) construction & preparations to begin operations.

Scope: Scope of this assessment will include the evaluation of physical condition of the NEPCS, review of system testing and start up evaluations, procedures and work controls necessary to start operations, and preparations for operational data collection. The condition of procedures and work controls not needed for system start up, (e.g. those necessary for preventative maintenance, long-term data reporting and evaluation, etc. will be assessed to verify they are on schedule to be in place as needed.

Schedule: Assessment activities began with documentation review & facility inspections during the week of October 2, 2017, and will be completed by October 10, 2017.

Documentation to Review: 1) NEPCS Operating Procedures; 2) NEPCS maintenance procedure drafts; 3) NEPCS Operation & Maintenance Plans; 4) NEPCS Construction Testing Plans; 5) JHA and Health & Safety Plan; 6) TPDs and Training Records. Other documents may be reviewed as appropriate during the assessment.

Expected assessment techniques to be used: (e.g., observation, interviews, etc.). Assessment techniques include facility walk downs & inspections; review of start-up testing plans, operating procedures, Health and Safety Plans and JHA's; discussions with NE Plume Optimization Project construction lead and operating personnel; and communication with support groups verbally or via email.

Assessed Manager's Concurrence:



Signature

10-10-17

Date

APPENDIX B

HYDROSTATIC TEST

Comment [A37]: Conforming change. Added multiple appendices.

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TEST REPORT

Job Number <i>LSR-SC-055</i>	Building Number <i>Treatment Trailer C-765-A</i>	Location <i>48 parking lot</i>
---------------------------------	---	-----------------------------------

Equipment Identification/System Component Description
6" PVC EFFLUENT Line From C-765-A TRAILER To discharge Line

M&TE Description and Identification Number <i>TRANSCAT - 0-300 S/A 8403 (MUC-69)</i>	Calibration Due Date <i>Feb 17 - 2019</i>
---	--

Test Description
25 LB INCREMENTS TO REACH 200 PSI

25 25 psi	7:00 AM = 7:05	<p><i>Hydrostatic Test WITH WATER</i></p> <p><i>Held Final pressure Test For 20 minutes</i></p>
50	7:05 = 7:10	
75	7:10 = 7:15	
100	7:15 = 7:20	
125	7:20 = 7:25	
150	7:25 = 7:30	
175	7:35 = 7:40	
200	7:40 8:00 AM	

Prepared by: <i>Tim Garmy / J. D. Damm</i>	Date <i>6-29-17</i>
---	------------------------

Test Start Approval by Customer <i>Jim Saut</i>	Date <i>6-29-17</i>
--	------------------------

Test Witness By Customer Yes No

Customer Signature *N/A* Date: *N/A*

Test Results: Satisfactory Unsatisfactory

Murtco Representative: *J. D. Damm* *6-29-17*
Signature Date

Customer: *Jim Saut* *6-29-17*
Signature Date

TEST REPORT

Job Number

LSR-SC055

Building Number

Treatment Trailer 765-A

Location

48 Parking lot

Equipment Identification/System Component Description

6" HDPE piping From 765-A Trailer To Extraction well 235

M&TE Description and Identification Number

TRANSCAT-O-300 S/N 8403 (MUR69)

Calibration Due Date

Feb 17 2018

Test Description

Filled Line WITH WATER TO ALLOW STABILIZATION FOR GROUND TEMPERATURE
PURGED LINE OF AIR FOR TESTING 6-26-17
HYDROED LINE TO 200 PSI AND ADD MAKE-UP WATER FOR
FOUR HOURS BEFORE 1 HOUR TEST
STARTED TEST AT 11:AM AT 190 PSI
ENDED TEST AT 12:PM AT 188 PSI

Total Test Time - 5hrs

TEST PERFORMED BY Tim Canale / J. Doble
TEST WITNESSED BY ERIC MILLER / Eric Miller

Prepared by:

Tim Canale / J. Doble

Date

6-27-17

Test Start Approval by Customer

Jul Sexton / Jeff Sexton

Date

6-27-17

Test Witness By Customer

Yes No

Customer Signature

Jul Sexton

Date:

6-28-17

Test Results:

Satisfactory Unsatisfactory

Murco Representative:

J. Doble
Signature

6-28-17

Date

Customer:

Jul Sexton
Signature

6-29-17

Date

TEST REPORT

Job Number <i>LSR-SC055</i>	Building Number	Location <i>EW234</i>
Equipment Identification/System Component Description <i>6" HDPE piping From EW234 well To Tie in point outside plant</i>		
M&TE Description and Identification Number <i>TRASCAT-O-300 s/n 8403 mva69</i>	Calibration Due Date <i>Feb 17-2018</i>	
Test Description <i>Filled Line water To allow water stabilization For Groundwater Temperature 6-29-17. Purged Line of AIR For Testing Hydroed Line To 200 psi and Add make up water For Four Hours Before 1 Hour Test</i> <i>STARTED TEST AT 11am AT 190psi</i> <i>Ended TEST AT 12pm AT 184psi</i> <i>TOTAL TEST Time 5 Hrs</i> <i>TEST Performed By J. Danhe</i> <i>WITNESSED BY Eric Dulla</i>		
Prepared by: <i>Tom Grumble / J. Danhe</i>	Date <i>7-6-17</i>	
Test Start Approval by Customer <i>[Signature]</i>	Date <i>7-6-17</i>	
Test Witness By Customer	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Customer Signature	Date:	
Test Results: <input checked="" type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory		
Murco Representative: <i>J. Danhe</i>	<i>7-6-17</i>	
	Signature	Date
Customer: <i>[Signature]</i>	<i>7-6-17</i>	
	Signature	Date

