N00164.AR.002594
NSA CRANE
5090.3a

FINAL SAMPLING AND ANALYSIS PLAN FIELD SAMPLING PLAN AND QUALITY ASSURANCE PROJECT PLAN FOR SOLID WASTE MANAGEMENT UNIT 17 (SWMU 17) PCB CAPACITOR BURIAL/POLE YARD FLOODPLAIN SAMPLING IN DITCH 3 NSA CRANE IN
03/01/2016
TETRA TECH EC INC

SAP Worksheet #1 – Title and Approval Page

FINAL

SAMPLING AND ANALYSIS PLAN
(Field Sampling Plan and Quality Assurance Project Plan)

March 2016

SWMU 17/04 – PCB CAPACITOR BURIAL/POLE YARD
FLOODPLAIN SAMPLING IN DITCH 3
NAVAL SUPPORT ACTIVITY CRANE
CRANE, INDIANA

Prepared for:
Department of the Navy
Naval Facilities Engineering Command, Mid-Atlantic
9742 Maryland Avenue
Norfolk, VA 23511-3095

Prepared by:
Tetra Tech EC, Inc.
5250 Challedon Drive
Virginia Beach, Virginia 23462

Prepared under:
Contract No. N62470-13-D-8007
DCN: 4659-WE38-16-0083
CTO No. WE38

Review Signature: Gregory D Joyce _____ March 23, 2016
Greg Joyce Date
TtEC Quality Control Program Manager

This page intentionally left blank.

EXECUTIVE SUMMARY

Tetra Tech EC, Inc. (TtEC) has prepared this Sampling and Analysis Plan (SAP) to provide guidance on sampling, analysis, and quality control (QC) in support of interim measures at Solid Waste Management Unit (SWMU) 17/04 – Polychlorinated Biphenyl (PCB) Capacitor Burial/Pole Yard at Naval Support Activity Crane in Crane, Indiana for the United States Department of the Navy, Naval Facilities Engineering Command Mid-Atlantic under a Remedial Action Contract, N62470-13-D-8007, Contract Task Order WE38. The quality assurance/QC elements in this SAP were prepared in accordance with the U.S. Environmental Protection Agency (EPA) Uniform Federal Policy for Quality Assurance Project Plans (EPA 2005) and Requirements for Quality Assurance Project Plans, EPA QA/R-5, QAMS (EPA 2006a) to ensure that all data collected are precise, accurate, representative, complete, and comparable to meet their intended use.

Due to Ditch 3 in SWMU 17/04 historically overflowing the ditch banks and historical data indicating PCBs above the 1 milligram per kilogram (mg/kg) cleanup goal, TtEC has been tasked to collect soil/sediment investigation samples in this area to determine the total PCB levels. This SAP only addresses the sampling and analysis associated with soil/sediment sample collection in the floodplains of Ditch 3. This sampling will constitute the first phase of this project, and these PCB results will be evaluated against the 1 mg/kg cleanup goal to determine extent of contamination in this area. Once the extent is determined, the remedial phase of this project will commence for not only Ditch 3 but other areas within SWMU 17/04 per the scope of work dated July 6, 2015. These interim measures and the sampling and analysis associated with those activities will be documented in a separate SAP.

Environmental investigation and remediation activities for this project are being conducted under the Department of Defense Installation Restoration Program in accordance with the Resource Conservation and Recovery Act Storage permit IN5170023498. The EPA Region 5 and the Indiana Department of Environmental Management will provide regulatory oversight for this project.

This page intentionally left blank.

SAP Worksheets

Page

SAP Worksheet #1 – Title and Approval Page....1
EXECUTIVE SUMMARY....3
SAP Worksheet #2 – SAP Identifying Information....9
SAP Worksheet #3 – Distribution List....13
SAP Worksheet #4 – Project Personnel Sign-Off Sheet....15
SAP Worksheet #5 – Project Organizational Chart....17
SAP Worksheet #6 – Communication Pathways....19
SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table....21
SAP Worksheet #8 – Special Personnel Training Requirements Table....25
SAP Worksheet #9 – Project Scoping Session Participants Sheet....27
SAP Worksheet #10 – Problem Definition....29
SAP Worksheet #11 – Project Quality Objectives/Systematic Planning Process Statements....33
SAP Worksheet #12 – Measurement Performance Criteria Table for Samples....35
SAP Worksheet #13 – Secondary Data Criteria and Limitations Table....37
SAP Worksheet #14 – Summary of Project Tasks....39
SAP Worksheet #15 – Reference Limits and Evaluation Table....43
SAP Worksheet #16 – Project Schedule/Timeline Table....45
SAP Worksheet #17 – Sampling Design and Rationale....47
SAP Worksheet #18 – Sampling Locations and Methods/SOP Requirements Table....49
SAP Worksheet #19 – Analytical SOP Requirements Table....51
SAP Worksheet #20 – Field Quality Control Sample Summary Table....53
SAP Worksheet #21 – Project Sampling SOP References Table....55
SAP Worksheet #22 – Field Equipment Calibration, Maintenance, Testing, and Inspection Table....57
SAP Worksheet #23 – Analytical SOP References Table....59
SAP Worksheet #24 – Analytical Instrument Calibration Table....61
SAP Worksheet #25 – Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table....63
SAP Worksheet #26 – Sample Handling System....65
SAP Worksheet #27 – Sample Custody Requirements Table....67
SAP Worksheet #28 – Laboratory QC Samples Table....69
SAP Worksheet #29 – Project Documents and Records Table....73
SAP Worksheet #30 – Analytical Services Table....77
SAP Worksheet #31 – Planned Project Assessments Table....79
SAP Worksheet #32 – Assessment Findings and Corrective Action Responses....81
SAP Worksheet #33 – QA Management Reports Table....83
SAP Worksheet #34 – Verification (Step I) Process Table....85
SAP Worksheet #35 – Validation (Steps IIa and IIb) Process Table....87
SAP Worksheet #36 – Analytical Data Validation (Steps IIa and IIb) Summary Table....89
SAP Worksheet #37 – Usability Assessment....91
REFERENCES....93

FIGURES

Figure 1 Site Vicinity Map

Figure 2 Site Location Map

Figure 3 Floodplain Sampling Area

ATTACHMENT

Attachment 1 Laboratory DoD ELAP Accreditation

Abbreviations and Acronyms

%R	percent recovery
µg/kg	micrograms per kilogram
bgs	below ground surface
CA	Corrective Action
CAS	Chemical Abstracts Service
CCV	continuing calibration verification
CMP	corrugated metal pipe
COC	chain-of-custody
COR	Contracting Officer's Representative
CTO	Contract Task Order
DL	detection limit
DoD	Department of Defense
DQA	data quality assessment
DQO	Data Quality Objective
EDD	electronic data deliverable
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
FCR	Field Change Request
GC/ECD	gas chromatography/electron capture detector
ICAL	initial calibration
IM	interim measure
IMR	interim measure report
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOD	limit of detection
LOQ	limit of quantitation
mg/kg	milligrams per kilogram
M-K	Morrison Knudsen
MS/MSD	matrix spike/ matrix spike duplicate
N/A	not applicable
NAVFAC	Naval Facilities Engineering Command
Navy	U.S. Department of the Navy
NEDD	Navy electronic data deliverable
NEESA	Naval Energy and Environmental Support Agency
NFA	no further action
NIRIS	Naval Installation Restoration Information Solution
NSA	Naval Support Activity

Abbreviations and Acronyms
(Continued)

OWS	oil water separator
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
PDF	portable document format
PM	Project Manager
PQCM	Project Quality Control Manager
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QCPM	Quality Control Program Manager
QSM	Quality Systems Manual
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RPD	relative percent difference
RSD	relative standard deviation
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SDG	sample delivery group
SOP	Standard Operating Procedure
SWMU	Solid Waste Management Unit
TtEC	Tetra Tech EC, Inc.
UFP	Uniform Federal Policy
U.S.	United States
VCT	vitreous clay tile
VRHK	VRHabilis-Kemron, LLC

SAP Worksheet #2 – SAP Identifying Information

Site Name/Number: Solid Waste Management Unit (SWMU) 17/04 – Polychlorinated Biphenyl (PCB) Capacitor Burial/Pole Yard at Naval Support Activity Crane
Contractor Name: Tetra Tech EC, Inc. (TtEC)
Contract Number: N62470-13-D-8007
Contract Title: Remedial Action Contract VI

1. This Sampling and Analysis Plan (SAP) was prepared in accordance with the requirements of the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) (U.S. Environmental Protection Agency [EPA] 2005) and EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS (EPA 2002).

2. Identify regulatory program: Resource Conservation and Recovery Act (RCRA).

3. This SAP is a project-specific SAP.

4. List dates of scoping sessions that were held.

Scoping Session	Date
Conference calls with the U.S. Department of the Navy (Navy)	November 9th and 16th, 2015

5. List dates and titles of any SAP documents written for previous site work that are relevant to the current investigation.

Title	Date
None	

6. List organizational partners (stakeholders) and connection with lead organization: EPA Region 5 will provide regulatory oversight and guidance.

7. Lead organization: Navy

8. If any required SAP elements or required information is not applicable to the project or is provided elsewhere, then note the omitted SAP elements and provide an explanation for its exclusion below:

   -
   - SAP Worksheet #21 (Project Sampling Standard Operating Procedure (SOP) References Table) is not applicable for this project since SOPs are not used and instead procedures are detailed in SAP Worksheet #14.
   - SAP Worksheet #22 (Field Equipment Calibration, Maintenance, Testing, and Inspection Table) is not applicable for this project since field equipment is not required.

SAP elements and required information that are not applicable to the project are noted below. An explanation is provided above and in the appropriate SAP worksheet(s), as necessary.

SAP Worksheet #2 – SAP Identifying Information (Continued)

UFP-QAPP Worksheet #	Required Information	Crosswalk to Related Information
A. Project Management		
Documentation		
1	Title and Approval Page	
2	Table of Contents SAP Identifying Information	
3	Distribution List	
4	Project Personnel Sign-Off Sheet	
Project Organization		
5	Project Organizational Chart	
6	Communication Pathways	
7	Personnel Responsibilities and Qualifications Table	
8	Special Personnel Training Requirements Table	
Project Planning/Problem Definition		
9	Project Planning Session Documentation (including Data Needs tables) Project Scoping Session Participants Sheet	
10	Problem Definition, Site History, and Background Site Maps (historical and present)	
11	Site-Specific Project Quality Objectives	
12	Measurement Performance Criteria Table for Samples	
13	Sources of Secondary Data and Information Secondary Data Criteria and Limitations Table	
14	Summary of Project Tasks	
15	Reference Limits and Evaluation Table	
16	Project Schedule/Timeline Table	
B. Measurement Data Acquisition		
Sampling Tasks		
17	Sampling Design and Rationale	
18	Sampling Locations and Methods/ SOP Requirements Table Sampling Location Map(s)	
19	Analytical Methods/SOP Requirements Table	
20	Field Quality Control Sample Summary Table	
21	Project Sampling SOP References Table	Not applicable
22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	Not applicable
Analytical Tasks		
23	Analytical SOPs Analytical SOP References Table	

SAP Worksheet #2 – SAP Identifying Information (Continued)

UFP-QAPP Worksheet #	Required Information	Crosswalk to Related Information
24	Analytical Instrument Calibration Table	
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	
Sample Collection		
26	Sample Handling System, Documentation Collection, Tracking, Archiving and Disposal Sample Handling Flow Diagram	
27	Sample Custody Requirements, Procedures/SOPs Sample Container Identification Example Chain-of-Custody Form and Seal	
Quality Control Samples		
28	QC Samples Table Screening/Confirmatory Analysis Decision Tree	
Data Management Tasks		
29	Project Documents and Records Table	
30	Analytical Services Table Analytical and Data Management SOPs	
C. Assessment Oversight		
31	Planned Project Assessments Table Audit Checklists	
32	Assessment Findings and Corrective Action Responses Table	
33	QA Management Reports Table	
D. Data Review		
34	Verification (Step I) Process Table	
35	Validation (Steps IIa and IIb) Process Table	
36	Validation (Steps IIa and IIb) Summary Table	
37	Usability Assessment	

This page intentionally left blank

SAP Worksheet #3 – Distribution List

The following distribution list represents the recipients of the final version of this SAP.

Name of SAP Recipients	Title/Role	Organization	Telephone Number	E-mail Address
Ms. Linda Cole	Contracting Officer's Representative (COR)	Navy	(757) 341-2011	linda.cole@navy.mil
Mr. Peter Ramanauskas	Remedial Project Manager (RPM)	EPA Region 5	(312) 886-7890	ramanauskas.peter@epa.gov
Mr. Tom Brent	Environmental Restoration Site Manager	Naval Support Activity (NSA) Crane	(812) 854-6160	thomas.brent@navy.mil
Mr. Deric Kearns	PM	TtEC	(215) 702-4083	deric.kearns@tetratech.com
Mr. Greg Joyce	Quality Control Program Manager (QCPM)	TtEC	(360) 780-0371	greg.joyce@tetratech.com
Ms. Lisa Bienkowski	Program Chemist	TtEC	(949) 809-5028	lisa.bienkowski@tetratech.com
Ms. Sabina Sudoko	Project Chemist	TtEC	(949) 809-5022	sabina.sudoko@tetratech.com
Ms. Jamie Ide	Laboratory PM	TestAmerica Denver	(303) 736-0126	jamie.ide@testamericainc.com

This page intentionally left blank.

SAP Worksheet #4 – Project Personnel Sign-Off Sheet

The key personnel listed below will read the final version of this SAP. Their signature and date will be filled in below and included in the project file.

Name	Organization/Title/Role	Signature/E-mail Receipt	SAP Section Reviewed	Date SAP Read
Mr. Deric Kearns	TtEC/PM		Entire document	
Ms. Sabina Sudoko	TtEC/Project Chemist		Entire document	
Ms. Jamie Ide	TestAmerica Denver/Laboratory PM		Entire document	
*	TtEC/Sampling Personnel		Entire document	
*	TtEC/Sampling Personnel		Entire document	
*	TtEC/Sampling Personnel		Entire document	
*	TtEC/Sampling Personnel		Entire document	

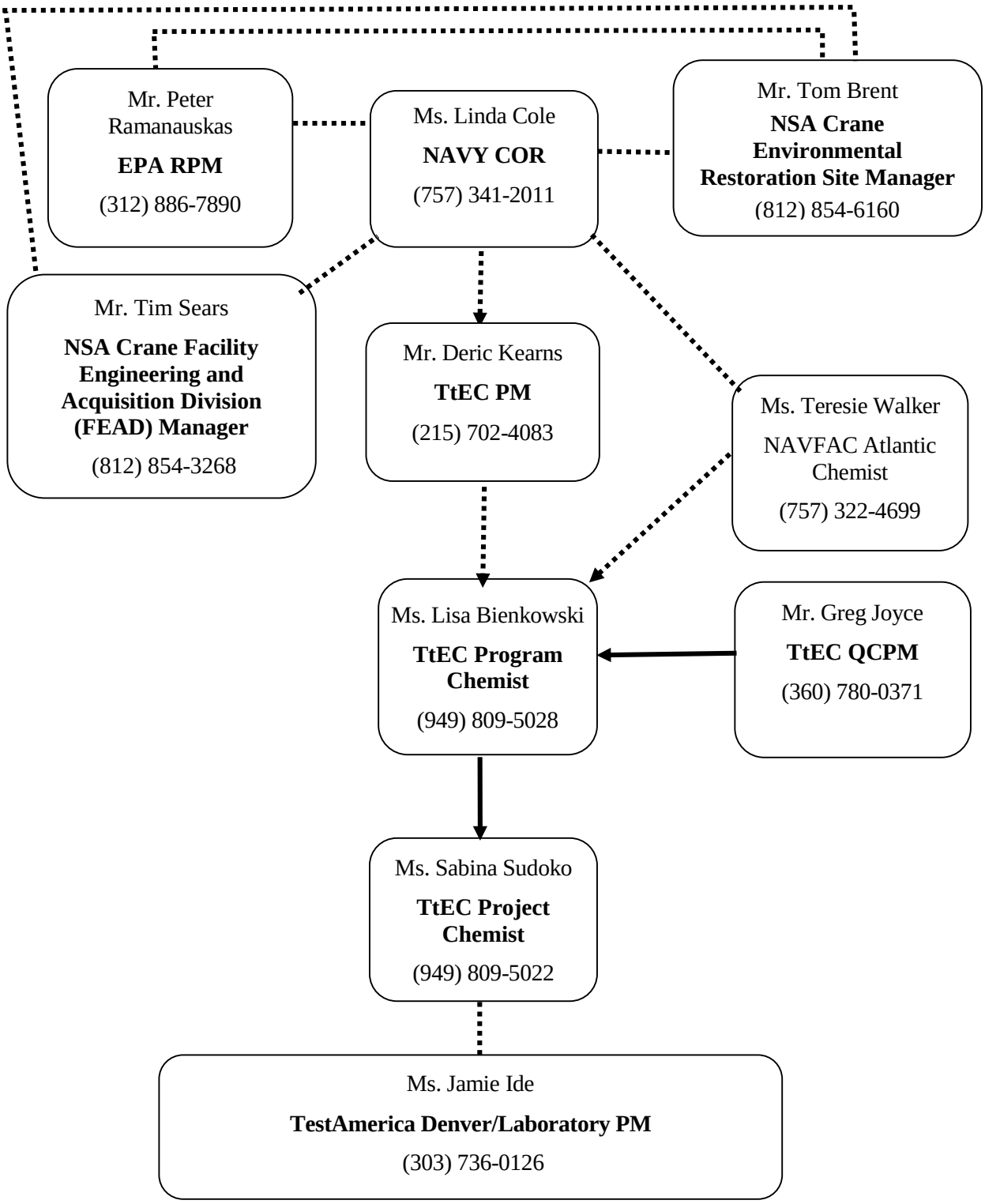
Note:

* Field sampling personnel have not currently been identified for this project. Extra lines have been included above for field sampling personnel to sign-off on SAP.

