QUALITY ASSURANCE PROJECT PLAN
Cabo Rojo Site
Cabo Rojo, Puerto Rico
Revision 2

Prepared for:
United States Environmental Protection Agency/Environmental Response Team
Edison, NJ

By:
Lockheed Martin/Scientific, Engineering, Response and Analytical Service (SERAS)
Work Assignment Number: SERAS-130

Based on the Intergovernmental Data Quality Task Force Uniform
Federal Policy for Quality Assurance Project Plans
(Final Version 1.1, June 2006)

March 12, 2013

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QAPP Worksheet #1
Title and Approval Page

Site Name/Project Name: Cabo Rojo
Site Location: Cabo Rojo, Puerto Rico

Document Title: Quality Assurance Project Plan for the Cabo Rojo Site

Lead Organization: Environmental Protection Agency/Environmental Response Team (EPA/ERT)

Preparer's Name and Organizational Affiliation: Jon McBurney - Lockheed Martin/Scientific Engineering Response Analytical Service (SERAS). Revision 1&2-Philip Solinski Lockheed Martin/SERAS

Preparer's Address, Telephone Number, and E-mail Address: 2890 Woodbridge Avenue, Edison, NJ 08837, (732)321-4244, jonathan.d.mcburney@lmco.com Revision 1 - 2890 Woodbridge Avenue, Edison, NJ 08837, (732)321-4283, philip,j.solinski@lmco.com

Preparation Date (Day/Month/Year): June 6, 2011. Revision 1 – February 27, 2012. Revision 2 - March 12, 2013.

Investigative Organization's Project Manager/Date: 3/18/13
Signature
Printed Name/Organization: Jeff Catanzarita/ERT Work Assignment Manager

Investigative Organization's Project QA Officer/Date: 3/13/13
Signature
Printed Name/Organization: Stephen Blaze/ERT Quality Coordinator

Lead Organization's Project Manager/Date:
Signature
Printed Name/Organization: Philip Solinski/SERAS Task Leader

Approval Signatures/Date: 3/12/13
Signature
Printed Name/Title: Deborah A. Killeen/SERAS QA/QC Officer

Approval Authority: Lockheed Martin/SERAS

Other Approval Signatures/Date: 3/13/13
Signature
Printed Name/Title: Dennis A. Miller/SERAS Program Manager

Document Control Numbering System: SERAS-130-DQAPPR2-031213

QAPP Worksheet #2
QAPP Identifying Information

Site Name/Project Name: Cabo Rojo
Site Location: Cabo Rojo, Puerto Rico
Site Number/Code: A244
Operable Unit:
Contractor Name: Lockheed Martin
Contractor Number: EP-W-09-031

Contract Title: SERAS
Work Assignment Number: SERAS-130

1. Identify regulatory program: Comprehensive Environmental Response and Compensation Liability Act (CERCLA)

2. Identify approval entity: EPA/ERT

3. The QAPP is (select one): ☐Generic ☒Project Specific

4. List dates of scoping sessions that were held: April 20, 2011, February 23, 2012 and February, 26, 2013.

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

Title	Approval Date
Quality Assurance Project Plan, Cabo Rojo Site,Cabo Rojo, Puerto Rico SERAS document number SERAS-0130-DQAPP-060611	06/06/2011
Quality Assurance Project Plan - Revision 1, Cabo Rojo Site,Cabo Rojo, Puerto Rico SERAS document number SERAS-0130-DQAPPR1-022712	02/27/2012

6. List organizational partners (stakeholders) and connection with lead organization:
   EPA Region 2

7. List data users:
   EPA Region 2

8. If any required QAPP elements and required information are not applicable to the project, then circle the omitted QAPP elements and required information on the attached table. Provide an explanation for their exclusions below:

   Worksheet 37 is not applicable. EPA Region II will decide the usability of project data.

QAPP Worksheet #2
QAPP Identifying Information
(Continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
Project Management and Objectives		
2.1 Title and Approval Page	- Title and Approval Page	1
2.2 Document Format and Table of Contents 2.2.1 Document Control Format 2.2.2 Document Control Numbering System 2.2.3 Table of Contents 2.2.4 QAPP Identifying Information	- Table of Contents - QAPP Identifying Information	2
2.3 Distribution List and Project Personnel Sign-Off Sheet 2.3.1 Distribution List 2.3.2 Project Personnel Sign-Off Sheet	- Distribution List - Project Personnel Sign-Off Sheet	3 4
2.4 Project Organization 2.4.1 Project Organizational Chart 2.4.2 Communication Pathways 2.4.3 Personnel Responsibilities and Qualifications 2.4.4 Special Training Requirements and Certification	- Project Organizational Chart - Communication Pathways - Personnel Responsibilities and Qualifications Table - Special Personnel Training Requirements Table	5 6 7 8
2.5 Project Planning/Problem Definition 2.5.1 Project Planning (Scoping) 2.5.2 Problem Definition, Site History, and Background	- Project Planning Session Documentation (including Data Needs tables) - Project Scoping Session Participants Sheet - Problem Definition, Site History, and Background - Site Maps (historical and present)	9 10
2.6 Project Quality Objectives and Measurement Performance Criteria 2.6.1 Development of Project Quality Objectives Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	- Site-Specific PQOs - Measurement Performance Criteria Table	11 12

QAPP Worksheet #2
QAPP Identifying Information
(continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
2.7 Secondary Data Evaluation	- Sources of Secondary Data and Information - Secondary Data Criteria and Limitations Table	13
2.8 Project Overview and Schedule 2.8.1 Project Overview 2.8.2 Project Schedule	- Summary of Project Tasks - Reference Limits and Evaluation Table - Project Schedule/Timeline Table	14 15 16
Measurement/Data Acquisition		
3.1 Sampling Tasks 3.1.1 Sampling Process Design and Rationale 3.1.2 Sampling Procedures and Requirements 3.1.2.1 Sampling Collection Procedures 3.1.2.2 Sample Containers, Volume, and Preservation 3.1.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures 3.1.2.3 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures 3.1.2.4 Supply Inspection and Acceptance Procedures 3.1.2.6 Field Documentation Procedures	- Sampling Design and Rationale - Sample Location Map - Sampling Locations and Methods/SOP Requirements Table - Analytical Methods/SOP Requirements Table - Field Quality Control Sample Summary Table - Sampling SOPs - Project Sampling SOP References Table - Field Equipment Calibration, Maintenance, Testing, and Inspection Table	17 18 19 20 21 22
3.2 Analytical Tasks 3.2.1 Analytical SOPs 3.2.2 Analytical Instrument Calibration Procedures 3.2.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures 3.2.4 Analytical Supply Inspection and Acceptance Procedures	- Analytical SOPs - Analytical SOP References Table - Analytical Instrument Calibration Table - Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	23 24 25

QAPP Worksheet #2
QAPP Identifying Information
(continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Required Documents
3.3 Sample Collection Documentation, Handling, Tracking, and Custody Procedures 3.3.1 Sample Collection Documentation 3.3.2 Sample Handling and Tracking System 3.3.3 Sample Custody	- Sample Collection Documentation Handling, Tracking, and Custody SOPs - Sample Container Identification - Sample Handling Flow Diagram - Example Chain-of-Custody Form and Seal	26 27
3.4 Quality Control Samples 3.4.1 Sampling Quality Control Samples 3.4.2 Analytical Quality Control Samples	- QC Samples Table - Screening/Confirmatory Analysis Decision Tree	28
3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling and Management 3.5.5 Data Tracking and Control	- Project Documents and Records Table - Analytical Services Table - Data Management SOPs	29 30
Assessment/Oversight		
4.1 Assessments and Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings and Corrective Action Responses	- Assessments and Response Actions - Planned Project Assessments Table - Audit Checklists - Assessment Findings and Corrective Action Responses Table	31 32
4.2 QA Management Reports	- QA Management Reports Table	33
4.3 Final Project Report		

QAPP Worksheet #2
QAPP Identifying Information
(continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
Data Review		
5.1 Overview		
5.2 Data Review Steps 5.2.1 Step I: Verification 5.2.2 Step II: Validation 5.2.2.1 Step IIa Validation Activities 5.2.2.2 Step IIb Validation Activities 5.2.3 Step III: Usability Assessment 5.2.3.1 Data Limitations and Actions from Usability Assessment 5.2.3.2 Activities	- Verification (Step I) Process Table - Validation (Steps IIa and IIb) Process Table - Validation (Steps IIa and IIb) Summary Table - Usability Assessment	34 35 36 NA
5.3 Streamlining Data Review 5.3.1 Data Review Steps To Be Streamlined 5.3.2 Criteria for Streamlining Data Review 5.3.3 Amounts and Types of Data Appropriate for Streamlining		

QAPP Worksheet #3-1 (June 2011 Mobilization)
Distribution List

QAPP Recipients	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Jeff Catanzarita	Work Assignment Manager (WAM)	EPA/ERT	732-906-6929	732-321-6724	catanzarita.jeff@epa.gov	SERAS-130-DQAPP-060611
Stephen Blaze	Quality Coordinator	EPA/ERT	732-906-6921	732-321-6724	blaze.stephen@epa.gov	SERAS-130-DQAPP-060611
Jon McBurney	Project Engineer/TL	SERAS	732-321-4244	732-494-4021	jonathan.d.mcburney@lmco.com	SERAS-130-DQAPP-060611
Deborah Killeen	Quality Assurance/Quality Control (QA/QC) Officer	SERAS	732-321-4245	732-494-4021	deborah.a.killeen@lmco.com	SERAS-130-DQAPP-060611
Dennis Miller	Program Manager	SERAS	732-321-4216	732-494-4021	dennis.a.miller@lmco.com	SERAS-130-DQAPP-060611

QAPP Worksheet #3-2 (February 2012 Mobilization)
Distribution List

QAPP Recipients	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Jeff Catanzarita	WAM	EPA/ERT	732-906-6929	732-321-6724	catanzarita.jeff@epa.gov	SERAS-130-DQAPPR1-022712
Stephen Blaze	Quality Coordinator	EPA/ERT	732-906-6921	732-321-6724	blaze.stephen@epa.gov	SERAS-130-DQAPPR1-022712
Mike Cartwright	Environmental Scientist/TL	SERAS	732-321-4284	732-494-4021	michael.w.cartwright@lmco.com	SERAS-130-DQAPPR1-022712
Deborah Killeen	QA/QC Officer	SERAS	732-321-4245	732-494-4021	deborah.a.killeen@lmco.com	SERAS-130-DQAPPR1-022712
Dennis Miller	Program Manager	SERAS	732-321-4216	732-494-4021	dennis.a.miller@lmco.com	SERAS-130-DQAPPR1-022712

