

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan (QAPP) has been updated from the QAPP provided for the Sampling and Analysis Plan used for the Vapor Intrusion Study for the Water Policy Area.

This project-specific QAPP incorporates updated information included in the 2016 Programmatic QAPP (P-QAPP).

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ACRONYMS

CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	chemical (or radionuclide) of potential concern
DOE	U.S. Department of Energy
DOECAP	U.S. Department of Energy Consolidated Audit Program
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
FPDP	Fluor Federal Services, Inc., Paducah Deactivation Project
FFA	Federal Facility Agreement
FSP	field sampling plan
GC/MS	gas chromatograph/mass spectrometer
ID	identification
IDQTF	Intergovernmental Data Quality Task Force
KDEP	Kentucky Department for Environmental Protection
KY	Commonwealth of Kentucky
LATA Kentucky	LATA Environmental Services of Kentucky, LLC
LSRS	LATA-Sharp Remediation Services, LLC
MDL	method detection limit
MPC	measurement performance criteria
MS	mass spectroscopy
N/A	not applicable
OREIS	Oak Ridge Environmental Information System
PAL	project action limit
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
PEGASIS	Portsmouth/Paducah Project Office Environmental Geographic Analytical Spatial Information System
PGDP	Paducah Gaseous Diffusion Plant
P-QAPP	programmatic quality assurance project plan
PQL	practical quantitation limit
QA	quality assurance
QC	quality control
QAPP	quality assurance project plan
SAP	sampling and analysis plan
SDG	Sample Delivery Group
SOP	standard operating procedure
TBD	to be determined
TPD	training position description
UCRS	Upper Continental Recharge System
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plans
VOC	volatile organic compound

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1. INTRODUCTION

This project-specific Quality Assurance Project Plan (QAPP) has been prepared to support the vapor intrusion investigation at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant (PGDP) by Fluor Federal Services, Inc., Paducah Deactivation Project (FPDP) based on the 2016 Programmatic QAPP (P-QAPP) updates to the *Programmatic Quality Assurance Project Plan* (DOE 2016), which was developed in alignment with the *Uniform Federal Policy for Quality Assurance Project Plans* (UFP-QAPP Manual) guidelines for QAPPs (IDQTF 2005), as updated by the *Optimized UFP-QAPP Worksheets* guidance (IDQTF 2012). (NOTE: As in the optimized guidance, the original worksheet numbers are retained, but combined per the guidance.) Table 1 in Worksheet #1 provides a crosswalk between the UFP-QAPP and the *U.S. Environmental Protection Agency Guidance on Quality Assurance Project Plans*, CIO 2106-G-05-QAPP (EPA 2012).

Title: QAPP for C-400 VI WP
Revision Number: 2
Revision Date: 7/2017

QAPP Worksheets #1 and #2. Title and Approval Page

Site Name/Project Name: PGDP/C-400 Vapor Intrusion Study
Site Location: Paducah, Kentucky
Site Number/Code: KY8890008982
Contractor Name: FPDP
Contractor Number: Task Order DE-DT0007774
Contract Title: Paducah Gaseous Diffusion Plant Deactivation Project

Document Title: *C-400 Vapor Intrusion Study Work Plan to Support the Additional Actions for the CERCLA Five-Year Review at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky; Appendix B, Quality Assurance Project Plan for C-400 Vapor Intrusion Study to Support the Five-Year Review*

Lead Organization: U.S. Department of Energy (DOE)

Preparer's Name and Organizational Affiliation: Joseph Towarnicky, Ph.D., FPDP

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Preparation Date (Month/Year): 7/2017

Document Control Number: Appendix B to the Work Plan, DOE/LX/07-2403&D2/R1

FPDP Signature: Bruce Ford Date: 7-28-2017
Bruce Ford
Acting Director of Environmental Management

FPDP Signature: Kelly Layne Date: 7/28/17
Kelly Layne
Acting Regulatory Affairs Manager

FPDP Signature: Lisa Crabtree Date: 7/28/17
Lisa Crabtree
Environmental Monitoring and Reporting Project Manager

FPDP Signature: Kelly Ausbrooks Date: 7/28/17
Kelly Ausbrooks
Acting QA Manager

QAPP Worksheets #1 and #2. Title and Approval Page (Continued)

1. Identify guidance used to prepare QAPP:
 - Intergovernmental Data Quality Task Force, March 2005. The *Uniform Federal Policy for Implementing Environmental Quality Systems*, Version 2.0, 126 pages.
 - Intergovernmental Data Quality Task Force, March 2005. The *Uniform Federal Policy for Quality Assurance Project Plans: Part 1 UFP QAPP Manual*, Version 1.0, 177 pages (DTIC ADA 427785 or EPA-505-B-04-900A).
 - Intergovernmental Data Quality Task Force, March 2005. The *Uniform Federal Policy for Quality Assurance Project Plans: Part 2A UFP QAPP Worksheets*, Version 1.0, 44 pages.
 - Intergovernmental Data Quality Task Force, March 2005. The *Uniform Federal Policy for Quality Assurance Project Plans: Part 2B Quality Assurance/Quality Control Compendium: Minimum QA/QC Activities*, Version 1.0, 76 pages.
 - Intergovernmental Data Quality Task Force, March 2012. *Uniform Federal Policy for Quality Assurance Project Plans, Optimized UFP QAPP Worksheets*, 42 pages.
 - *Paducah Gaseous Diffusion Plant Programmatic Quality Assurance Project Plan*, DOE/LX/07-1269&D2/R2, March 2015, 352 pages.
 - EPA 2016. OSWER Vapor Intrusion Screening Level (VISL) Calculator, Version 3.4, November 2015. <http://www.epa.gov/oswer/vaporintrusion/documents/VISL-Calculator.xlsm>.
2. Identify regulatory program: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and *Federal Facility Agreement for the Paducah Gaseous Diffusion Plant*, DOE/OR/07-1707 (FFA)
3. Identify approval entities: DOE, U.S. Environmental Protection Agency (EPA) Region 4, and Kentucky Department for Environmental Protection (KDEP)
4. Indicate whether the QAPP is a generic or a project-specific QAPP (circle one).
5. List dates of scoping sessions that were held: Vapor Intrusion Scoping Sessions
 - August 2014 Conference Call: Vapor Intrusion for the Water Policy Area
 - February 2015 DQO Scoping: Vapor Intrusion for the Water Policy Area
 - April 2015 DQO Scoping: Vapor Intrusion for the Water Policy Area
 - September 2015 DQO Scoping: Vapor Intrusion for the C-400 Cleaning Building

QAPP Worksheets #1 and #2. Title and Approval Page (Continued)

6. List dates and titles of QAPP documents written for previous site work, if applicable:

Title:	Approval Date:
<i>Sampling and Analysis Plan to Support the Additional Action for the CERCLA Five-Year Review at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Appendix A, DOE/LX/07-2200&D2</i>	5/2015

-
7. List organizational partners (stakeholders) and connection with lead organization:
EPA Region 4, KDEP
8. List data users: DOE, FPDP, subcontractors, EPA Region 4, KDEP
9. Table 1 provides a crosswalk of required QAPP elements. No elements are omitted intentionally from this QAPP.

This QAPP includes all 28 worksheets that are required based on UFP-QAPP guidance, as updated with the optimized worksheet guidance. Each of these worksheets has been reviewed to ensure the accuracy of the information presented in this QAPP.

Table 1. Crosswalk: UFP-QAPP Workbook to 2106-G-05-QAPP

Optimized UFP-QAPP Worksheets		CIO 2106-G-05 QAPP Guidance Section	
1 & 2	Title and Approval Page	2.2.1	Title, Version, and Approval/Sign-Off
3 & 5	Project Organization and QAPP Distribution	2.2.3	Distribution List
		2.2.4	Project Organization and Schedule
4, 7, & 8	Personnel Qualifications and Sign-off Sheet	2.2.1	Title, Version, and Approval/Sign-Off
		2.2.7	Special Training Requirements and Certification
6	Communication Pathways	2.2.4	Project Organization and Schedule
9	Project Planning Session Summary	2.2.5	Project Background, Overview, and Intended Use of Data
10	Conceptual Site Model	2.2.5	Project Background, Overview, and Intended Use of Data
11	Project/Data Quality Objectives	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
12	Measurement Performance Criteria	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
13	Secondary Data Uses and Limitations	Chapter 3	QAPP ELEMENTS FOR EVALUATING EXISTING DATA
14 & 16	Project Tasks and Schedule	2.2.4	Project Organization and Schedule
15	Project Action Limits and Laboratory-Specific Detection/Quantitation Limits	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
17	Sampling Design and Rationale	2.3.1	Sample Collection Procedure, Experimental Design, and Sampling Tasks
18	Sampling Locations and Methods	2.3.1	Sample Collection Procedure, Experimental Design, and Sampling Tasks
		2.3.2	Sampling Procedures and Requirements
19 & 30	Sample Containers, Preservation, and Hold Times	2.3.2	Sampling Procedures and Requirements
20	Field QC	2.3.5	Quality Control Requirements
21	Field SOPs	2.3.2	Sampling Procedures and Requirements
22	Field Equipment Calibration, Maintenance, Testing, and Inspection	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies and Consumables
23	Analytical SOPs	2.3.4	Analytical Methods Requirements and Task Description
24	Analytical Instrument Calibration	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Require
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies and Consumables
26 & 27	Sample Handling, Custody, and Disposal	2.3.3	Sample Handling, Custody Procedures, and Documentation
28	Analytical Quality Control and Corrective Action	2.3.5	Quality Control Requirements
29	Project Documents and Records	2.2.8	Documentation and Records Requirements
31, 32, & 33	Assessments and Corrective Action	2.4	ASSESSMENTS AND DATA REVIEW (CHECK)
		2.5.5	Reports to Management
34	Data Verification and Validation Inputs	2.5.1	Data Verification and Validation Targets and Methods
35	Data Verification Procedures	2.5.1	Data Verification and Validation Targets and Methods
36	Data Validation Procedures	2.5.1	Data Verification and Validation Targets and Methods
37	Data Usability Assessment	2.5.2	Quantitative and Qualitative Evaluations of Usability
		2.5.3	Potential Limitations on Data Interpretation
		2.5.4	Reconciliation with Project Requirements