This page intentionally left blank.

SAP Worksheet #5 – Project Organizational Chart

Lines of Authority ——— Lines of Communication



This page intentionally left blank.

SAP Worksheet #6 – Communication Pathways

Communication Drivers	Responsible Affiliation	Name	Phone Number	Procedure
Review and approval of Draft SAP	NAVFAC Atlantic Chemist	Ms. Teresie Walker	(757) 322-4699	The NAVFAC Atlantic Chemist will review and approve the Draft SAP prior to submittal for regulatory review.
Point of contact for significant changes or corrective actions	Navy COR	Ms. Linda Cole	(757) 341-2011	If significant changes or corrective actions occur during the project, the COR will notify the regulators involved in this project.
Point of contact for contractor quality issues	TtEC QCPM	Mr. Greg Joyce	(360) 780-0371	The QCPM is responsible for overseeing program quality control (QC), including construction and analytical data acquisition. The QCPM has the authority to suspend project activities if quality standards are not maintained.
Project management	TtEC PM	Mr. Deric Kearns	(215) 702-4083	If changes are necessary, the PM is responsible for communicating the changes via phone and/or e-mail to the project staff and is authorized to stop work, if necessary.
SAP review	TtEC QCPM	Mr. Greg Joyce	(360) 780-0371	The SAP will be written by the TtEC Program Chemist and reviewed by the QCPM prior to submittal to the Navy for review.
Notification of nonusable analytical results	TtEC Program Chemist	Ms. Lisa Bienkowski	(949) 809-5028	If significant problems are identified by the laboratory or the project team that impact the usability of the data (i.e., the data are rejected or data quality objectives are not met), the Program Chemist will notify the TtEC PM who will in turn notify the Navy COR.
Coordination of laboratory supplies for field sampling activities	TtEC Project Chemist	Ms. Sabina Sudoko	(949) 809-5022	The Project Chemist will contact the laboratory to provide all necessary sample containers and appropriate shipping materials (such as coolers and bubble wrap) to be delivered

SAP Worksheet #6 – Communication Pathways (Continued)

Communication Drivers	Responsible Affiliation	Name	Phone Number	Procedure
				on-site prior to commencement of field sampling activities and throughout the course of the project.
Reporting laboratory data quality issues or analytical corrective actions	TestAmerica Denver Laboratory PM	Ms. Jamie Ide	(303) 736-0126	All data quality issues and associated corrective actions will be reported by the laboratory in writing to the TtEC Project Chemist within 24 hours.
Release of analytical results	TtEC Project Chemist	Ms. Sabina Sudoko	(949) 809-5022	The Project Chemist will review analytical results to verify that the requirements in this SAP have been met prior to releasing the data to the project team for evaluation.
SAP procedure revision during field activities	TtEC Program Chemist	Ms. Lisa Bienkowski	(949) 809-5028	The Program Chemist (or designee) will prepare a Field Change Request (FCR) for any changes in sampling or analytical procedures that occur due to conditions in the field.
SAP addendums	TtEC Program Chemist	Ms. Lisa Bienkowski	(949) 809-5028	Significant changes to the SAP such as additional scope of work that is not covered in this SAP may require that the Program Chemist prepare an addendum to this SAP. If prepared, addendums will be sent to the Navy COR for review and regulators as required.

SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table

Name	Title/Role	Organizational Affiliation	Responsibilities
Ms. Linda Cole	COR	Navy	• Performing project management for the Navy • Ensuring that the project scope of work requirements are fulfilled • Overseeing the project cost and schedule • Acting as lead interface with agencies
Mr. Deric Kearns	PM	TtEC	• Coordinating work activities of subcontractors and TtEC personnel, and ensuring that all personnel adhere to the administrative and technical requirements of the project • Monitoring and reporting the progress of work, and ensuring that the project deliverables are completed on time and within project budget • Monitoring the budget and schedule, and notifying the Navy COR of any changes that may require administrative actions • Ensuring adherence to the quality requirements of the contract, project scope of work, and the QC plans • Ensuring that all work meets the requirements of the technical specifications and complies with applicable codes and regulations • Ensuring that all work activities are conducted in a safe manner in accordance with the Site-Specific Safety and Health Plan, U.S. Army Corps of Engineers' Safety and Health Requirements (Engineer Manual 385-1-1), and all applicable Occupational Safety and Health Administration regulations • Serving as the primary contact between the Navy and TtEC for actions and information related to the work and including appropriate TtEC technical personnel in the decision-making • Coordinating satisfactory resolution and completion of evaluation and acceptance report for nonconformance reports • Suspending project activities if standards are not maintained

SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table (Continued)

Name	Title/Role	Organizational Affiliation	Responsibilities
Mr. Greg Joyce	QCPM	TtEC	• Establishing and maintaining the Quality Program • Overseeing program QC, including construction and analytical data acquisition • Working directly with the TtEC PM and the Navy to ensure implementation of the program QC Plans • Acting as a focal point for coordination for quality matters across all projects and resolving quality issues • Suspending project activities if quality standards are not maintained • Interfacing with the Navy on quality-related items • Conducting field QC audits to ensure project plans are being followed • Performing reviews of audit and surveillance reports conducted by others • Approving any FCRs and reviewing the SAP and any addendums to the SAP
Ms. Lisa Bienkowski	Program Chemist	TtEC	• Developing the SAP and any addendums to the SAP • Implementing contract requirements for data collection • Supporting projects as the technical lead for data collection and analysis • Evaluating and selecting qualified laboratories • Providing oversight of the laboratories with regards to deliverable requirements and monitoring performance of the laboratories • Overseeing preparation of the Navy Electronic Data Deliverable (NEDD) deliverable for analytical results for upload to the Naval Installation Restoration Information Solution (NIRIS) website

SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table (Continued)

Name	Title/Role	Organizational Affiliation	Responsibilities
Ms. Sabina Sudoko	Project Chemist	TtEC	• Main point of contact with the laboratory • Providing project support to ensure sampling supplies are delivered from laboratory to the site • Tracking samples sent to laboratory to ensure laboratory receipt of samples and proper login of samples for analysis • Tracking receipt of analytical results • Reviewing analytical results against requirements in this SAP prior to distribution to the project team
Ms. Jamie Ide	Laboratory PM	TestAmerica Denver	• Coordinating with the TtEC Project Chemist regarding sample receipt and discrepancies • Ensuring samples are logged in according to the chain-of-custody (COC) • Checking that analytical results are produced in accordance with this SAP and providing those results to the TtEC Project Chemist at the expected turnaround time • Ensuring that analytical data packages and electronic deliverable requirements are in accordance with SAP Worksheet #29

This page intentionally left blank.

SAP Worksheet #8 – Special Personnel Training Requirements Table

Project Function	Specialized Training by Title or Course Description	Training Provider	Training Date	Personnel/ Groups Receiving Training	Personnel Titles /Organizational Affiliation	Location of Training Records/ Certificates
All field team personnel	40 hour HAZWOPER and CPR	TtEC or outside subcontractor	Prior to start of field activities	All field team personnel	All individuals working on the project site	TtEC corporate training record files

This page intentionally left blank.

SAP Worksheet #9 – Project Scoping Session Participants Sheet

Project Name: SWMU 17/04 – PCB Capacitor Burial/Pole Yard **Projected Date(s) of Sampling:** January/February 2016 **Project Manager:** Mr. Deric Kearns	**Site Name:** NSA Crane **Site Location:** Crane, Indiana

Date of Session: November 9th and 16th, 2015

Scoping Session Purpose: Multiple phone and email communications between Navy and TtEC discussing scope of this phase of the project and the planning documents to be developed and submitted.

Name	Title	Affiliation	Phone #	E-mail Address
Ms. Linda Cole	COR	Navy	(757) 341-2011	linda.cole@navy.mil
Mr. Deric Kearns	PM	TtEC	(215) 702-4083	deric.kearns@tetratech.com

This page intentionally left blank.

SAP Worksheet #10 – Problem Definition

The main problem defined for this project is: Based on analytical results from previous investigations, the floodplains in a portion of Ditch 3 in SWMU 17/04 potentially contain contaminants of concern (PCBs) that could pose an unacceptable risk; however, the extent and significance of contamination in this area is unknown. Therefore, soil/sediment investigation sampling of floodplains associated with Ditch 3 between sediment trap 2 and the concrete pipe outfall will be conducted to assess PCB concentrations.

SITE DESCRIPTION AND OPERATIONAL HISTORY

NSA Crane is located in the southern portion of Indiana, approximately 75 miles southwest of Indianapolis and 71 miles northwest of Louisville, Kentucky, immediately east of Crane Village and Burns City (Figure 1). NSA Crane encompasses 62,463 acres (approximately 98 square miles), most of which are located in the northern portion of Martin County. Smaller portions of NSA Crane are located in Greene, Daviess, and Lawrence Counties. NSA Crane is located in a rural sparsely populated area. Most of NSA Crane is forested, and the surrounding area is wooded or farmed land. Much of NSA Crane, including SWMU 17/04, is deeply incised with natural drainage channels (ditches) and streams.

The location of SWMU 17/04 is shown on Figure 1. SWMU 17/04 has been in use since before the late 1940s. Historically, SWMU 17/04 has been used for:

- Storage of electrical capacitors, some of which contained PCBs.
- Storage of electrical transformers, some of which contained PCBs.
- Reported burial of capacitors, some of which may have contained PCBs.
- Storage of creosote-impregnated utility poles, some of which may have been contaminated with PCBs as a result of leaking transformers.

Capacitors were believed to have been buried near Building 357 (B-357) in the early to mid-1970s, but few capacitors or other electrical equipment items have been found at SWMU 17/04. Utility pole and electrical transformer laydown areas near B-357, however, were evidently sources of PCB contamination for surrounding soil. PCB contamination also was found in soil and sediment in ditches, streams, and adjacent floodplains downgradient of B-357 (Tetra Tech 2013). The contamination near buildings was removed during the 2013 Interim Measures (IM) Phase 1.

Building 2721 (B-2721), located at the eastern end of SWMU 17/04, was used as an electrical transformer maintenance facility where maintenance was performed on transformers containing PCB oil. Large quantities of PCB oil were stored in a 4-foot-diameter, 6-foot-long, 550-gallon aboveground tank adjacent to the eastern exterior wall of B-2721. The circa 1987 interim sampling report documents PCB contamination within and outside the building. Most of the detected PCB contamination was associated with chip and core samples collected near floor drains, from interior B-2721 floors and walls, and from the eastern exterior B-2721 wall. A minor amount of PCB contamination (generally less than 1 milligram per kilogram [mg/kg] total PCBs) was found in rock/soil samples from under the asphalt east of B 2721 and from the grassy slope west of B-2721.

SAP Worksheet #10 – Problem Definition (Continued)

Discharge pipe from a buried drum appears to have been routed through an oil-water separator (OWS) located approximately 15 feet northwest of B-2721 which was likely added sometime after operations began in B-2721. PCBs released west of B-2721 would likely have migrated to Ditch 3 via overland flow.

A concrete storm sewer culvert discharges at the head of Ditch 3. Previously used floor drains in B-2721 may have discharged near the culvert. Approximately 135 feet of 4-inch vitreous clay tile (VCT) pipe was connected to the B-2721 floor drains and following a route that leads about 4 feet north of B-2721 then west of B-2721. A total length of 135 feet would place the outfall end of the VCT pipe on the ground slope above the concrete culvert at the head of Ditch 3.

A corrugated metal pipe (CMP) under B-2721 is connected to the buried end of the concrete storm sewer pipe. The other end of the CMP is connected to a catch basin near Building 2516.

SITE INVESTIGATION AND INTERIM MEASURES

Investigations of PCB contamination at B-2721 started as early as 1987, and soil and sediment at SWMU 17/04 have been investigated extensively. PCBs have not been detected in groundwater collected from temporary well points during previous investigations. When PCBs have been detected in surface water, the PCBs have been attributed to suspended particulates, and the concentrations have been near the limits of detectability. An IM conducted in August 2003 (TolTest 2004) removed a limited amount of contaminated soil and sediment. A 2013/2014 IM was conducted in two phases and resulted in the removal of nearly 8,000 tons of soil and sediment from SWMU 17/04. The following is a list of SWMU 17/04 investigations, IMs, and other significant activities relating to investigation or removal of PCB contamination:

- From 1981 to 1983, the Naval Energy and Environmental Support Agency (NEESA) conducted an Initial Assessment Study, which indicated that three PCB capacitors were buried at the site, referred to as Site 4 – PCB Burial Area (Pole Yard), now called SWMU 17/04 (NEESA 1983).
- In 1987, sampling was conducted within and outside of B-2721, and an OWS removal was conducted.
- From 1993 to 1997, investigations and IMs were conducted that focused on finding and removing buried PCB capacitors near B-357.
- As part of an IM, Morrison-Knudsen (M-K) searched locations established during a geophysical survey conducted in 1995 by the United States Army Corps of Engineers Waterways Experiment Station but found only inert debris (wire, rebar, natural iron, etc.). No capacitors were found (M-K 1999). In addition, waste characterization using field test kits detected no PCBs.
- In 1999, No Further Action (NFA) was requested in the form of a risk screening document based on finding no buried PCB-related debris and no unacceptable risks from human exposure to groundwater, air, surface water, or soil (M-K 1999).

SAP Worksheet #10 – Problem Definition (Continued)

- In 2000, the 1999 NFA request was approved by the EPA (EPA 2000).
- In 2001, Science Applications International Corporation (SAIC) found PCB contamination in soil near B-357 when sampling to support a construction project (SAIC 2001).
- A March 2002 RCRA Facility Investigation (RFI) was conducted (Tetra Tech 2002).
- An IM was conducted by TolTest at the PCB Capacitor Burial/Pole Yard in 2003 and was reported in a November 2004 IM Report (IMR) (TolTest 2004).
- October 2005, April 2006, May 2006, and October 2006 RCRA RFI Addendum Field Investigations (Tetra Tech 2007) were conducted to delineate PCB contamination.
- An August 2008 Fish Tissue Report was prepared for Boggs Creek (United States Fish and Wildlife Service 2008) to describe site conditions.
- A December 2008 Boggs Creek Field Investigation (Tetra Tech 2010) included additional delineation of PCB contamination.
- A January 2011 Field Investigation (Tetra Tech 2011) included additional delineation of PCB contamination.
- A March 2013 IMWP was prepared for SWMU 17/04 (Tetra Tech 2013) to govern IMs designed to remove all soil and sediment with total PCB concentrations greater than 1 mg/kg.
- Additional sampling was conducted and a March 2013 Report for Additional Investigation in Support of Prescriptive PCB Remediation at SWMU 17/04 PCB Capacitor Burial/Pole Yard was completed.
- SEQ Vets prepared a workplan to implement the building area" portions of the Tetra Tech 2013 IMWP (SEQ Vets 2013).
- VRHabilis-Kemron, LLC (VRHK) prepared a workplan to implement the ditches, streams, and floodplains portions of the Tetra Tech 2013 IMWP (VRHK 2014).
- IM Phases 1 and 2 were conducted from April 2013 to September 2014 to remove all known soil and sediment PCB contamination at SWMU 17/04. Additional sampling was conducted to investigate PCB concentrations in black sludge discovered during IM Phase 2 and to provide an initial identification of a residual PCB contamination source near the top of Ditch 3.
- Tetra Tech prepared an IM Report for SWMU 17/04. The draft final version of this report is undergoing regulatory review (Tetra Tech 2015). This report identified the presence of a continuing PCB contamination source at SWMU 17/04 but did not delineate the source.
- Tetra Tech conducted additional PCB source delineation sampling, sediment trap installation, and rock coring at SWMU 17/04 in 2015.

SAP Worksheet #10 – Problem Definition (Continued)

Sampling of Ditch 3 conducted during the conclusion of the 2013/2014 IM indicated that Ditch 3 sediments were again becoming contaminated. The existence of a residual PCB contamination source upgradient of Ditch 3 was evident.