QAPP Worksheet #3-3 (March 2103 Mobilization)
Distribution List

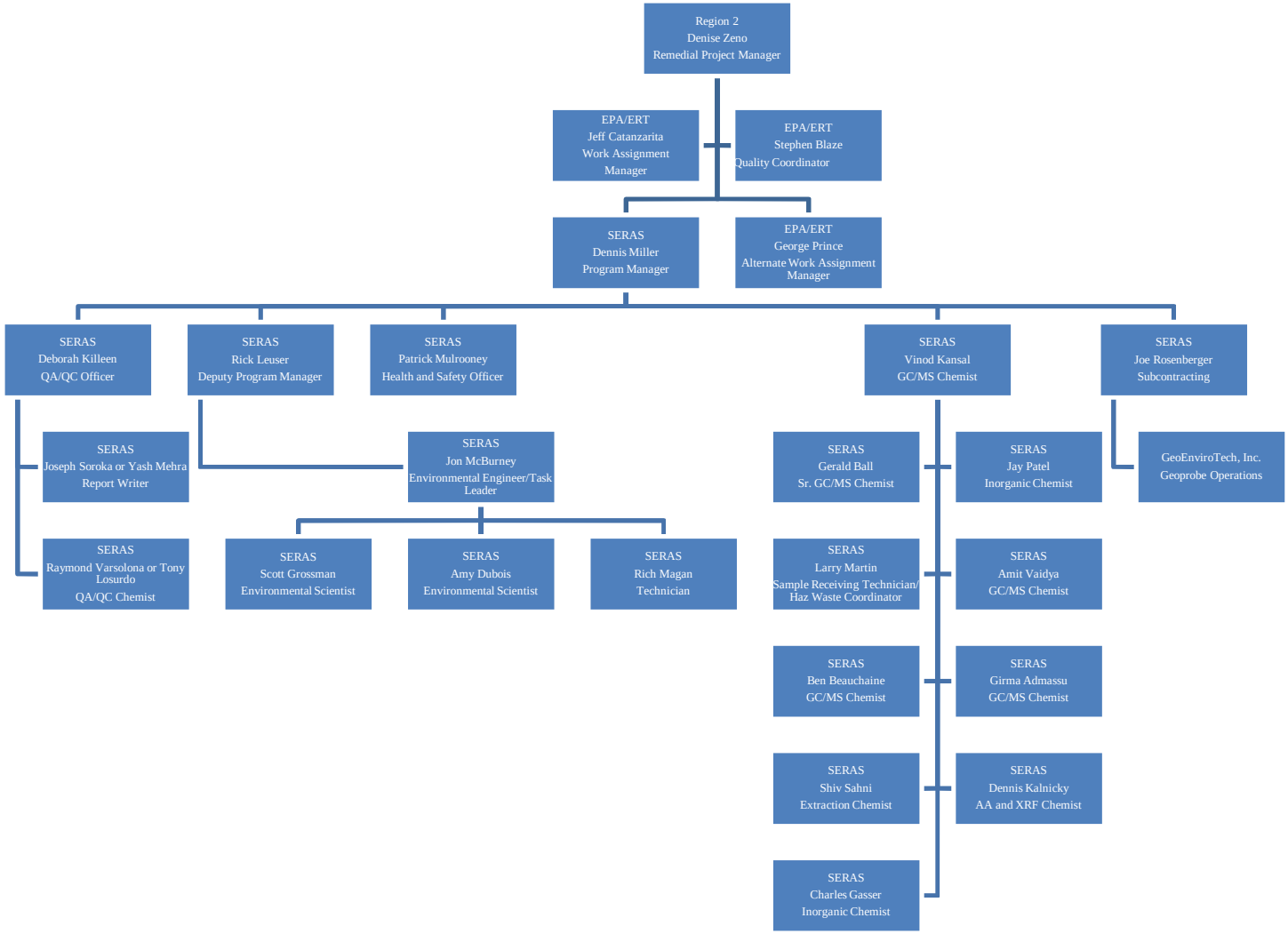
QAPP Recipients	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Jeff Catanzarita	WAM	EPA/ERT	732-906-6929	732-321-6724	catanzarita.jeff@epa.gov	SERAS-130-DQAPPR2-031213
Stephen Blaze	Quality Coordinator	EPA/ERT	732-906-6921	732-321-6724	blaze.stephen@epa.gov	SERAS-130-DQAPPR2-031213
Philip Solinski	Air Response Chemist/TL	SERAS	732-321-4283	732-494-4021	philip.j.solinski@lmco.com	SERAS-130-DQAPPR2-031213
Deborah Killeen	QA/QC Officer	SERAS	732-321-4245	732-494-4021	deborah.a.killeen@lmco.com	SERAS-130-DQAPPR2-031213
Dennis Miller	Program Manager	SERAS	732-321-4216	732-494-4021	dennis.a.miller@lmco.com	SERAS-130-DQAPPR2-031213

QAPP Worksheet #4 (March 2013 Mobilization)
Project Personnel Sign-Off Sheet

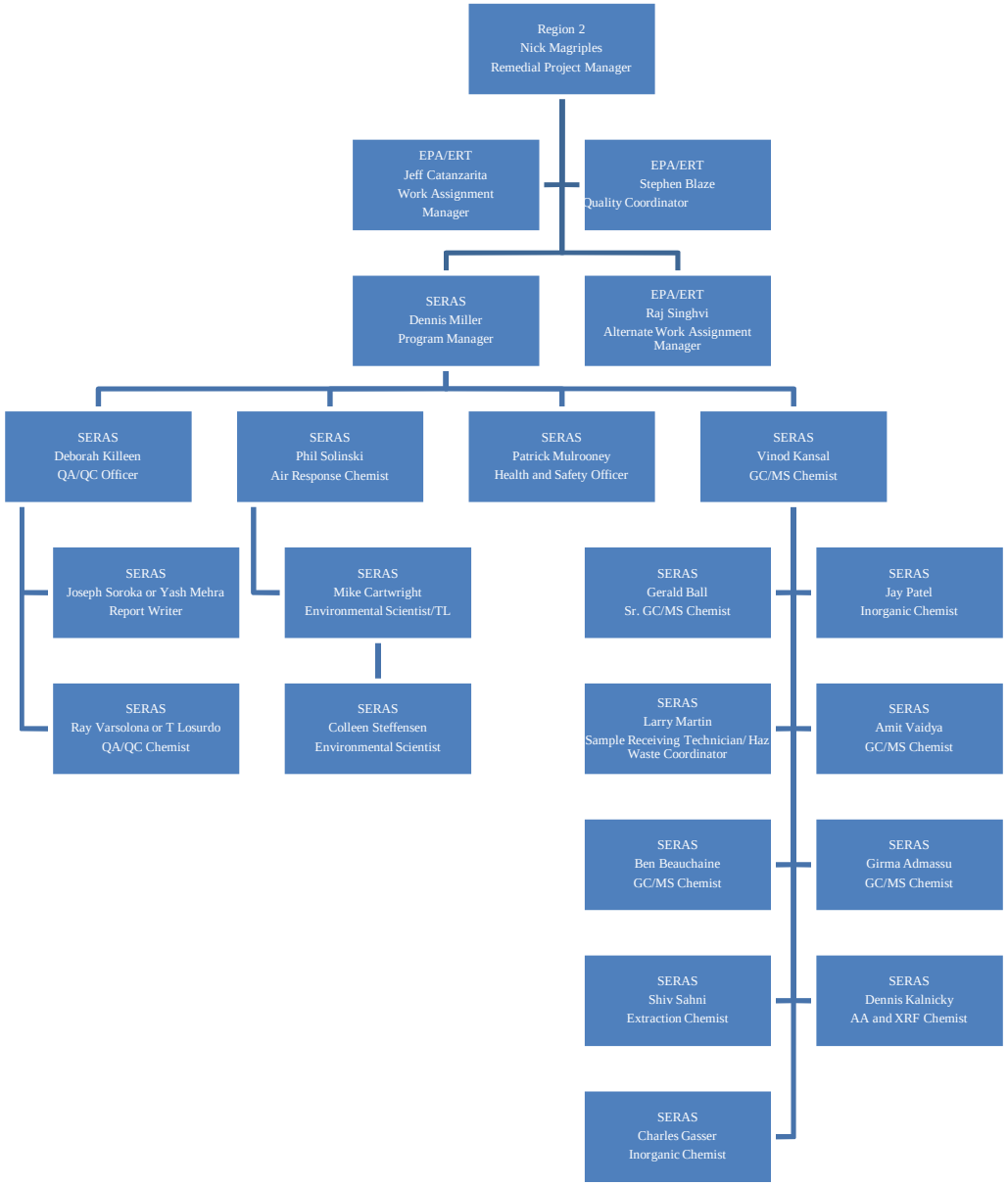
Organization: ERT/EPA/SERAS

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Jeff Catanzarita	EPA/ERT WAM	732-906-6929		3/17/13
Denise Zeno	EPA Region 2 Remedial Project Manager (RPM)	917-359-7311		
Philip Solinski	Air Response Chemist/TL	732-321-4283		3/12/13
Colleen Steffensen	SERAS Environmental Scientist	732-321-4202		3/17/13
David Adams	SERAS Environmental Scientist	732-494-4008		3/17/13
Joe Brandine	SERAS Environmental Scientist	732-321-4220		3/17/13