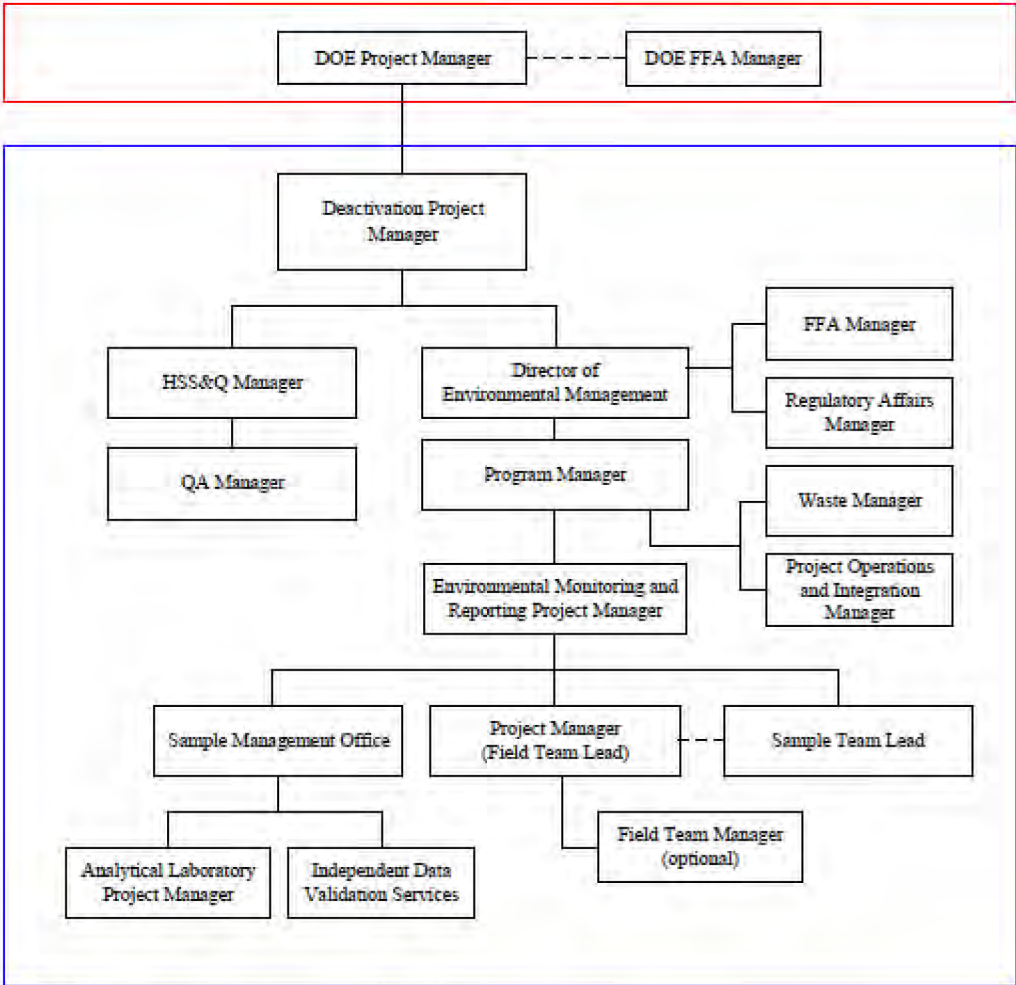
QAPP Worksheet #3. Minimum Distribution List

Distribution is based on the position title. A change in the individual within an organization will not trigger a resubmittal of the QAPP. DOE may choose to update the sheet and submit changes to the document holders. This change will not require a review by FFA stakeholders because it is not a substantive change. Managers are responsible for distribution to their staff.

Controlled copies of this QAPP will not be generated nor submitted. Uncontrolled copies of the QAPP will be distributed with the Sampling and Analysis Plan (SAP) according to the distribution list below.

Position Title	Organization	QAPP Recipients	Current Telephone Number	Current E-mail Address	Document Control Number
Paducah Site Lead	DOE	Jennifer Woodard	(270) 441-6820	jennifer.woodard@lex.doe.gov	1
FFA Manager	DOE	Tracey Duncan	(270) 441-6862	tracey.duncan@lex.doe.gov	2
Project Manager	DOE	Cynthia Zvonar	(859) 219-4066	cynthia.zvonar@lex.doe.gov	3
Acting Director of Environmental Management	FPDP	Bruce Ford	(270) 441-5357	bruce.ford@ffspaducah.com	4
Acting Regulatory Affairs Manager	FPDP	Kelly Layne	(270) 441-5069	kelly.layne@ffspaducah.com	5
Program Manager Assigns Project Manager and Manages Subcontractors	FPDP	Craig Jones	(270) 441-5114	craig.jones@ffspaducah.com	6
Project Manager (Field Team Lead)	FPDP	Joe Towarnicky (Shay Mitchell)	(614) 207-5397 [(270) 441-5430]	joseph.towarnicky@ffspaducah.com (shay.mitchell@ffspaducah.com)	7 (8)
Division of Waste Management, Hazardous Waste Branch, PGDP Section Supervisor and FFA Manager	KDEP	Brian Begley	(502) 782-6317	brian.begley@ky.gov	9
Kentucky Division of Waste Management	KDEP	Gaye Brewer	(270) 898-8468	gaye.brewer@ky.gov	10
FFA Manager	EPA	Julie Corkran	(404) 562-8547	corkran.julie@epa.gov	11
Remedial Project Manager	EPA	Jon Richards	(404) 562-8648	richards.jon@epa.gov	12
Environmental Radiation Protection and Risk Assessment Manager	FPDP	LeAnne Garner	(270) 441-5136	leanne.garner@ffspaducah.com	13
FFA Manager	FPDP	Jana White	(270) 441-5185	jana.white@ffspaducah.com	14
Acting Quality Assurance Manager	FPDP	Kelly Ausbrooks	(270) 441-5123	kelly.ausbrooks@ffspaducah.com	15
Environmental Monitoring and Reporting Project Manager	FPDP	Lisa Crabtree	(270) 441-5135	lisa.crabtree@ffspaducah.com	16
Health and Safety Manager	FPDP	Roland Chretien	(270) 441-6238	roland.chretien@ffspaducah.com	17
Sample Management Office Oversees Laboratory Contracts Manages Data Validators	FPDP	Jaime Morrow	(270) 441-5508	jaime.morrow@ffspaducah.com	18

QAPP Worksheet #5-A. Project Level Organizational Chart



NOTE: DOE contractor and subcontractor personnel inside blue box.

QAPP Worksheet #4. Project Personnel Sign-Off Sheet: Sample Collection, Data Analysis, Data Validation

Personnel actively engaged in sample collection, data analysis, and data validation for this project are required to read applicable sections of this QAPP and sign a Personnel Sign-off Sheet. The master list of signatures will be kept with the project work control documentation.

Project Position Title	Organization	Specialized Training/ Certification, if any	Signature*	Date
Sampler	FPDP	Per Training Position Description (TPD)		
Sample Team Lead	FPDP	Per TPD		
Sample Management Office Responsible for analytical laboratory	FPDP	Per TPD		
Independent Third-Party Data Validator	Los Alamos Technical Associates (LATA), Ohio	Bachelor degree plus relevant experience		
Environmental Radiation Protection and Risk Assessment Manager Responsible for Data Analysis	FPDP	Per TPD		
Project Manager (Field Team Lead)	FPDP	Per TPD		

*QA/QC reviews are performed by each position relative to their respective area of expertise.

**Signatures indicate personnel have read and agree to implement this project-specific QAPP as written.

QAPP Worksheet #7. Personnel Responsibility and Qualifications Table

ORGANIZATION: FPDP

Name	Position Title Responsible	Organization Affiliation	Responsibilities	Education and Experience Qualifications¹
Craig Jones	Program Manager	FPDP	Overall project responsibility	> 4 years relevant work experience
Joe Towarnicky (Shay Mitchell)	Project Manager (Field Team Lead)	FPDP	Project SAP (Implement Project SAP)	Bachelor degree plus > 1 year relevant work experience
Kelly Layne	Acting Regulatory Affairs Manager	FPDP	Project environmental compliance responsibility	Bachelor degree plus > 4 years work experience
Jana White	FFA Manager	FPDP	Project compliance with the FFA	> 4 years work relevant experience
Lisa Crabtree	Environmental Monitoring and Reporting Project Manager— QA/QC	FPDP	Support project on sampling and reporting activities	> 4 years relevant work experience
Jaime Morrow	Sample Management Office	FPDP	Project sample and data management	> 2 years relevant work experience
Roland Chretien	Health and Safety Manager	FPDP	Project health and safety responsibility	Bachelor degree plus > 1 year relevant experience
Bill Chase	Waste Coordinator	FPDP	Overall project waste management responsibility	> 4 years relevant experience
James Moore	Data Validator	Los Alamos Technical Associates, Inc.	Performing data validation according to specified procedures	Bachelor degree plus relevant experience
Laboratory Project Manager	Analytical Laboratory Project Manager	Laboratory	Sample analysis and data reporting	Bachelor degree plus relevant experience

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¹ Candidates who do not have a certificate or required degree but demonstrate additional “equivalent relevant work experience” can be considered when evaluating qualifications. This assessment will be conducted by the project manager as he/she assembles the appropriate team for the project.