TEST REPORT

Job Number <i>LSR-SC-055</i>	Building Number <i>TREATMENT TRAILER C-765-A</i>	Location <i>48. PARKING LOT</i>																																
Equipment Identification/System Component Description <i>6" PVC INFLUENT LINE TO 765-A TREATMENT TRAILER</i>																																		
M&TE Description and Identification Number <i>TRANSCAT-D-300 S/N 8403 (MUR-69)</i>		Calibration Due Date <i>FEB. 17 2018</i>																																
Test Description <i>25 LB INCREMENTS TO REACH 200 PSI</i>																																		
<table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;"><i>25 PSI</i></td><td style="width: 15%;"><i>6:51</i></td><td style="width: 15%;"><i>TO</i></td><td style="width: 15%;"><i>7:01</i></td></tr> <tr><td><i>50 PSI</i></td><td><i>7:02</i></td><td><i>TO</i></td><td><i>7:12</i></td></tr> <tr><td><i>75 PSI</i></td><td><i>7:13</i></td><td><i>TO</i></td><td><i>7:33</i></td></tr> <tr><td><i>100 PSI</i></td><td><i>7:23</i></td><td><i>TO</i></td><td><i>7:34</i></td></tr> <tr><td><i>125 PSI</i></td><td><i>7:35</i></td><td><i>TO</i></td><td><i>7:45</i></td></tr> <tr><td><i>150 PSI</i></td><td><i>7:46</i></td><td><i>TO</i></td><td><i>7:56</i></td></tr> <tr><td><i>175 PSI</i></td><td><i>8:17</i></td><td><i>TO</i></td><td><i>8:27</i></td></tr> <tr><td><i>200 PSI</i></td><td><i>8:28</i></td><td><i>TO</i></td><td><i>8:38</i></td></tr> </table>		<i>25 PSI</i>	<i>6:51</i>	<i>TO</i>	<i>7:01</i>	<i>50 PSI</i>	<i>7:02</i>	<i>TO</i>	<i>7:12</i>	<i>75 PSI</i>	<i>7:13</i>	<i>TO</i>	<i>7:33</i>	<i>100 PSI</i>	<i>7:23</i>	<i>TO</i>	<i>7:34</i>	<i>125 PSI</i>	<i>7:35</i>	<i>TO</i>	<i>7:45</i>	<i>150 PSI</i>	<i>7:46</i>	<i>TO</i>	<i>7:56</i>	<i>175 PSI</i>	<i>8:17</i>	<i>TO</i>	<i>8:27</i>	<i>200 PSI</i>	<i>8:28</i>	<i>TO</i>	<i>8:38</i>	<i>HYDROSTATIC TESTING WITH WATER</i>
<i>25 PSI</i>	<i>6:51</i>	<i>TO</i>	<i>7:01</i>																															
<i>50 PSI</i>	<i>7:02</i>	<i>TO</i>	<i>7:12</i>																															
<i>75 PSI</i>	<i>7:13</i>	<i>TO</i>	<i>7:33</i>																															
<i>100 PSI</i>	<i>7:23</i>	<i>TO</i>	<i>7:34</i>																															
<i>125 PSI</i>	<i>7:35</i>	<i>TO</i>	<i>7:45</i>																															
<i>150 PSI</i>	<i>7:46</i>	<i>TO</i>	<i>7:56</i>																															
<i>175 PSI</i>	<i>8:17</i>	<i>TO</i>	<i>8:27</i>																															
<i>200 PSI</i>	<i>8:28</i>	<i>TO</i>	<i>8:38</i>																															
Prepared by: <i>Tim Canale</i>		Date <i>6-22-17</i>																																
Test Start Approval by Customer <i>Jeff Seaton</i>		Date <i>6-22-17</i>																																
Test Witness By Customer <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																		
Customer Signature		Date:																																
Test Results: <input checked="" type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory																																		
Murtco Representative:	<i>John Shelley</i> Signature	<i>6-22-17</i> Date																																
Customer:	<i>Jeff Seaton</i> Signature	<i>6-22-17</i> Date																																

TEST REPORT

Job Number LSR-SC-055	Building Number Treatment TRAILOR C-765-A	Location 48-PARKING LOT
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Equipment Identification/System Component Description
4" PVC INFLUENT Line inside VAULT AT EXTRACTION well #235

M&TE Description and Identification Number TRASCAT-0-300 S/A 8403 (MUR-69)	Calibration Due Date Feb-17-2018
---	-------------------------------------

Test Description
25 PSI To reach 200psi
25 psi 7:15 TO 725
50 psi 7:25 TO 735
75 psi 735 TO 745
100 psi 745 TO 755
125 psi 755 TO 805
150 psi 805 TO 815
175 psi 815 TO 825
200 psi 825 TO 8:40
Held TEST For 15 minutes AT 200psi

Prepared by: Tim Bamsli J. Dulle	Date 7-19-17
-------------------------------------	-----------------

Test Start Approval by Customer J. Dulle	Date 7-19-17
---	-----------------

Test Witness By Customer Yes No

Customer Signature J. Dulle Date: 7-19-17

Test Results: Satisfactory Unsatisfactory

Murco Representative: J. Dulle 7-19-17
Signature Date

Customer: J. Dulle 7-19-17
Signature Date

TEST REPORT

Job Number <i>LSR-SC-055</i>	Building Number <i>TREATMENT TRAILOR C-765-4</i>	Location <i>48 PARKING LOT</i>
---------------------------------	---	-----------------------------------

Equipment Identification/System Component Description
4" PVC Inflow Line inside VAULT AT EXTRACTION well #234

M&TE Description and Identification Number <i>TRANSCAT-O-300 S/N 8403 (MUR-69)</i>	Calibration Due Date <i>Feb 17-2018</i>
---	--

Test Description

25 psi To Reach 200psi

<i>25 psi</i>	<i>9:00</i>	<i>TO</i>	<i>9:10</i>
<i>50 psi</i>	<i>9:10</i>	<i>TO</i>	<i>9:20</i>
<i>75 psi</i>	<i>9:20</i>	<i>TO</i>	<i>9:30</i>
<i>100 psi</i>	<i>9:30</i>	<i>TO</i>	<i>9:40</i>
<i>125 psi</i>	<i>9:40</i>	<i>TO</i>	<i>9:50</i>
<i>150 psi</i>	<i>9:50</i>	<i>TO</i>	<i>10:00</i>
<i>175 psi</i>	<i>10:00</i>	<i>TO</i>	<i>10:10</i>
<i>200 psi</i>	<i>10:10</i>	<i>TO</i>	<i>10:25</i>

Hold TEST FOR 15 minutes AT 200psi

Prepared by: <i>Tim Gansler / J. Dable</i>	Date <i>7-19-17</i>
---	------------------------

Test Start Approval by Customer <i>J. Dable</i>	Date <i>7-19-17</i>
--	------------------------

Test Witness By Customer Yes No

Customer Signature <i>J. Dable</i>	Date: <i>7-19-17</i>
---------------------------------------	----------------------

Test Results: Satisfactory Unsatisfactory

Murtco Representative: <i>J. Dable</i>	<i>7-19-17</i>
Signature	Date

Customer: <i>J. Dable</i>	<i>7-19-17</i>
Signature	Date

TEST REPORT

Job Number LSR-5C-055	Building Number	Location EW 234
---------------------------------	-----------------	---------------------------

Equipment Identification/System Component Description

**614 well - Removed Flow meter & installed spool piece
Removed Flow control & installed Blind Flange
C/T & capped 1" Drain line AT 614 well**

**C-765 Trailer - Removed 6" pipe outside Trailer & Butterfly valve and installed Blind Flange
with Bleeder to bleed air from system for Hydro**

EW-234 well - Installed Blind with Ball Valve for Location to Hydro system

**637 Cooling Tower - Removed 10' section of pipe and installed 6" Blind Flange
with Bleeder valve to bleed air from system for Testing**

M&TE Description and Identification Number TRANSCAT-O-300 s/n 8403 mura69	Calibration Due Date Feb 17, 2018
---	---

Test Description **8-2-17 Filled Line with water & Bled air**

8-3-17 Achieved 200 PSI AT 10:AM AFTER Hydroing system For 2 Hours To get to 200psi

8-3-17 MAINTAINED 200PSI For 4 Hours. 12:00 pm.

Dropped pressure to 190 PSI AT 2:00 pm To Begin 1 Hour Test. with a 5% Loss Allowed.

3:00 pm Test over with a loss of 0 PSI.

TEST PASSED

Prepared by: Tim Gumbel / J. DeLuca	Date 8-2-17
---	-----------------------

Test Start Approval by Customer Jeff Seaton / J. Seaton	Date 8-2-17
---	-----------------------

Test Witness By Customer Yes No

Customer Signature Chris Biebel	Date: 8/3/17
---	---------------------

Test Results: Satisfactory Unsatisfactory

Murtco Representative: J. DeLuca Signature	8-3-17 Date
--	-----------------------

Customer: J. Seaton Signature	8-3-17 Date
---	-----------------------

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APPENDIX C

WELL RELOCATION APPROVAL E-MAILS

Comment [A38]: Conforming change. Added multiple appendices.