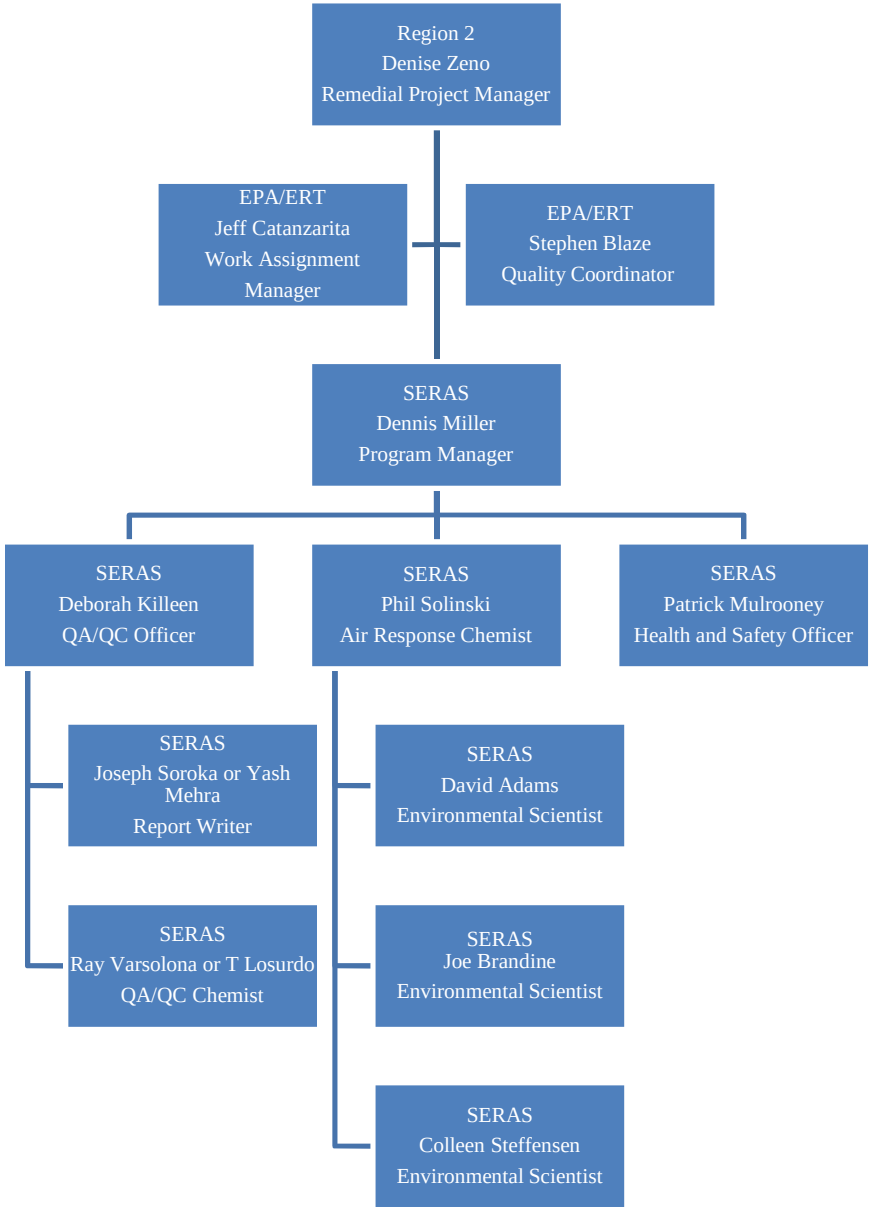
QAPP Worksheet #5-1 (June 2011 Mobilization)
Project Organizational Chart



QAPP Worksheet #5-2 (February 2012 Mobilization)
Project Organizational Chart



QAPP Worksheet #5-3 (March 2013 Mobilization)
Project Organizational Chart



QAPP Worksheet #6
Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Approval of initial QAPP and any amendments	ERT WAM ERT Quality Coordinator SERAS Program Manager SERAS QA/QC Officer SERAS TL	Jeff Catanzarita Stephen Blaze Dennis A. Miller Deborah Killeen Philip Solinski	(732) 906-6929 (732) 906-6921 (732) 321-4216 (732) 321-4245 (732) 321-4283	SERAS internal peer review, followed by ERT approval, implementation of changes effective only with approved QAPP or QAPP Change Form.
Nonconformance and Corrective Action	SERAS TL ERT WAM SERAS QA/QC Officer	Philip Solinski Jeff Catanzarita Deborah Killeen Amit Vaidya Gerald Ball Ben Beauchaine Girma Admassu Shiv Sahni Charles Gasser Dennis Kalnicky Larry Martin	(732) 321-4283 (732) 906-6929 (732) 321-4245 (732) 321-4251 (732) 321-4286 (732) 494-4006 (732) 321-4394 (732) 321-9312 (732) 321-4297 (732) 321-4214 (732) 321 4213	Use of the Work Assignment Field Change Form for field issues. Use of the laboratory nonconformances for any laboratory deviations and deficiencies (June 2011 and February 2012).
Posting of Deliverables to the ERT-Information Management System (IMS) website	SERAS TL SERAS QA/QC Officer SERAS Deputy Program Manager SERAS Administrative Support	Philip Solinski Deborah Killeen Richard Leuser Eileen Ciambotti	(732) 321-4283 (732) 321-4245 (732) 494-4060 (732) 321-4255	As per work assignment, posting of deliverables to ERT-IMS website constitutes delivery to the WAM.
Work Assignment	SERAS Program Manager	Dennis A. Miller	(732) 321-4216	Describes scope of work to SERAS personnel from the ERT WAM.
Health and Safety On-Site Meeting	SERAS TL	Philip Solinski	(732) 321-4283	Describe potential site hazards, required personal protective equipment, and access to local emergency services.

QAPP Worksheet #7
Personnel Responsibilities and Qualification Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Philip Solinski	Air Response Chemist	SERAS	Task Leader, Project Supervision, Reporting, Document Preparation	Minimum B.S. degree plus 14 years of related experience/Lockheed Martin Employee Files
Mike Cartwright	Environmental Scientist	SERAS	Task Leader, Project Supervision, Reporting, Document Preparation	Minimum B.S. degree plus 3 years of related experience/Lockheed Martin Employee Files
Nesya Belyarchik	Computer Assisted Design (ACAD)	SERAS	Map Creation	Minimum B.S. degree plus 8 years of related experience/Lockheed Martin Employee Files
Mingling Li	Geographic Information System (GIS) Specialist	SERAS	GIS/Map Creation	Minimum B.S. degree plus 3 years of related experience/Lockheed Martin Employee Files
Scott Grossman	Environmental Engineer/Scientist	SERAS	Field Investigation, Field Sampling	Minimum B.S degree plus 8 years of related experience//Lockheed Martin Employee Files
Amy Dubois	Environmental Scientist (Air/Response)	SERAS	Field Sampling, Sample Documentation	Minimum B.S. degree plus 8 years of related experience/Lockheed Martin Employee Files
Rich Magan	Environmental Technician	SERAS	Field Sampling, Sample Documentation, Mobilization	Environmental sampling experience/Lockheed Martin Employee Files
Deborah Killeen	QA/QC Officer	SERAS	Quality Assurance/Validation Oversight and Deliverable Review	Minimum B.S. degree plus 14 years of related experience/Lockheed Martin Employee Files
Ray Varsolona	QA/QC Chemist	SERAS	Data Validation	Minimum B.S. degree plus 8 years of related experience/Lockheed Martin Employee Files
Yash Mehra	Report Writer	SERAS	Report & EDD Preparation	Minimum B.S. degree plus 8 years of related experience/Lockheed Martin Employee Files
David Adams	Environmental Scientist	SERAS	Field Sampling, Sample Documentation	Minimum B.S. degree plus 8 years of related experience/Lockheed Martin Employee Files
Joe Brandine	Environmental Scientist	SERAS	Field Sampling, Sample Documentation	Minimum B.S. degree plus 3 years of related experience/Lockheed Martin Employee Files
Colleen Steffensen	Environmental Scientist	SERAS	Field Sampling, Sample Documentation	Minimum B.S. degree plus 3 years of related experience/Lockheed Martin Employee Files
Jeff Catanzarita	WAM	EPA/ERT	Technical Direction/Field Oversight	EPA Job-related qualifications/EPA Files
George Prince	Alternate WAM	EPA/ERT	Technical Direction/Field Oversight	EPA Job-related qualifications/EPA Files
Stephen Blaze	Quality Coordinator	ERT	QA Oversight	EPA job-related qualifications/EPA Files
Nick Magriples	RPM (June 2011)	EPA Region 2	Technical and Logistical Support	EPA job-related qualifications/EPA Files
Denise Zeno	RPM	EPA Region 2	Technical and Logistical Support	EPA job-related qualifications/EPA Files

QAPP Worksheet #7
Personnel Responsibilities and Qualification Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Gerald Ball	Sr. GC/MS Chemist	SERAS	Sample Analysis	Minimum B.S. degree plus 14 years of related experience/Lockheed Martin Employee Files
Jay Patel	ICP and ICP-MS Chemist	SERAS	Sample Analysis	Minimum B.S. degree plus 14 years of related experience/Lockheed Martin Employee Files
Larry Martin	Sample Receiving Technician/Hazardous Waste Coordinator	SERAS	Sample Receiving/Hazardous Waste Management	Minimum B.S. degree plus 3 years of related experience/Lockheed Martin Employee Files
Amit Vaidya	GC/MS Chemist	SERAS	Sample Analysis	Minimum B.S. degree plus 8 years of related experience/Lockheed Martin Employee Files
Ben Beauchaine	GC/MS Chemist	SERAS	Sample Analysis	Minimum B.S. degree plus 8 years of related experience/Lockheed Martin Employee Files
Girma Admassu	GC/MS Chemist	SERAS	Sample Analysis	Minimum B.S. degree plus 8 years of related experience/Lockheed Martin Employee Files
Shiv Sahni	Extraction Chemist	SERAS	Sample Extraction	Minimum B.S. degree plus 3 years of related experience/Lockheed Martin Employee Files
Charles Gasser	Extraction Chemist	SERAS	Sample Digestion	Minimum B.S. degree plus 3 years of related experience/Lockheed Martin Employee Files
Dennis Kalnicky	AA and XRF Chemist	SERAS	Sample Analysis	Minimum B.S. degree plus 14 years of related experience/Lockheed Martin Employee Files

QAPP Worksheet #8-1 (June 2011 Mobilization)
Special Personnel Training Requirements Table

Project Function	Specialized Training – Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
Project Oversight	Health & Safety Training	SERAS	December 2010	Jon McBurney	Project Engineer/ TL/SERAS	SERAS H&S Files
Field Sampling	Health & Safety Training	SERAS	December 2010	Rich Magan	Environmental Technician/SERAS	SERAS H&S Files
Field Sampling	Health & Safety Training	SERAS	August 2010	Amy Dubois	Environmental Scientist/SERAS	SERAS H&S Files
Field Sampling	Health & Safety Training	SERAS	November 2009	Scott Grossman	Project Engineer/SERAS	SERAS H&S Files
Field Chemist	Health & Safety Training	SERAS	November 2010	Gerald Ball	Sr. GC/MS Chemist	SERAS H&S Files
Validation Support	Data Integrity/Peak Integration	SERAS	July 2010	Raymond Varsolona or Tony Losurdo	QA/QC Chemist	Quality Files
Validation Support	Data Integrity/Peak Integration	SERAS	July 2010	Joseph Soroka or Yash Mehra	QA/QC Chemist	Quality Files
Laboratory Analysis	Data Integrity Training	SERAS	July 2010	Jay Patel Dennis Kalnicky Charles Gasser	ICP and ICP-MS Chemist AA and XRF Chemist Digestion Chemist	Quality Files
Laboratory Analysis	Data Integrity/Peak Integration Training			Shiv Sahni Amit Vaidya Ben Beauchaine Girma Admassu Larry Martin	Extraction Chemist GC/MS Chemist GC/MS Chemist Extraction Chemist Sample Receiving Tech.	
QA Oversight	Data Review & Validation	Laboratory Data Consultants	January 2007	Deborah Killeen	QA/QC Officer/SERAS	Quality Files
QA Oversight	Lead Auditor Training	IT Corporation	September 1991	Deborah Killeen	QA/QC Officer, SERAS	Quality Files
QA Oversight	Uniform Federal Policy for Quality Assurance Project Plans	Advanced Systems	January 2006	Deborah Killeen	QA/QC Officer/SERAS	Quality Files