QAPP Worksheet #8. Special Personnel Training Requirements Table

Personnel are trained in the safe and appropriate performance of their assigned duties in accordance with requirements of work to be performed. For this project, there are no special training requirements other than what normally is required for work at the PGDP site.

QAPP development uses a graded approach. A work control package will be generated prior to implementation of the project; the package will list any specific project-level training requirements.

Project Function	Specialized Training— Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
Project Tasks	There has been no specialized training required for this program other than what normally is required for site work at PGDP. The contractor will evaluate specific tasks and personnel will be assigned training as necessary to perform those tasks. Training may address health and safety aspects of specific tasks as well as contractor-specific, site-specific, and task-specific requirements.	FPDP	Prior to fieldwork	Based upon required duties	FPDP staff, subcontractors	Training files are maintained by the FPDP training organization. A training database is used to manage and track training.

QAPP Worksheet #6. Communication Pathways

NOTE: Formal communication across company or regulatory boundaries occurs via letter. Other forms of communication, such as e-mail, meetings, phone calls, etc., will occur throughout the project. The DOE Project Manager will communicate preliminary analytical results and field updates with the regulatory agencies project managers throughout the project. The project will establish regular conference calls during fieldwork and throughout preparation of the report to discuss analytical data and other project information. Issues identified during field work that require changes to the work plan or deviations will be communicated by the DOE Project Manager to the regulatory agencies project managers via phone call or email and followed up with a formal letter from DOE documenting the issue and resolution. This type of communication will be as timely as possible.

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Communication Drivers	Organizational Affiliation	Position Title Responsible	Procedure
Federal Facility Agreement, DOE/OR/07-1707	DOE Paducah	Federal Facility Agreement Manager	Formal communication among DOE, EPA, and KDEP.
Federal Facility Agreement, DOE/OR/07-1707	DOE Paducah	DOE Project Manager	Formal communication between DOE and contractor for Environmental Remediation Projects.
Project requirements	FPDP	Director of Environmental Management	Formal communication among the project, the Site Lead, and the DOE Project Manager.
Project requirements	FPDP	Project Manager	Communication between the project and the FPDP Environmental Remediation Project Manager.
Project quality assurance (QA) requirements	FPDP	Quality Manager	Project quality-related communication between the QA department and FPDP project personnel.
FFA Compliance	FPDP	Federal Facility Agreement Manager	Internal communication regarding FFA compliance with the FPDP Project Manager.

QAPP Worksheet #6. Communication Pathways (Continued)

Communication Drivers	Organizational Affiliation	Position Title Responsible	Organizational Department Manager	Procedure
Sampling Requirements	FPDP	Sample Team Lead	Environmental Monitoring and Reporting Project Manager	Internal communication regarding field sampling with the FPDP Project Manager.
Analytical Laboratory Interface	FPDP	Scientist	Sample Management Office	Communication between FPDP and analytical laboratory.
Waste Management Requirements	FPDP	Waste Coordinator	Waste Manager	Internal communication regarding project waste management with FPDP Project Manager.
Environmental Compliance Requirements	FPDP	Regulatory Compliance Manager	Regulatory Affairs Manager	Internal correspondence regarding environmental requirements and compliance with the FPDP Project Manager.
Subcontractor Requirements (if applicable)	FPDP	Subcontract Administrator	Project Operations and Integration Manager	Correspondence among the project and subcontractors, if applicable.
Health and Safety Requirements	FPDP	Health and Safety Manager	Health and Safety Manager	Internal communication regarding safety and health requirements with the FPDP Project Manager.

QAPP Worksheet #9. Project Scoping Session Participant Sheet

Project scoping is the key to the success of any project and is part of the systematic planning process. The preparation of this QAPP included review of past documents produced and planning meetings to establish the objectives of the project. This QAPP has been prepared to be consistent with the Data Management Plan (DOE 1998) developed for the FFA. The summary of the results of the project scoping is presented in the SAP. Participant Scoping Sheets follow. The DQO process was used in scoping meetings conducted on both the Water Policy Area and the C-400 area. The Work Plan for the investigation was one of the results of the DQO process. The PowerPoint summary of the DQO process used for the September 29, 2015, scoping meeting is available in <http://ffspaducah.com/public-documents/all>.

Name of Project: Addendum for the Five-Year Review, SAP Date of Session: August 21, 2014 Scoping Session Purpose: Develop data quality objectives (DQOs)					
Position Title	Affiliation	Name	Phone #	E-mail Address	Project Role
LATA Kentucky Project Manager	LATA Kentucky	Teresa Overby	270-441-5188	teresa.overby@lataky.com	Project management
DOE Project Manager	DOE	Cynthia Zvonar	859-219-4066	cynthia.zvonar@lex.doe.gov	Program management
Risk Manager	DOE	Rich Bonczek	859-219-4051	rich.bonczek@lex.doe.gov	Technical support
FFA Manager	KDEP	Todd Mullins	502-564-6716	todd.mullins@ky.gov	Project management
Geologist	LATA Kentucky	Ken Davis	270-441-5049	ken.davis@lataky.com	Technical support
FFA Manager	EPA	Jennifer Tufts	404-562-8513	tufts.jennifer@epa.gov	Project management
Technical Advisor	KDEP	Mike Guffey	502-564-1299	mike.guffey@ky.gov	Technical support
Technical support	DOE PPPO Contractor, Pro2Serve	Tracey Duncan	270-441-5060	tracey.duncan@lataky.com	Technical support
Technical support	DOE PPPO Contractor, Strategic Management Solutions, LLC (SMSI)	Bobette Nourse	865-712-2669	bobette.nourse@lex.doe.gov	Technical support
LATA Kentucky Risk Manager	LATA Kentucky	Joe Towarnicky	270-441-5134	joseph.towarnicky@lataky.com	Technical support

**QAPP Worksheet #9 (Continued)
Project Scoping Session Participants Sheet**

Project scoping is the key to the success of any project and is part of the systematic planning process. A scoping meeting was held to develop the DQOs of the project.

Name of Project: Addendum for the Five-Year Review, SAP					
Date of Session: February 24, 2015					
Scoping Session Purpose: Develop DQOs					
Position Title	Affiliation	Name	Phone #	E-mail Address	Project Role
LATA Kentucky Project Manager	LATA Kentucky	Teresa Overby	270-441-5188	teresa.overby@lataky.com	Project management
DOE Project Manager	DOE	Cynthia Zvonar	859-219-4066	cynthia.zvonar@lex.doe.gov	Program management
Risk Manager	DOE	Rich Bonczek	859-219-4051	rich.bonczek@lex.doe.gov	Technical support
FFA Manager	KDEP	Todd Mullins	502-564-6716	todd.mullins@ky.gov	Project management
Geologist	LATA Kentucky	Ken Davis	270-441-5049	ken.davis@lataky.com	Technical support
FFA Manager	EPA	Jennifer Tufts	404-562-8513	tufts.jennifer@epa.gov	Project management
Technical Advisor	KDEP	Mike Guffey	502-564-1299	mike.guffey@ky.gov	Technical support
Facilitator	LATA Kentucky	Tracey Duncan	270-441-5060	tracey.duncan@lataky.com	Facilitator
Technical support	DOE PPPO Contractor, SMSI	Bobette Nourse	865-712-2669	bobette.nourse@lex.doe.gov	Technical support
LATA Kentucky Risk Manager	LATA Kentucky	Joe Towarnicky	270-441-5134	joseph.towarnicky@lataky.com	Technical support
Groundwater Project Manager	DOE	David Dollins	270-441-6819	dave.dollins@lex.doe.gov	Technical support
Technical Advisor	EPA	Ben Bentkowski	404- 562-8507	bnentkowski.ben@epa.gov	Technical support
Technical Advisor	KDEP	Brian Begley	502- 564-6716	brian.begley@ky.gov	Technical support
Technical Advisor	EPA	Jon Richards	404-562-8648	richards.jon@epa.gov	Technical support

QAPP Worksheet #9 (Continued)
Project Scoping Session Participants Sheet

Project scoping is the key to the success of any project and is part of the systematic planning process. A scoping meeting was held to develop the DQOs of the project.