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From: Corkran, Julie
To: [Dollins, Dave](mailto:Dollins.Dave)
Cc: [Begley, Brian \(EEC\)](mailto:Brian.Begley@ky.gov); [Montgomery, Brad](mailto:Brad.Montgomery@FFSPaducah.com); [Garner, Nathan \(CHS-PH\)](mailto:Nathan.Garner@ky.gov); [Brewer, Gaye \(EEC\)](mailto:Gaye.Brewer@ky.gov); [Clark, Bill \(EEC\)](mailto:Bill.Clark@ky.gov); [Powers, Todd](mailto:Todd.Powers@FFSPaducah.com); [Jones, Craig](mailto:Craig.Jones@FFSPaducah.com); [Ford, Bruce](mailto:Bruce.Ford@FFSPaducah.com); [Redfield, Myrna](mailto:Myrna.Redfield@FFSPaducah.com); [Davis, Ken](mailto:Ken.Davis@FFSPaducah.com)
Subject: Re: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in
Date: Tuesday, November 22, 2016 5:22:48 PM

EPA approves the proposal to move the subject extraction well.

Sent from my iPhone

On Nov 22, 2016, at 2:54 PM, Dollins, Dave <Dave.Dollins@lex.doe.gov> wrote:

Thanks Brian!

From: Begley, Brian (EEC) [<mailto:Brian.Begley@ky.gov>]
Sent: Tuesday, November 22, 2016 1:39 PM
To: Dollins, Dave <Dave.Dollins@lex.doe.gov>; Corkran, Julie <Corkran.Julie@epa.gov>; Montgomery, Brad <Brad.Montgomery@FFSPaducah.com>; Garner, Nathan (CHS-PH) <Nathan.Garner@ky.gov>; Brewer, Gaye (EEC) <Gaye.Brewer@ky.gov>; Clark, Bill (EEC) <Bill.Clark@ky.gov>
Cc: Powers, Todd <Todd.Powers@FFSPaducah.com>; Jones, Craig <Craig.Jones@FFSPaducah.com>; Ford, Bruce <Bruce.Ford@FFSPaducah.com>; Redfield, Myrna <Myrna.Redfield@FFSPaducah.com>; Montgomery, Brad <Brad.Montgomery@FFSPaducah.com>; Davis, Ken <Ken.Davis@FFSPaducah.com>
Subject: RE: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in

Thanks Dave,

Kentucky approves the 10-ft relocation of the EW.

Brian Begley, PG

Registered Geologist Supervisor

KY Federal Facilities Agreement Manager

Energy and Environment Cabinet

Division of Waste Management

Hazardous Waste Branch

Paducah Gaseous Diffusion Plant Section

300 Sower Blvd., Frankfort, KY 40601

Brian.Begley@KY.GOV

office: (502) 782-6317

From: Dollins, Dave [<mailto:Dave.Dollins@lex.doe.gov>]
Sent: Tuesday, November 22, 2016 2:24 PM
To: Begley, Brian (EEC); Corkran, Julie; Montgomery, Brad; Garner, Nathan (CHS-PH); Brewer, Gaye (EEC); Clark, Bill (EEC)
Cc: Powers, Todd; Jones, Craig; Ford, Bruce; Redfield, Myrna; Montgomery, Brad; Davis, Ken
Subject: RE: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in
Importance: High

Brian and Julie –

The request is to relocate EW235 10 ft. north to address a security concern. This relocation north would result in the two EWs being slightly closer together, but would not make an appreciable difference in the groundwater extraction well and/or plume containment.

Dave

From: Begley, Brian (EEC) [<mailto:Brian.Begley@ky.gov>]

Sent: Tuesday, November 22, 2016 12:50 PM

To: Dollins, Dave <Dave.Dollins@lex.doe.gov>; Corkran, Julie <Corkran.Julie@epa.gov>; Montgomery, Brad <Brad.Montgomery@FFSPaducah.com>; Garner, Nathan (CHS-PH) <Nathan.Garner@ky.gov>; Brewer, Gaye (EEC) <Gaye.Brewer@ky.gov>; Clark, Bill (EEC) <BillJ.Clark@ky.gov>

Cc: Powers, Todd <Todd.Powers@FFSPaducah.com>; Jones, Craig <Craig.Jones@FFSPaducah.com>; Ford, Bruce <Bruce.Ford@FFSPaducah.com>; Redfield, Myrna <Myrna.Redfield@FFSPaducah.com>; Montgomery, Brad <Brad.Montgomery@FFSPaducah.com>

Subject: RE: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in

Dave,

I told Julie that I left you a voice message on November 14th regarding the proposed 10ft change to the NE Plume extraction wells. I wanted to know if the wells would be 10ft closer together or farther apart with the proposed change.

-Brian

From: Dollins, Dave [<mailto:Dave.Dollins@lex.doe.gov>]

Sent: Tuesday, November 22, 2016 1:42 PM

To: Corkran, Julie; Montgomery, Brad; Begley, Brian (EEC); Garner, Nathan (CHS-PH); Brewer, Gaye (EEC); Clark, Bill (EEC)

Cc: Begley, Brian (EEC); Powers, Todd; Jones, Craig; Ford, Bruce; Redfield, Myrna; Montgomery, Brad

Subject: RE: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in

Julie, I've been out several days sick, however, I'm not aware of the additional information that you are referring to. Can you all help us understand what more is required?

Thanks

Dave

From: Corkran, Julie [<mailto:Corkran.Julie@epa.gov>]

Sent: Monday, November 21, 2016 11:08 AM

To: Dollins, Dave <Dave.Dollins@lex.doe.gov>; Montgomery, Brad <Brad.Montgomery@FFSPaducah.com>; 'Brian Begley' <brian.begley@ky.gov>; nathan.garner@ky.gov; gaye.brewer@ky.gov; Clark, Bill (EEC) <BillJ.Clark@ky.gov>

Subject: Follow-up on DOE request to move proposed NE Plume optimization extraction well: check-in

Dave:

In speaking with Brian, I understand that he reached out to you for more specific information regarding the DOE proposal (mentioned during the last weekly GW call) to

move one of the two new EWs to address potential safety concerns during drilling.
Have DOE/FLUOR had a chance to respond to Brian so that EPA and KY can provide a
response to DOE's request?

Please advise.

Thanks,

Julie

Julie L. Corkran, Ph.D. | Senior Remedial Project Manager

USEPA Region 4 | Atlanta Federal Center 9T25

61 Forsyth Street SW | Atlanta GA 30303-8960

Office: 404.562.8547 | Fax: 404.562.8518 | corkran.julie@epa.gov

From: Begley, Brian (EEC)
To: [Corkran, Julie](#); [Dollins, Dave](#); [Brewer, Gaye \(EEC\)](#)
Cc: [Powers, Todd](#); [Taylor, Tracy \(PPPO/CONTR\)](#); [Redfield, Myrna](#); [Richards, Jon M.](#); [Ahsanuzzaman, Noman](#); [Davis, Eva](#); [Garner, Nathan \(CHS-PH\)](#); [Stephanie Brock](#); [Jones, Craig](#)
Subject: RE: Request for minor relocations of NE Optimization wells
Date: Thursday, June 23, 2016 1:46:48 PM

All,

KY concurs with the relocations of NE Optimization project proposed below.