UPDATED CONCEPTUAL SITE MODEL

The results of sediment and soil sampling during the conclusion of IM Phase 2 in 2014 and from May to July 2015 show that Ditch 3, Segments 4, 5, and 6, which constitute approximately 1,500 feet of sediment in the uppermost portion of Ditch 3, have been recontaminated since the IM. IM activities do not appear to be responsible for this recontamination. Sampling within the concrete culvert pipe shows that very low levels of PCBs (less than 1 mg/kg) are present in sediment within the new 6-footlong section of pipe. This indicates the presence of a PCB source upstream of the culvert outfall, although the measured concentrations are less than the cleanup goal. Soil and sediment samples collected under and adjacent to the new 6-foot-long section of concrete culvert pipe in 2014 indicated that there remains greater than 1 mg/kg PCB contamination immediately under the pipe and probably within 6 to 8 feet laterally of the pipe. One sample, 17SD1380003, collected in 2014 under the joint between the old and new concrete culvert pipes contained 490 mg/kg total PCBs. This and the surrounding residual contaminated soil and sediment were immobilized at the conclusion of IM Phase 2 by covering the contaminated material with several feet of uncontaminated fill. The relatively clean portion of Ditch 3 upstream of Sediment Trap #1 indicates that limited quantities of PCB contamination are migrating within that region of Ditch 3.

Continued migration of contamination from upper elevations of Ditch 3 to downstream elevations is a virtual certainty unless the contamination in the upper elevations of Ditch 3 is removed. The two primary sources of contamination are: (1) soil and sediment in the immediate vicinity of the concrete culvert and (2) the segment of Ditch 3 between Sediment Traps #1 and #3. Most of the latter contamination is confined to between Sediment Traps #1 and #2. Downstream migration of contamination would increase the potential for exposure of ecological and human receptors to PCB contamination by increasing the potential exposure area. Sediment traps currently prevent the majority of contamination from migrating downstream. A small mass of PCBs has migrated downstream of Sediment Trap #2 and will continue migrating downstream.

SAP Worksheet #11 – Project Quality Objectives/Systematic Planning Process Statements

The Data Quality Objectives (DQOs) specify project objectives, data collection boundaries and limitations, the most appropriate type of data to collect, and the level of acceptable decision error. The quality and quantity of data required to implement environmental removal actions are also defined.

The DQOs, as defined through the seven-step process (EPA 2006b), are as follows:

1. State the problem

The main problem defined for this project is: Based on analytical results from previous investigations, the floodplains in a portion of Ditch 3 in SWMU 17/04 potentially contain contaminants of concern (PCBs) that could pose an unacceptable risk; however, the extent and significance of contamination in this area is unknown. Therefore, soil/sediment investigation sampling of floodplains associated with Ditch 3 between sediment trap 2 and the concrete pipe outfall will be conducted to assess PCB concentrations.

2. Identify the goal of the study

Are the soil/sediment investigation samples collected in select floodplain areas adjacent to Ditch 3 above the cleanup goal of 1 mg/kg for total PCBs?

3. Identify information inputs

Analytical results generated during this project.

4. Define the boundaries of the study

Temporal boundaries are not applicable to this project. Figure 2 illustrates the 40 proposed sampling locations which may be altered based on field conditions.

5. Develop the analytic approach

If the soil/sediment investigation results are above the cleanup goal of 1 mg/kg for total PCBs, then potential remedial actions will be evaluated. If the results are below, then no further action will be required in the Ditch 3 floodplain area.

6. Specify performance or acceptance criteria

Field crews will review this SAP prior to collection of samples and sign off on SAP Worksheet #4. Sampling and analytical performance or acceptance criteria are specified in SAP Worksheets #12, 15, and 28.

7. Develop the plan for obtaining data

Sampling design and rationale are discussed in SAP Worksheet #17.

This page intentionally left blank.

SAP Worksheet #12 – Measurement Performance Criteria Table for Samples

QC Sample	Analytical Group	Frequency	Data Quality Indicators	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Field Duplicate	PCBs	1 per 20 samples	Precision	Relative percent difference (RPD) ≤30% when detected concentrations >2x LOQ.	S&A
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	PCBs	1 per 20 samples	Precision/ Accuracy	See SAP Worksheet #28	S&A
Equipment Rinsate	PCBs	1 per entire sampling event	Precision	Analytes detected below the limit of quantitation (LOQ)	S&A
Temperature blank	PCBs	1 per cooler	Precision	Cooler temperature 4 ± 2 degrees Celsius	S

This page intentionally left blank.

SAP Worksheet #13 – Secondary Data Criteria and Limitations Table

Secondary Data	Data Source	Data Generator(s)	How Data Will Be Used	Limitations on Data Use
Soil/sediment data	Tetra Tech, Inc. Interim Measures Report for SWMU 17 – PCB Capacitor Burial/Pole Yard, Naval Support Activity Crane, Indiana. April 2015.	Navy	Data was used to determine sampling location discussed in this SAP	None

This page intentionally left blank.

SAP Worksheet #14 – Summary of Project Tasks

PROJECT TASKS

A summary of activities performed by TtEC for this project include the following:

- Mobilization and Setup Activities
- Staking/Surveying of Soil/Sediment Investigation Sample Locations
- Soil/Sediment Investigation Sampling

SAMPLE COLLECTION PROCEDURES

Soil/sediment samples will be collected using a hand auger or equivalent. The hand auger will be used to collect a surface sample at 0 to 0.5 feet below ground surface (bgs) and then a sample at 1.5 to 2 feet bgs. (The subsurface sample depth may vary based on field conditions such as bedrock or refusal but will not be collected deeper than 2 feet bgs.)

1. Prior to performing sampling, the 40 proposed locations illustrated in Figure 3 will be marked with stakes or equivalent to denote each sampling location. (Subsequently, each location will be surveyed using a handheld Global Positioning System unit.)
2. Personnel will don a new pair of disposable nitrile gloves before collecting samples at each location to prevent cross-contamination.
3. The area to be sampled will be cleared of any surface debris or twigs.
4. A decontaminated hand auger will be used to auger down from 0 to 0.5 feet (which is the length of the hand auger bucket).
5. The hand auger will be turned upside down to dispense the material into a disposable pan. Any debris or twigs will be removed. All soil, sediment, or rocks will remain in the pan.
6. The material in the pan will mixed with a disposable scoop to homogenize the material.
7. The scoop will be used to place material into laboratory provided sample containers as listed in SAP Worksheet #19. Personnel will used their gloved hand to pack the jar completely full with material to ensure no headspace in the container.
8. Once the 0 to 0.5 foot sample is collected, the material in the pan and the disposable scoop will be discarded, and the hand auger will be decontaminated.
9. Personnel will don a new pair of disposable nitrile gloves.
10. After decontamination, the hand auger will be used in the same location to auger down to 1.5 feet. Since the hand auger bucket is approximately 6 inches (or 0.5 feet), personnel will auger to fill the bucket. That material will be discarded near the hole. This will be repeated once more to achieve a clear hole down to 1.5 feet.
11. Once 1.5 foot interval is reached, the hand auger will be used to collect the 1.5 to 2 foot interval.
12. A new disposable scoop and pan will be used to repeat steps 5 through 7.

SAP Worksheet #14 – Summary of Project Tasks (Continued)

13. Each sample container will be labeled and packaged in accordance with SAP Worksheet #27.
14. The COC will be filled out during sample collection as described in SAP Worksheets #18, 27, and 29.
15. Once sampling is complete and that location, the hand auger will be decontaminated and all material from the disposable pans will be placed back in the hole. The pans and disposable scoops will be discarded.
16. Personnel will move to the next sampling location and repeat steps 2 through 15 at each new location.

DECONTAMINATION PROCEDURES

Decontamination of nondisposable sampling equipment that comes in contact with the samples (such as a hand auger) will be performed to prevent the introduction of extraneous material into samples, and to prevent cross-contamination between samples. All sampling equipment will be decontaminated by washing with a nonphosphate detergent such as Liquinox™ (or equivalent) as follows:

1. Dilute the nonphosphate detergent with potable water in a bucket (or equivalent) as directed by the manufacturer. Wash the equipment with the nonphosphate detergent and potable water solution.
2. Use a second bucket with potable water to rinse the equipment.
3. Use a third bucket with potable water to rinse the equipment again.

An equipment rinsate sample will be collected using laboratory provided deionized water which will be poured over decontaminated sampling equipment (in this case a hand auger). That water will be captured into laboratory provided sample containers. The equipment rinsate will be analyzed for PCBs to determine if the decontamination procedure used for the hand auger was sufficient to remove any potential contamination.

Decontamination water will be drummed and personal protective equipment such as gloves, tyveks, and booties will be placed in plastic bags. All of these items will be disposed of in accordance with local, state, and federal law.

DATA MANAGEMENT PROCEDURES

Field surveying data, logbooks, and COC records will be maintained in the TtEC project file. The field crews will send a copy of the COC records and any shipping information to the TtEC Project Chemist the day any samples are collected and submitted to the laboratory.

The laboratory will e-mail analytical results within the turnaround time to the TtEC Project Chemist. This submittal will include analytical results and basic QC results (method blanks, laboratory control sample [LCS], laboratory control sample duplicate [LCSD], MS/MSD, and laboratory duplicate as applicable). The TtEC Project Chemist will review prior to distribution to

SAP Worksheet #14 – Summary of Project Tasks (Continued)

the project team. Following this submittal, the laboratory will submit deliverables as described in SAP Worksheet #29.

Survey data will be recorded by on-site personnel for all samples locations. Horizontal control information will be captured in the State Plane Coordinate System in feet and vertical control standards will be in mean sea level. The survey data and associated analytical results will be submitted to the NIRIS website in NEDD format as applicable for this project.

This page intentionally left blank.

SAP Worksheet #15 – Reference Limits and Evaluation Table

Matrix: Soil/Sediment (investigation samples)
Analytical Group: PCBs

Analyte	CAS Number	Project Action Limit (µg/kg)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-specific limits [b]		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
Aroclor 1016	12674-11-2	1,000 for total PCBs; total PCBs calculated using only detected values for the individual aroclors	Cleanup goal [a]	33	33	15.0	5.09
Aroclor 1221	11104-28-2			47	47	17.0	15.6
Aroclor 1232	11141-16-5			33	33	15.0	5.12
Aroclor 1242	53469-21-9			33	33	33.0	9.12
Aroclor 1248	12672-29-6			33	33	20.0	5.61
Aroclor 1254	11097-69-1			33	33	17.0	5.52
Aroclor 1260	11096-82-5			33	33	7.70	2.65

Notes:

All results will be percent moisture (dry weight) corrected. Non-detected results will be reported by the laboratory with a "U" qualifier at the limit of detection (LOD). Results between the detection limit (DL) and LOQ will be reported as "J" flagged as estimated.

[a] The cleanup goal of 1 mg/kg is the Toxic Substances Control Act high occupancy limit which is a limit agreed to by the Navy, U.S. Fish and Wildlife Service, and EPA.

[b] The laboratory's DLs, LODs, and LOQs are evaluated and reviewed quarterly and/or annually and therefore are subject to change. The laboratory will adhere to the most current limits when analyzing samples for this project.

SAP Worksheet #15 – Reference Limits and Evaluation Table (Continued)

Matrix: Water (equipment rinsate sample)
Analytical Group: PCBs

Analyte	CAS Number	Project Action Limit (µg/L)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/L)	Laboratory-specific limits [a]		
					LOQ (µg/L)	LOD (µg/L)	DL (µg/L)
Aroclor 1016	12674-11-2	1	SAP Worksheet #12; no analyte detected above LOQ	1	1	0.600	0.170
Aroclor 1221	11104-28-2	1		1	1	0.256	0.180
Aroclor 1232	11141-16-5	1		1	1	0.304	0.130
Aroclor 1242	53469-21-9	1		1	1	0.304	0.104
Aroclor 1248	12672-29-6	1		1	1	0.600	0.170
Aroclor 1254	11097-69-1	1		1	1	0.256	0.140
Aroclor 1260	11096-82-5	1		1	1	0.304	0.0890

Notes:

Non-detected results will be reported by the laboratory with a "U" qualifier at the LOD. Results between the DL and LOQ will be reported as "J" flagged as estimated.

[a] The laboratory's DLs, LODs, and LOQs are evaluated and reviewed quarterly and/or annually and therefore are subject to change. The laboratory will adhere to the most current limits when analyzing samples for this project.

SAP Worksheet #16 – Project Schedule/Timeline Table

Activity	Start Date	Duration (days)	Deliverable	Deliverable Due Date
Preparing SAP	11/6/2015	5	Internal Draft SAP	11/13/2015
Incorporating Navy comments	01/26/2016	14	Draft SAP	02/12/2016
Regulatory review of SAP	2/15/2016	45	Draft Final SAP	3/31/2016
Incorporating regulator comments	3/31/2016	3	Final SAP	4/5/2016
Sampling effort described in this SAP	4/6/2016	5	None	None
Preparing report discussing data	October 2016	-	Report	October 2016

This page intentionally left blank.

SAP Worksheet #17 – Sampling Design and Rationale

Due to Ditch 3 historically overflowing the ditch banks, TtEC will collect soil/sediment investigation samples to determine the total PCB levels in select floodplain areas. TtEC will lay out a grid over the 4,000-square foot area and will collect samples at a maximum of 40 locations. The proposed 40 locations are illustrated on Figure 3 and may be adjusted based on field observations to ensure that the sample locations are within the floodplain and not within Ditch 3. At each location two soil/sediment samples will be collected – one from the surface at 0 to 0.5 feet bgs and one from the subsurface at approximately 1.5 to 2 feet bgs. During sample collection with a hand auger, sample depths will be measured and noted in the field logbook to ensure samples are collected from appropriate depths. The subsurface sample depth may vary based on field conditions such as bedrock or refusal but will not be collected deeper than 2 feet bgs. The surface soil/sediment samples will be analyzed for PCBs as indicated in SAP Worksheet #15. The subsurface soil/sediment samples will be put on hold for PCB analysis pending evaluation of the surface soil/sediment sample results. If a surface soil/sediment sample result is above 1 mg/kg for total PCBs, then the associated subsurface soil/sediment sample will be analyzed for PCBs in accordance with SAP Worksheet #15.

This page intentionally left blank.

SAP Worksheet #18 – Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ ID Number	Matrix	Depth	Analytical Group	Number of Samples	Sampling SOP Reference
FP-01-0-0.5 and FP-01-1.5-2 FP-02-0-0.5 and FP-02-1.5-2 FP-03-0-0.5 and FP-03-1.5-2 FP-04-0-0.5 and FP-04-1.5-2 FP-05-0-0.5 and FP-05-1.5-2 FP-06-0-0.5 and FP-06-1.5-2 FP-07-0-0.5 and FP-07-1.5-2 FP-08-0-0.5 and FP-08-1.5-2 FP-09-0-0.5 and FP-09-1.5-2 FP-10-0-0.5 and FP-10-1.5-2 FP-11-0-0.5 and FP-11-1.5-2 FP-12-0-0.5 and FP-12-1.5-2 FP-13-0-0.5 and FP-13-1.5-2 FP-14-0-0.5 and FP-14-1.5-2 FP-15-0-0.5 and FP-15-1.5-2 FP-16-0-0.5 and FP-16-1.5-2 FP-17-0-0.5 and FP-17-1.5-2 FP-18-0-0.5 and FP-18-1.5-2 FP-19-0-0.5 and FP-19-1.5-2 FP-20-0-0.5 and FP-20-1.5-2 FP-21-0-0.5 and FP-21-1.5-2 FP-22-0-0.5 and FP-22-1.5-2 FP-23-0-0.5 and FP-23-1.5-2 FP-24-0-0.5 and FP-24-1.5-2 FP-25-0-0.5 and FP-25-1.5-2 FP-26-0-0.5 and FP-26-1.5-2 FP-27-0-0.5 and FP-27-1.5-2 FP-28-0-0.5 and FP-28-1.5-2 FP-29-0-0.5 and FP-29-1.5-2 FP-30-0-0.5 and FP-30-1.5-2 FP-31-0-0.5 and FP-31-1.5-2 FP-32-0-0.5 and FP-32-1.5-2 FP-33-0-0.5 and FP-33-1.5-2 FP-34-0-0.5 and FP-34-1.5-2 FP-35-0-0.5 and FP-35-1.5-2 FP-36-0-0.5 and FP-36-1.5-2 FP-37-0-0.5 and FP-37-1.5-2 FP-38-0-0.5 and FP-38-1.5-2 FP-39-0-0.5 and FP-39-1.5-2 FP-40-0-0.5 and FP-40-1.5-2	Soil/ Sediment	0-0.5 feet 1.5-2 feet	PCBs	One discrete soil/sediment sample per boring per depth; 0-0.5 feet samples will be analyzed for PCBs while the 1.5-2 feet samples will be put on hold pending PCB analysis.	See SAP Worksheet #14
ER-MMDDYYYY (equipment rinsate sample)	Water	Not applicable	PCBs	One	See SAP Worksheet #14

Notes:

The 1.5-2 feet bgs sampling depth may be revised based on field conditions. Therefore, the sample ID will be revised as needed to include the actual sampling depth.