Name of Project: Addendum for the Five-Year Review, SAP					
Date of Session: April 22, 2015					
Scoping Session Purpose: Develop DQOs					
Position Title	Affiliation	Name	Phone #	E-mail Address	Project Role
LATA Kentucky Project Manager	LATA Kentucky	Teresa Overby	270-441-5188	teresa.overby@lataky.com	Project management
DOE Project Manager	DOE	Cynthia Zvonar	859-219-4066	cynthia.zvonar@lex.doe.gov	Program management
Risk Manager	DOE	Rich Bonczek	859-219-4051	rich.bonczek@lex.doe.gov	Technical support
FFA Manager	KDEP	Todd Mullins	502-564-6716	todd.mullins@ky.gov	Program management
Geologist	LATA Kentucky	Ken Davis	270-441-5049	ken.davis@lataky.com	Technical support
FFA Manager	EPA	Julie Corkran	404-562-8547	corkran.julie@epa.gov	Program management
Technical Advisor	KDEP	Mike Guffey	502-564-1299	mike.guffey@ky.gov	Technical support
Project Support	LATA Kentucky	Tracey Duncan	270-441-5060	tracey.duncan@lataky.com	Facilitator
Technical Advisor	DOE PPPO Contractor, SMSI	Bobette Nourse	865-712-2669	bobette.nourse@lex.doe.gov	Technical support
LATA Kentucky Risk Manager	LATA Kentucky	Joe Towarnicky	270-441-5134	joseph.towarnicky@lataky.com	Technical support
Groundwater Project Manager	DOE	David Dollins	270-441-6819	dave.dollins@lex.doe.gov	Technical support
Technical Advisor	EPA	Ben Bentkowski	404- 562-8507	bentkowski.ben@epa.gov	Technical support
Technical Advisor	KDEP	Brian Begley	502- 564-6716	brian.begley@ky.gov	Technical support
Technical Advisor	EPA	Jon Richards	404-562-8648	richards.jon@epa.gov	Technical support

**QAPP Worksheet #9 (Continued)
Project Scoping Session Participants Sheet**

Name of Project: Addendum for the Five-Year Review, SAP					
Date of Session: April 22, 2015					
Scoping Session Purpose: Develop DQOs					
Position Title	Affiliation	Name	Phone #	E-mail Address	Project Role
Technical Advisor	KDWM	Jeri Higgenbotham	502-564-6716, ext. 4726	jeri.higginbotham@ky.gov	Technical support
Technical Advisor	Geosyntec	Helen Dawson	703-533-3148	hdawson@geosyntec.com	Technical support
Technical Advisor	EPA	Noman Ahsanuzzamen	404-562-8047	ahsanuzzaman.noman@epa.gov	Technical support
Technical Advisor	EPA	Glenn Adams	404-562-8771	adams.glenn@epa.gov	Technical support
Technical Advisor	KDWM	Gaye Brewer	270-898-8468	gaye.brewer@ky.gov	Technical support
Technical Advisor	DOE PPPO Contractor, Pro2Serve	Allison Keefer	270-441-6809	allison.keeper@lex.doe.gov	Technical support
Technical Advisor	DOE PPPO Contractor, Pro2Serve	Tracy Taylor	270-441-6866	tracy.taylor@lex.doe.gov	Technical support

QAPP Worksheet #9 (Continued)
Project Scoping Session Participants Sheet

Name of Project: Addendum for the Five-Year Review, C-400 VI Scoping					
Date of Session: September 29, 2015					
Scoping Session Purpose: Develop DQOs					
Position Title	Affiliation	Name	Phone #	E-mail Address	Project Role
Fluor Project Manager	FFS	Teresa Overby	270-441-5188	teresa.overby@ffspaducah.com	Project management
DOE Project Manager	DOE	Cynthia Zvonar	859-219-4066	cynthia.zvonar@lex.doe.gov	Program management
Risk Manager	DOE	Rich Bonczek	859-219-4051	rich.bonczek@lex.doe.gov	Technical support
FFA Manager	KDEP	Brian Begley	502- 564-6716	brian.begley@ky.gov	Program management
Geologist	FFS	Ken Davis	270-441-5049	ken.davis@ffspaducah.com	Technical support
FFA Manager	EPA	Julie Corkran	404-562-8547	corkran.julie@epa.gov	Program management
FFA Manager	DOE	Tracey Duncan	270-441-5060	tracey.duncan@lex.doe.gov	Facilitator
Technical Advisor	DOE PPPO Contractor, SMSI	Bobette Nourse	865-712-2669	bobette.nourse@lex.doe.gov	Technical support
Project Scientist	FFS	Joe Towarnicky	270-441-5134	joseph.towarnicky@ffspaducah.com	Technical support
Groundwater Project Manager	DOE	David Dollins	270-441-6819	dave.dollins@lex.doe.gov	Technical support
Technical Advisor	EPA	Ben Bentkowski	404- 562-8507	bentkowski.ben@epa.gov	Technical support
Technical Advisor	EPA	Jon Richards	404-562-8648	richards.jon@epa.gov	Technical support

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QAPP Worksheet #9 (Continued)
Project Scoping Session Participants Sheet

Name of Project: Addendum for the Five-Year Review, C-400 VI scoping					
Date of Session: September 29, 2015					
Scoping Session Purpose: Develop DQOs					
Position Title	Affiliation	Name	Phone #	E-mail Address	Project Role
Technical Advisor	KDWM	Jeri Higgenbotham	502-564-6716, ext 4726	jeri.higginbotham@ky.gov	Technical support
Technical Advisor	KDWM	Gaye Brewer	270-898-8468	gaye.brewer@ky.gov	Technical support
Technical Advisor	DOE PPPO Contractor, Pro2Serve	Tracy Taylor	270-441-6866	tracy.taylor@lex.doe.gov	Technical support
Technical Advisor	DOE PPPO Contractor, Pro2Serve	Jennifer Johnson	270-441-6846	jennifer.johnson@lex.doe.gov	Technical support

**QAPP Worksheet #10.
Problem Definition**

The problem to be addressed by the project: The problem being addressed is a concern that volatile organic compounds (VOCs) vapors including trichloroethene, 1,1,1-trichloroethane (1,1,1-TCA), 1,1,2-trichloroethane, 1,4-dioxane, 1,1-dichloroethene (1,1-DCE); *cis*-1,2-DCE; *trans*-1,2-DCE; 1,1-dichloroethane, (1,1-DCA), 1,2-dichloroethane (1,2--dichloroethane, and vinyl chloride may be migrating from the PGDP Regional Gravel Aquifer plume and from contaminated soils and groundwater of the Upper Continental Recharge System (UCRS) and into the C-400 Cleaning Building at unacceptable levels.

The environmental questions being asked: Are vapors migrating from VOCs in the groundwater into the air of C-400 Cleaning Building at levels that exceed VISLs?

Observations from any site reconnaissance reports: See Work Plan Section 6.1, Site Operations That Could Have Released VOCs; Section 6.2, Chemicals of Interest; and Section 6.4, C-400 Cleaning Building Characteristics.

A synopsis of secondary data or information from site reports: See Work Plan Section 6.5, Potential Sources of Chemicals of Interest.

The possible classes of contaminants and the affected matrices: Volatile organic compounds listed above and in Section 5, Table 1.

The rationale for inclusion of chemical and nonchemical analyses: See Worksheets #11 and #17.

Information concerning various environmental indicators: Based on KDEP Environmental Indicator determination, contaminated groundwater migration currently is not considered to be under control at PGDP, under the Government Performance and Results Act.

Project decision conditions (“If..., then...” statements): See Work Plan Section 10, Investigation Decision Rules.

QAPP Worksheet #11. Project Quality Objectives/Systematic Planning Process Statements

This worksheet details the standards for field and analytical data quality. Analytical data will be generated by DOE Consolidated Audit Program (DOECAP) laboratories utilizing approved laboratory test methods. The overall project quality objectives are to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting that will meet the DQOs of this project.

Who will use the data? DOE, FPDP, KDEP, and EPA.

What will the data be used for? To eliminate the data gaps identified in Worksheet #10.

What type of data is needed? (target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques): Indoor air data, ambient (upwind) air data, air from floor crack.

How “good” do the data need to be in order to support the environmental decision? Data need to have practical quantitation limits below the respective VISL. Data will meet the measurement quality objective and data quality indicators established by the systematic planning process consistent with procedure CP3-ES-5003, *Quality Assured Data*. Results will undergo 100% data validation.

Where, when, and how should the data be collected/generated? See Section 7. Sampling Locations and Rationale, and Section 8, Sampling and Analysis Methods.

Who will collect and generate the data? FPDP. Additionally, weather reporting data from the weather station located at the Paducah airport (i.e., official weather data) also will be included in the project’s report with a focus on wind direction to supplement the on-site wind direction determination.

How will the data be reported? Field data will be recorded on chain-of-custody forms, in field logbooks, and field data sheets. The fixed-base laboratory will provide data in an Electronic Data Deliverable. Project data following verification assessment and validation will be placed into and reported from the Paducah Oak Ridge Environmental Information System (OREIS). Data loaded into Paducah OREIS will be made available to the public stakeholders via the Portsmouth/Paducah Project Office Environmental Geographic Analytical Spatial Information System (PEGASIS).

How will the data be archived? Electronic data will be archived in OREIS in accordance with Section 8.5 (Data and Records Archival) of the *Data and Documents Management and Quality Assurance Plan* (DOE 1998).

NOTE: The worksheet is completed partially with items that will be consistent across project-specific field sampling plans (FSPs). The project-specific FSPs will need to populate the balance of this worksheet.

Sampling will follow the referenced standard operating procedures. The following tables provide the measurement performance criteria.

QAPP Worksheet #12. Measurement Performance Criteria

Matrix	Air				
Analytical Group^a	C-400 VOCs, including trichloroethene, 1,2-DCE, vinyl chloride, 1,1-DCE				
Concentration Level	Very Low				
Sampling Procedure^b	Analytical Method/SOP	Data Quality Indicators	Measurement Performance Criteria^c	Quality Control (QC) Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
CP4-ER-1035, Vapor Sampling	EPA-TO-15. Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air: Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)	Precision-Lab	N/A	Evaluate lab data packages	A

^a If information varies within an analytical group, separate by individual analyte.

^b The most current version of the method will be used.

^c Measurement Performance Criteria (MPC) is listed as N/A for EPA-TO-15 because air samples are stand-alone samples, and the results of one sample cannot be used to evaluate sampling and analysis precision, accuracy, or bias. Thus, MPC cannot be provided. Replicate samples will be collected per the work plan and they will be reviewed to estimate the degree of sampling precision, accuracy, and bias without defined MPC.

QAPP Worksheet #13. Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/Collection Dates)	How Data Will Be Used	Limitations on Data Use
OREIS Database	Various	Various	Data for soil and groundwater contamination will be used to approximate expected sub-slab VOC concentrations.	Data have been verified, assessed, and validated (if validation is required). Rejected data will not be used.