Brian Begley, PG

Registered Geologist Supervisor

Please Note New Phone & Address (as of 6-22-16)

Energy and Environment Cabinet
Division of Waste Management
Hazardous Waste Branch
Paducah Gaseous Diffusion Plant Section
300 Sower Blvd., Frankfort, KY 40601

Brian.Begley@KY.GOV

office: (502) 782-6317

From: Corkran, Julie [mailto:Corkran.Julie@epa.gov]

Sent: Thursday, June 23, 2016 2:43 PM

To: Dollins, Dave; Begley, Brian (EEC); Brewer, Gaye (EEC)

Cc: Powers, Todd; Taylor, Tracy (PPPO/CONTR); Redfield, Myrna; Richards, Jon M.; Ahsanuzzaman, Noman; Davis, Eva

Subject: RE: Request for minor relocations of NE Optimization wells

Noman and Jon have advised that they are in agreement with DOE's proposed alternate locations for the NE Plume P&T Optimization wells.

Julie

Julie L. Corkran, Ph.D. | Senior Remedial Project Manager

USEPA Region 4 | Atlanta Federal Center 9T25

61 Forsyth Street SW | Atlanta GA 30303-8960

Office: 404.562.8547 | Fax: 404.562.8518 | corkran.julie@epa.gov

From: Corkran, Julie

Sent: Wednesday, June 22, 2016 5:32 PM

To: Dollins, Dave ; brian.begley@ky.gov; 'Gaye.Brewer@ky.gov' (Gaye.Brewer@ky.gov)

Cc: Powers, Todd ; Taylor, Tracy (PPPO/CONTR) ; Redfield, Myrna ; Richards, Jon M. ; Ahsanuzzaman, Noman ; Davis, Eva

Subject: Re: Request for minor relocations of NE Optimization wells

I am in an all-day VTC tomorrow and not available for this discussion.

I have copied Jon, Noman and Eva on this note in case they can call in and support DOE and KY discussions.

If no one from EPA is available, EPA defers to KY in order to keep the project on target.

If resolution cannot be reached tomorrow, I am available on Monday of next week for a call.

thanks,

Julie

From: Dollins, Dave <Dave.Dollins@lex.doe.gov>

Sent: Wednesday, June 22, 2016 4:25:04 PM

To: Corkran, Julie; brian.begley@ky.gov; 'Gaye.Brewer@ky.gov' (Gaye.Brewer@ky.gov)

Cc: Powers, Todd; Taylor, Tracy (PPPO/CONTR); Redfield, Myrna

Subject: Request for minor relocations of NE Optimization wells

Julie/Brian,

The Northeast Optimization Project team is requesting concurrence/approval for minor relocations within the well network. These adjustments are being requested due to safety concerns and/or ease of well installation identified during walk downs with the drilling subcontractor. We can discuss this request further tomorrow during the weekly GWOU call, if needed.

See the attached figure to assist in your review of this request.

The wells to be relocated and supporting rationale are provided below.

- Swap planned location of Piezometer well 534 (PZ-534) and Extraction Well 234 (EW-234) to eliminate electrical hazard associated with proximity of drill rig mast and high voltage overhead power line(s).
- PZ555 – Relocate approximately 20 ft. northwest to eliminate electrical hazard associated with proximity of drill rig mast and high voltage overhead transmission line(s).
- PZ535 – Relocate approximately 10-15 ft. westward to ensure level ground is available at the drilling location.
- MW531 – Relocate approximately 10 ft. westward to ensure level ground is available at the drilling location.

The installed locations of the well network will be captured on as-built drawings and documented in the Post Construction Report.

Let me know if any additional information is required to address any questions/concerns. If these relocations are acceptable, then a response to this email documenting your concurrence/approval will be appreciated.

Thanks in advance

Dave

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APPENDIX D

Comment [A39]: Conforming change. Added multiple appendices.

AS-BUILT DRAWINGS (ON CD)

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APPENDIX D

AS-BUILT DRAWINGS (ON CD)

Comment [A40]: Conforming change. Added multiple appendices.

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APPENDIX E

STEP TEST SUMMARY

Comment [A41]: Conforming change. Added multiple appendices.

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**Northeast Plume Optimization Project
Extraction Well Pumping Step-Drawdown Tests**

Well construction details and aquifer depths

Well Construction/Aquifer Depth	EW234	EW235
Depth (ft below temporary reference point) of static water level at beginning of pumping step-drawdown test	50.45	51.63
Depth (ft bgs) of top of HU5 Gravel Interval (top of aquifer)	79.00	83.60
Depth (ft bgs) of top of well screen	80.70	85.00
Depth (ft bgs) of base of well screen	95.70	100.00
Depth (ft bgs) of base of HU5 Gravel Interval (base of aquifer)	96.80	102.90

Pumping Step-Drawdown Test

The EW234 step test was performed on June 19, 2017 (pumping from 07:35 to 11:37) and the EW235 step test was performed on June 20, 2017 (pumping from 11:47 to 15:47).

Pumping test measurements

Measurement	EW234			EW235		
	Average Pumping Rate (gpm)	Stage Drawdown (ft)	Final Depth of Water (ft)	Average Pumping Rate (gpm)	Stage Drawdown (ft)	Final Depth of Water (ft)
Static water level	0.00	NA	50.45	0.00	NA	51.63
1 st pumping stage	49.61	1.10	51.55	50.29	6.33	57.96
2 nd pumping stage	101.00	1.39	52.94	99.43	7.23	65.19
3 rd pumping stage	149.83	1.38	54.32	147.62	8.23	73.42
4 th pumping stage	198.18	1.63	55.95	196.00	14.04	87.46

NA = not applicable

Pumping Step-Test Distances (ft from EW)

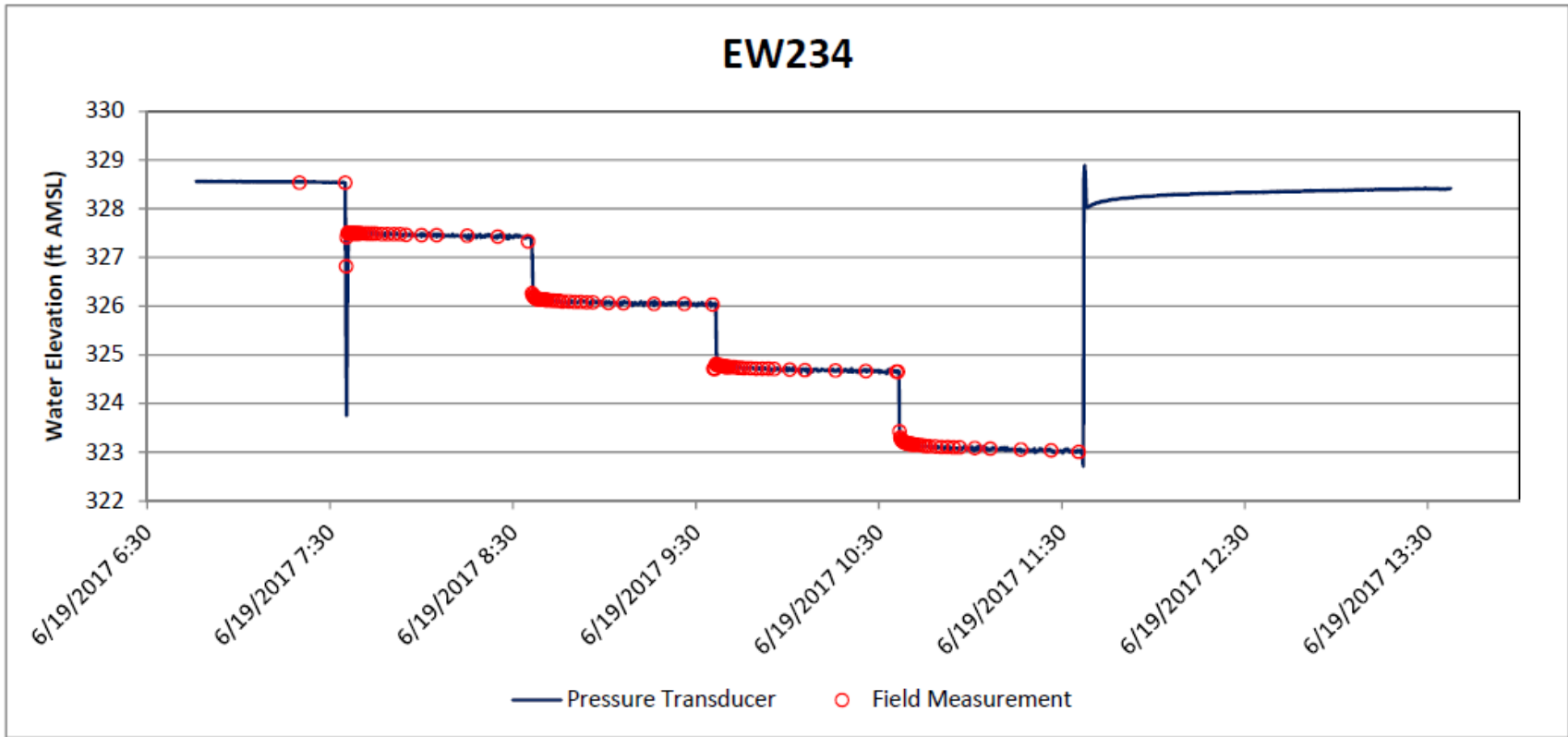
EW234 Step Test			EW235 Step Test	
Nearby Piezometer PZ534	Distal Piezometer PZ540		Nearby Piezometer PZ554	Distal Piezometer PZ540
30.66	782.62		21.56	474.76