The sample collection date will be recorded on the COC and field logbook as indicated in SAP Worksheets #27 and 29.

This page intentionally left blank.

SAP Worksheet #19 – Analytical SOP Requirements Table

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Containers	Sample Volume	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Soil/Sediment	PCBs	EPA 3546/8082A DV-OP-0015/DV-GC-0021	One 8 ounce glass jar	30 grams	Cool all samples to ≤6°C, but not frozen per EPA	1 year to extract/40 days to analyze
Water (equipment rinsate)	PCBs	EPA 3510C/8082A DV-OP-0006/DV-GC-0021	Two 250 milliliter glass ambers (for low volume extraction method)	250 milliliter	Cool all samples to ≤6°C, but not frozen per EPA	1 year to extract/40 days to analyze

This page intentionally left blank.

SAP Worksheet #20 – Field Quality Control Sample Summary Table

Matrix	Analytical Group	No. of Sampling Locations	No. of Field Duplicates	No. of MS/MSDs	No. of Source Blanks	No. of Equipment Rinsate	No. of VOA Trip Blanks	Total No. of Samples to Lab
Soil/Sediment	PCBs	80 [a]	4	4	0 [b]	1 [c]	Not applicable	89

Notes:

[a] Two soil/sediment samples will be collected from each of the 40 proposed locations. The surface sample from 0 to 0.5 feet bgs will be analyzed by the laboratory for PCBs and the subsurface sample (1.5 to 2 feet bgs) will be held for analysis pending evaluation of surface sample results.

[b] The laboratory will provide certification that the water provided to collect an equipment rinsate is below the LOQs for PCBs. Therefore, a source blank is not required.

[c] If non-disposable sampling equipment is used to collect the soil/sediment samples, one equipment rinsate will be collected for the entire sampling event.

This page intentionally left blank.

SAP Worksheet #21 – Project Sampling SOP References Table

This worksheet is not applicable to this project as described in SAP Worksheet #2.

This page intentionally left blank.

SAP Worksheet #22 – Field Equipment Calibration, Maintenance, Testing, and Inspection Table

This worksheet is not applicable to this project as described in SAP Worksheet #2.

This page intentionally left blank.

SAP Worksheet #23 – Analytical SOP References Table

Lab SOP Number [a]	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
DV-GC-0021	Polychlorinated Biphenyls (PCBs) by GC/ECD (SW846 Method 8082 and 8082A), Revision 10, 4/30/2015.	Definitive	Soil/Sediment/Water PCBs	Gas Chromatograph/ Electron Capture Detector (GC/ECD)	TestAmerica Denver	N

Note:

[a] Analytical SOP revision number and date listed are current as of the date this SAP was published. The laboratory's SOPs are evaluated and reviewed annually and therefore are subject to change. The laboratory will adhere to the most current SOP when analyzing samples for this project.

This page intentionally left blank.

SAP Worksheet #24 – Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/ECD (PCBs)	An initial calibration (ICAL) using a minimum of 5 levels will be performed for all the Aroclors.	Instrument receipt, major instrument change, when CCV does not meet criteria	Acceptance criteria options: • Option 1: RSD for each analyte ≤ 20%; • Option 2: linear least squares regression: r ≥ 0.99; • Option 3: non-linear regression: coefficient of determination $r^2 \geq 0.99$	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration.	TestAmerica Denver Analyst	DV-GC-0021
GC/ECD (PCBs)	Initial calibration verification	Second source standard, immediately following ICAL	All project analytes within ± 20% of the expected value from the ICAL	Evaluate data. If problem (e.g., concentrated standard, plugged injector needle) found, correct, then repeat second source verification. If still fails, repeat initial calibration.	TestAmerica Denver Analyst	DV-GC-0021
GC/ECD (PCBs)	Continuing calibration verification (CCV)	Prior to sample analysis, after every 10 field samples, and at the end of the sequence.	All project analytes within ± 20% of the expected value from the ICAL	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze once all affected samples since the last acceptable CCV. If CCV still fails, consult client before reporting.	TestAmerica Denver Analyst	DV-GC-0021

This page intentionally left blank.

SAP 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/ECD (PCBs)	Change septum, clean injection port, change or clip column, install new liner, replace column, filters and seals	Detector signals and chromatogram review	Instrument performance and sensitivity	As needed	CCV passes criteria	Re-inspect injector port, cut additional column, reanalyze CCV, recalibrate instrument	TestAmerica Denver Analyst	DV-GC-0021

This page intentionally left blank.

SAP Worksheet #26 – Sample Handling System

Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): Sampler/TtEC
Sample Packaging (Personnel/Organization): Sampler/TtEC
Coordination of Shipment (Personnel/Organization): Sampler/TtEC
Type of Shipment/Carrier: FedEx
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Custodian/TestAmerica Denver
Sample Custody and Storage (Personnel/Organization): Sample Custodian/ TestAmerica Denver
Sample Preparation (Personnel/Organization): Sample preparation personnel/ TestAmerica Denver
Sample Determinative Analysis (Personnel/Organization): Analyst/ TestAmerica Denver
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): 90 calendar days
Sample Extract/Digestate Storage (No. of days from extraction/digestion): 30 calendar days
Biological Sample Storage (No. of days from sample collection): Not applicable to this project
SAMPLE DISPOSAL/ARCHIVE
Personnel/Organization: Sample Custodian/ TestAmerica Denver
Number of Days from Analysis: 90 calendar days from sample receipt

This page intentionally left blank.

SAP Worksheet #27 – Sample Custody Requirements Table

An overriding consideration for data resulting from laboratory analyses is the ability to demonstrate that the data are legally defensible, i.e., that the samples were obtained from the locations stated and that they reached the laboratory without alteration. To accomplish this, evidence of collection, shipment, laboratory receipt, and laboratory custody until disposal will be documented through the COC record. A sample is considered to be in custody if the following conditions have been observed:

- In actual possession or in view of the person who collected the samples
- Locked in a secure area
- Placed in an area restricted to authorized personnel

The COC record lists each sample and the individuals performing the sample collection, shipment, and receipt. Any unused lines on the COC will be crossed out with a diagonal line, and initialed and dated by the person signing or creating the COC. The COC record will be the controlling document to ensure that the sample custody is maintained. Each time the sample custody is transferred, the former custodian will sign the COC on the _Relinquished By_ line, and the new custodian will sign the COC on the _Received By_ line. The date, time, and project or company affiliation will accompany each signature. When FedEx is used to ship samples to the laboratory, the carrier name (i.e., FedEx) will be recorded on the COC. The shipping container will be secured with two custody seals, thereby allowing for custody to be maintained by the shipping personnel until receipt by the laboratory.

Sample custody will be the responsibility of sampling personnel from the time of sample collection until the samples are accepted by the laboratory. Thereafter, the laboratory performing the analysis will maintain custody. The sample custodian will sign the COC, inventory each shipment, and note any discrepancies on the sample login form. The laboratory will immediately notify the TtEC Project Chemist of any discrepancies. The laboratory will have a system for tracking samples consistent with the Quality Systems Manual (QSM) (Department of Defense [DoD] 2013). The laboratory will dispose of samples.

In addition to providing a custody exchange record for the samples, the COC record serves as a formal request for sample analyses. The COC records will be completed, signed, and distributed as follows:

- The original copy sent to the laboratory along with the samples
- A copy retained on-site for inclusion in the project files
- A copy e-mailed to the TtEC Project Chemist on a daily basis to allow tracking of samples sent to laboratories to confirm laboratory receipt of samples along with the FedEx shipping number

SAMPLE NUMBERING

The sample number will be recorded in the field logbook, on the labels, and on the COC record at the time of sample collection. A complete description of the sample and sampling conditions will

SAP Worksheet #27 – Sample Custody Requirements Table (Continued)

be recorded in the field logbook and referenced using the unique sample identification number. Samples will be uniquely designated using a numbering system that is presented in SAP Worksheet #18.

SAMPLE PACKAGING

For samples submitted to the laboratory, immediately after sample labeling, containers will be placed in double-resealable plastic bags to protect the samples from moisture. Glass containers will be wrapped in bubble wrap after placing in double resealable bags to protect from breakage.

Samples to be sent to the laboratory will be packaged in coolers. Each cooler will be shipped with a temperature blank. (A temperature blank is a laboratory-provided container filled with tap water and stored in the cooler during sample collection and transportation.) The temperature of the cooler will be recorded by the laboratory on the COC record immediately upon receipt of the samples by using the temperature blank.

Samples to be shipped by FedEx will be packed in a sample cooler lined with a plastic bag, and the cooler drain spouts will be taped from the inside and outside of the cooler to prevent any leakage. Double-bagged wet ice (not blue ice) will be added inside the plastic bag at the bottom of the cooler, one layer of sample containers will be placed on the ice, and more double-bagged ice will be placed on top of the containers. This will be repeated until the cooler is filled with ice as the top layer in the cooler.

The COC record will include the FedEx air bill number, and the “Received By” box will be labeled with “FedEx”. The COC record will be sealed in a double-resealable bag and then taped to the inside of the sample cooler lid. The cooler will be taped shut with strapping tape. Two custody seals will be taped across the cooler lid: one seal in the front and one seal in the back. Clear tape will be applied to the custody seals to prevent accidental breakage during shipment. The pouch for the FedEx air bill will be placed on the cooler and secured with clear tape. The FedEx air bill will be completed for priority overnight delivery and placed in the pouch. If multiple coolers are being shipped, the original FedEx air bill will be placed on the cooler with the COC record, and copies of the FedEx air bill will be placed on the other coolers. The number of packages should be included on each FedEx air bill (1 of 2, 2 of 2). Saturday deliveries, if required, should be coordinated with the laboratory in advance, and field sampling personnel must ensure that Saturday delivery stickers are placed on each cooler by FedEx. “Dangerous goods” declarations will also be completed as applicable.

SAP Worksheet #28 – Laboratory QC Samples Table

Matrix: Soil/Sediment
Analytical Group: PCBs
Analytical Method/SOP Reference: EPA 8082A/DV-GC-0021

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No Target Compounds> ½ LOQ and > 1/10 the amount in any sample or 1/10 the regulatory limit (whichever is greater).	If sufficient sample is available, reanalyze samples. Qualify data as needed. Report results if sample results >10x blank result or sample results non-detect.	TestAmerica Denver Analyst	Accuracy	No Target Compounds> ½ LOQ and > 1/10 the amount in any sample or 1/10 the regulatory limit (whichever is greater).
LCS and/or LCSD	1 per preparatory batch (defined as ≤ 20 samples)	Aroclor 1016: 47–134% Aroclor 1254: 67–135% Aroclor 1260: 53–140% RPD ≤ 30% If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and reprep and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available. If insufficient sample, then apply Q-flag to specific analyte(s) in all samples in the associated prep batch. Flagging is only appropriate when samples cannot be reanalyzed.	TestAmerica Denver Analyst	Accuracy	Aroclor 1016: 47–134% Aroclor 1254: 67–135% Aroclor 1260: 53–140% RPD ≤ 30% If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.

SAP Worksheet #28 – Laboratory QC Samples Table (Continued)

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
MS/MSD	1 per preparatory batch (defined as ≤ 20 samples)	Aroclor 1016: 47–134% Aroclor 1254: 67–135% Aroclor 1260: 53–140% RPD ≤ 30% If the analyte(s) are not listed, use in-house MS/MSD limits if project limits are not specified.	For specific analyte(s) in parent sample, apply J-flag if acceptance criteria are not met. Explain in the case narrative. The MS is for matrix evaluation only. If MS falls outside LCS limits, evaluate data to determine the source of the difference and to determine if there is a matrix effect or analytical error.	TestAmerica Denver Analyst	Accuracy/ Precision	Aroclor 1016: 47–134% Aroclor 1254: 67–135% Aroclor 1260: 53–140% RPD ≤ 30% If the analyte(s) are not listed, use in-house MS/MSD limits if project limits are not specified.
Surrogate	Per sample, blank, LCS, LCSD, MS, MSD	Tetrachloro-m-xylene: 44–130% Decachlorobiphenyl: 59–130% (in-house limit)	Evaluate data, if obvious chromatographic interference is present, report with narrative comment. If preparation problem noted, reextract and reanalyze. Apply Q-flag to all associated analytes if acceptance criteria are not met. Explain in the case narrative.	TestAmerica Denver Analyst	Accuracy	Tetrachloro-m-xylene: 44–130% Decachlorobiphenyl: 59–130% (in-house limit)

Note:

The laboratory's in-house limits are evaluated and reviewed quarterly and/or annually and therefore are subject to change. The laboratory will adhere to the most current limits when analyzing samples for this project.

SAP Worksheet #28 – Laboratory QC Samples Table (Continued)

Matrix: Water (equipment rinsate sample)
Analytical Group: PCBs
Analytical Method/SOP Reference: EPA 8082A/ DV-GC-0021

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	1 per preparatory batch (defined as ≤ 20 samples)	No Target Compounds> ½ LOQ and > 1/10 the amount in any sample or 1/10 the regulatory limit (whichever is greater).	If sufficient sample is available, reanalyze samples. Qualify data as needed. Report results if sample results >10x blank result or sample results non-detect.	TestAmerica Denver Analyst	Accuracy	No Target Compounds> ½ LOQ and > 1/10 the amount in any sample or 1/10 the regulatory limit (whichever is greater).
LCS and/or LCSD	1 per preparatory batch (defined as ≤ 20 samples)	Aroclor 1016: 46–129% Aroclor 1254: 34–127% Aroclor 1260: 45–134% RPD ≤ 30%	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and reprep and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available. If insufficient sample, then apply Q-flag to specific analyte(s) in all samples in the associated prep batch. Flagging is only appropriate when samples cannot be reanalyzed.	TestAmerica Denver Analyst	Accuracy	Aroclor 1016: 46–129% Aroclor 1254: 34–127% Aroclor 1260: 45–134% RPD ≤ 30%

SAP Worksheet #28 – Laboratory QC Samples Table (Continued)

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
MS/MSD	1 per preparatory batch (defined as ≤ 20 samples)	Aroclor 1016: 46–129% Aroclor 1254: 34–127% Aroclor 1260: 45–134% RPD ≤ 30%	For specific analyte(s) in parent sample, apply J-flag if acceptance criteria are not met. Explain in the case narrative. The MS is for matrix evaluation only. If MS falls outside LCS limits, evaluate data to determine the source of the difference and to determine if there is a matrix effect or analytical error.	TestAmerica Denver Analyst	Accuracy/ Precision	Aroclor 1016: 46–129% Aroclor 1254: 34–127% Aroclor 1260: 45–134% RPD ≤ 30%
Surrogate	Per sample, blank, LCS, LCSD, MS, MSD	Tetrachloro-m-xylene: 25–120% (in-house limit) Decachlorobiphenyl: 30–136% (in-house limit)	Evaluate data, if obvious chromatographic interference is present, report with narrative comment. If preparation problem noted, reextract and reanalyze. Apply Q-flag to all associated analytes if acceptance criteria are not met. Explain in the case narrative.	TestAmerica Denver Analyst	Accuracy	Tetrachloro-m-xylene: 25–120% (in-house limit) Decachlorobiphenyl: 30–136% (in-house limit)

Note:

The laboratory's in-house limits are evaluated and reviewed quarterly and/or annually and therefore are subject to change. The laboratory will adhere to the most current limits when analyzing samples for this project.

SAP Worksheet #29 – Project Documents and Records Table

Document	Where Maintained
Field logbook	TtEC project file
Sample Labels	TestAmerica Denver
COC	TtEC project file; TestAmerica Denver
Shipping records	TtEC project file
Field surveillance reports	TtEC project file
FCRs	TtEC project file
Laboratory documentation	TtEC project file; TestAmerica Denver

Field documentation associated with sampling activities includes field logbooks, sample labels, COCs, sample shipping records, field surveillance reports, and FCR forms. In addition, laboratory documentation will be generated during this project. These types are described in the following sections.