QAPP Worksheet #14. Summary of Project Tasks*

Sampling Tasks: Collect samples, document field notes, complete chain-of-custody, label samples, package/ship samples per standard operating procedures Worksheet #21.

Analysis Tasks: Receive samples, complete chain-of-custody, extract samples, analyze extract, review data, report data per standard methods in Worksheet #21.

Quality Control Tasks: QC will be per QAPP worksheets as follows:

- QC samples—Worksheets #20 and #28
- Equipment calibration—Worksheets #22 and #24
- Data review/validation—Worksheets #34, #35, #36, and #37

Secondary Data: See Section 8, Sampling and Analysis Methods.

Data Management Tasks: Data management will be per procedure CP4-ES-5007, *Data Management Coordination*; CP3-ES-1003, *Developing, Implementing, and Maintaining Data Management Implementation Plan*; and CP2-ES-0063, *Environmental Monitoring Data Management Plan at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*.

Documentation and Records: Documentation and records will be per procedure CP3-RD-0010, *Records Management Process*.

Assessment/Audit Tasks: Assessments and audits will be per procedure CP3-QA-1003, *Management and Self Assessments*.

Data Review Tasks: Data review tasks will be per procedure CP3-ES-5003, *Quality Assured Data*; and CP2-ES-0063, *Environmental Monitoring Data Management Plan at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*.

*It is understood that SOPs are DOE Prime Contractor specific.

QAPP Worksheet #16. Project Schedule/Timeline Table

Section 7 of the work plan describes the locations and approach to sampling to be used for C-400 vapor intrusion sampling. Once the work plan is approved by the regulatory agencies, planning activities, including laboratory contracting, work package preparation, training, and other preparatory activities will be completed in 30 days. The total duration of the field sampling period is approximately three weeks. An actual start date and corresponding finish date are not forecast at this time, pending approval of the work plan. Analytical laboratory analyses are expected within 14 days of completion of the fieldwork. Data verification, validation, and assessment will be completed in 14 days following receipt of data; however, real-time data will be shared via e-mail with the FFA Parties and conference calls held to discuss the results.

Activities	Organization	Actual Dates Will be Based on Approval of the Work Plan		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Vapor intrusion sampling conducted in C-400	FPDP	Field work mobilization for sub-slab coring—begin 30 days after Work Plan approval.	1 week after initiation of coring	Five-Year Review Addendum Report	Within 90 days after receipt of laboratory data
		SUMMA® Canister sampling ~ 5 weeks after Work Plan approval	~3 weeks after initiation of sampling		
		Laboratory analysis	14 days of receipt of last sample		
		Data verification and validation	14 days of receipt of laboratory data		

QAPP Worksheet #15. Project Action Limits and Laboratory-Specific Detection/Quantitation Limits

Matrix: Air
Analytical Group: VOCs

VOCs	CAS Number	Project Action Limit (PAL) ($\mu\text{g}/\text{m}^3$) ^e	Project Action Limit Reference ^a	Site COPC? ^b	Laboratory-Specific ^c	
					Practical Quantitation Limits (PQLs) ($\mu\text{g}/\text{m}^3$)	Method Detection Limits (MDLs) ($\mu\text{g}/\text{m}^3$)
1,1-Dichloroethane	75-34-3	7.7	VISL, Commercial ^d	No	2.0	0.61
1,1-Dichloroethene	75-35-4	880	VISL, Commercial ^d	Yes	2.0	0.59
1,2- Dichloroethane	107-06-2	0.47	VISL, Commercial ^d	Yes	2.0	0.61
1,1,1-Trichloroethane	71-55-6	22000	VISL, Commercial ^d	Yes	2.7	0.81
1,1,2-Trichloroethane	79-00-5	0.77	VISL, Commercial ^d	Yes	2.7	0.81
<i>cis</i> -1,2-Dichloroethene	156-59-2	N/A, 3500 ^e	No VISL ^d , Provisional Value	Yes	2.0	0.59
<i>trans</i> -1,2-Dichloroethene	156-60-5	N/A, 3500 ^e	No VISL ^d , Provisional Value	Yes	2.0	0.59
1,4-Dioxane	123-91-1	2.5	VISL, Commercial ^d	No	7.2	N/A
Trichloroethene	79-01-6	3.0	VISL, Commercial ^d	Yes	2.7	0.81
Vinyl Chloride	75-01-4	2.8	VISL, Commercial ^d	Yes	1.3	0.38

^a VISL = Vapor Intrusion Screening Level (Commercial, Carcinogen Target Risk = 1.0E-6, Target Hazard Quotient = 1.0).

^b Analytes marked with chemical of potential concern (COPC) are from Table 2.1 of the Paducah Risk Methods Document (DOE 2016).

^c Laboratory has PQL of 0.5 ppbv and MDL of 0.15 ppbv. Values were converted to $\mu\text{g}/\text{m}^3$ at 25°C. These are target values; the contract required MDL and PQL will not be established until the laboratory is contracted.

^d VISL Calculator Version 3. 5.1, May 2016 Regional Screening Levels: <https://semspub.epa.gov/src/document/11/196702>.

^e Project Action Limits are listed as N/A for *cis*-1,2-Dichloroethene and *trans*-1,2-Dichloroethene because there are no VISL values available for these analytes. EPA has provided a provisional value for *trans*-1,2- Dichloroethene. In addition, EPA recommended use of the *trans*-1,2- Dichloroethene value as a surrogate for *cis*-1,2-dichloroethene, as presented in this Worksheet. Additional information regarding the derivation of these values can be found in the Agency for Toxic Substances and Disease Registry Guidance.

QAPP Worksheet #17. Sampling Design and Rationale

See Section 7, Sampling Locations and Rationale. The goal of this SAP is to collect samples to determine whether the vapor intrusion pathway is complete and presents unacceptable risks to humans in C-400. To that end, air samples will be collected in areas believed to be susceptible to vapor intrusion, along with sub-slab samples at some of the same locations and ambient air samples. The air results will be used to determine if building occupants are exposed to contaminants of interest at levels of concern. Those levels will depend, in part, on the amount of time individuals spend in the building and are exposed to the vapors. Sub-slab vapor samples and outdoor air samples will be collected concurrently with indoor air samples to assist with interpreting the indoor air results, evaluating the degree of vapor intrusion, and supporting other C-400 investigations.

This vapor intrusion investigation will sample at eight indoor and four outdoor locations during each of three scenarios described below. Photos of the vicinity of the planned sample locations are provided in Appendix D. Seven of the eight indoor locations will have sub-slab vapor samples collected concurrently. SUMMA® canister samples will be collected as 10-hour composite samples during normal work hours to mirror the exposure duration of a typical worker.

The following three scenarios were selected based upon the possible working conditions now and in the expected future. Each scenario will be maintained for 24 hours prior to initiation of sampling. In no particular order, the three scenarios selected for sampling are as follows:

1. Exhaust fan on and large bay doors open
2. Exhaust fan on and large bay doors closed
3. Exhaust fan off and large bay doors closed

Locations 1–7, as shown on Figure 12, will have indoor air samples collected during each of the three scenarios and will have the temperature and differential pressure (relative to ambient outdoor air) measured in the vicinity of the SUMMA®, six times per each sampling event (i.e., start of the sampling event, end of sampling event, and every two hours during sampling).

Locations 1–7, as shown on Figure 12, will have sub-slab vapor samples collected at the same locations during each of the three scenarios and will have a pressure differential measured (split manometer) between the sub-slab and the indoor atmosphere six times per each sampling event (i.e., start of the sampling event, end of sampling event, and every two hours during sampling). The slab thickness will be measured and recorded at each sub-slab location.

The objective of the sub-slab vapor samples is to monitor the difference between sub-slab vapor concentrations and indoor air concentrations of the selected VOCs to support an estimation of degree of attenuation/vapor intrusion through the building floor. Collection of sub-slab samples was chosen, in part, because these data are expected to support other C-400 investigations.

QAPP Worksheet #17. Sampling Design and Rationale (Continued)

Location 8, as shown on Figure 12, is the location of the operable fan exhaust sample. A port will be installed on the exhaust side of the operating fan and an air sample will be collected during each of the three scenarios and will have the differential pressure (relative to ambient outdoor air) and temperature measured six times per each sampling event (i.e., start of the sampling event, end of sampling event, and every two hours during sampling). Other differential pressure measurements (e.g., relative to indoor air at the intake of ductwork) may be collected.

During each of the three scenarios, outdoor ambient air samples will be collected at four locations (Locations Ambient 1–Ambient 4 on Figure 13) which are located within 50 ft to 100 ft of the building. These samples will be used to differentiate outdoor air contributions to concentrations in indoor air. These locations were walked down on April 20, 2017, and selected to avoid external SWMUs, dumpsters, roads, construction, or other items that may influence the sampling results. One of the two locations on the east side will be selected depending on the wind direction on the day of sampling to minimize the potential for impacts on ambient concentrations due to the location of the operating fan stack. Therefore, either Ambient 3-Northeast or Ambient 3-Southeast will be selected for sampling based on which of these locations is less downwind of the stack at the time of sample initiation. The sampling team will document the rationale for the selected location on the day of each sampling event. Figure 14 provides locations of SWMUs located in and around C-400. Based on the wind rose (Figure 15) for Barkley Airport, Paducah, Kentucky, the prevailing winds come from the southwest.

A weather station, location Ambient 5 as shown on Figure 13, will be located outside of the C-400 Building to record the barometric pressure, wind direction and speed, relative humidity, along with temperature every two hours for a total of six readings during the sampling period of ten hours. (i.e., start of the sampling event, end of sampling event, and every two hours during sampling). Additionally, weather reporting data from the weather station located at the Paducah airport (i.e., official weather data) will also be included in the project's report with a focus on wind direction to supplement on-site wind direction determination.