QAPP Worksheet #8-2 (February 2012 Mobilization)
Special Personnel Training Requirements Table

Project Function	Specialized Training – Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
Project Oversight	Health & Safety Training	SERAS	December 2011	Mike Cartwright	TL-Air/SERAS	SERAS H&S Files
Field Sampling	Health & Safety Training	SERAS	December 2011	Colleen Steffensen	Environmental Scientist/SERAS	SERAS H&S Files
Validation Support	Data Integrity/Peak Integration	SERAS	June 2011	Raymond Varsolona or Tony Losurdo	QA/QC Chemist	Quality Files
Validation Support	Data Integrity/Peak Integration	SERAS	June 2011	Joseph Soroka or Yash Mehra	QA/QC Chemist	Quality Files
Laboratory Analysis	Data Integrity Training	SERAS	June 2011	Jay Patel Dennis Kalnicky Charles Gasser	ICP and ICP-MS Chemist AA and XRF Chemist Digestion Chemist	Quality Files
Laboratory Analysis	Data Integrity/Peak Integration Training			Shiv Sahni Amit Vaidya Ben Beauchaine Girma Admassu Larry Martin	Extraction Chemist GC/MS Chemist GC/MS Chemist Extraction Chemist Sample Receiving Tech.	
QA Oversight	Data Review & Validation	Laboratory Data Consultants	January 2007	Deborah Killeen	QA/QC Officer/SERAS	Quality Files
QA Oversight	Lead Auditor Training	IT Corporation	September 1991	Deborah Killeen	QA/QC Officer, SERAS	Quality Files
QA Oversight	Uniform Federal Policy for Quality Assurance Project Plans	Advanced Systems	January 2006	Deborah Killeen	QA/QC Officer/SERAS	Quality Files

QAPP Worksheet #8-3 (March 2013 Mobilization)
Special Personnel Training Requirements Table

Project Function	Specialized Training – Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
Project Oversight	Health & Safety Training	SERAS	September 2012	Philip Solinski	TL-Air/SERAS	SERAS H&S Files
Field Sampling	Health & Safety Training	SERAS	February 2013	David Adams	Environmental Scientist/SERAS	SERAS H&S Files
Field Sampling	Health & Safety Training	SERAS	December 2012	Colleen Steffensen	Environmental Scientist/SERAS	SERAS H&S Files
Field Sampling	Health & Safety Training	SERAS	February 2013	Joe Brandine	Environmental Scientist/SERAS	SERAS H&S Files
Validation Support	Data Integrity/Peak Integration	SERAS	June 2012	Raymond Varsolona or Tony Losurdo	QA/QC Chemist	Quality Files
Validation Support	Data Integrity/Peak Integration	SERAS	June 2012	Joseph Soroka or Yash Mehra	QA/QC Chemist	Quality Files
QA Oversight	Data Review & Validation	Laboratory Data Consultants	January 2007	Deborah Killeen	QA/QC Officer/SERAS	Quality Files
QA Oversight	Uniform Federal Policy for Quality Assurance Project Plans	Advanced Systems	January 2006	Deborah Killeen	QA/QC Officer/SERAS	Quality Files

QAPP Worksheet #9-1 (June 2011 Mobilization)
Project Scoping Session Participants Sheet

Project Name: Cabo Rojo **Projected Date(s) of Sampling:** June 13, 2011 **Project Manager:** Jon McBurney	**Site Name:** Cabo Rojo **Site Location:** Cabo Rojo, Puerto Rico

Date of Session: 4/20/2011
Scoping Session Purpose: Initial Scoping Meeting

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Jon McBurney	Environmental Engineer/ TL	SERAS	732-321-4244	jonathan.d.mcburney@lmco.com	TL
Jeff Catanzarita	WAM	ERT	732-906-6929	catanzarita.jeff@epa.gov	WAM
George Prince	Assistant WAM	ERT	732-321-6649	prince.george@epa.gov	Asst. WAM
Rick Leuser	Deputy Program Manager	SERAS	732-494-4060	richard.m.leuser@lmco.com	Project Oversight
Amy Dubois	Environmental Scientist (Air)	SERAS	732-494-4007	amy.e.dubois@lmco.com	Sampling

Comments/Decisions:
1. Travel should be to the BQN Airport in Western Puerto Rico.
2. Soil gas sampling will be the primary sampling type for the first sampling event. Approximately 8 locations have been identified as possible sources. At each, approximately 3 indoor samples and 4 to 5 outdoor soil gas samples will be collected. SUMMA® grab samples will be taken at a rate of 1 in 10 as verification samples. A Geoprobe will be on call for soil gas sampling.
3. Other sampling methods will be for groundwater and soil. Groundwater would be collected either from dedicated sample ports on municiple wells, from pre-installed monitoring wells, or from temporary SP-16 wells installed by Geoprobe. Water samples other than SP-16 must be for definitive data. SP-16 can be screening data only. Low flow will be used where possible. All soil sampling will be definitive data.
4. All Soil gas data will be screening only.
5. Less than half of all water samples will be submitted for BNA, VOC, PCB and Pesticides as well as VOCs.
6. Benchmarks will be Federal MCLs. If Federal MCLs are not available, use NYS drinking water criteria.

Action Items: None.
Consensus Decisions: See Comments/Decisions section.

QAPP Worksheet #9-2 (February 2012 Mobilization)
Project Scoping Session Participants Sheet

Project Name: Cabo Rojo **Projected Date(s) of Sampling:** February 28, 2012 **Project Manager:** Mike Cartwright	**Site Name:** Cabo Rojo **Site Location:** Cabo Rojo, Puerto Rico

Date of Session: 2/23/2012
Scoping Session Purpose: Scoping Meeting

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Mike Cartwright	Environmental Scientist/ Task Leader	SERAS	732-321-4844	michael.w.cartright@lmco.com	Task Lead
Phil Solinski	Air Response Chemist	SERAS	732-321-4283	Philip.j.solinski@lmco.com	Project Oversight
Debbie Killeen	QA/QC Officer	SERAS	732-321-4245	Deborah.a.killeen@lmco.com	QA Officer
Gerald Ball	Sr GC/MS Chemist	SERAS	732-321-4286	Gerald.a.ball@lmco.com	Sample Analysis

Comments/Decisions:

1. Ambient air, indoor air and soil gas sampling will be performed during this sampling event. Six locations have been identified for sampling based upon previous sample events. Approximately 66 Summa samples will be collected for VOC analysis. Approximately 25 samples from a school and a near-by print shop will be analyzed for a full TO-15 list. Of these 25 samples, approximately 6 will be ambient air samples, 8 will be soil gas samples and 10 will be indoor air samples. The trip blank will also be analyzed for a full TO-15 list. The remaining 41 samples will be collected at four other locations and analyzed for PCE, TCE and six other breakdown products. Approximately 9 ambient air samples, 20 soil gas samples and 12 indoor air samples will be collected.
2. SUMMA® sampling equipment and analysis will be performed by the ERT/SERAS laboratory.

QAPP Worksheet #9-3 (March 2013 Mobilization)
Project Scoping Session Participants Sheet

Project Name: Cabo Rojo **Projected Date(s) of Sampling:** March 18 to 27, 2013 **Project Manager:** Philip Solinski	**Site Name:** Cabo Rojo **Site Location:** Cabo Rojo, Puerto Rico

Date of Session: 2/26/2013
Scoping Session Purpose: Scoping Meeting

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Amy Dubois	Environmental Scientist	SERAS	732-494-4007	Amy.e.dubois@lmco.com	Acting for Task Lead
Misty Barkley	Property Administrator	SERAS	732-321-4205	Misty.barkley@lmco.com	Subcontract Analysis
Debbie Killeen	QA/QC Officer	SERAS	732-321-4245	Deborah.a.killeen@lmco.com	QA Oversight
Vinod Kansal	GC/MS Chemist	SERAS	732-321-4252	Vinod.kansal@lmco.com	Analytical Support Leader

Comments/Decisions: 1) Ambient air, indoor air and soil gas sampling will be performed during this sampling event. Locations have been identified for sampling based upon previous sample events. Approximately 20 SUMMA samples will be collected for VOC analysis. Of the 20 samples, approximately 3 will be ambient air samples, 8 will be soil gas samples and 6 will be indoor air samples. Two additional SUMMA® canisters will also be available for use. A trip blank will also be collected. The San German Vapor Intrustion site will be performed immediately prior to this sampling event. It would make sense if both projects were analyzed by the same laboratory.

Action Items: 1) Determine compound list. 2) Determine required reporting limits. 3) Determine if SUMMA sampling equipment and analysis will be performed by the ERT/SERAS Laboratory or a subcontract laboratory.

QAPP Worksheet #10
Problem Definition

The problem to be addressed by the project: For the June 2011 mobilization, the purpose of this project is to provide technical support to the Environmental Protection Agency/Environmental Response Team (EPA/ERT) and EPA Region II in conducting a preliminary remedial investigation (RI) in the town of Cabo Rojo, Puerto Rico (PR). The objectives of the RI are to confirm or negate possible sources of groundwater contamination and to collect groundwater samples for a RI/Risk Assessment (RA). For the February 2012 and March 2013 mobilizations, the purpose of the mobilizations is to determine if groundwater contamination is causing VOCs to intrude into buildings in the area of concern.
The environmental questions being asked: 1. What possible sources can be found for the tetrachloroethylene (PCE) and trichloroethylene (TCE) contamination being found in the groundwater? 2. What are the relative impacts from the different possible sources? 3. Is indoor air being impacted by soil vapor intrusion? 4. Are nearby industrial sources adversely impacting indoor air quality?
Observations from any site reconnaissance reports: See secondary Data, Worksheet 13.
A synopsis of secondary data or information from site reports: Secondary data available for this site include the preliminary investigations at the site as detailed in the Hazard Ranking System (HRS) Documentation Record as prepared by EPA and Weston Solutions Region 2 Site Assessment Team (SAT) contractor dated October, 2010. This document can be found at: http://www.epa.gov/superfund/sites/docrec/pdoc1823.pdf
The possible classes of contaminants and the affected matrices: Contaminants affecting the site are PCE and TCE. These contaminants are believed to be affecting Groundwater, Subsurface Soils, Soil Gases, Indoor Air and Ambient Air.
The rationale for inclusion of chemical and nonchemical analyses: 1. On-site screening of soil vapors will be used to direct the investigation towards possible source areas. 2. Off-site water analysis for TCE and PCE will be used to determine the magnitude of the source area and will be used in the RI/RA and Conceptual Site Model (CSM). 3. Analysis of site soils will be used along with the water analysis to determine the extent of the source contamination for use in the RI/RA and CSM. 4. Previous sampling has shown elevated concentrations of PCE, TCE and some of their breakdown products in soil gas.
Information concerning various environmental indicators: There have been no environmental indicators to date.