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

Northeast Plume Optimization Well and Piezometer Installations

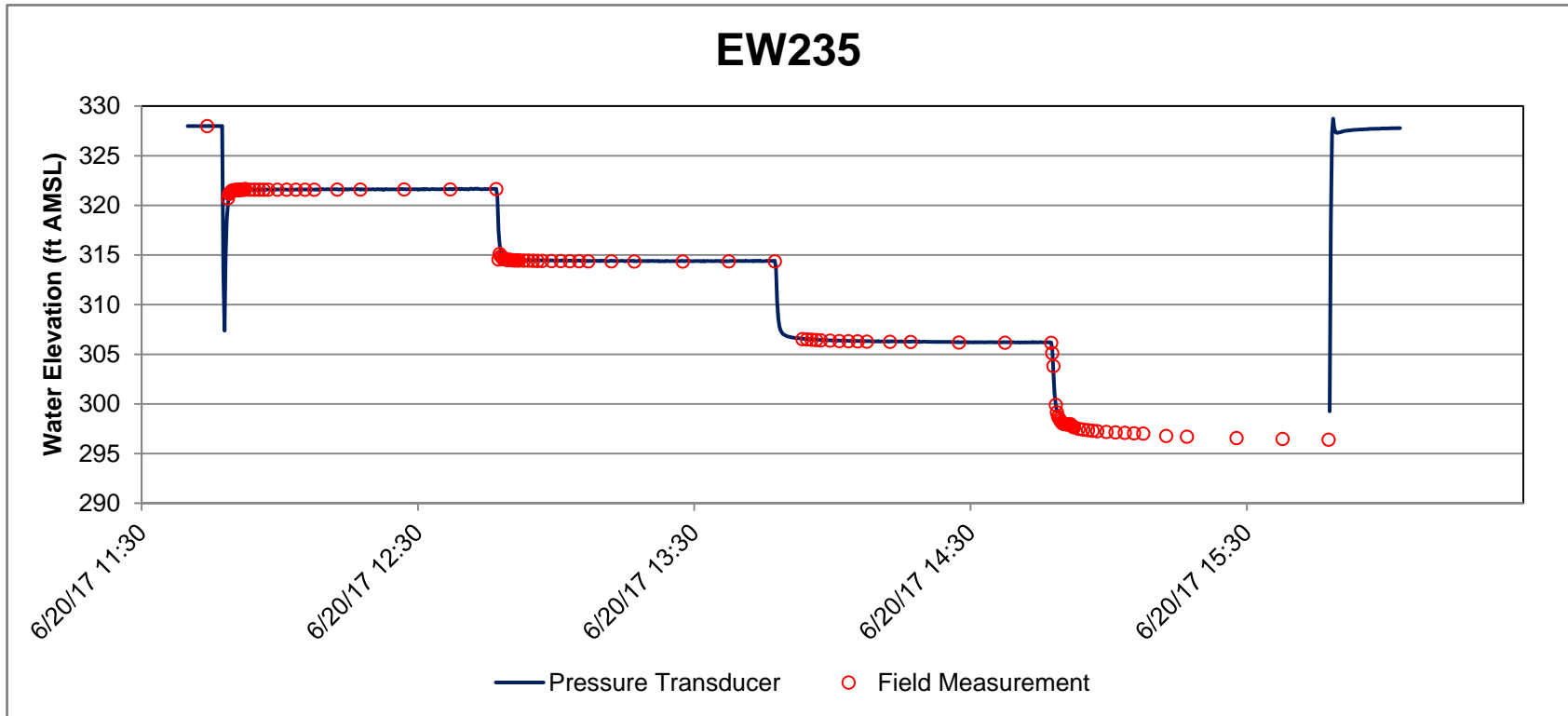




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PADUCAH GASEOUS DIFFUSION PLANT