FIELD LOGBOOK

A permanently bound field logbook with consecutively numbered pages will be assigned to this project. The logbooks will be numbered sequentially on the cover by the Project Quality Control Manager (PQCM) and that number will be entered into a logsheet maintained by the PQCM. All entries will be recorded in indelible black or blue ink. At the end of each work day, the logbook pages will be signed by the responsible sampler, and any unused portions of the logbook pages will be crossed out, signed, and dated. If it is necessary to transfer the logbook to another person, the person relinquishing the logbook will sign and date the last page used, and the person receiving the logbook will sign and date the next page to be used. At a minimum, the logbook will contain the following information:

- Project name and site location
- Date and time
- Personnel in attendance
- General weather information
- Work performed
- Field observations
- Sampling performed, including specifics such as location, type of sample, type of analyses, and sample identification; sample description information such as the soil/sediment description and any metal or other waste observed in the excavation
- Field analyses performed, including results, instrument checks, problems, and calibration records for field instruments

SAP Worksheet #29 – Project Documents and Records Table (Continued)

- Descriptions of deviations from this SAP
- Problems encountered and corrective action taken
- Identification of field QC samples
- QC activities
- Verbal or written instructions
- Any other events that may affect the samples

SAMPLE LABELS

Sample labels will be hand-written using indelible black or blue ink and affixed to each sample container at the time of sample collection (or labels may be computer generated). The label will contain the following information:

- Sample identification number
- Sample collection date (month/day/year)
- Time of collection (24-hour clock) from the start of sampling
- Sampler's initials
- Preservative (if any)

CHAIN-OF-CUSTODY

COC information is described in SAP Worksheet #27.

SAMPLE SHIPPING RECORDS

Samples will be shipped via FedEx as described in SAP Worksheet #27.

FIELD SURVEILLANCE REPORTS

Field surveillances will be performed in accordance with the three phases of inspection as required by the QC Program. A Preparatory Inspection will be performed by the PQCM prior to the first sampling activities. This will include a general orientation for health and safety. An Initial Inspection will be conducted at the beginning of field sampling activities for this project. Daily field inspections and subsequent surveillances will be performed at the discretion of the PQCM or the QCPM throughout the duration of the project. The PQCM will use the Initial Inspection Checklist during inspection.

FIELD CHANGE REQUEST

An FCR will be prepared by the TtEC Program Chemist, or a designee, if a change to the SAP occurs during sampling or analysis activities. These changes will be minor and not result in a change in scope and/or DQOs for this project. Major changes to the work scope affecting the original DQOs may require preparation of a SAP Addendum.

SAP Worksheet #29 – Project Documents and Records Table (Continued)

LABORATORY DOCUMENTATION

Samples will be assigned into a sample delivery group (SDG) number for every batch of 20 samples or less based on as received on a daily basis by the laboratory. Initial laboratory analytical results that are e-mailed to the TtEC Project Chemist for review will include:

- Laboratory signed review page
- Copy of COC
- Sample receipt and login
- Sample results
- Batch QC results

The laboratory will then produce a final data package in portable document format (PDF) format which will be sent to the TtEC Project Chemist. The PDF package will resemble an EPA Level IV-equivalent data package (or Stage 4 data package as referenced in the QSM for Environmental Laboratories [DoD 2013]), will be page numbered, and contain the following information:

- Cover page (with laboratory name, address, phone number, contact person, and SDG number, as well as the project name and project number)
- Table of contents
- Case narrative including resolution of all corrective actions and nonconformance
- Sample management records, including a copy of the COC record, shipping documents as applicable, and laboratory sample receipt forms
- Cross-reference table for sample IDs versus laboratory IDs
- Analytical results and quality assurance/QC information as follows:
  - Sample results forms, including method blanks
  - Raw data for samples, QC, and calibration
  - QC summaries
  - Calibration
  - Instrument preparation log, run log, quantitation reports, and chromatograms/spectra
  - Sample preparation log
  - Standards traceability

All relevant laboratory raw data and documentation including, but not limited to, logbook, data sheets, electronic files, and reports, will be maintained by the laboratory for at least 5 years.

An electronic data deliverable (EDD) will be submitted to the TtEC Project Chemist. Both the EDDs and the PDF data package will present results to at least two significant figures.

SAP Worksheet #29 – Project Documents and Records Table (Continued)

When revisions to data packages are required, the revised pages will be stamped with the notation "amended or revised report" and have the same page numbering system as the original pages. If the revisions affect the EDDs, the revised EDD will then be sent along with the revised PDF pages to the TtEC Project Chemist.

SAP Worksheet #30 – Analytical Services Table

Matrix	Analytical Group	Sampling Locations/ ID Number	Analytical Method	Data Package Turnaround Time	Laboratory/ Organization (contact information)	Backup Laboratory/ Organization (contact information)
Soil/Sediment/ Water	All	All	All	5 business days	TestAmerica Denver Contact: Ms. Jamie Ide 4955 Yarrow Street Arvada, CO 80002 (303) 736-0126	TestAmerica St. Louis Contact: Erika Gish 13715 Rider Trail North Earth City, MO 63045 (314) 298-8566

TestAmerica Denver has been selected to analyze samples for this project. The laboratory has successfully completed the DoD Environmental Laboratory Accreditation Program (ELAP) certification, as provided in Appendix A, for the matrices and methods listed in SAP Worksheet #23 and will maintain current status throughout the duration of this project. The laboratory is capable of providing the project QC and data deliverables required by this SAP and the QSM for Environmental Laboratories (DoD 2013). Currently, the Indiana Department of Environmental Management does not certify laboratories for the analysis of samples associated with SW-846 methods for CERCLA/RCRA sites.

This page intentionally left blank.

SAP Worksheet #31 – Planned Project Assessments Table

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 Corrective Actions (Title and Organizational Affiliation)
Field Sampling Surveillance	Once during the project duration	Internal	TtEC	PQCM, TtEC	PM, TtEC	PM, TtEC	PM, TtEC QCPM, TtEC
Management Review	Once during the project duration	Internal	TtEC	QCPM, TtEC	PM, TtEC	PM, TtEC	PM, TtEC QCPM, TtEC

This page intentionally left blank.

SAP Worksheet #32 – Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Title and Organizational Affiliation)	Time Frame of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Title and Organizational Affiliation)	Time Frame for Response
Field Sampling Surveillance	Surveillance Report	PM, TtEC	7 days after completion of the inspection	Corrective Action Report	PM, TtEC QCPM, TtEC	5 days after notification
Management Review	Surveillance Report	PM, TtEC	7 days after completion of the inspection	Corrective Action Report	PM, TtEC QCPM, TtEC	14 days after notification

This page intentionally left blank.

SAP Worksheet #33 – QA Management Reports Table

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 Sampling Surveillance Report	Once during the project	Determined during the project	PQCM, TtEC	PM, TtEC QCPM, TtEC
Management Review Report	Once after management review is completed	Determined during the project	QCPM, TtEC	PM, TtEC Program Manager, TtEC

This page intentionally left blank.

SAP Worksheet #34 – Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Title and Organizational Affiliation)
Field logbook	Field logbooks will be reviewed daily and verified for information accuracy and completeness. The inspection will be documented in daily QC reports.	I	PQCM, TtEC
COC records	COC records will be reviewed daily upon their completion and verified for completeness.	I I	PQCM, TtEC Project Chemist, TtEC
Sample receipt	The Project Chemist will verify receipt of samples by the laboratory.	I	Project Chemist, TtEC
Sample logins	Sample login information will be reviewed and verified for accuracy and completeness in accordance with the requirements in this SAP.	E I	Laboratory PM, TestAmerica Denver Project Chemist, TtEC
Laboratory analytical results prior to release	Laboratory analytical results will be reviewed to verify that the requirements in this SAP have been met. Prior to release, results will be verified as follows:	E	Laboratory PM, TestAmerica Denver
	All analytical results (100 percent) comply with the method- and project-specific requirements and any deviations or failure to meet criteria is documented for the project file.	E	Analyst, TestAmerica Denver
	All manual entries (100 percent) are free of transcription errors and manual calculations are accurate; computer calculations are spot-checked to verify program validity; results reported are compliant with method- and project-specific QC requirements; raw data and supporting materials are complete; spectral assignments are confirmed; descriptions of deviations from method or project requirements are documented; significant figures and rounding have been appropriately used; reported values include dilution factors; and results are reasonable.	E	Peer Analyst, TestAmerica Denver
	Analytical results reported are compliant with method- and project-specific QC requirements; the reported information is complete; the information in the report narrative is complete and accurate; and results are reasonable.	E	Laboratory PM or Second Level Data Reviewer, TestAmerica Denver
	Analytical results reported are compliant with method- and project-specific QC; analytical methods are performed in compliance with approved SOPs. This review may be conducted after release of results since reviews are done monthly on 10 percent of all results produced by the laboratory for all projects.	E	Laboratory QC Manager, TestAmerica Denver

SAP Worksheet #34 – Verification (Step I) Process Table (Continued)

Verification Input	Description	Internal/ External	Responsible for Verification (Title and Organizational Affiliation)
Laboratory analytical results due at turnaround time listed on COC	Laboratory analytical results will be verified for having been obtained following the protocols in this SAP and being of sufficient quality to satisfy DQOs.	I	Project Chemist, TtEC
Laboratory data packages	EPA Level IV-equivalent laboratory data packages will be verified by the laboratory performing the work for completeness and technical accuracy prior to submittal in accordance with requirements described in SAP Worksheet #29.	E I	Laboratory PM, TestAmerica Denver Project Chemist, TtEC

Notes:

E – external

I – internal

Step I – Step 1 (Verification) is a completeness check that is performed before the data review process continues in order to determine whether the required information (complete data package) is available for further review.

SAP Worksheet #35 – Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Title and Organizational Affiliation)
IIa	Sample Collection	Ensure that the sampling procedures described in this SAP were used to collect samples and that any deviations to those procedures were documented in a FCR.	PQCM, TtEC
IIa	Sample Handling	Ensure that the procedures described in this SAP for sample handling, packaging, and transport to the laboratory were followed.	PQCM, TtEC Project Chemist, TtEC
IIa	Sample Documentation	Ensure that the COC procedures described in this SAP were followed for sample collection and that logbooks or field forms were completed as required.	PQCM, TtEC Project Chemist, TtEC
IIa	Analytical Procedures	Ensure that the analytical methods and deliverable requirements described in this SAP were followed including holding times, analyte lists, and QC criteria.	Laboratory PM, TestAmerica Denver Project Chemist, TtEC
IIa	Laboratory data reports	Data reports will be validated by the laboratory performing the work for technical accuracy and requirements listed in SAP Worksheet #29 prior to submittal.	Laboratory PM, TestAmerica Denver
IIb	Sampling Procedures	Review of sampling procedures to appropriately document if any deviations occurred and if corrective action is required.	PQCM, TtEC
IIb	Analytical Procedures	Review of analytical procedures to appropriately document if any deviations occurred and if corrective action is required.	Project Chemist, TtEC
IIb	Project quantitation limits goals and laboratory QC criteria	Ensure project quantitation limits and laboratory QC criteria were followed and any deviations documented.	Project Chemist, TtEC

Notes:

Step IIa – Step IIa (validation) is a review that the data generated is in compliance with analytical methods, procedures, and contracts.

Step IIb - Step IIb (validation) is a comparison of generated data against measurement performance criteria in the SAP (both sampling and analytical).

This page intentionally left blank.

SAP Worksheet #36 – Analytical Data Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Validation Criteria	Data Validator (Title and Organizational Affiliation)
IIa	All	All	In accordance with laboratory SOPs listed in SAP Worksheet #23	Laboratory PM, TestAmerica Denver
IIb	All	All	In accordance with DoD QSM criteria listed in SAP Worksheets #15 and 28 and all requirements listed in this SAP	Project Chemist, TtEC

Notes:

Step IIa – Step IIa (validation) is a review that the data generated is in compliance with analytical methods, procedures, and contracts.

Step IIb - Step IIb (validation) is a comparison of generated data against measurement performance criteria in the SAP (both sampling and analytical).

This page intentionally left blank.

SAP Worksheet #37 – Usability Assessment

After the analytical results have been reviewed, verified, and validated in accordance with SAP Worksheets #34 through 36, a data quality assessment (DQA) report may be prepared to assess data quality and usability. The DQA will include review of the following:

- Sample collection and analytical methods to verify that these were performed as discussed in SAP Worksheets #14, 17, and 19
- DQOs to determine whether they have been achieved by the data collected
- Project-specific data quality indicators for precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) parameters as discussed below

The DQA along with the laboratory results will be included in the report for this project which will be provided to the Navy and regulators for review.

Analytical DQOs as assessed through the PARCCS parameters (as defined in the QSM for Environmental Laboratories ([DoD 2013]) are as follows:

PRECISION

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. Precision is usually expressed as standard deviation, variance, percent difference, or range, in either absolute or relative terms. Precision data indicate how consistent and reproducible the field sampling or analytical procedures have been. As applicable, field duplicate, laboratory control sample duplicate (LCSD), and MSD samples will be used to assess field and analytical precision. The precision measurement will be determined using the RPD between the duplicate sample results as follows:

$$RPD = 100 \times 2 \times |(\text{result - duplicate result})|/(\text{result + duplicate result})$$

As applicable, the RPD limits for LCSD and MSD are presented in SAP Worksheet #28.

ACCURACY

Accuracy is the degree of agreement between an observed value (sample result) and an accepted reference value. Analytical accuracy is measured by comparing the percent recovery (%R) of analytes spiked into a sample against a control limit. Spiked samples include LCS/LCSD or MS/MSD and are analyzed for every batch of up to 20 samples to serve as a measure of analytical accuracy. Surrogate standards, as applicable, are added to all samples, blanks, LCS, LCSD, MS, or MSD and evaluate the method's accuracy and help to determine matrix interferences. %R is calculated as follows:

$$\%R = 100 \times (\text{spiked sample result - unspiked sample result})/\text{amount of spike added}$$

As applicable, the laboratory will review the spiked sample and surrogate recoveries for each analysis to ensure that the %R lies within the control limits listed in SAP Worksheet #28.

REPRESENTATIVENESS

SAP Worksheet #37 – Usability Assessment (Continued)

Representativeness is a qualitative term that describes the extent to which a sampling design adequately reflects the environmental conditions of a site. It takes into consideration the magnitude of the site area represented by one sample and indicates the feasibility and reasonableness of that design rationale. Representativeness also reflects the ability of the sample team to collect samples and the ability of the laboratory personnel to analyze those samples so that the generated data accurately and precisely reflect site conditions. In other words, a discrete sample that is collected and then subsampled by the laboratory is representative when its measured contaminant concentration equates to the contaminant concentration of some predefined vertical and horizontal spatial area at the site. Field personnel will be responsible for ensuring that samples are representative of field conditions by collecting and handling samples according to the procedures in this SAP. The laboratory personnel will be responsible for analyzing samples in accordance with the criteria in this SAP. Errors in sample collection, packaging, preservation, COC procedures, or laboratory analysis may result in samples being judged non-representative and may form a basis for rejecting the data.

COMPLETENESS

Completeness is a measure of the amount of valid data collected using a measurement system. The completeness goal is to generate a sufficient amount of valid data to meet project needs. Completeness is calculated and reported for each method, matrix, and analyte combination. The number of valid results divided by the number of possible individual analyte results, expressed as a percentage, determines the completeness of the data set. For completeness requirements, valid results are all results not qualified with a rejected (R) flag. The requirement of completeness is 95 percent for samples and is determined using the following equation:

$$\% \text{ completeness} = 100 \times (\text{number of valid analyte results/number of possible results})$$

COMPARABILITY

Comparability is the degree to which different methods or data agree or can be represented as similar. It describes the confidence that two data sets can contribute to a common analysis and interpolation. The use of standardized field and analytical procedures ensures comparability of analytical results. Sample collection and handling procedures will adhere to EPA-approved protocols. Laboratory procedures will follow standard analytical protocols, use standard units and standardized report formats, follow the calculations as referenced in approved analytical methods, and use a standard statistical approach for QC measurements.

SENSITIVITY

Sensitivity is the ability of the method or instrument to detect the target analytes at the level of interest. The LOQ is the minimum concentration of an analyte that can be routinely identified and quantified above the DL by a laboratory. Sensitivity can be measured by calculating the percent recovery of the analytes at the LOQ. The project team should document the project-required LOQs for each matrix, analytical group, concentration level, and analyte.

REFERENCES

DoD (Department of Defense). 2013. Quality Systems Manual for Environmental Laboratories. Version 5.0. July.

EPA (U.S. Environmental Protection Agency). 2000. Letter from Mr. P. Ramanauskas to Mr. T. Brent approving the 1999 Risk Screening document with request for No Further Action at SWMU 17, September.

——————. 2002. Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS. December.

——————. 2005. Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP). March.

——————. 2006a. EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, QAMS. May.

——————. 2006b. Guidance on Systematic Planning using the Data Quality Objectives Process, EPA QA/G-4, QAMS. February.

M-K (Morrison-Knudsen). 1999. Risk Screening Documentation for SWMU 17/04a and three other SWMUs, PCB Capacitor Burial – Pole Yard. December.

NEESA (Naval Energy and Environmental Support Activity). 1983. Initial Assessment Study of Naval Weapons Support Center, Crane, Indiana. NEESA 13-003. May.

SAIC (Science Applications International Corporation). 2001. Pole Yard Soil Sampling Analysis, Prepared for Environmental Protection Department Code 095, Crane Division, Naval Surface Warfare Center. May.