Project decision conditions ("If..., then..." statements):
1. If the soil gas samples analyzed on site indicate the presence of TCE or PCE, then additional soil gas samples will be taken to determine the location of the source of the contamination.
2. If an elevated level of PCE or TCE is measured in the soil gas, then soil and groundwater samples will be collected at a later date to determine the nature and extent of the source area.
3. If the results of the soil samples exceed the New York State (NYS) Part 375 Protection of Groundwater Standards, then EPA Region 2 will evaluate the data and determine what further courses of action are required.
4. If the results of the groundwater samples exceed the federal Maximum Contaminant Levels (MCLs) or the NYS MCLs for those compounds without federal MCLs, then EPA Region 2 will evaluate the data and determine what further courses of action are required.

For the February 2012 and March 2013 mobilizations:

1. If indoor air and or ambient air concentrations exceed action levels, data will be evaluated by EPA Region 2 to determine if further investigations and/or futher actions are taken.

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

Who will use the data? The EPA Region 2, EPA ERT and Lockheed Martin SERAS personnel

What will the data be used for?

1. Determine or negate potential sources for the ground water contamination based on soil-gas (SG) sampling to locate elevated volatile organic compound (VOC) vapor concentrations. The benchmark will be determined by the results of a limit of detection (LOD) study for PCE and TCE using a Voyager portable gas-chromatograph (GC) to ascertain the absence or presence and magnitude of the contaminants.
2. Collect current groundwater data for the creation of a conceptual site model (CSM) of the groundwater regime from pre-established monitoring wells and drinking water wells, and answer RI/RA objectives. Federal drinking water maximum contaminant levels (MCLs) will be used as benchmarks for groundwater sampling. When no Federal MCL exists for a contaminant of concern (COC), New York State Department of Environmental Conservation (NYSDEC) drinking water standards will be used.
3. Determine VOC levels in soils at or near suspected source locations. New York State 375 Regulations for impact to groundwater will be utilized as benchmarks.
4. Along with historical data, the CSM will be created for use with the RI.
5. To determine if action needs to be taken to preserve indoor air quality.

What type of data is needed? (target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques)

1. On-site screening of soil gas samples will be performed by a field chemist using a Voyager portable GC. The analytes will be PCE, TCE and cis 1,2 DCE. Samples will be collected by temporary soil gas points (outdoor samples) and by sub-slab sampling (indoor samples) into dedicated Tedlar bags. A subset of 10% of all soil gas locations will be sampled by collecting a grab sample into a SUMMA canister. The SUMMA canisters will be analyzed for VOCs at the ERT/SERAS laboratory in Edison, New Jersey (NJ). The SUMMA® canister results will be used to verify the on-site screening results. Soil gas sample points may be screened using a MultiRAE photoionization detector (PID) prior to sampling to screen the vapors.
2. Off-site analysis of soil samples collected in suspected source areas for VOCs.
3. Off-site analysis of water samples collected from existing monitoring wells for VOCs. A subset of the samples will be analyzed for Target Analyte List (TAL) Metals, Polychlorinated Biphenyls (PCBs), SVOCs, and Pesticides. Groundwater samples collected from temporary well points by Geoprobe SP-16 methodology will be screening data only. All data from existing monitoring wells or potable water sources will be definitive data.
4. Water samples may be collected from temporary well points using Geoprobe SP-16 sampling methodology. These points may be field screened for VOCs on the Voyager Portable GC or analyzed at the ERT/SERAS Laboratory in Edison, NJ.
5. Water quality readings (screening data) may be collected for low-flow groundwater sampling methodology.
6. All sample locations will be located using Global Positioning System (GPS) technology.
7. In February 2012, twenty-four hour soil gas, indoor air and ambient air samples will be collected to determine if chemicals present in the soil gas or nearby industrial sources are affecting indoor air or ambient air. Samples collected with a suspected industrial source in the vicinity will be analyzed for a full VOC list. Samples collected in areas with suspected PCE and TCE in groundwater or soil gas will be analyzed for PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1-dichloroethane (DCA), 1,2-DCA and vinyl chloride. All samples will be collected in SUMMA canisters and will be shipped to an off-site laboratory (SERAS) for analysis.
8. In March 2013, twenty-four hour soil gas, indoor air and ambient air samples will be collected in SUMMA® canisters to determine if chemicals present in the soil gas or nearby industrial sources are affecting indoor air or ambient air. Samples collected will be analyzed by ALS Laboratories (formerly Columbia) for 36-compound VOC list using selective ion monitoring (SIM).

How "good" do the data need to be in order to support the environmental decision? For the June 2011 mobilization, all soil gas results generated by the Voyager portable GC will be considered screening data. The data will be used to direct further sampling in an attempt to locate possible sources of VOCs impacting groundwater. Soil, soil gas and groundwater results will be used for further RI evaluation, with the exception of temporary SP-16 wells which will be for screening purposes only. The soil and groundwater results will be definitive data. All GPS, water quality (YSI or equivalent) and air quality (MultiRAE or equivalent) readings will be for screening purposes only. All samples collected for the February 2012 and March 2013 mobilizations must meet definitive data requirements.

How much data are needed? (number of samples for each analytical group, matrix, and concentration) Approximately 60 soil gas locations will be sampled for on-site screening of PCE, TCE and cis 1,2 DCE. Of the 60 samples, 25 are expected to be indoor sub-slab samples, and the remaining 35 are expected to be outdoor temporary sample points. Approximately 50 groundwater and 50 soil samples have been planned for collection and analysis for VOCs. Of the 50 groundwater samples, approximately half (25) will be submitted for Metals, PCBs, Pesticides and SVOCs.

For the February 2012 mobilization, ambient air, indoor air and soil gas sampling will be performed during this sampling event. Six locations have been identified for sampling based upon previous sample events. Approximately 66 SUMMA samples will be collected for VOC analysis. Approximately 25 samples from a school and a near-by print shop will be analyzed for a full TO-15 list. Of these 25 samples, approximately 6 will be ambient air samples, 8 will be soil gas samples and 10 will be indoor air samples. The trip blank will also be analyzed for a full TO-15 list. The remaing 41 samples will be collected at four other locations and analyzed for PCE, TCE and six other breakdown products. Approximately 9 ambient air samples, 20 soil gas samples and 12 indoor air samples will be collected.

For the March 2013 mobilization, ambient air, indoor air and soil gas sampling will be performed during this sampling event. Ambient air, indoor air and soil gas sampling will be performed during this sampling event. Locations have been identified for sampling based upon previous sample events. Approximately 20 SUMMA® samples will be collected for VOC analysis. Of the 20 sample approximately 3 will be ambient air samples, 8 will be soil gas samples and 6 will be indoor air samples. Two additional SUMMA® canisters will also be available for use. A trip blank per shipment and one collocated indoor or ambient air sample will also be collected.

Where, when, and how should the data be collected/generated? Soil gas samples will be collected during the week of June 13, 2011 from locations determined by the RPM and WAM. The samples will be collected using SERAS Standard Operating Procedure (SOP) #2102, *Tedlar Bag Sampling* and #1704, *SUMMA Canister Sampling*. See Worksheets 18 and 19 for details. The collection date of the groundwater samples and soil samples will be determined after the June 13 sampling event. Groundwater samples will be collected using SERAS SOP# 2007, *Groundwater Well Sampling*. Soil samples will be collected using SERAS SOP# 2012, *Soil Sampling*.

For the February 2012 mobilization soil gas, indoor air and ambient air samples will be collected during the week of February 27, 2012 from locations determined by the RPM and WAM. For the March 2013 mobilization soil gas, indoor air and ambient air samples will be collected during the week of March 18 or 25, 2013 from locations determined by the RPM and WAM. The samples will be collected using SERAS Standard Operating Procedure (SOP) #1704, *SUMMA Canister Sampling*. See Worksheets 18 and 19 for details.

Who will collect and generate the data? SERAS field personnel will collect all samples and a SERAS field chemist will generate all field screening data. ERT/SERAS Laboratory chemists will generate all soil, groundwater and soil gas confirmation data.

For the February 2012 mobilization, SERAS field personnel will collect all samples and ERT/SERAS Laboratory chemists will analyzed the samples collected. For the March 2013 mobilization, SERAS field personnel will collected all samples and ship them to ALS Laboratories for analysis of the samples collected.

How will the data be reported? The SERAS field laboratory will provide VOC analytical results for all soil gas samples. Results will be reported daily to the RPM and WAM in an electronic spreadsheet. Final ERT/SERAS Laboratory generated validated data will be reported in accordance with SERAS SOP #4020, *Analytical Report Preparation*. A SERAS Final Report containing all data will be generated in accordance with SOP #4017, *Preparation of Trip Reports.* The trip report will be the final deliverable to the EPA/ERT WAM. Data will be disseminated to EPA Region 2 by the WAM.
How will the data be archived? Data will be archived in electronic *.pdf format. Data packages from the ERT/SERAS Laboratory or ALS Laboratory will be archived by the SERAS QA/QC Group both in hard copy and electronically. Hard copies of all deliverables will be stored in SERAS Central Files and e-copies will be archived on the SERAS Local Area Network (LAN) in accordance with Administrative Procedure (AP) #34, *Archiving Electronic Files*. Data will be imported into a SCRIBE database and posted to the ERT-IMS website.