QAPP Worksheet #18. Sampling Locations and Methods/Standard Operating Procedure Requirements Table

See Section 7. Sampling Locations and Rationale, and Section and 8, Sampling and Analysis Methods

Sampling Location/ID Number	Matrix	Analytical Group	Method ^a	Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
Basement Furnace Room on North End/Location 3	Air	VOCs	EPA TO-15	6	See Worksheet #21	See Section 7 of the Work Plan
Basement Level Near Degreaser Tanks/Location 5	Air	VOCs	EPA TO-15	9*	See Worksheet #21	See Section 7 of the Work Plan
Southeast Office/Location 6	Air	VOCs	EPA TO-15	9*	See Worksheet #21	See Section 7 of the Work Plan
Southeast Corner Near Column E2/Location 7	Air	VOCs	EPA TO-15	6	See Worksheet #21	See Section 7 of the Work Plan
Main Floor Adjacent to Degreaser/Location 1	Air	VOCs	EPA TO-15	6	See Worksheet #21	See Section 7 of the Work Plan
Deteriorated Concrete Near Column A10/Location 2	Air	VOCs	EPA TO-15	6	See Worksheet #21	See Section 7 of the Work Plan
Northeast Central Near Column D 12/Location 4	Air	VOCs	EPA TO-15	6	See Worksheet #21	See Section 7 of the Work Plan
Basement Fan Room, Intake/Exhaust Plenum Fans 88/89/Location 8	Air	VOCs	EPA TO-15	3	See Worksheet #21	See Section 7 of the Work Plan
Outside Ambient Air Locations	Air	VOCs	EPA TO-15	12	See Worksheet #21	See Section 7 of the Work Plan

^a See Analytical SOP References Table (Worksheet #23).

*Replicate sampling location.

QAPP Worksheet #19. Analytical SOP Requirements Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference^a	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/analysis)^b
Air	VOCs	Very Low	See Worksheet #12		SUMMA® canister with 10-hour sample duration.		N/A

^a See Analytical SOP References table (Worksheet #23).

^b The Maximum Holding Time is listed as N/A for the analysis because the method does not specify a holding time; however, EPA Method TO-15 has a suggested guideline of 30 days.

QAPP Worksheet #30. Analytical Services Table

Matrix	Analytical Group	Concentration Level	Sample Locations/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)^a	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number)^a
Air	VOCs	Low	See Section 7, Sampling Locations and Rationale	See Worksheet #23	28-day	TBD	TBD

^a Laboratory contracting will be subsequent to the approval of the SAP to Support Additional Action for the CERCLA Five-Year Review; therefore, this is listed as TBD (to be determined) until a laboratory is selected through the procurement process. Information will be updated once a laboratory is selected.

QAPP Worksheet #20. Field Quality Control Sample Summary Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation SOP Reference	No. of Sampling Locations	No. of Field Duplicate Pairs	Inorganic	No. of Field Blanks	No. of Equip. Blanks	No. of Proficiency Testing (PT) Samples ^a	Total No. of Samples to Lab ^b
						No. of MS				
Air	VOCs	Low	See Worksheet #12	12, including 7 sub-slab at same location (See SAP Section 7)	2 Replicates per Operating Scenario	N/A	0	0	N/A	63 (See SAP, Section 7, Table 4)

^a PT sample will be collected only when required by a specific project.

^b Analyses will be performed by a fixed-base laboratory.

N/A—there are no inorganic parameters collected for this project.

QAPP Worksheet #21. Project Sampling SOP References Table

SOPs to be used on this project are summarized below.

Reference Number	Title and Number^a	Originating Organization^b	Equipment Type	Modified for Project Work? (Y/N)	Comments
1	CP4-ES-0043, <i>Temperature Control for Sample Storage</i>	Contractor	Sampling	N	N/A
2	CP2-ES-0025, <i>Paducah Environmental Monitoring Waste Management Plan</i>	Contractor	N/A	N	N/A
3	CP4-ES-1001, <i>Transmitting Data to the Paducah Oak Ridge Environmental Information System (OREIS)</i>	Contractor	N/A	N	N/A
4	CP4-ES-2700, <i>Logbooks and Data Forms</i>	Contractor	N/A	N	N/A
5	CP4-ES-2702, <i>Decontamination of Sampling Equipment and Devices</i>	Contractor	Sampling	N	N/A
6	CP4-ES-2704, <i>Trip, Equipment, and Field Blank Preparation</i>	Contractor	N/A	N	N/A
7	CP4-ES-2708, <i>Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals</i>	Contractor	N/A	N	N/A

QAPP Worksheet #21. Project Sampling SOP References Table (Continued)

Reference Number	Title and Number^a	Originating Organization^b	Equipment Type	Modified for Project Work? (Y/N)	Comments
8	CP3-ES-5003, <i>Quality Assured Data</i>	Contractor	N/A	N	N/A
9	CP3-ES-5004, <i>Sample Tracking, Lab Coordination, and Sample Handling Guidance</i>	Contractor	N/A	N	N/A
10	CP4-ES-5007, <i>Data Management Coordination</i>	Contractor	N/A	N	N/A
11	CP2-ES-5105, <i>Volatile and Semivolatile Data Verification and Validation</i>	Contractor	N/A	N	N/A
12	CP4-ES-1002, <i>Submitting, Reviewing, and Dispositioning Changes to the Environmental Databases OREIS and PEMS</i>	Contractor	N/A	N	N/A
13	CP4-ER-1035, <i>Vapor Sampling</i>	Contractor	N/A	N	N/A

^aSOPs are posted to the FPDP intranet Web site. External FFA parties can access this site using remote access with privileges upon approval. It is understood that SOPs are contractor specific.

^bThe work will be conducted by FPDP staff or a subcontractor. In either case, SOPs listed will be followed.

QAPP Worksheet #22. Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Differential pressure will be measured using factory-calibrated Dwyer Magnehelic gauges (or equivalent) sufficient to monitor the pressure difference to a precision of 0.1 inch water column between the inside of C-400 and the ambient air, between the inside of C-400 and the sub-slab, and between the fan ductwork/plenum and the inside of C-400.

QAPP Worksheet #23. Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number^a	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?(Y/N)
TO-15	Determination of VOCs In Air Collected In Specially Prepared Canisters and Analyzed by GC/MS	Definitive	VOCs	GC/MS	TBD	No

^a Analytical method number that the to-be determined DOECAP-certified laboratory will utilize. DOE national DOECAP program performs annual audits of the laboratories used by DOE. The audit includes a rigorous review/crosswalk of the EPA approved methods compared to the laboratories procedures. Therefore, DOE does not require DOECAP audited laboratories to submit SOPS on a project basis.

QAPP Worksheet #24. Analytical Instrument Calibration

Laboratory equipment and instruments used for quantitative measurements are calibrated in accordance with the laboratory's formal calibration program as summarized in the SOPs. Whenever possible, the laboratory uses recognized procedures for calibration such as those published by EPA or American Society for Testing and Materials. If established procedures are not available, the laboratory develops a calibration procedure based on the type of equipment, stability, characteristics of the equipment, required accuracy, and the effect of operation error on the quantities measured. Whenever possible, physical reference standards associated with periodic calibrations such as weights or certified thermometers with known relationships to nationally recognized standards are used. Where national reference standards are not available, the basis for the reference standard is documented. Equipment or instruments that fail calibration or become inoperable during use are tagged to indicate they are out of calibration. Such instruments or equipment are repaired and successfully recalibrated prior to reuse. High resolution mass spectrometer instruments undergo extensive tuning and calibration and are checked prior to running each sample set. The calibrations and ongoing instrument performance parameters are recorded and reported as part of the analytical data package.

QAPP Worksheet #25. Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference*
GC/MS	Replace/clean ion source; clean injector, replace injector liner, replace/clip capillary column, flush/replace tubing on purge and trap; replace trap	QC standards	Ion source, injector liner, column, column flow, purge lines, purge flow, trap	As needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Laboratory Section Manager	See Worksheet #23

*The laboratory is responsible for instrument and equipment maintenance, testing, and inspection information per their QA Plan. DOE national DOECAP program performs annual audits of the laboratories used by DOE. The audit includes a rigorous review of each laboratory QA Plan and procedures and reviews instrument/equipment maintenance logs to ensure they are maintained in accordance with their QA Plan and procedures. DOE, therefore, does not require DOECAP audited laboratories to submit SOPS on a project basis. Field survey/sampling instrumentation will be maintained, tested, and inspected according to manufacturer's instructions.

QAPP Worksheet #26. Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT	
Sample Collection (Personnel/Organization):	Sampling Teams/DOE Prime Contractor and Subcontractors
Sample Packaging (Personnel/Organization):	Sampling Teams/DOE Prime Contractor and Subcontractors
Coordination of Shipment (Personnel/Organization):	Lab Coordinator/DOE Prime Contractor
Type of Shipment/Carrier:	Direct Delivery or Overnight/Federal Express in accordance with the on-site transportation plan or U. S. Department of Transportation requirements
SAMPLE RECEIPT AND ANALYSIS	
Sample Receipt (Personnel/Organization):	Sample Management/Contracted Laboratory
Sample Custody and Storage (Personnel/Organization):	Sample Management/Contracted Laboratory
Sample Preparation (Personnel/Organization):	Analysts/Contracted Laboratory
Sample Determinative Analysis (Personnel/Organization):	Analysts/Contracted Laboratory
SAMPLE ARCHIVING	
Field Sample Storage (No. of days from sample collection):	The field laboratory is required to analyze samples within 48 hours of collection and those samples are archived until results are screened (same day as analysis). The fixed-base laboratory will archive samples for 4 months or less depending on project-specific requirements.
Sample Extract/Digestate Storage (No. of days from extraction/digestion):	120 Days
Biological Sample Storage (No. of days from sample collection):	Not applicable.
SAMPLE DISPOSAL	
Personnel/Organization:	Waste Disposition/Sample Management Office/DOE Prime Contractor and Subcontractors
Number of Days from Analysis	6 months

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QAPP Worksheet #27. Sample Custody Requirements*

Chain-of-custody procedures are comprised of maintaining sample custody and documentation of samples for evidence. To document chain-of-custody, an accurate record of samples must be maintained in order to trace the possession of each sample from the time of collection to its introduction to the laboratory.