Plot of Water Level Measurements from EW234 Step Test

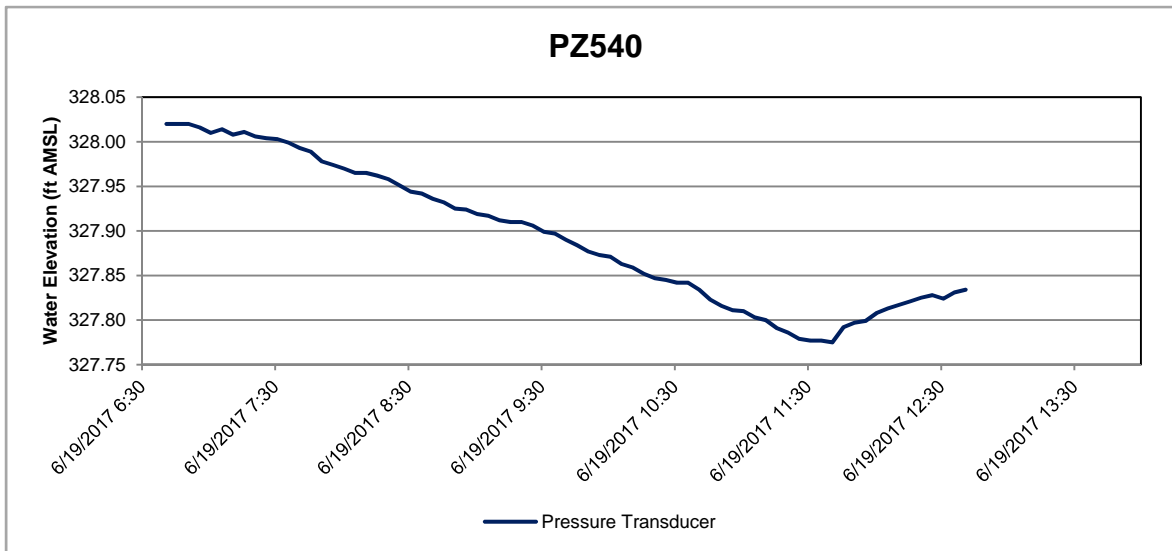
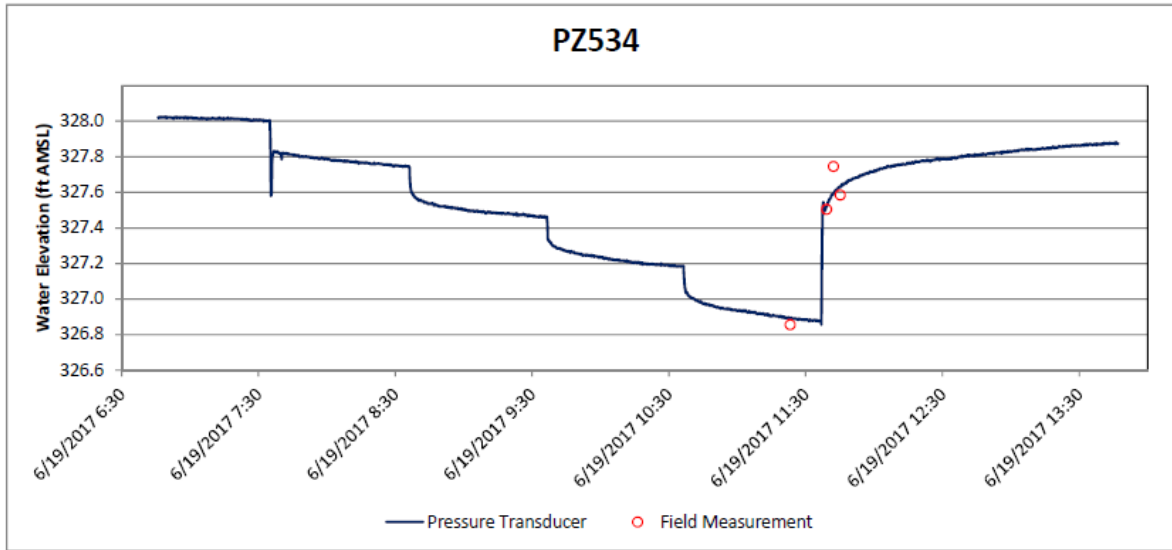




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PADUCAH GASEOUS DIFFUSION PLANT

Plot of Water Level Measurements from EW235 Step Test

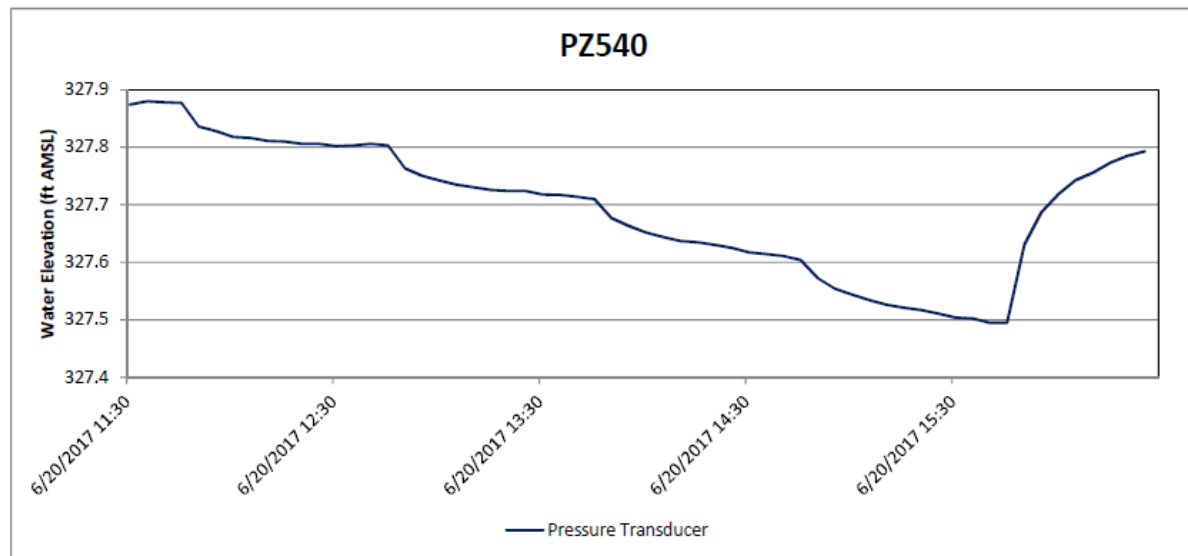
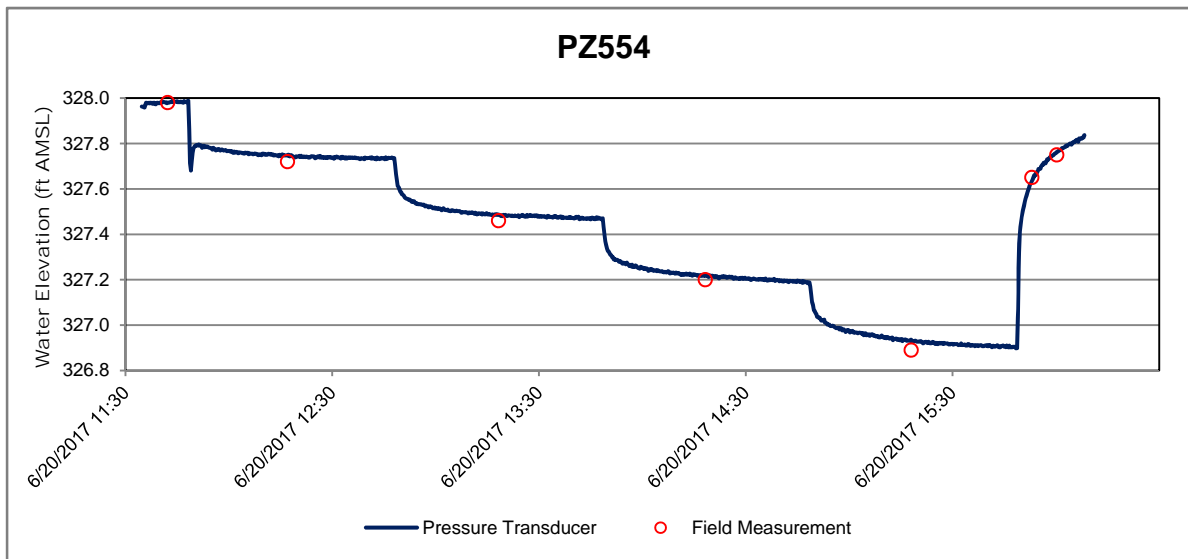




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PADUCAH GASEOUS DIFFUSION PLANT