QAPP Worksheet #12-1
Measurement Performance Criteria Table

Matrix	Groundwater
Analytical Group	VOA
Concentration Level	Low

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2007	SERAS SOP #1806 (EPA SW-846 Method 8260B)	Precision (Field)	RPD ± 20%	Field Duplicates	S & A
		Precision (Laboratory)	1,1-Dichloroethene (RPD ±14%) Trichloroethene (RPD ±14%) Benzene (RPD ±11%) Toluene (RPD ±13%) Chlorobenzene (RPD ±13%)	MS/MSD	A
		Accuracy/Bias (Field) Contamination	<RL	Field Blank Trip Blank	S & A
		Accuracy (Laboratory)	%R = Within control chart limits	LCS	A
		Accuracy/Bias	-50% to +100%	Internal Standards	A
		Accuracy/Bias	1,1-Dichloroethene (%R=61-145%) Trichloroethene (%R=71-120%) Benzene (%R=76-127%) Toluene (%R=76-125%) Chlorobenzene (%R=75-130%)	MS	A
		Accuracy/Bias Contamination	<RL	Method Blank	A
		Accuracy/Bias	1,2-Dichloroethane-d4 (%R=76-114%) Toluene-d8 (%R=88-110%) p-Bromofluorobenzene (%R=86-115%)	Surrogates	A
		Completeness	> 90% sampling completed > 90% laboratory analysis	Data Completeness Check	S & A

[1]Reference number from QAPP Worksheet #21 (see Section 3.1.2)
[2]Reference number from QAPP Worksheet #23 (see Section 3.2)

QAPP Worksheet #12-2
Measurement Performance Criteria Table

Matrix	Soil
Analytical Group	VOA
Concentration Level	Low/Medium

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2012	EPA SW-846 Method 8260B/ SERAS SOP #1807	Precision	1,1-Dichloroethene (RPD ±22%) Trichloroethene (RPD ±24%) Benzene (RPD ±21%) Toluene (RPD ±21%) Chlorobenzene (RPD ±21%)	MS/MSD	A
		Accuracy/Bias	%R = Within control limits	LCS	A
		Precision	RPD±35%	Field Duplicates	S & A
		Accuracy/Bias	-50% to +100%	Internal Standards	A
		Accuracy/Bias	1,1-Dichloroethene (%R=59-172) Trichloroethene (%R=62-137) Benzene (%R=66-142) Toluene (%R=59-139) Chlorobenzene (%R=60-133)	Matrix Spikes	A
		Accuracy/Bias Contamination	<RL	Method Blank	A
		Accuracy/Bias	1,2-Dichloroethane-d4 (%R=70-121) Toluene-d8 (%R=84-138) p-Bromofluorobenzene (%R=59-113%)	Surrogates	A
		Completeness	> 90% sampling completed > 90% laboratory analysis	Data Completeness Check	S & A

[1]Reference number from QAPP Worksheet #21 (see Section 3.1.2)
[2]Reference number from QAPP Worksheet #23 (see Section 3.2)

QAPP Worksheet #12-3
Measurement Performance Criteria Table

Matrix	Groundwater
Analytical Group	PCBs
Concentration Level	Low

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2007	SERAS SOP #1801	Precision (Field)	RPD: ±20%	Field Duplicates	S&A
		Accuracy/Bias	Within control chart limits	LCS	A
		Accuracy/Bias	%R=30-150 (advisory limits)	Surrogate Spike	A
		Accuracy/Bias	No limits defined	Matrix Spike	A
		Accuracy/Bias	<RL	Method Blank	A
				Field Blank	S&A
		Precision	RPD ±20%	MS/MSD	A
		Accuracy/Bias	50-150%	Internal Standards	A
		Completeness	> 90% sampling completed > 90% laboratory analysis	Data Completeness Check	S&A

[1]Reference number from QAPP Worksheet #21 (see Section 3.1.2)
[2]Reference number from QAPP Worksheet #23 (see Section 3.2)

QAPP Worksheet #12-4
Measurement Performance Criteria Table

Matrix	Groundwater
Analytical Group	Pesticides
Concentration Level	Low

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2007	SERAS SOP #1808	Precision (Field)	RPD ±20%	Field Duplicates	S&A
		Accuracy/Bias	70-130% or within control chart limits	LCS	A
		Accuracy/Bias	%R=30-150 (advisory limits)	Surrogate Spike	A
		Accuracy/Bias	Gamma-BHC (%R=56-123) Heptachlor (%R=40-131) Aldrin (%R=40-120) Dieldrin (%R=52-126) Endrin (%R=56-121) 4,4'-DDT (%R=38-127)	Matrix Spike	A
		Accuracy/Bias	< RL	Method Blank	A
				Field Blank	S&A
		Precision	Gamma-BHC (RPD±15%) Heptachlor (RPD±20%) Aldrin (RPD±22%) Dieldrin (RPD±18%) Endrin (RPD±21%) 4,4'-DDT (RPD±27%)	MS/MSD	A
		Accuracy/Bias	50-150%	Internal Standards	A
		Completeness	> 90% sampling completed > 90% laboratory analysis	Data Completeness Check	S & A

[1]Reference number from QAPP Worksheet #21 (see Section 3.1.2)
[2]Reference number from QAPP Worksheet #23 (see Section 3.2)

QAPP Worksheet #12-5
Measurement Performance Criteria Table

Matrix	Groundwater
Analytical Group	SVOC
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	Data Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2007	SERAS SOP #1804	Precision (Field)	RPD ±20%	Field Duplicate	S&A
		Accuracy/Bias	Phenol (%R=12-110) 2-Chlorophenol (%R=27-123) 1,4-dichlorobenzene (%R=36-97) N-Nitroso-di-n-propylamine (%R=41-116) 1,2,4 Trichlorobenzene (%R= 39-98) 4-Chloro-3-methylphenol (%R=23-97) Acenaphthene (%R=46-118) 4-Nitrophenol (%R=10-80) 4-Dinitotoluene (%R=24-96) Pentachlorophenol (%R=9-103) Pyrene (%R=26-127)	MS	A
		Precision	Phenol RPD ±42% 2-Chlorophenol RPD ±40% 1,4-Dichlorobenzene RPD ±28% N-Nitroso-di-n-propylamine RPD ±38% 1,2,4 Trichlorobenzene RPD ±28% 4-Chloro-3-methylphenol RPD ±42% Acenaphthene RPD ±31% 4-Nitrophenol RPD ±50% 2,4-Dinitotoluene RPD ±38% Pentachlorophenol RPD ±50% Pyrene RPD ±31%	MS/MSD	A
		Accuracy/Bias	%R=Within control chart limits	LCS	A

QAPP Worksheet #12-5
Measurement Performance Criteria Table

Matrix	Groundwater
Analytical Group	SVOC
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	Data Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
		Accuracy/Bias	Nitrobenzene-d5 (%R=35-114%) 2-Fluorobiphenyl (%R=43-116%) Terphenyl-d14 (%R=33-141%) Phenol-d5 (%R=10-110%) 2-Fluorophenol (%R=21-110%) 2,4,6-Tribromophenol (%R=10-123%)	Surrogate Spikes	A
		Accuracy/Bias Contamination	<RL	Method Blank	A
				Field Blank	S & A
		Accuracy/Bias	-50% to +100%	Internal Standards	A
		Completeness	> 90% sampling completed > 90% laboratory analysis	Data Completeness Check	S & A

[1]Reference number from QAPP Worksheet #21 (see Section 3.1.2)
[2]Reference number from QAPP Worksheet #23 (see Section 3.2)

QAPP Worksheet #12-6
Measurement Performance Criteria Table

Matrix	Groundwater
Analytical Group	Metals
Concentration Level	Low

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2007	SERAS SOP #1811	Precision (Field)	RPD ±20%	Field Duplicates	S & A
		Precision (Laboratory)	RPD ±20%	MS/MSD	A
		Accuracy/Bias (Field) Contamination	<RL	Field Blank	S & A
		Accuracy/Bias	%R=75-125 or within performance acceptance limits	LCS	A
		Accuracy/Bias Contamination	<RL	Method Blank	A
		Accuracy/Bias	%R=75-125	Matrix Spike	A
		Completeness	> 90% sampling completed > 90% laboratory analysis	Data Completeness Check	S & A
		Accuracy/Bias	%D ±20	ICS	A
		Precision	%D ±10	Serial Dilution	A

[1]Reference number from QAPP Worksheet #21 (see Section 3.1.2)
[2]Reference number from QAPP Worksheet #23 (see Section 3.2)

QAPP Worksheet #12-7
Measurement Performance Criteria Table

Matrix	Groundwater
Analytical Group	Mercury
Concentration Level	Low

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2007	SERAS SOP #1832	Precision (Field)	RPD ±20%	Field Duplicates	S & A
		Precision (Laboratory)	RPD ±20%	MS/MSD	A
		Accuracy/Bias (Field) Contamination	<RL	Field Blank	S & A
		Accuracy/Bias	%R=75-125 or within performance acceptance limits	LCS	A
		Accuracy/Bias Contamination	<RL	Method Blank	A
		Accuracy/Bias	%R=75-125	Matrix Spike	A
		Completeness	> 90% sampling completed > 90% laboratory analysis	Data Completeness Check	S & A

[1]Reference number from QAPP Worksheet #21 (see Section 3.1.2)
[2]Reference number from QAPP Worksheet #23 (see Section 3.2)

QAPP Worksheet 12-8 (February 2012 and March 2013 Mobilizations)
Measurement Performance Criteria Table

Matrix	Soil Gas (SUMMA® Canister)
Analytical Group	VOA
Concentration Level	Low Level

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP 1704	TO-15 (SERAS SOP # 1814)	Precision	RPD ± 25%	Laboratory Duplicates	A
		Accuracy/Bias	±30% Recovery or within control chart limits	Laboratory Control Sample (LCS)	A
		Accuracy/Bias	±40% of mean area response	Internal Standards	A
		Accuracy/Bias Contamination	No target compound ≥ RL	Method Blank Trip Blank	A S & A
		Sensitivity	LOD - Standard deviation x T-factor <RL LOQ ±30%	LOD/LOQ	A
		Sensitivity	±50% or within control chart limits	Limit of Quantitation	A
		Completeness	> 90% SUMMA sampling, > 90% laboratory analysis	Data Completeness Check	S & A

[1]Reference number from QAPP Worksheet #21 (see Section 3.1.2)
[2]Reference number from QAPP Worksheet #23 (see Section 3.2)

QAPP Worksheet 12-9 (February 2012 and March 2013 Mobilizations)
Measurement Performance Criteria Table

Matrix	Indoor and Ambient Air (SUMMA® Canister)
Analytical Group	VOA
Concentration Level	Low Level