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):

Field sample custody requirements will be per DOE Prime Contractor procedures, CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals*; and CP3-ES-5004, *Sample Tracking, Lab Coordination, and Sample Handling Guidance*.

Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal):

Are per the DOECAP-audited laboratory's standard procedures. When the samples are delivered to the laboratory, signatures of the laboratory personnel receiving them and the courier personnel relinquishing them will be completed in the appropriate spaces on the chain-of-custody record, unless the courier is a commercial carrier. This will complete the sample transfer. It will be every laboratory's responsibility to maintain internal logbooks and records that provide custody throughout sample preparation and analysis process.

Sample Identification Procedures:

Sample identification requirements will be specified in work package documents.

Chain-of-custody Procedures:

Chain-of-custody requirements will be per DOE Prime Contractor procedures, CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals*; and CP3-ES-5004, *Sample Tracking, Lab Coordination, and Sample Handling Guidance*.

*It is understood that SOPs are DOE Prime Contractor specific.

QAPP Worksheet #28-A. QC Samples Table

Matrix: Air
Analytical Group/Concentration Level: VOCs/Low
Sampling SOP: See Worksheet #21
Analytical Method/SOP Reference: TO-15
Sampler's Name/Field Sampling Organization: FPDP
Analytical Organization: TBD
No. of Sample Locations: 10 Locations for a total of 13 + 1 duplicate = 14 samples

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Duplicate	1	As with other samples	Data reviewer will place qualifiers on samples affected	Project	Homogeneity/Precision	RPD ≤ 50%
Method Blank (MB)	Each 12-hour time period, minimum of one per SDG	< CRQL for each compound	Ensure lab determines source of contamination and takes appropriate corrective measures before further analysis. Qualify analytes if found in both the blank and associated samples.	Data reviewer/Data validator	Contamination-Accuracy/bias	See data validation procedure CP2-ES-5105/RO (Volatile and Semivolatile Analyses Data Verification and Validation)

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QAPP Worksheet #28-A. QC Samples Table (Continued)

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria (MPC)
Laboratory Spiked Blanks	1 analytical batch	70–130% recovery	Check calculations and instrument; reanalyze affected samples. Qualify data based on the percent recovery.	Laboratory should alert project	Accuracy	See procedure CP3-ES-5003, <i>Quality Assured Data</i> .
Surrogate Standards ^a	All samples, blanks, and QC samples	80–120% recovery	Reanalyze affected samples. Qualify data based on the percent recovery.	Laboratory analyst/Data reviewer/Data validator	Accuracy	See data validation procedure CP2-ES-5105/RO (Volatile and Semivolatile Analyses Data Verification and Validation).
Internal Standards	All samples, blanks, and QC samples	Peak area % difference between 50 and 200	Check calculations and instrument; reanalyze affected samples. Qualify data based on the percent difference.	Laboratory Analyst	Accuracy	See procedure CP3-ES-5003, <i>Quality Assured Data</i> .

^a 1,2-dichloroethane-d4, Toluene-d8, and 4-Bromofluorobenzene. If other surrogates are used the laboratory must demonstrate that the surrogates do not interfere with any target analytes. Reanalyze samples containing target analytes at concentrations greater than the initial calibration range. Analyze a smaller aliquot of sample from the SUMMA® canister. If after analyzing a smaller aliquot, the concentration is still greater than the initial calibration range, then dilute the sample and reanalyze according to procedures outlined in EPA Method TO-15. If sample dilution is necessary, the dilution must be adjusted so that the target analyte is quantitated at a level in the upper half of the calibration range. Report the results and submit documentation for the analysis of both the diluted and undiluted sample.

Both the primary ions and the secondary ions must be present in the spectra. The acceptance level for relative abundance of the appropriate ions in all standards, method blanks, QC samples, laboratory duplicates and field samples is determined to be ±20% of the expected abundance observed in the most recent continuing calibration standard. All ions greater than 15% in the standard spectrum must be present in the sample spectrum.

QAPP Worksheet #29. Project Documents and Records Table

All project data and information must be documented in a format that is usable by project personnel. The QAPP describes how project data and information shall be documented, tracked, and managed from generation in the field to final use and storage in a manner that ensures data integrity, defensibility, and retrieval. Project data and associated documents will be managed in accordance with the Data and Documents Management and Quality Assurance Plan for Paducah Environmental Management and Enrichment Facilities, DOE/OR/07-1595&D2, which describes the data base and document requirements for all FFA-related records.

Field data will be recorded on chain-of-custody forms, in field logbooks, and field data sheets. The fixed-base laboratory will provide data in an Electronic Data Deliverable. Project data following verification assessment and validation will be placed into and reported from the Paducah Oak Ridge Environmental Information System (OREIS). Data loaded into Paducah OREIS will be made available to the public stakeholders via the Portsmouth/Paducah Project Office Environmental Geographic Analytical Spatial Information System (PEGASIS). Field and analytical data are entered/transferred electronically, verified and assessed per DOE Prime Contractor procedure CP3-ES-5003, *Quality Assured Data*.

Data assessment packages will be created per this procedure. The data assessment packages will include field and analytical data, chains-of-custody, data verification and assessment queries, and other project-specific information needed for personnel to review the package adequately. Data assessment packages will be reviewed to document any issues pertaining to the data and to indicate if data met the DQOs of the project. Data is loaded for storage in the Paducah OREIS data system, maintained on the Paducah Site servers and included in the Administrative Record by reference. The system will be maintained for future reference as part of the Administrative Record at the Paducah Site.

QAPP Worksheet #29. Project Documents and Records Table (Continued)

Sample Collection Documents and Records	Analysis Documents and Records	Project Reports and Correspondence	Data Assessment Documents and Records*	Other
<p>Data logbooks and associated completed sampling forms; sample chains-of-custody, field notes, documentation of sample location and coordinates, sampling notes, site conditions</p> <p>Where Maintained;</p> <p>Initially kept with the field sampling organization satellite records center; transferred to the project file within the DOE onsite records repository (electronic storage on server hosting the DOE Electronic Documents Management System) and the Administrative Record.</p>	<p>Laboratory data packages (including sample receipt, custody, and tracking records; sample preparation, equipment calibration, and run logs; OREIS database, and associated data packages</p> <p>Where Maintained;</p> <p>Initially kept with the Sample Management Office satellite records center; transferred to the project file within the DOE onsite records repository (electronic storage on server hosting the DOE Electronic Documents Management System) and the Administrative Record.</p>	<p>E-mails, status reports, project report documents, sign-off forms, and report submittals</p> <p>Where Maintained;</p> <p>Initially kept with the Contractor project team files during field effort and report writing; transferred to the project file within the DOE onsite records repository (electronic storage on server hosting the DOE Electronic Documents Management System) and the Administrative Record.</p>	<p>CP3-ES-5003, Att. G, Data Assessment Review Checklist and Comment Form</p> <p>Where Maintained;</p> <p>Initially kept with the Sample Management Office satellite records center; transferred to the project file within the DOE onsite records repository (electronic storage on server hosting the DOE Electronic Documents Management System) and the Administrative Record.</p>	<p>CP3-OP-0009-F01, Observation Checklist Form</p> <p>Where Maintained;</p> <p>Initially kept with the Sample Management Office satellite records center; transferred to the project file within the DOE onsite records repository (electronic storage on server hosting the DOE Electronic Documents Management System) and the Administrative Record.</p>

*It is understood that SOPs are DOE Prime Contractor specific.

QAPP Worksheet #31. Planned Project Assessments Table

FPDP will ensure that protocol outlined in the QAPP is implemented adequately. Assessment activities help to ensure that the resultant data quality is adequate for its intended use and that appropriate responses are in place to address nonconformances and deviations from the QAPP. Below is a list of assessments project teams may use.

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title and Organizational Affiliation)	Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (Title and Organizational Affiliation)
Independent Assessment/ Surveillance	A	Internal	QA Manager or designee	QA Specialists	Project Manager	Project Manager	QA Manager
Laboratory Audit	Annual	External	DOECAP	Laboratory Assessor	Laboratory	Laboratory	DOECAP
Management Assessments	Annual	Internal	Project Manager or designee	Project Manager or Designee	Project Manager	Project Manager	QA Manager
Performance Observation	B	Internal	Project Manager or designee	Project Manager	Project Manager	Project Manager	Project Manager
Performance Observation Follow-up surveillances	Quarterly	Internal	Project Manager or designee	Project Manager or designee	Project Manager	Project Manager	Project Manager

A = Assessment frequency determined by QA Manager and conducted per CP3-QA-1003, *Management and Self Assessments*.

B = Assessment frequency determined by project manager.

*Reference: CP3-OP-0009, *Performance Observations Desk Instructions*.

QAPP Worksheet #32. Assessment Findings and Corrective Action Responses

Provisions shall be taken in the field and laboratory to ensure that any problems that may develop shall be dealt with as quickly as possible to ensure the continuity of the project/sampling events. Field modifications to procedures in the QAPP must be approved by the FFA parties before the modifications are implemented and then documented. The process controlling procedure modification is CP3-OP-0002, *Development, Approval, and Change Control for FPDP Performance Documents*. Field modifications are documented through the work control process per CP3-SM-1003. Corrective action in the field may be necessary when the sampling design is changed. For example, a change in the field may include increasing the number or type of samples or analyses, changing sampling locations, and/or modifying sampling protocol. When this occurs, the project team shall identify any suspected technical or QA deficiencies and note them in the field logbook. Listed in Worksheet #32 is how project teams will address assessment findings.