SEQ Vets (SEQ/Vets Remediation JV B). 2013. Final Work Plan Soil Excavation at SWMU-17, Polychlorinated Biphenyl (PCB) Capacitor Burial/Pole Yard, Naval Support Activity, Crane, Indiana. March.

Tetra Tech, Inc. (Tetra Tech). 2002. Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for PCB Capacitor Burial/Pole Yard, Solid Waste Management Unit (SWMU) 17, Naval Surface Warfare Center, Crane, Crane, Indiana. August.

——————. 2007. RFI Addendum Field Investigations at PCB Capacitor Burial/Pole Yard, October 2005, April 2006, May 2006, and October.2006 August.

——————. 2010. Field Investigation Report for Solid Waste Management Unit 17- Boggs Creek, Naval Support Activity (NSA) Crane, Crane, Indiana. September.

——————. 2011. Letter Report for Results of Additional Sampling and Analysis in SWMU 17 Boggs Creek [Segment 1, Ditch 3 (Segments 2 and 6), and Northwest Ditch], NSA Crane, Crane, Indiana. May.

——————. 2013. Final Interim Measures Work Plan (IMWP) for SWMU 17, NSA Crane, Crane, Indiana. March 5.

——————. 2015. Interim Measures Report for SWMU 17 – PCB Capacitor Burial/Pole Yard, Naval Support Activity Crane, Indiana. April. (Draft final, undergoing regulatory review).

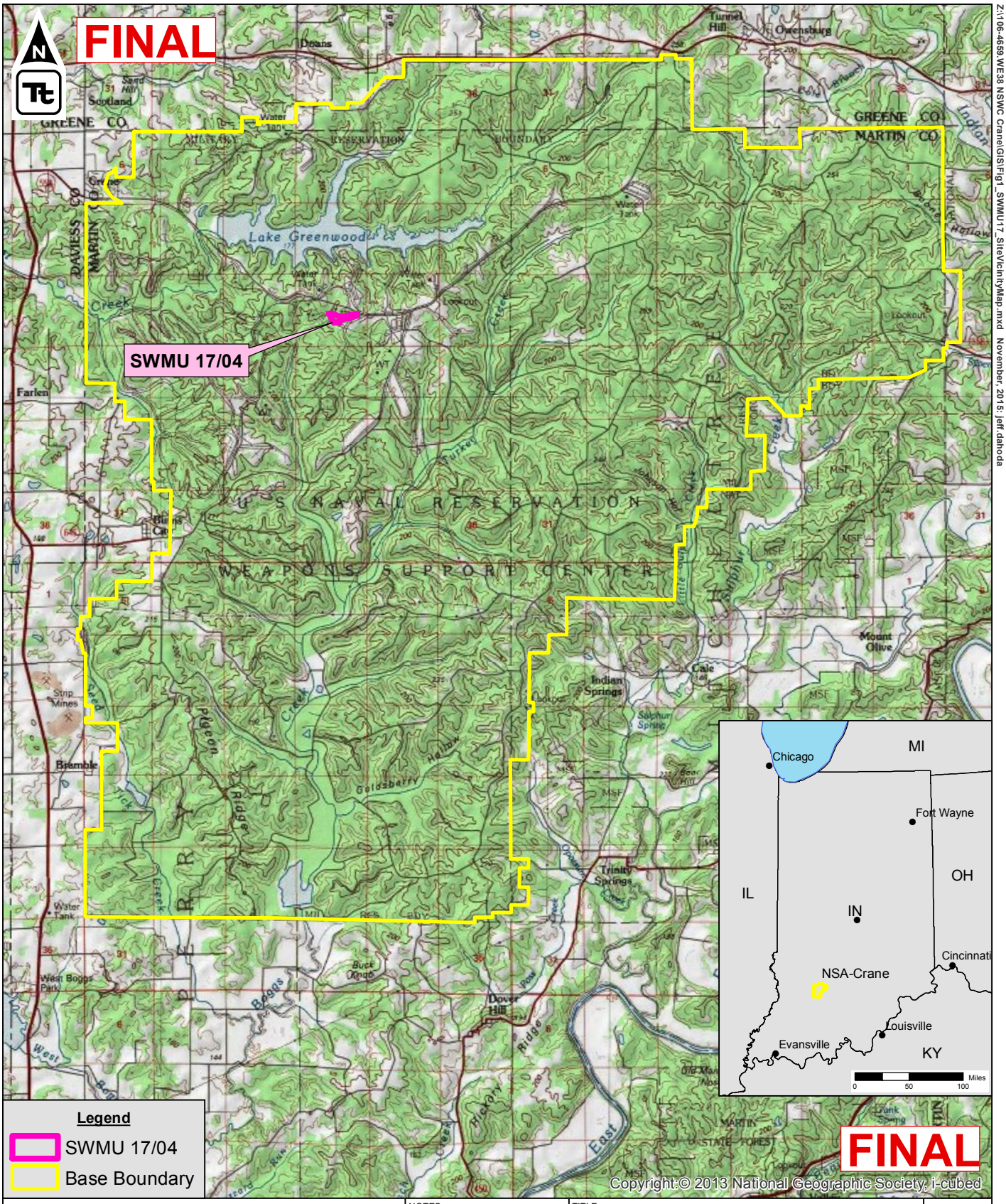
TolTest. 2004. Interim Measures Report, PCB Capacitor Burial Pole Yard Remediation, NSWC Crane, Crane, Indiana. November.

United States Fish and Wildlife Service (USFWS). Fish Tissue Report, August 2008 – Email from Mr. Daniel Sparks of USFWS to Mr. Tom Brent conveying results of fish tissue analysis, 13 August. 2008.

VRHK (VRHabilis-Kemron, LLC). 2014. Final Revision 1 Work Plan SWMU 17 - Phase II, Naval Support Activity Crane, Indiana. June.

FIGURES

This page intentionally left blank.



Z:\106-4659.WE38 NSWC Crane\GIS\Fig1_SWMU17_SiteVicinityMap.mxd November, 2015; jeff.dahoda

SCALE IN FEET
0 5,000 10,000

1 INCH = 10,000 FEET
(SCALE AT 8.5" X 11")
NAD 1983 STATEPLANE
INDIANA WEST FIPS 1302 FEET

NOTES:
1) Definitions:
- NSA = Naval Support Activity
- SWMU = Solid Waste Management Unit

TITLE:
SITE VICINITY MAP: SWMU 17/04
REMEDIAL ACTION WORK PLAN

A
REVISION

PREPARED FOR:
NAVFAC

PREPARED BY:
TETRA TECH EC, INC.
One Oxford Valley, Suite 200
Langhorne, Pennsylvania 19047
(215) 702-4000 (215) 702-4045 fax

PROJECT:
N62470-13-D-8007 LANT-RAC

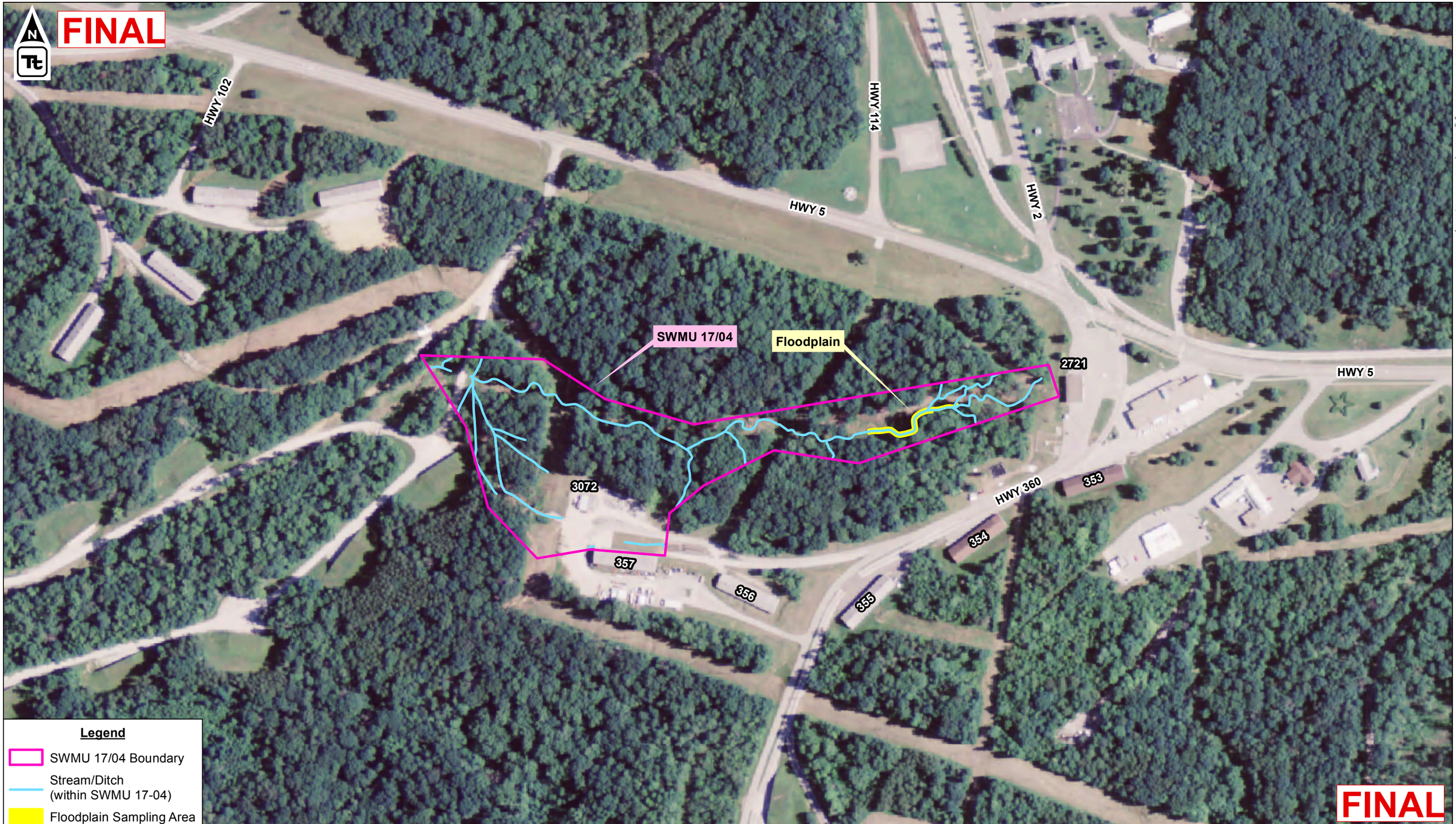
LOCATION:
NSA-CRANE, CRANE, INDIANA

PROJECT NO.:
106-4659

DATE:
11/2015

FIGURE:
Figure 1

This page intentionally left blank.



1 INCH = 300 FEET (SCALE AT 17" X 11")

SCALE IN FEET

0 300 600

NAD 1983 STATEPLANE INDIANA WEST
FIPS 1302 FEET

NOTES:
1) Imagery from the USDA National Agriculture Imagery Program (NAIP), 1-m resolution, 2014, via the ArcGIS Image Server.
2) Definitions:
- PCB = polychlorinated biphenyl (CAS 1336-36-3)
- NSA = Naval Support Activity
- SWMU = Solid Waste Management Unit

PREPARED FOR:
NAVFAC

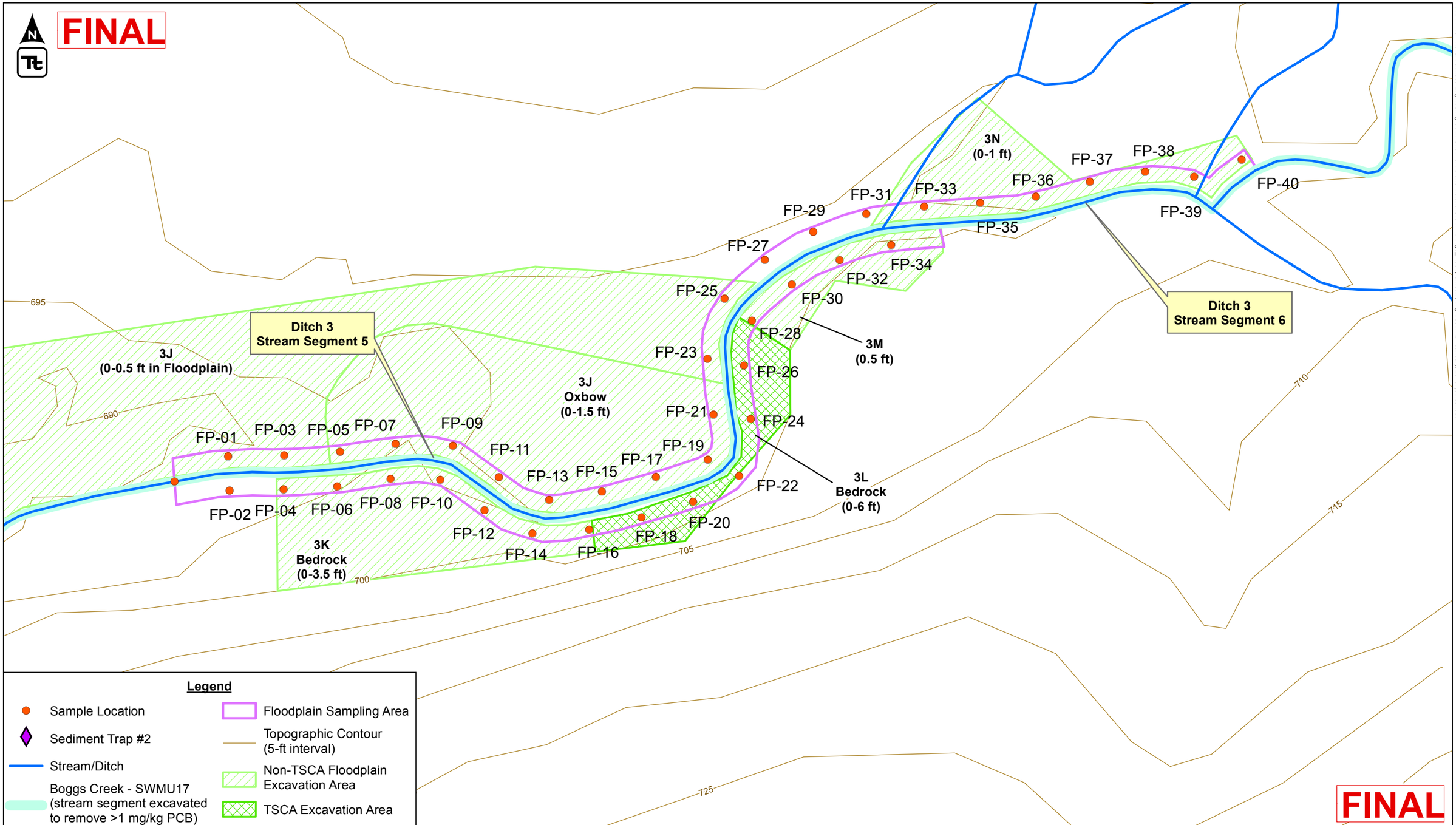
PREPARED BY:
TETRA TECH EC, INC.
One Oxford Valley, Suite 200
Langhorne, Pennsylvania 19047
(215) 702-4000 (215) 702-4045 fax

TITLE:
SITE LOCATION MAP
SWMU 17/04 - PCB CAPACITOR BURIAL/POLE YARD
REMEDIAL ACTION WORK PLAN

A
REVISION

PROJECT:	PROJECT NO.:	FIGURE:
N62470-13-D-8007 LANT-RAC	106-4659	Figure 2
LOCATION: NSA-CRANE, CRANE, INDIANA	DATE: 11/2015	

Z:\106-4659 WE38 NSWC Crane\GIS\Fig2_SiteLocMap.mxd November, 2015, jeff.dahoda



1 INCH = 25 FEET (SCALE AT 17" X 11")

SCALE IN FEET

0 25 50

NAD 1983 STATEPLANE INDIANA WEST
FIPS 1302 FEET

NOTES:
1) Definitions:
- PCB = polychlorinated biphenyl (CAS 1336-36-3)
- NSA = Naval Support Activity
- SWMU = Solid Waste Management Unit
- TSCA = Toxic Substances Control Act

PREPARED FOR:
NAVFAC

PREPARED BY:
TETRA TECH EC, INC.
One Oxford Valley, Suite 200
Langhorne, Pennsylvania 19047
(215) 702-4000 (215) 702-4045 fax

TITLE:
FLOODPLAIN SAMPLING AREA
SWMU 17/04 - PCB CAPACITOR BURIAL/POLE YARD
REMEDIAL ACTION WORK PLAN

A
REVISION

PROJECT:	PROJECT NO.:	FIGURE:
N62470-13-D-8007 LANT-RAC	106-4659	**Figure 3**
LOCATION: NSA-CRANE, CRANE, INDIANA	DATE: 11/2015	

P:\NAVFAC - Naval Facilities Engineering Command\NSA-Crane Indiana\GIS\MXD\Fig3_FloodplainSamplingArea.mxd January, 2016; jeff dahoda

ATTACHMENT 1

LABORATORY DOD ELAP ACCREDITATION

This page intentionally left blank.