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP 1704	TO-15 (SERAS SOP # 1814)	Precision	RPD ± 25%	Laboratory Duplicates	A
		Accuracy/Bias	±30% Recovery or within control chart limits	Laboratory Control Sample (LCS)	A
		Accuracy/Bias	±40% of mean area response	Internal Standards	A
		Accuracy/Bias Contamination	No target compound ≥ RL	Method Blank Trip Blank	A S & A
		Precision	RPD ±35%	Collocated Field Duplicates	S & A
		Sensitivity	LOD - Standard deviation x T-factor <RL LOQ ±30%	LOD/LOQ	A
		Completeness	> 90% SUMMA sampling, > 90% laboratory analysis	Data Completeness Check	S & A

[1]Reference number from QAPP Worksheet #21 (see Section 3.1.2)
[2]Reference number from QAPP Worksheet #23 (see Section 3.2)

QAPP Worksheet #13
Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
Locations for Sampling	Hazard Ranking System (HRS) Documentation Record	EPA and Weston Solutions Region 2 SAT Contract, dated October, 2010	For review and planning sample locations.	None
Location Reconnaisance	Final Preliminary Assessment/Site Inspection (PA/SI) Work Assignment No.: 065, Abandoned Mechanic – PA/SI	Weston Solutions, EPA Region 2 SAT Contract, June 8, 2007	Review	None

QAPP Worksheet #14
Summary of Project Tasks

Sampling Tasks: 1. Soil Gas Sampling. SERAS will collect up to 60 soil gas samples as detailed in Worksheet 18 and 19. 2. Groundwater Sampling. SERAS will collect up to 50 groundwater samples as detailed in Worksheet 18 and 19. 3. Soil Sampling. SERAS will collect up to 50 soil samples from suspected contaminated boring locations as detailed in Worksheet 18 and 19. 4. Screening of soil gas. A MultiRae gas analyzer will be used to screen soil gas points prior to sampling. 5. Groundwater parameters such as pH, temperature, dissolved oxygen(DO), oxidation reduction potential (ORP) may be collected during sampling for low flow sampling method. 6. All sample locations will be located using Global Positioning Satellite (GPS) technology. 7. In February 2012, twenty-four hour soil gas, indoor air and ambient air samples will be collected to determine if chemicals present in the soil gas or nearby industrial sources are affecting indoor air or ambient air. Samples (~25) collected with a suspected industrial source in the vicinity will be analyzed for a full VOC list. Samples (~41) collected in areas with suspected PCE and TCE in groundwater or soil gas will be analyzed for PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1-dichloroethane (DCA), 1,2-DCA and vinyl chloride. All samples will be collected in SUMMA canisters and will be shipped to an off-site laboratory (SERAS) for analysis. 8. In March 2013, twenty-four hour soil gas, indoor air and ambient air samples will be collected in SUMMA® canisters to determine if chemicals present in the soil gas or nearby industrial sources are affecting indoor air or ambient air. Samples collected will be analyzed by ALS Laboratories (formerly Columbia).
Analysis Tasks: Samples collected will be analyzed by ALS Laboratories (formerly Columbia) for 36-compound VOC list using selective ion monitoring (SIM). All samples will be analyzed per the details in Worksheet 19, Analytical SOP Requirements.
Quality Control Tasks: Refer to Worksheet #20 for field QC Samples and Worksheets #12 and #28 for analytical QC Samples based on SERAS SOPs. One collocated indoor/ambient air samples will be collected.
Secondary Data: Secondary data will be used as described in Worksheet 13.
Data Management Tasks: Field data will be recorded on air sampling and/or air monitoring worksheets. SCRIBE will be used for data management. GPS data will be downloaded and imported into Scribe. A comma separated value (*.csv) file will be prepared by the QA/QC Group containing validated data that can also be imported into Scribe. This file will be available on I:\Final Validated EDD directory. A trip report will be posted to the ERT-IMS website for this WA. Posting of the reports will be considered as completion of the deliverable.
Documentation and Records: Observations noted during field efforts will be documented in accordance with SERAS SOP #4001, *Logbook Documentation* and SERAS SOP #2002, *Sample Documentation*. Documents and records that will be generated during this project include: Work Plan (WP), QAPP, Air Sampling Worksheets, Air Monitoring Worksheets, Sample Labels, Chain of Custody Forms, Custody Seals, Analytical Report and Field Change Forms, if necessary. The Trip Report will present the results of the investigation and include all field activities including sampling records and field observations. The Trip Report will be prepared in accordance with SERAS SOP# 4017, *Preparation of Trip Reports*.

Assessment/Audit Tasks: A performance audit of field operations is not anticipated for this project. The tasks associated with the QAPP are assessed using peer review and management system review. Peer review enables the task leader to identify and correct reporting errors before reports are submitted. Management system reviews establish compliance with prevailing management structure, policies and procedures, and ensures that the required data are obtained.
Data Review Tasks: Analytical data generated by ALS Laboratory in Simi Valley, CA will be validated by SERAS QA/QC chemists per SERAS SOPs. Data validation will be conducted in accordance with the SOPs listed in Worksheet #36. All SERAS project deliverables will receive an internal peer review prior to release as per the guidelines established in SERAS AP #22, *Peer Review of SERAS Deliverables*.

QAPP Worksheet #15-1
Reference Limits and Evaluation Table

Matrix: Soil

Analytical Group: VOA

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/kg) (NYS 375 Protection of Groundwater[2])	Project Quantitation Limit (µg/kg)	SERAS Method 1807/ EPA/SW846 8000B and 8260B Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/kg)	Method QLs (µg/kg)	MDLs[1] (µg/kg)	QLs (µg/kg)
Dichlorodifluoromethane	75-71-8	NS	5.00	NS	5.00	1.12	5.00
Chloromethane	74-87-3	NS	5.00	NS	5.00	0.766	5.00
Vinyl chloride	75-01-4	20	5.00	NS	5.00	0.786	5.00
Bromomethane	74-83-9	NS	5.00	NS	5.00	1.09	5.00
Chloroethane	75-00-3	NS	5.00	NS	5.00	0.957	5.00
Trichlorofluoromethane	75-69-4	NS	5.00	NS	5.00	0.974	5.00
Acetone	67-64-1	50	20.0	NS	20.0	0.97	20.0
1,1-Dichloroethene	75-35-4	330	5.00	NS	5.00	1.27	5.00
Methylene chloride	75-09-2	50	5.00	NS	5.00	2.88	5.00
Carbon disulfide	75-15-0	NS	5.00	NS	5.00	1.37	5.00
Methyl tert-butyl ether	1634-04-4	930	5.00	NS	5.00	0.620	5.00
trans-1,2-Dichloroethene	156-60-5	190	5.00	NS	5.00	0.843	5.00
1,1-Dichloroethane	75-34-3	20	5.00	NS	5.00	0.686	5.00
2-Butanone	78-93-3	NS	5.00	NS	5.00	0.641	5.00
2,2-Dichloropropane	594-20-7	NS	5.00	NS	5.00	0.705	5.00
cis-1,2-Dichloroethene	156-59-2	250	5.00	NS	5.00	0.724	5.00
Chloroform	67-66-3	370	5.00	NS	5.00	0.677	5.00
1,1-Dichloropropene	563-58-6	NS	5.00	NS	5.00	0.728	5.00
1,2-Dichloroethane	107-06-2	20	5.00	NS	5.00	0.604	5.00
1,1,1-Trichloroethane	71-55-6	680	5.00	NS	5.00	0.693	5.00
Carbon tetrachloride	56-23-5	760	5.00	NS	5.00	0.665	5.00
Benzene	71-43-2	60	5.00	NS	5.00	0.785	5.00
Trichloroethene	79-01-6	470	5.00	NS	5.00	0.685	5.00
1,2-Dichloropropane	78-87-5	NS	5.00	NS	5.00	0.652	5.00
Bromodichloromethane	75-27-4	NS	5.00	NS	5.00	0.522	5.00
Dibromomethane	74-95-3	NS	5.00	NS	5.00	0.716	5.00

QAPP Worksheet #15-1
Reference Limits and Evaluation Table

Matrix: Soil

Analytical Group: VOA

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/kg) (NYS 375 Protection of Groundwater[2])	Project Quantitation Limit (µg/kg)	SERAS Method 1807/ EPA/SW846 8000B and 8260B Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/kg)	Method QLs (µg/kg)	MDLs[1] (µg/kg)	QLs (µg/kg)
cis-1,3-Dichloropropene	10061-01-5	NS	5.00	NS	5.00	0.625	5.00
trans-1,3-Dichloro-propene	10061-02-6	NS	5.00	NS	5.00	0.700	5.00
1,1,2-Trichloroethane	79-00-5	NS	5.00	NS	5.00	0.577	5.00
1,3-Dichloropropane	142-28-9	NS	5.00	NS	5.00	0.633	5.00
Dibromochloromethane	124-48-1	NS	5.00	NS	5.00	0.553	5.00
1,2-Dibromoethane	106-93-4	NS	5.00	NS	5.00	0.687	5.00
Bromoform	75-25-2	NS	5.00	NS	5.00	0.545	5.00
4-Methyl-2-pentanone	108-10-1	NS	5.00	NS	5.00	0.498	5.00
Toluene	108-88-3	700	5.00	NS	5.00	1.87	5.00
2-Hexanone	591-78-6	NS	5.00	NS	5.00	0.668	5.00
Tetrachloroethene	127-18-4	1,300	5.00	NS	5.00	0.755	5.00
Chlorobenzene	108-90-7	1,100	5.00	NS	5.00	0.698	5.00
1,1,1,2-Tetrachloro-ethane	630-20-6	NS	5.00	NS	5.00	0.832	5.00
Ethylbenzene	100-41-4	1,000	5.00	NS	5.00	0.819	5.00
m,p-Xylene	108-38-3/ 106-42-3	NS	10.0	NS	10.0	1.70	10.0
o-Xylene	95-47-6	NS	5.00	NS	5.00	0.888	5.00
Styrene	100-42-5	NS	5.00	NS	5.00	0.888	5.00
Isopropylbenzene	98-82-8	NS	5.00	NS	5.00	0.647	5.00
1,1,2,2-Tetrachloro-ethane	79-34-5	NS	5.00	NS	5.00	0.723	5.00
1,2,3-Trichloropropane	96-18-4	NS	5.00	NS	5.00	0.826	5.00
n-Propylbenzene	103-65-1	3,900	5.00	NS	5.00	0.811	5.00
Bromobenzene	108-86-1	NS	5.00	NS	5.00	0.907	5.00
1,3,5-Trimethylbenzene	108-67-8	8,400	5.00	NS	5.00	0.862	5.00