**Water Level Trends of EW234 Step Test
on adjacent Piezometer PZ534 and Distant Background Piezometer PZ540**





U.S. DEPARTMENT OF ENERGY
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PADUCAH GASEOUS DIFFUSION PLANT

**Water Level Trends of EW235 Step Test
on adjacent Piezometer PZ554 and Distant Background Piezometer PZ540**



Well/ Piezometer	Plant Coordinates*		Screen Interval	
	Easting	Northing	Elevation (above mean sea level)	Regional Gravel Aquifer Interval**
EW234	-2110.68	-1019.85	285.6-300.6	Full RGA
EW235	-1375.35	-1740.89	282.8-297.8	Full RGA
MW524	-3314.77	-874.95	298.7-308.7	MRGA
MW525	-3389.27	-1075.11	300.6-310.6	MRGA
MW526	-3373.91	-1266.96	301.8-311.8	MRGA
MW527	-3369.59	-1525.32	301.6-311.4	MRGA
MW528	-3375.71	-1531.84	291.4-301.4	LRGA
MW529	-3364.05	-1675.13	288.9-298.9	LRGA
MW530	-3364.71	-1893.38	285.1-295.1	LRGA
MW531	-2038.94	9.63	267.3-277.3	LRGA
PZ532	-1892.67	-576.08	285.7-295.7	LRGA
MW533	-2312.45	-1026.16	282.0-292.0	LRGA
PZ534	-2080.02	-1020.02	283.7-293.7	LRGA
PZ535	-2119.75	-1224.77	280.9-290.9	LRGA
MW536	-2370.02	-1598.95	287.7-297.7	LRGA
MW537	-2359.67	-1599.48	277.1-287.1	LRGA
MW538	-2304.68	-2102.73	294.4-304.4	MRGA
MW539	-2295.12	-2102.56	281.4-291.4	LRGA
PZ540	-1367.83	-1266.18	279.5-289.5	LRGA
PZ541	-1460.67	-1500.54	277.0-287.0	LRGA
PZ553	-1460.86	-1635.60	279.2-289.2	LRGA
PZ554	-1374.82	-1719.25	279.2-289.2	LRGA
PZ555	-1508.32	-1976.65	280.1-290.1	LRGA
MW556	-738.35	-1146.84	278.8-288.8	LRGA

**RGA = Regional Gravel Aquifer; MRGA = Middle Regional Gravel Aquifer; LRGA = Lower Regional Gravel Aquifer

**Response to U.S. Environmental Protection Agency
Comments Submitted March 21, 2018
*Postconstruction Report for the
Northeast Plume Optimization at the
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky, Document No. DOE/LX/07-2419&D1***

General Comments:

Comment 1: A copy of the signed Northeast Plume Optimization Readiness Checklist is not provided as an appendix to the Postconstruction Report for the Northeast Plume Optimization at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/LX/07-2419&D1, Secondary Document, dated January 5, 2018 (PCR). Based on Section 5 (Synopsis of the Construction Work and Certification that the Construction Work has been Completed), “The original document is maintained in the project file located at Paducah Site.”

- For completeness, the PCR should be revised to include a copy of the signed Northeast Plume Optimization Readiness Checklist as an appendix to the PCR.

Response 1: Requested comment incorporated. Copies of the signed project Assessment Checklist, Assessment Plan, and Assessment Report are included in Appendix A.

Comment 2: Sections 2 (Brief Description of How Outstanding Items Noted in the Prefinal Inspection were Resolved) and 5 (Synopsis of the Construction Work and Certification that the Construction Work has been Completed) indicate that the resizing of the well pump in EW235 was based on the step test results; however, the PCR does not provide and/or reference the step test results.

- The PCR should be revised to include the step test results as an appendix to the PCR.

Response 2: Requested comment incorporated. A copy of the Northeast Plume Step Test Data Package is included in Appendix E.

Comment 3: Figure 1 (Location of Wells & Piezometers Installed for the Northeast Plume Interim Remedial Action Optimization Project) includes the locations of the extraction wells, new transect wells, new performance monitoring wells and piezometers and treatment units. However, the extent of the Northeast Plume is not shown on the figure to provide context relative to the location of the wells and piezometers installed for the Northeast Plume Interim Remedial Action Optimization Project.

- While the extent of the Northeast Plume is provided in documents referenced in the PCR, for completeness, Figure 1 should be revised to include the extent of the Northeast Plume at the time of the Northeast Plume Interim Remedial Action Optimization Project. Plume extent is defined as the constituent-specific detection limit.

Response 3: Requested comment incorporated. Figure 2, Northeast Plume Extraction Well Field with 2016 TCE Plume Map, has been added to the report that maps the extent of TCE at 5 µg/L and identifies sample locations with TCE levels of 1–5 µg/L, less than 1 µg/L (the common laboratory reporting limit), and Not Detected.

Comment 4: Table 2 (New Wells and Piezometers Installed for the Northeast Plume Interim Remedial Action Optimization Project) includes the well/piezometer plant coordinates (i.e., easting, northing), screened interval elevations and the screened Regional Gravel Aquifer (RGA) interval. However, the table does not include the top of casing elevations or the bottom of the boring elevations.

- To ensure the PCR provides a complete reference related to the new wells and piezometers installed for the Northeast Plume Interim Remedial Action Optimization Project, the PCR should be revised to include the top of casing elevations and the bottom of the boring elevations for the new wells and piezometers.

Response 4: Requested comment incorporated. Table 2 has been modified to incorporate requested data.

Specific Comments:

Comment 1, Section 2, Brief Description of How Outstanding Items Noted in the Prefinal Inspection were Resolved, Page 1: Section 2 identifies two add-on items slated for completion prior to project turnover to operational personnel; however, the text does not clarify if the two add-on items (i.e., hydrostatic testing of the complete process line system, resizing of the well pump in EW235 based on the step test results) were completed. It should be noted that Section IV (Acceptance and Functional Testing Results) of Section 5 (Synopsis of the Construction Work and Certification that the Construction Work has been Completed) does not specifically include the hydrostatic testing of the complete process line system.

- Section 2 should be revised to discuss when the two add-on items were completed.
- In addition, revise Section IV of Section 5 to include the testing results from the hydrostatic testing of the complete process line system.

Response 1: Requested comment incorporated. Section 2 has been modified to include requested information. Section 5 Subsection IV has been modified to include process line system hydrostatic tests. Copies of the hydrostatic tests are included in Appendix B.

Comment 2, Section 3, Explanations of Modifications to the Original Remediation Design and Remedial Action Work Plans, Page 2: The text states, “The relocations were documented by the Federal Facility Agreement (FFA) parties through e-mail submittals and approvals, and as-built drawings were revised to reflect the changes;” however, documentation of these e-mail submittals and approvals is not included as an appendix to the PCR.

- For completeness, the PCR should be revised to include documentation of these e-mail submittals and approvals.

Response 2: Requested comment incorporated. Copies of requested e-mail correspondence are included in Appendix C.

Comment 3, Table 1, Relocations from Proposed Monitoring Well and Piezometer Locations, Page 2: Table 1 includes the monitoring well and piezometer locations that were relocated from the proposed locations; however, it is unclear why the table does not include the extraction wells (i.e., EW234 and EW235). Based on the paragraph preceding the table, extraction wells EW234 and EW235 were both relocated.

- Table 1 should be revised to provide a comprehensive list of the wells and piezometer locations that were relocated from the proposed locations.

Response 3: Requested comment incorporated. Table 1 has been updated to include displacement values for extraction wells EW234 and EW235.

Comment 4, Table 1, Relocations from Proposed Monitoring Well and Piezometer Locations, Page 2: Table 1 indicates that monitoring well MW528 was relocated 12.7 feet southwest from its proposed location such that it is offset from monitoring well MW527; however, it is unclear why the monitoring well required offsetting. Specifically, it is unclear if the proposed locations were incorrectly spaced in the original remediation design and remedial action work plans or if onsite conditions required the monitoring wells to be offset.