Accredited Laboratory

A2LA has accredited

TESTAMERICA DENVER

Arvada, CO

for technical competence in the field of

Environmental Testing

In recognition of the successful completion of the A2LA evaluation process that includes an assessment of the laboratory's compliance with ISO/IEC 17025:2005, the 2009 TNI Environmental Testing Laboratory Standard, and the requirements of the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 5.0 of the DoD Quality System Manual for Environmental Laboratories (QSM), accreditation is granted to this laboratory to perform recognized EPA methods as defined on the associated A2LA Environmental Scope of Accreditation. This accreditation demonstrates technical competence for this defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION
CORPORATE SEAL 1978
DISTRICT OF COLUMBIA
A2LA

Presented this 14th day of December 2015.

President & CEO
For the Accreditation Council
Certificate Number 2907.01
Valid to October 31, 2017

For the tests to which this accreditation applies, please refer to the laboratory's Environmental Scope of Accreditation.

December 14, 2015

Margaret Sleevi
TestAmerica Denver
4955 Yarrow Street
Arvada CO 80002

Dear Ms. Sleevi:

Your laboratory has been approved for continued accreditation by the American Association for Laboratory Accreditation (A2LA) in the Environmental field of testing for the tests listed on the enclosed Scope of Accreditation. An A2LA Certificate numbered 2907.01 is enclosed and may be displayed in a prominent place in your facility. Your renewed Certificate and Scope of Accreditation have also been added to the searchable database of accredited laboratories contained on our website, www.A2LA.org.

Your laboratory is now accredited to ISO/IEC 17025:2005 through **October 31, 2017**, by virtue of the reassessment of your laboratory and an evaluation by the Accreditation Council of all activity related to this assessment and any recent proficiency testing results. One year prior to your accreditation expiration date, you must pay an annual review fee and submit updated information on your laboratory. This process will be initiated three months prior to the expected completion date to allow sufficient time for submittal of required information and fees. In addition, A2LA must be notified in writing within 30 days at any time that significant changes occur in your laboratory's location, ownership, management, authorized representative, primary contact or major facilities.

We hope that you have been enjoying the benefits of using your A2LA accreditation for promotional and advertising purposes. Such publicity strengthens our own public information program and leads to broader recognition and acceptance of A2LA accredited laboratories. A2LA has made the promotion of your A2LA Accreditation ***easy*** by providing you with helpful tips and advice in our '*A2LA Promotion of Accreditation Package*' brochure located on your CAB Portal. Please be sure to read this and also A2LA *R105 – Requirements When Making Reference to A2LA Accredited Status* to ensure you are maximizing the benefits of promoting your A2LA Accreditation. When promoting or providing proof of your accreditation, please use your Scope of Accreditation, as this document details the specific tests which are accredited. The certificate is to be used for display purposes only.

We are pleased that you have chosen to continue as an A2LA accredited laboratory.

Sincerely,

Peter S. Unger
President

Enclosures

Asst ID: 24277
Master Code: 131040
Cert No: Environmental (2907.01)

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

TESTAMERICA DENVER
4955 Yarrow Street
Arvada, CO 80002
Margaret S. Sleevi Phone: 303-736-0100
www.testamericainc.com

ENVIRONMENTAL

Valid To: October 31, 2017 Certificate Number: 2907.01

In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the laboratory's compliance with ISO IEC 17025:2005, the 2009 TNI Environmental Testing Laboratory Standard, the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 5.0 of the DoD Quality Systems Manual for Environmental Laboratories), and for the test methods applicable to the Wyoming Storage Tank Remediation Laboratory Accreditation Program, accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below:

Testing Technologies

Atomic Absorption/ICP-AES Spectrometry, ICP/MS, Gas Chromatography, Gas Chromatography/Mass Spectrometry, Gravimetry, High Performance Liquid Chromatography, Ion Chromatography, Misc.- Electronic Probes (pH, O_2), Oxygen Demand, Hazardous Waste Characteristics Tests, Spectrophotometry (Visible), Spectrophotometry (Automated), Titrimetry, Total Organic Carbon, Total Organic Halide

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
Metals				
Aluminum	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Antimony	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Arsenic	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Barium	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010 / 6020/6020A
Beryllium	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Boron	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Cadmium	EPA 6010C	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Calcium	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Chromium	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
Cobalt	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Copper	----------	----------	EPA 6010B/6010C/ 6020 /6020A	EPA 6010B/6010C/ 6020/6020A
Iron	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Lead	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Lithium	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Magnesium	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Manganese	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Mercury	----------	----------	EPA 7470A	EPA 7471A/7471B
Molybdenum	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Nickel	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Potassium	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Selenium	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Silica	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Silicon	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Silver	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Sodium	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Strontium	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Thallium	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Tin	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Titanium	----------	----------	EPA 6010B/6010C	EPA 6010B/6010C
Vanadium	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Zinc	----------	----------	EPA 6010B/6010C/ 6020/6020A	EPA 6010B/6010C/ 6020/6020A
Nutrients				
Nitrate (as N)	----------	By calculation	By calculation/EPA 9056/9056A/300.0	By calculation /EPA 9056/9056A
Nitrate-nitrite (as N)	----------	EPA 353.2	EPA 353.2/9056/ 9056A/300.0	EPA 9056/9056A
Nitrite (as N)	----------	SM 4500-NO2 B	SM 4500-NO2 B; EPA 9056/9056A/300.0	EPA 9056/9056A
Orthophosphate (as P)	----------	----------	EPA 9056/9056A/ 300.0	EPA 9056/9056A
~~Total Phosphorus~~	~~----------~~	~~----------~~	~~EPA 6010B/6010C~~	~~EPA 6010B/6010C~~
Demands	----------			
Total Organic Carbon	----------	----------	EPA 9060/9060A	EPA 9060/9060A
Total Organic Halides	----------	----------	EPA 9020B	----------

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
Wet Chemistry	----------			----------
Alkalinity (Total Bicarbonate, Carbonate, and Hydroxide Alkalinty)	----------	SM 2320 B_1997	SM 2320 B	SM 2320 B
Ammonia	----------	EPA 350.1	EPA 350.1	----------
Biological Oxygen Demand	----------	SM 5210B	SM 5210B	----------
Bromide	----------	----------	EPA 9056/9056A/ 300.0	EPA 9056/9056A
Chloride	----------	----------	EPA 9056/9056A/ 300.0	EPA 9056/9056A
Chemical Oxygen Demand	----------	EPA 410.4	EPA 410.4	----------
Conductivity	----------	----------	EPA 9050/9050A	EPA 9050/9050A
Cyanide	----------	----------	9012A/9012B	9012A/9012B
Ferrous iron	----------	SM 3500 Fe B, D	SM 3500 Fe B, D	----------
Fluoride	----------	----------	EPA 9056/9056A 300.0	EPA 9056/9056A
Hexavalent chromium	EPA 7196A	----------	EPA 7196A	----------
pH	----------	----------	EPA 9040B/9040C	EPA 9045C/9045D
Oil and Grease (HEM and SGT-HEM)	----------	----------	EPA 1664A/1664B	9071B
Percent moisture	----------	----------	----------	ASTM D2216
Perchlorate	----------	----------	EPA 6860	EPA 6860
Phenols	----------	----------	EPA 9066	
Solids, total	----------	SM 2540 B	SM 2540 B	SM 2540 B
Solids, Total Suspended	----------	SM 2540 D	SM 2540 D	SM 2540 D
Solids, Total Dissolved	----------	SM 2540 C	SM 2540 C	SM 2540 C
Sulfate	----------	----------	EPA 9056/9056A/ 300.0	EPA 9056/9056A
Sulfide, total	----------	----------	EPA 9034	EPA 9034
Sulfide	----------	----------	EPA 9030B	EPA 9030B
Total Kjeldahl Nitrogen	----------	----------	EPA 351.2	----------
Purgeable Organics (volatiles)				----------
Acetone	----------	----------	EPA 8260B	EPA 8260B
Acetonitrile	----------	----------	EPA 8260B	EPA 8260B
Acrolein	----------	----------	EPA 8260B	EPA 8260B
Acrylonitrile	----------	----------	EPA 8260B	EPA 8260B
Allyl Chloride	----------	----------	EPA 8260B	EPA 8260B
tert-Amyl Methyl Ether	EPA 8260B			
Benzene	EPA 8260B/ 8021B	----------	EPA 8260B/8021B/ AK101/OK DEQ	EPA 8260B/8021B/ AK101/OK DEQ
			GRO/8260B SIM	GRO
Bromobenzene	----------	----------	EPA 8260B	EPA 8260B
Bromochloromethane	----------	----------	EPA 8260B	EPA 8260B
Bromodichloromethane	----------	----------	EPA 8260B	EPA 8260B
Bromoform	----------	----------	EPA 8260B	EPA 8260B
Bromomethane	----------	----------	EPA 8260B	EPA 8260B
2-Butanone	----------	----------	EPA 8260B	EPA 8260B

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
n-Butyl alcohol	----------	----------	EPA 8260B/8015B/ 8015C	EPA 8260B/8015B/ 8015C
tert-Butyl alcohol (2-Methyl-2-propanol)	EPA 8260B		EPA 8260B/8260B SIM	EPA 8260B
n-Butylbenzene	----------	----------	EPA 8260B	EPA 8260B
sec-Butylbenzene	----------	----------	EPA 8260B	EPA 8260B
tert-Butylbenzene	----------	----------	EPA 8260B	EPA 8260B
Carbon disulfide	----------	----------	EPA 8260B	EPA 8260B
Carbon tetrachloride	----------	----------	EPA 8260B	EPA 8260B
Chlorobenzene	----------	----------	EPA 8260B/8021B	EPA 8260B/8021B
2-Chloro-1,3-butadiene	----------	----------	EPA 8260B	EPA 8260B
Chloroethane	----------	----------	EPA 8260B	EPA 8260B
2-Chloroethyl vinyl ether	----------	----------	EPA 8260B	EPA 8260B
Chloroform	----------	----------	EPA 8260B	EPA 8260B
1-Chlorohexane	----------	----------	EPA 8260B	EPA 8260B
Chloromethane	----------	----------	EPA 8260B	EPA 8260B
Chloroprene	----------	----------	EPA 8260B	EPA 8260B
4-Chlorotoluene	----------	----------	EPA 8260B	EPA 8260B
2-Chlorotoluene	----------	----------	EPA 8260B	EPA 8260B
Cyclohexane	----------	----------	EPA 8260B	EPA 8260B
Cyclohexanone	----------	----------	EPA 8260B	EPA 8260B
Dibromochloromethane	----------	----------	EPA 8260B	EPA 8260B
1,2-Dibromo-3-chloropropane (DBCP)	----------		EPA 8260B/8011	EPA 8260B/8011
Dibromochloromethane	----------	----------	EPA 8260B	EPA 8260B
Dichlorodifluoromethane	----------	----------	EPA 8260B	EPA 8260B
Dibromomethane	----------	----------	EPA 8260B	EPA 8260B
1,2 Dibromoethane (EDB)	EPA 8011		EPA 8260B/8011	EPA 8260B/8011
1,2-Dichlorobenzene	----------	----------	EPA 8260B/8021B	EPA 8260B/8021B
1,3-Dichlorobenzene	----------	----------	EPA 8260B/8021B	EPA 8260B/8021B
1,4-Dichlorobenzene	----------	----------	EPA 8260B/8021B	EPA 8260B/8021B
cis-1,4-Dichloro-2-butene	----------	----------	EPA 8260B	EPA 8260B
trans-1,4-Dichloro-2-butene	----------	----------	EPA 8260B	EPA 8260B
1,1-Dichloroethane	----------	----------	EPA 8260B	EPA 8260B
1,2-Dichloroethane	----------	----------	EPA 8260B	EPA 8260B
1,1-Dichloroethene	----------	----------	EPA 8260B	EPA 8260B
1,2-Dichloroethene	----------	----------	EPA 8260B	EPA 8260B
cis-1,2-Dichloroethene	----------	----------	EPA 8260B	EPA 8260B
trans-1,2-Dichloroethene	----------	----------	EPA 8260B	EPA 8260B
Dichlorofluoromethane	----------	----------	EPA 8260B	EPA 8260B
1,2-Dichloropropane	----------	----------	EPA 8260B	EPA 8260B
1,3-Dichloropropane	----------	----------	EPA 8260B	EPA 8260B
2,2-Dichloropropane	----------	----------	EPA 8260B	EPA 8260B
1,1-Dichloropropene	----------	----------	EPA 8260B	EPA 8260B
1,3-Dichloropropene	----------	----------	EPA 8260B	EPA 8260B
cis-1,3-Dichloropropene	----------	----------	EPA 8260B	EPA 8260B
trans-1,3-Dichloropropene	----------	----------	EPA 8260B	EPA 8260B
Diethyl ether	----------	----------	EPA 8260B	EPA 8260B
Di-isopropylether	----------	----------	EPA 8260B	EPA 8260B
1,4-Dioxane	----------	----------	EPA 8260B/8260B SIM	EPA 8260B/8260B SIM

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
Ethanol	----------	----------	EPA 8260B/8015B/ 8015C	EPA 8260B/8015B/ 8015C
Ethyl acetate	----------	----------	EPA 8260B	EPA 8260B
Ethyl benzene	EPA 8260B/8021B	----------	EPA 8260B/8021B/ AK101/OK DEQ GRO	EPA 8260B/8021B/ AK101/OK DEQ GRO
Ethyl methacrylate	----------	----------	EPA 8260B	EPA 8260B
Ethyl tert-butyl ether	EPA 8260B	----------	----------	----------
Ethylene glycol	----------	----------	EPA 8015C	EPA 8015C
Gas Range Organics (GRO)	EPA 8015C	----------	EPA 8015B/8015C/ AK101/8015D/ OK DEQ GRO	EPA 8015B/8015C/ AK101/8015D/ OK DEQ GRO
Hexane	----------	----------	EPA 8260B	EPA 8260B
2-Hexanone	----------	----------	EPA 8260B	EPA 8260B
Hexachlorobutadiene	----------	----------	EPA 8260B	EPA 8260B
Isobutyl alcohol (2-Methyl-1-propanol)	----------	----------	EPA 8260B/8015B/ 8015C	EPA 8260B/8015B/ 8015C
Isopropyl alcohol	----------	----------	EPA 8260B	EPA 8260B
Isopropylbenzene	----------	----------	EPA 8260B	EPA 8260B
1,4-Isopropyltoluene	----------	----------	EPA 8260B	EPA 8260B
Iodomethane	----------	----------	EPA 8260B	EPA 8260B
Methacrylonitrile	----------	----------	EPA 8260B	EPA 8260B
Methanol	----------	----------	EPA 8015B/8015C	EPA 8015B/8015C
Methyl acetate	----------	----------	EPA 8260B	EPA 8260B
Methyl cyclohexane	----------	----------	EPA 8260B	EPA 8260B
Methylene chloride	----------	----------	EPA 8260B	EPA 8260B
Methyl ethyl ketone (MEK)	----------	----------	EPA 8260B	EPA 8260B
Methyl isobutyl ketone	----------	----------	EPA 8260B	EPA 8260B
Methyl methacrylate	----------	----------	EPA 8260B	EPA 8260B
Methyl tert-butyl ether (MtBE)	EPA 8260B/ 8021B	----------	EPA 8260B/8021B/ OK DEQ GRO	EPA 8260B/8021B/ OK DEQ GRO
4-Methyl-2-pentanone	----------	----------	EPA 8260B	EPA 8260B
Naphthalene	EPA 8260B/ 8021B	----------	EPA 8260B/OK DEQ GRO	EPA 8260B/OK DEQ GRO
2-Nitropropane	----------	----------	EPA 8260B	EPA 8260B
2,2' Oxybisethanol	----------	----------	EPA 8015C	EPA 8015C
2-Pentanone	----------	----------	EPA 8260B	EPA 8260B
Propionitrile	----------	----------	EPA 8260B	EPA 8260B
n-Propylbenzene	----------	----------	EPA 8260B	EPA 8260B
Propylene glycol	----------	----------	EPA 8015C	EPA 8015C
Styrene	----------	----------	EPA 8260B	EPA 8260B
1,1,1,2-Tetrachloroethane	----------	----------	EPA 8260B	EPA 8260B
1,1,2,2-Tetrachloroethane	----------	----------	EPA 8260B	EPA 8260B
Tetrachloroethene	----------	----------	EPA 8260B	EPA 8260B
Tetrahydrofuran	----------	----------	EPA 8260B	EPA 8260B
Toluene	EPA 8260B/ 8021B	----------	EPA 8260B/8021B/ AK101/OK DEQ GRO	EPA 8260B/8021B/ AK101/OK DEQ GRO
Total Petroleum Hydrocarbons (TPH)	----------	EPA 1664A/ 1664B	EPA 1664A/1664B	----------