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)**	Time frame of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Time Frame for Response
Management, Independent, and Surveillances	Form CP3-QA-1003-F02, Management/Self-Assessment Report; Form CP3-QA-1003-F03, Management/Self-Assessment Checklist; and Form CP3-QA-3001-F02, Issue Identification Form	Project management, issue owner, contractor	Upon issuance of Forms CP3-QA-1003-F02, Management/Self-Assessment Report, and CP3-QA-1003-F03, Management/Self-Assessment Checklist, form CP3-QA-3001-F02, Issue Identification Form, will be completed and attached to the assessment report.	CP3-QA-3001, Issue Identification Form, documents the issue response and/or corrective actions.	Action owner as designated by issue owner, contractor	Fifteen days for initial issue response, corrective action schedule determined by issue owner, per CP3-QA-3001*

*It is understood that SOPs are DOE Prime Contractor specific.
**General project communications and those related to corrective actions are summarized on Worksheets #6, #31, and #33.

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QAPP Worksheet #33. QA Management Reports Table

Reports to management include project status reports, field and/or laboratory audits, and data quality assessments. These reports will be directed to the QA Manager and Project Manager who have ultimate responsibility for assuring that any corrective action response is completed, verified, and documented.

Type of Report*	Frequency (daily, weekly monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
Field Change Requests	As needed	Ongoing	Field staff	QAPP recipients
QAPP Addenda	As needed	Not Applicable	Project Manager	QAPP recipients
Field Audit Report	TBD as determined by QA Manager	30 days after completion of audit	QA Manager	FPDP Project Manager QA Manager
Corrective Action Plan	As needed	Within 3 weeks of request	Project Manager	QA Manager

TBD = to be determined

*Worksheet #31 and #32 summarize the nature and frequency of other QA assessments.

QAPP Worksheet #34. Verification (Step I) Process Table

This section of the QAPP provides a description of the QA activities that will occur after the data collection phase of the project is completed. Implementation of this section will determine whether the data conforms to the specified criteria satisfying the project objectives.

Verification Input	Description *	Internal/ External	Responsible for Verification (Name, Organization)
Field Logbooks	Field logbooks are verified per DOE Prime Contractor (FPDP) procedure CP4-ES-2700, <i>Logbooks and Data Forms</i> , and CP3-ES-5003, <i>Quality Assured Data</i> .	Internal	Project Management or designee, Contractor
Chains-of-custody	Chains-of-custody are controlled by DOE Prime Contractor procedure CP3-ES-5004, <i>Sample Tracking, Lab Coordination and Sample Handling Guidance</i> ; and CP4-ES-2708, <i>Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals</i> . Chains-of-custody will be included in data assessment packages for review as part of data verification and data assessment.	Internal	Sample Management Office Personnel and Project Management, Contractor
Field and Laboratory Data	Field and analytical data are verified and assessed per DOE Prime Contractor procedure CP3-ES-5003, <i>Quality Assured Data</i> . Data assessment packages will be created per this procedure. The data assessment packages will include field and analytical data, chains-of-custody, data verification and assessment queries, and other project- specific information needed for personnel to review the package adequately. Data assessment packages will be reviewed to document any issues pertaining to the data and to indicate if data met the DQOs of the project.	Internal	Sample Management Office Personnel and Project Management, Contractor
Sampling Procedures	Evaluate whether sampling procedures were followed with respect to equipment and proper sampling support using audit and sampling reports, field change requests and field logbooks.	Internal	Sample Management Office Personnel, Project Management, and QA Personnel,** Contractor
Laboratory Data	Laboratory data will be verified by the laboratory performing the analysis for completeness and technical accuracy prior to submittal to FPDP. Subsequently, FPDP will evaluate the data packages for completeness and compliance.	External/ Internal	Laboratory Manager, FPDP Sample Management Office Personnel
Electronic Data Deliverables	Determine whether required fields and format were provided.	Internal	Sample Management Office Personnel
QAPP	Planning documents will be available to reviewers to allow reconciliation with planned activities and objectives.	Internal	All data users

*It is understood that SOPs are DOE Prime Contractor specific.

**QA specialist performs general QA review.

QAPP Worksheet #35. Assessment, Verification, and Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description ^a	Responsible for Validation (Name, Organization)
IIa	Data Deliverables, Analytes, and Holding Times	The documentation from the contractual screening will be included in the data assessment packages, per DOE Prime Contractor procedure CP3-ES-5003, <i>Quality Assured Data</i> . Data assessment qualifiers and definitions are included in the procedure CP3-ES-5003, <i>Quality Assured Data</i> .	Sample Management Office Personnel, Contractor
IIa	Chain-of-Custody, Sample Handling, Sampling Methods and Procedures, and Field Transcription	These items will be validated during the data assessment process as required by DOE Prime Contractor procedure CP3-ES-5003, <i>Quality Assured Data</i> , and CP3-ES-1003, <i>Developing, Implementing, and Maintaining Data Management Implementation Plans</i> . The documentation of this validation will be included in the data assessment packages.	Sample Management Office Personnel, Contractor
IIa	Analytical Methods and Procedures, Laboratory Data Qualifiers, and Standards	These items will be reviewed during the data validation process as required by DOE Prime Contractor data validation procedures. Data validation will be performed in parallel with data assessment. The data validation report and data validation qualifiers will be considered when the data assessment process is being finalized. Data validation qualifiers and definitions are listed in the procedures used for validation: CP2-ES-5105/RO (Volatile and Semivolatile Analyses Data Verification and Validation) CP2-ES-5107/RO (Inorganic Analyses Data Verification and Validation)	Data Validation Subcontractor, and Sample Management Office Personnel, Project, Contractor
IIa	Audits	The audit reports and accreditation and certification records for the laboratory supporting the projects will be considered in the bidding process.	QA Personnel
IIb	Deviations and qualifiers from Step IIa	Any deviations and qualifiers resulting from Step IIa process will be documented in the data assessment packages.	Sample Management Office Personnel, Project, and QA Personnel, Contractor
IIb	Sampling Plan, Sampling Procedures, Co-located Field Duplicates, PQLs, Confirmatory Analyses, Performance Criteria	These items will be evaluated as part of the data verification and data assessment process per DOE Prime Contractor procedure CP3-ES-5003, <i>Quality Assured Data</i> . These items will be considered when evaluating whether the project met their DQOs. Data assessment qualifiers and definitions are included in the procedure CP3-ES-5003, <i>Quality Assured Data</i> .	Sample Management Office Personnel, Project, and QA Personnel, Contractor

^a It is understood that SOPs are DOE Prime Contractor specific.

QAPP Worksheet #36. Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
Step IIa/IIb	Air	VOCs	Very Low	SOP CP2-ES-5105/RO (Volatile and Semivolatile Analyses Data Verification and Validation) SOP CP2-ES-5107/RO (Inorganic Analyses Data Verification and Validation) National Functional Guidelines; Worksheets #12, #15, and #28	Data Validator ^a

^a Validation is to be conducted by a qualified individual, independent of sampling, laboratory, project management, or other decision making personnel for the task. This could be an outside party or someone within FPDP who is not involved in the project.

QAPP Worksheet #37. Usability Assessment^{1,2}

FPDP shall determine the adequacy of data based on the results of validation and verification. The usability step involves assessing whether the process execution and resulting data meet project quality objectives documented in the QAPP.

Summarize the usability assessment process and procedures, including interim steps and any statistics, equations, and computer algorithms that will be used: Field and analytical data are verified and assessed per procedure CP3-ES-5003, *Quality Assured Data*. Data assessment packages will be created per this procedure. Data assessment packages will include field and analytical data, chains-of-custody, data verification and assessment queries, and other project-specific information needed for personnel to review the package adequately. Data assessment packages will be reviewed to document any issues pertaining to the data and to indicate if DQOs of the project were met. For data selected for validation, the following procedures are used: CP2-ES-5105 and CP2-ES-5107.

Describe the evaluative procedures used to assess overall measurement error associated with the project: PARCCS parameters (precision, accuracy, representativeness, comparability, completeness, and sensitivity) will be evaluated per procedure, CP3-ES-5003, *Quality Assured Data*. This information will be included in the data assessment packages for review by project personnel. Data assessment also will include documentation of QC exceedances, trends, and/or bias in the data set. Data assessment will document any statistics used; however, for this project, the sampling design is not random and statistical tests may not be appropriate.

Identify the personnel responsible for performing the usability assessment: Project personnel, as verified by QA personnel.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies: Data assessment packages will be created, which will include data assessment comments/questions and laboratory comments. Data verification and assessment queries indicating any historical outliers and background exceedances also will be included in the data assessment packages. Once data assessment is complete, project personnel will compare the data against the data quality objectives to determine if the data collected are sufficient to meet the objectives. Data summaries will be prepared to demonstrate that DQOs have been met and the information is suitable for decision making. This information is typically included in the project report, along with the final decisions associated with the project.

¹ It is understood that SOPs are DOE Prime Contractor specific.

² Additional usability assessment information can be referenced on Worksheets #11, #13, #14, and #16.

2. REFERENCES

- DOE (U.S. Department of Energy) 1998. *Data and Documents Management and Quality Assurance Plan for Paducah Environmental Management and Enrichment Facilities*, DOE/OR/07-1595&D2, U.S. Department of Energy, Paducah, KY.
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