- Section 3 should be revised to clarify why monitoring well MW528 was relocated 12.7 feet southwest from its proposed location such that it was offset from monitoring well MW527.

Response 4: Requested comment incorporated. Table 1 has been revised with reason for relocation. The original survey spotted MW527 and MW528 at the same location. These wells are collocated, monitoring the middle RGA and the lower RGA zones, respectively. The MW528 location was moved to allow the placement of well pads and bollards to accommodate both MWs.

Comment 5, Section 5, Synopsis of the Construction Work and Certification that the Construction Work has been Completed, Pages 6-7: Section II (Configuration Control Documents) of the Northeast Plume Optimization Readiness Checklist does not indicate that the configuration control documents were updated to address the resizing of the well pump in EW235. Based on Section 2 (Brief Description of How Outstanding Items Noted in the Prefinal Inspection were Resolved) and the footnote on Page 6, the EW235 well pump was resized to address the sustainable well yield of approximately 100 gallons per minute (gpm).

- Section 5 should be revised to clarify if the configuration control documents were updated to address the resizing of the well pump in EW235.

Response 5: This comment did not result in a change to the document. The *Operation and Maintenance Plan for the Northeast Plume Containment System Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-1535&D3/R6, discusses the resizing of EW235 to operate at a range of between approximately 75 to 150 gpm. The design basis document did not require revision since design inputs assumed a maximum flow rate of 200 gpm. In addition, Section 2.2.2 of the approved *Remedial Action Work Plan for Optimization of the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-1280&D2/R3 states the following, “The EW field volumetric flow rate is not limited by the treatment plant capacity, but will be limited by the EW well yield.”

**Response to Kentucky Department for Environmental Protection
Comments Submitted April 2, 2018,
*Postconstruction Report for the Northeast Plume Optimization
at the Paducah Gaseous Diffusion Plant,
Paducah, Kentucky, DOE/LX/07-2419&D1***

Specific Comments:

Comment 1, Section 1, Page 1, General Introduction: Pumping implementation dates for EW234 and EW235 were not provided in the text. Please revise the report and provide the start date for pump operations at EW234 and EW235 and when EW331 and EW332 were taken off-line. Also, EW331 and EW332 are mentioned to be in “stand-by mode” without any other context. Please mention that criteria that would cause three-party discussion and possible shut-down of the optimized extraction wells. Perhaps implementation of Kentucky’s Specific Comment #3 will address this concern. Note: This language is also mentioned in Section 5.

Response 1: Requested comment incorporated. Construction of the Northeast Plume Containment System was completed on October 10, 2017. Subsequently, tests consistent with the RAWP to optimize TCE mass removal were initiated. EW331 and EW332 were taken off-line and placed in stand-by mode on September 2, 2017, pursuant to Section 1.2 of the approved RAWP, which contains criteria regarding “three-party discussion and possible shut-down of the optimized extraction wells.”

Comment 2, Section 1, Page 1, General Introduction: The end of the third sentence states “... with a total system flow rate of no more than 300 gpm for the optimized NEP Containment System.” It is unclear where the documentation exists to support that the NEP Containment System will have a total system flow rate bound at 300 gpm. Please provide the reference where the NERP Containment System will not exceed 300 gpm. Note: This language is also mentioned in Section 5.

Response 2: Requested comment incorporated. Reference to Section 2.2.1 of the O&M Plan has been added to Sections 1 and 5.

Comment 3, Section 1, Page 1, General Introduction: The eighth sentence references “expected conditions” from the “MW transect” wells. Please add a reference to the which will provide a reference to the those two terms.

Response 3: Requested comment incorporated. A footnote was added to the sentence referencing the 2015 MOA.

The sentence now states, “Sample results from the MW transect confirmed anticipated conditions,² leading to a second phase of the project drilling and construction.”

The footnote states, “Refer to *Memorandum of Agreement for Resolution of Formal Dispute of the Explanation of Significant Differences to the Record of Decision for the Interim Remedial Action of the Northeast Plume at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-1291&D2), and Remedial Action Work Plan for the Optimization of the Northeast Plume Interim Remedial Action at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/LX/07-1280&D2)* (DOE 2015).”

Comment 4, Section 2, Page 1, Northeast Plume Optimization List of Outstanding Items: It is unclear to the reviewer that no outstanding items remain, yet there are “add on items” remaining. Please clarify.

Response 4: Requested comment incorporated. Section 2 has been revised to include dates on which “add on items” were completed.

Comment 5, Section 3, Page 2, Explanations of Modifications to the Original Remediation Design and Remedial Action Work Plans: The third sentence of the second paragraph references, “a site security concern.” The site security concern being referenced is not understood. Please clarify.

Response 5: Requested comment incorporated. DOE site security protocols strictly prohibit any equipment from being staged within 10 ft of the “Limited Area” perimeter fence. Table 1 was modified to identify the “site security concern.”

Comment 6, Section 3, Page 2, Table 1: Table 1 provides relocation information for monitoring wells and piezometers. For clarity purposes EW234 and EW235 should be added to the list in Table 1, along with their subsequent displacement and reason for relocation.

Response 6: Requested comment incorporated.

Comment 7, Section 4, Page 4, Table 2: This table indicates which aquifer interval (RGA, MRGA, & LRGA) the wells are screened. It would increase the readers understanding if the well’s datum were also provided. Please revise Table 2 to include the aforementioned data. Also, Kentucky was unable to obtain datum information off of PEGASIS for any locations referenced in Table 2 and multiple attempts to use the assistance function in PEGASIS were unsuccessful.

Response 7: Requested comment incorporated. Table 2 has been modified to include 3 additional datum columns (elevation ground grade, top of inside casing, and total depth of boring). The PEGASIS database issue was investigated, and currently all wells listed on Table 2 are included in the database, except for extraction wells, EW234 and EW235. The FRNP Sample Management Office (SMO) is in the process of updating PEGASIS with EW234 and EW235 data. Please note that currently all piezometers are listed as monitoring wells (MWs) in PEGASIS.

Comment 8, Section 4, Page 4, Table 2: The RGA Interval description for EW234 and EW235 is specified as being the “Full RGA.” The screen intervals for each EW are only 15 feet. It is unclear how 15 feet of screen encompasses the full RGA and based on other MWs, it appears that the upper RGA is not represented in the EWs screen interval. Please explain.

Response 8: Requested comment incorporated. Table 2 has been modified to identify RGA interval as MRGA and LRGA for both EW234 and EW235. The 15-ft well screens extend across the majority of the RGA gravel interval in both wells (15 of 17.8 ft in EW234 and 15 of 19.3 ft in EW235).

Comment 9, Section 5, Page 5, Synopsis of the Construction Work and Certification that the Construction Work has been Completed: This section indicates that the original signed certification that construction is complete resides in the project file at the Paducah Site. According to the outline in Appendix D of the FFA a certification is required to call the report complete. Please provide a copy of the certification page.

Response 9: Requested comment incorporated. Copies of the signed project Assessment Checklist, Assessment Plan, and Assessment Report are included in Appendix A.

Comment 10, Section 6, Summary of Project Cost: The reported cost for the project is \$5,850,000. It is unclear what task, documents, etc. the cost represents. Please provide some level of detail other than a total estimated project cost.

Response 10: Requested comment incorporated. The footnote associated with the cost estimate has been expanded to include a general list of items included in the estimated project cost.