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
1,2,3-Trichlorobenzene	----------	----------	EPA 8260B	EPA 8260B
1,1,1-Trichloroethane	----------	----------	EPA 8260B	EPA 8260B
1,1,2-Trichloroethane	----------	----------	EPA 8260B	EPA 8260B
Trichloroethene	----------	----------	EPA 8260B/8260B SIM	EPA 8260B
Trichlorofluoromethane	----------	----------	EPA 8260B	EPA 8260B
1,2,3-Trichlorobenzene	----------	----------	EPA 8260B	EPA 8260B
1,2,4-Trichlorobenzene	----------	----------	EPA 8260B	EPA 8260B
1,2,3-Trichloropropane	----------		EPA 8260B/8011	EPA 8260B/8011
1,1,2-Trichloro-1,2,2-trifluoroethane	----------	----------	EPA 8260B	EPA 8260B
Triethylene glycol	----------	----------	EPA 8015C	EPA 8015C
1,2,3-Trimethylbenzene	----------	----------	EPA 8260B	EPA 8260B
1,2,4-Trimethylbenzene	----------	----------	EPA 8260B	EPA 8260B
1,3,5-Trimethylbenzene	----------	----------	EPA 8260B	EPA 8260B
Vinyl acetate	----------	----------	EPA 8260B	EPA 8260B
Vinyl chloride	----------	----------	EPA 8260B/8260B SIM	EPA 8260B
Xylenes, total	EPA 8260B/ 8021B	----------	EPA 8260B/8021B/ AK101/OK DEQ GRO	EPA 8260B/8021B/ AK101/OK DEQ GRO
1,2-Xylene	EPA 8260B/ 8021B	----------	EPA 8260B/8021B/ AK101/OK DEQ GRO	EPA 8260B/8021B/ AK101/OK DEQ GRO
M+P-Xylene	EPA 8260B/ 8021B	----------	EPA 8260B/8021B/ AK101/OK DEQ GRO	EPA 8260B/8021B/ AK101/ K DEQ GRO
Methane	----------	----------	RSK-175	----------
Ethane	----------	----------	RSK-175	----------
Ethylene (Ethene)	----------	----------	RSK-175	----------
Acetylene	----------	----------	RSK-175	----------
Acetylene ethane	----------	----------	RSK-175	----------
Extractable Organics (semivolatiles)	----------			
Acenaphthene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Acenaphthylene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Acetophenone	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2-Acetylaminofluorene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Alachlor	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
4-Aminobiphenyl	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Aniline	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Anthracene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Aramite	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Atrazine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Azobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Benzaldehyde	----------	----------	EPA 8270C 8270D	EPA 8270C/8270D
Benzidine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Benzoic acid	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
Benzo (a) anthracene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Benzo (b) fluoranthene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Benzo (k) fluoranthene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Benzo (ghi) perylene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Benzo (a) pyrene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Benzyl alcohol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
bis (2-Chloroethoxy) methane	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
bis (2-Chloroethyl) ether	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
bis (2-Chloroisopropyl) ether (2,2'Oxybis(1-chloropropane)	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
bis (2-Ethylhexyl) phthalate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
4-Bromophenyl phenyl ether	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
butyl Benzyl phthalate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2-sec-butyl-4,6-Dinitrophenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Carbazole	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
4-Chloroanilene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Chlorobenzilate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
4-chloro-3-Methylphenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1-Chloronaphthalene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2-Chloronaphthalene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2-Chlorophenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
4-Chlorophenyl phenyl ether	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Chrysene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Cresols	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Diallate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Dibenzo (a,h) anthracene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Dibenzofuran	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1,2-Dichlorobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1,3-Dichlorobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1,4-Dichlorobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
3,3'-Dichlorobenzidine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2,4-Dichlorophenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2,6-Dichlorophenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Diethyl phthalate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Dimethoate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
3,3-Dimethylbenzidine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
p-Dimethylaminoazobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
7,12-Dimethylbenz(a)anthracene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
alpha-,alpha-Dimethylphenethylamine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2,4-Dimethylphenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Dimethyl phthalate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
di-n-butyl Phthalate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
di-n-octyl Phthalate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1,3-Dinitrobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1,4-Dinitrobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2,4-Dinitrophenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2,4-Dinitrotoluene	----------	----------	EPA 8270C/8270D	EPA 8270 C/8270D
2,6-Dinitrotoluene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1,4-Dioxane	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Diphenylamine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1,2-Diphenylhydrazine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Disulfoton	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Diesel Range Organics (DRO)	EPA 8015C (WY: C10-C32)	----------	EPA 8015B/8015C, AK102/8015D/OK DEQ DRO	EPA 8015B/8015C, AK102/8015D/OK DEQ DRO
ethyl Methanesulfonate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Famphur	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Fluoroanthene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Fluorene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Hexachlorobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Hexachlorobutadiene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Hexachlorocyclopentadiene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Hexachloroethane	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Hexachloropropene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Indeno (1,2,3-cd) pyrene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Isodrin	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Isophorone	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Isosafrole	----------	----------	EPA 8270C/8270D	EPA 8270 C/8270D
Methapyrilene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
3-Methylcholanthrene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2-methyl-4,6-Dinitrophenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
methyl Methane sulfonate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1-Methylnaphthalene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
2-Methylnaphthalene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
2-Methylphenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
3+4-Methylphenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Naphthalene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
1,4-Naphthoquinone	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1-Naphthylamine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2-Naphthylamine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2-Nitroaniline	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
3-Nitroaniline	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
4-Nitroaniline	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Nitrobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2-Nitrophenol	----------	----------	EPA 8270C /8270D	EPA 8270C/8270D
4-Nitrophenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Nitroquinoline-1-oxide	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
N-Nitrosodiethylamine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
N-Nitrosodimethylamine	----------	----------	EPA 8270C/8270D/ 8270D SIM	EPA 8270C/8270D/ 8270D SIM
N-Nitrosodi-n-butylamine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
N-Nitrosodi-n-propylamine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
N-Nitrosodiphenylamine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
N-Nitrosomethylethylamine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
N-Nitrosomorpholine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
N-Nitrosopiperidine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
N-Nitrosopyrrolidine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
5-nitro-o-Toluidine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2,2-oxybis(1-chloropropane)	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Parathion, methyl	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Parathion, ethyl	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Pentachlorobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Pentachloroethane	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Pentachloronitobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Pentachlorophenol	----------	----------	EPA 8270C/8270D/ 8321A/8321B	EPA 8270C/8270D/ 8321A/8321B
Phenacetin	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Phenanthrene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Phenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Phorate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2-Picoline	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Pronamide	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Pyrene	----------	----------	EPA 8270C/8270D/ 8270SIM	EPA 8270C/8270D/ 8270SIM
Pyridine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Safrole	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Sulfotepp	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1,2,4,5-Tetrachlorobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2,3,4,6-Tetrachlorophenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Thionazin	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
o-Toluidine	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1,2,4-Trichlorobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2,4,5-Trichlorophenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
2,4,6-Trichlorophenol	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
o,o,o-triethyl Phosphorothioate	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
1,3,5-Trinitrobenzene	----------	----------	EPA 8270C/8270D	EPA 8270C/8270D
Motor Oil (Residual Range Organics)	----------	----------	EPA 8015B/8015C/ 8015D, AK103/OK DEQ RRO	EPA 8015B/ 8015C/ 8015D, AK103/ OK DEQ RRO

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
Pesticides/Herbicides/PCBs				
Aldrin	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Atrazine	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Azinophos ethyl	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Azinophos methyl	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
alpha-BHC	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
beta-BHC	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
delta-BHC	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
gamma-BHC	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Bolstar	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
alpha-Chlordane	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
gamma-Chlordane	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Chlordane (technical)	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Chloropyrifos	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Coumaphos	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
2,4-D	----------	----------	EPA 8151A/8321A	EPA 8151A/8321A
Dalapon	----------	----------	EPA 8151A/8321A	EPA 8151A/8321A
2,4-DB	----------	----------	EPA 8151A/8321A	EPA 8151A/8321A
4,4'-DDD	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
4,4'-DDE	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
4,4'-DDT	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Demeton-O	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Demeton-S	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Demeton, total	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Diazinon	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Dicamba	----------	----------	EPA 8151A/8321A	EPA 8151A/8321A
Dichlorovos	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Dichloroprop	----------	----------	EPA 8151A/8321A	EPA 8151A/8321A
Dieldrin	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Dimethoate	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Dinoseb	----------	----------	EPA 8151A/8321A	EPA 8321A
Disulfoton	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Endosulfan I	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Endosulfan II	----------	----------	EPA 8081A /8081B	EPA 8081A/8081B
Endonsulfan sulfate	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Endrin	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Endrin aldehyde	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Endrin ketone	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
EPN	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Ethoprop	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Ethyl Parathion	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Famphur	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Fensulfothion	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Fenthion	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
Heptachlor	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Heptachlor epoxide	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Hexachlorobenzene	----------	----------	EPA 8081A/8081B	EPA 8081A/8081B
Malathion	----------	----------	EPA 8141A/8141B	EPA 8141A/8141B
MCPA	----------	----------	EPA 8151A/8321A	EPA 8151A/8321A

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
MCPP	----------	----------	EPA 8151A /8321A	EPA 8151A/8321A
Merphos	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
Methoxychlor	----------	----------	EPA 8081A /8081B	EPA 8081A/8081B
Methyl parathion	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
Mevinphos	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
Naled	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
PCB-1016 (Arochlor)	----------	----------	EPA 8082 /8082A	EPA 8082/8082A
PCB-1221	----------	----------	EPA 8082 /8082A	EPA 8082/8082A
PCB-1232	----------	----------	EPA 8082 /8082A	EPA 8082/8082A
PCB-1242	----------	----------	EPA 8082 /8082A	EPA 8082/8082A
PCB-1248	----------	----------	EPA 8082 /8082A	EPA 8082/8082A
PCB-1254	----------	----------	EPA 8082 /8082A	EPA 8082/8082A
PCB-1260	----------	----------	EPA 8082 /8082A	EPA 8082/8082A
PCB-1262	----------	----------	EPA 8082 /8082A	EPA 8082/8082A
PCB-1268	----------	----------	EPA 8082 /8082A	EPA 8082/8082A
Total PCBs	----------	----------	EPA 8082 /8082A	EPA 8082/8082A
Phorate	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
Phosmet	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
Propazine	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
Ronnel	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
Simazine	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
Stirophos	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
Sulfotepp	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
2,4,5-T	----------	----------	EPA 8151A /8321A	EPA 8151A/8321A
Thionazin	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
Tokuthion	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
2,4,5-TP	----------	----------	EPA 8151A /8321A	EPA 8151A/8321A
Toxaphene	----------	----------	EPA 8081A /8081B	EPA 8081A/8081B
Trichloronate	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
o,o,o-triethylphos Phorothioate	----------	----------	EPA 8141A /8141B	EPA 8141A/8141B
Explosives				
1,3,5-Trinitrobenzene	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
1,3-Dinitrobenzene	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
2,4,6-Trinitrotoluene	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
3,5-Dinitroaniline	----------	----------	EPA 8330B	EPA 8330B
2,4-Dinitrotoluene	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
2,6-Dinitroltoluene	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
2-amino-4,6-Dinitrotoluene	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
2-Nitrotoluene	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
3-Nitrotoluene	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
4-amino-2,6-Dinitrotoluene	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
4-Nitrotoluene	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
Nitrobenzene	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
Nitroglycerin	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
octahydro-1,3,5,7-tetrabitro-1,3,5,7-Tetrazocine (HMX)	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
Pentaerythritoltetranitrate (PETN)	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
Picric acid	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
RDX (hexahydro-1,3,5-trinitro-1,3,5-Triazine)	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
Tetryl (methyl 2,4,6-Trinitrophenylnitramine	----------	----------	EPA 8330A/8330B/ 8321A/8321B	EPA 8330A/8330B/ 8321A/8321B
Perfluorinated Hydrocarbons (PFCs) and Perfluorinated Sulfonates (PFSs)				
Perfluorobutanoic acid	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluoropentanoic acid	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorohexanoic acid	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluoroheptanoic acid	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorooctanoic acid	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorononanoic acid	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorodecanoic acid	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluoroundecanoic acid	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorododecanoic acid	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorotridecanoic acid	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorotetradecanoic acid	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorobutane sulfonate	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorohexane sulfonate	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorooctane sulfonate	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorodecane sulfonate	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Perfluorooctane sulfonamide	----------	SOP DV-LC-0012	SOP DV-LC-0012	SOP DV-LC-0012
Hazardous Waste Characteristics				
Conductivity	----------	----------	EPA 9050A	EPA 9050A
Corrosivity	----------	----------	EPA 9040B/9040C	EPA 9045C/9045D
Ignitibility	----------	EPA 1010/1010A	EPA 1010/1010A	EPA 1010/1010A
Paint filter liquids test	----------	----------	EPA 9095A	EPA 9095A
Synthetic Precipitation Leaching Procedure (SPLP)	----------	----------	EPA 1312	EPA 1312
Toxicity Characteristic Leaching Procedure	----------	----------	EPA 1311	EPA 1311

Parameter/Analyte	WY Storage Tank Program	Non-Potable Water	Solid Hazardous Waste (Water)	Solid Hazardous Waste (Solid)
Organic Prep Methods				
Separatory funnel liquid-liquid extraction	----------	----------	EPA 3510C	----------
Continuous liquid-liquid extraction	----------	----------	EPA 3520C	----------
Soxhlet extraction	----------	----------	----------	EPA 3540C
Microwave extraction	----------	----------	----------	EPA 3546
Ultrasonic extraction	----------	----------	----------	EPA 3550B/3550C
Waste dilution	----------	----------	EPA 3580A	EPA 3580A
Solid phase extraction	----------	----------	EPA 3535A	----------
Volatiles purge and trap	----------	----------	EPA 5030B	EPA 5030A/5035A/ 5035
Organic Cleanup Procedures				
Florisil cleanup	----------	----------	EPA 3620B	EPA 3620B
Florisil cleanup	----------	----------	EPA 3620C	EPA 3620C
Sulfur cleanup			EPA 3660A	EPA 3660A
Sulfuric acid/Permanganate cleanup	----------	----------	EPA 3665A	EPA 3665A
Metals Digestion				
Acid digestion total recoverable or dissolved metals	----------	----------	EPA 3005A	----------
Acid digestion for total metals	----------	----------	EPA 3010A	----------
Acid digestion for total metals	----------	----------	EPA 3020A	----------
Acid digestion of sediments, sludges and soils	----------	----------	----------	EPA 3050B

Joint ISO-ILAC-IAF Communiqué **8 January 2009**

ILAC members will be aware that many of their accredited laboratories have been experiencing difficulty convincing their customers they should be asking laboratories to be accredited to ISO/IEC 17025, (prior to 1999 ISO Guide 25) rather than be certified (registered) to ISO 9001. The situation became more acute with the publication of ISO 9001:2008, as some customers continually asked laboratories to be certified, when they really meant accredited. The confusion is caused by the perception that accredited laboratories do not operate a recognised quality management system.

To address this problem the ILAC Laboratory Committee asked that a statement be put on accreditation (attestation) certificates, issued by their accreditation body, stating that an accredited laboratory's management system meets the principles of ISO 9001:2008. The same statement could also be used by accredited laboratories on their calibration certificates and test reports.

Working through the ISO-ILAC-IAF Joint Working Group (JWG), ILAC is pleased to be able to advise it's member accreditation bodies that the problem raised by the Laboratory Committee may now be addressed as follows:-

On accreditation (attestation) certificates, accreditation bodies may add the following:

"This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated January 2009)"

Accreditation Bodies choosing to use the above statement on their accreditation certificates should either supply, or provide access to (via a website), the Joint ISO-ILAC-IAF Communiqué as part of the package. (It may be convenient for accreditation bodies to do this when they issue new accreditation certificates for ISO/IEC 17025:2005 to their accredited laboratories.)

Accredited laboratories choosing to use the above statement on their test reports and calibration certificates should also either supply, or provide access to (via a website), the Joint ISO-ILAC-IAF Communiqué as part of the package for their laboratory customers.

The Joint Communiqué is available on the ILAC website at www.ilac.org on the publications and resources page.

The ILAC Laboratory Committee thanks the members of the ILAC and IAF Executive Committees and the ISO-ILAC-IAF JWG, for developing a solution to a critical market issue facing some accredited laboratories.

Daniel Pierre, ILAC Chair

Joint IAF-ILAC-ISO Communiqué
on the
Management Systems Requirements of ISO/IEC 17025:2005,
General requirements for the competence of testing and calibration laboratories

A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and **management system requirements** that are necessary for it to consistently deliver technically valid test results and calibrations. The **management system requirements** in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 **Quality Management Systems — Requirements** and are aligned with its pertinent requirements.

IAF Chair	**ILAC Chair**	**ISO Secretary General**

January 2009

This page intentionally left blank.