QAPP Worksheet #15-1
Reference Limits and Evaluation Table

Matrix: Soil

Analytical Group: VOA

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/kg) (NYS 375 Protection of Groundwater[2])	Project Quantitation Limit (µg/kg)	SERAS Method 1807/ EPA/SW846 8000B and 8260B Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/kg)	Method QLs (µg/kg)	MDLs[1] (µg/kg)	QLs (µg/kg)
2-Chlorotoluene	95-49-8	NS	5.00	NS	5.00	0.647	5.00
4-Chlorotoluene	106-43-4	NS	5.00	NS	5.00	0.815	5.00
tert-Butylbenzene	98-06-6	5,900	5.00	NS	5.00	0.939	5.00
1,2,4-Trimethylbenzene	95-63-6	3,600	5.00	NS	5.00	0.781	5.00
sec-Butylbenzene	135-98-8	11,000	5.00	NS	5.00	0.710	5.00
p-Isopropyltoluene	99-87-6	NS	5.00	NS	5.00	0.713	5.00
1,3-Dichlorobenzene	541-73-1	2,400	5.00	NS	5.00	0.563	5.00
1,4-Dichlorobenzene	106-46-7	1,800	5.00	NS	5.00	0.754	5.00
n-Butylbenzene	104-51-8	12,000	5.00	NS	5.00	0.832	5.00
1,2-Dichlorobenzene	95-50-1	1,100	5.00	NS	5.00	0.744	5.00
1,2-Dibromo-3 -chloropropane	96-12-8	NS	5.00	NS	5.00	0.551	5.00
1,2,4-Trichlorobenzene	120-82-1	NS	5.00	NS	5.00	0.929	5.00
Hexachlorobutadiene	87-68-3	NS	5.00	NS	5.00	1.18	5.00
Naphthalene	91-20-3	NS	5.00	NS	5.00	0.971	5.00
1,2,3-Trichlorobenzene	87-61-6	NS	5.00	NS	5.00	0.867	5.00

NS = Not Specified
[1] Based on LOD Study dated 4/28/11 for VOC Instrument "B"
[2.] New York State Table 375-6.8(b): Restricted Use Soil Cleanup Objectives – Protection of Groundwater.

QAPP Worksheet #15-2
Reference Limits and Evaluation Table

Matrix: Groundwater
Analytical Group: VOA
Concentration Level: Trace

Analyte	CAS Number	Project Action Limit (µg/L) Federal Drinking Water MCLs	Project Action Limit (µg/L) NYS Drinking Water MCLs	Project Quantitation Limit[2] (µg/L)	SERAS Method 1806/ EPA/SW846/8000B and 8260B Analytical Method		Achievable Laboratory Limits	
					MDLs (µg/L)	Method QLs (µg/L)	MDLs[1] (µg/L)	QLs (µg/L)
Dichlorodifluoromethane	75-71-8	NS	5	0.50	NS	5.00	0.412	0.50
Chloromethane	74-87-3	NS	5	1.00	NS	5.00	0.546	1.00
Vinyl chloride	75-01-4	2	2	0.50	NS	5.00	0.453	0.50
Bromomethane	74-83-9	NS	5	1.00	NS	5.00	0.660	1.00
Chloroethane	75-00-3	NS	5	0.50	NS	5.00	0.492	0.50
Trichlorofluoromethane	75-69-4	NS	5	1.00	NS	5.00	0.504	1.00
1,1-Dichloroethene	75-35-4	NS	5	0.50	NS	5.00	0.066	0.50
Methylene chloride	75-09-2	NS	5	0.50	NS	5.00	0.077	0.50
Carbon disulfide	75-15-0	NS	50	0.50	NS	5.00	0.079	0.50
Methyl tert-butyl ether	1634-04-4	NS	10	0.50	NS	5.00	0.038	0.50
trans-1,2-Dichloroethene	156-60-5	100	5	0.50	NS	5.00	0.040	0.50
1,1-Dichloroethane	75-34-3	5	5	0.50	NS	5.00	0.065	0.50
2,2-Dichloropropane	594-20-7	NS	5	0.50	NS	5.00	0.151	0.50
cis-1,2-Dichloroethene	156-59-2	70	5	0.50	NS	5.00	0.042	0.50
Chloroform	67-66-3	80	50	0.50	NS	5.00	0.062	0.50
1,1-Dichloropropene	563-58-6	NS	5	0.50	NS	5.00	0.076	0.50
1,2-Dichloroethane	107-06-2	5	5	0.50	NS	5.00	0.087	0.50
1,1,1-Trichloroethane	71-55-6	20	5	0.50	NS	5.00	0.078	0.50
Carbon tetrachloride	56-23-5	5	5	0.50	NS	5.00	0.077	0.50
Benzene	71-43-2	5	5	0.50	NS	5.00	0.062	0.50
Trichloroethene	79-01-6	5	5	0.50	NS	5.00	0.073	0.50
1,2-Dichloropropane	78-87-5	5	5	0.50	NS	5.00	0.062	0.50
Bromodichloromethane	75-27-4	80	50	0.50	NS	5.00	0.054	0.50
Dibromomethane	74-95-3	NS	5	0.50	NS	5.00	0.057	0.50
cis-1,3-Dichloropropene	10061-01-5	NS	5	0.50	NS	5.00	0.067	0.50
trans-1,3-Dichloropropene	10061-02-6	NS	5	0.50	NS	5.00	0.107	0.50

QAPP Worksheet #15-2
Reference Limits and Evaluation Table

Matrix: Groundwater
Analytical Group: VOA
Concentration Level: Trace

Analyte	CAS Number	Project Action Limit (µg/L) Federal Drinking Water MCLs	Project Action Limit (µg/L) NYS Drinking Water MCLs	Project Quantitation Limit[2] (µg/L)	SERAS Method 1806/ EPA/SW846/8000B and 8260B Analytical Method		Achievable Laboratory Limits	
					MDLs (µg/L)	Method QLs (µg/L)	MDLs[1] (µg/L)	QLs (µg/L)
1,1,2-Trichloroethane	79-00-5	5	5	0.50	NS	5.00	0.097	0.50
1,3-Dichloropropane	142-28-9	NS	5	0.50	NS	5.00	0.057	0.50
Dibromochloromethane	124-48-1	80	50	0.50	NS	5.00	0.065	0.50
1,2-Dibromoethane	106-93-4	NS	50	0.50	NS	5.00	0.083	0.50
Bromoform	75-25-2	80	50	0.50	NS	5.00	0.081	0.50
Toluene	108-88-3	1,000	5	0.50	NS	5.00	0.072	0.50
Tetrachloroethene	127-18-4	5	5	0.50	NS	5.00	0.060	0.50
Chlorobenzene	108-90-7	NS	5	0.50	NS	5.00	0.057	0.50
1,1,1,2-Tetrachloroethane	630-20-6	NS	5	0.50	NS	5.00	0.071	0.50
Ethylbenzene	100-41-4	700	5	0.50	NS	5.00	0.049	0.50
m,p-Xylene	108-38-3/ 106-42-3	NS	5	1.00	NS	10.0	0.108	1.00
o-Xylene	95-47-6	NS	5	0.50	NS	5.00	0.031	0.50
Styrene	100-42-5	100	5	0.50	NS	5.00	0.050	0.50
Isopropylbenzene	98-82-8	NS	5	0.50	NS	5.00	0.056	0.50
1,1,2,2-Tetrachloroethane	79-34-5	NS	5	0.50	NS	5.00	0.072	0.50
1,2,3-Trichlorpropane	96-18-4	NS	5	0.50	NS	5.00	0.130	0.50
n-Propylbenzene	103-65-1	NS	5	0.50	NS	5.00	0.057	0.50
Bromobenzene	108-86-1	NS	5	0.50	NS	5.00	0.042	0.50
1,3,5-Trimethylbenzene	108-67-8	NS	5	0.50	NS	5.00	0.048	0.50
2-Chlorotoluene	95-49-8	NS	5	0.50	NS	5.00	0.081	0.50
4-Chlorotoluene	106-43-4	NS	5	0.50	NS	5.00	0.111	0.50
tert-Butylbenzene	98-06-6	NS	5	0.50	NS	5.00	0.048	0.50
1,2,4-Trimethylbenzene	95-63-6	NS	5	0.50	NS	5.00	0.051	0.50
sec-Butylbenzene	135-98-8	NS	5	0.50	NS	5.00	0.046	0.50
p-Isopropyltoluene	99-87-6	NS	5	0.50	NS	5.00	0.050	0.50

QAPP Worksheet #15-2
Reference Limits and Evaluation Table

Matrix: Groundwater
Analytical Group: VOA
Concentration Level: Trace

Analyte	CAS Number	Project Action Limit (µg/L) Federal Drinking Water MCLs	Project Action Limit (µg/L) NYS Drinking Water MCLs	Project Quantitation Limit[2] (µg/L)	SERAS Method 1806/ EPA/SW846/8000B and 8260B Analytical Method		Achievable Laboratory Limits	
					MDLs (µg/L)	Method QLs (µg/L)	MDLs[1] (µg/L)	QLs (µg/L)
1,3-Dichlorobenzene	541-73-1	NS	5	0.50	NS	5.00	0.047	0.50
1,4-Dichlorobenzene	106-46-7	NS	5	0.50	NS	5.00	0.070	0.50
n-Butylbenzene	104-51-8	NS	5	0.50	NS	5.00	0.065	0.50
1,2-Dichlorobenzene	95-50-1	0.2 [2]	5	0.50	NS	5.00	0.056	0.50
1,2,4-Trichlorobenzene	120-82-1	70	5	0.50	NS	5.00	0.069	0.50
Hexachlorobutadiene	87-68-3	NS	5	0.50	NS	5.00	0.090	0.50
Naphthalene	91-20-3	NS	50	0.50	NS	5.00	0.073	0.50
1,2,3-Trichlorobenzene	87-61-6	NS	5	0.50	NS	5.00	0.075	0.50

NS = Not Specified
[1] Based on LOD Study dated 1/14/11 on system C
[2.] Since the benchmark for this compound is a magnitude less than the lowest benchmark, concentrations between the MDL and the RL will be flagged "J" – estimated.

QAPP Worksheet #15-3
Reference Limits and Evaluation Table

Matrix: Groundwater collected by SP-16 methodology for screening only.
Analytical Group: VOA
Concentration Level: Trace

Analyte	CAS Number	Project Action Limit (µg/L) For Screening Only	Project Quantitation Limit[2] (µg/L)	SERAS Method 1806/ EPA/SW846/8000B and 8260B Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	Method QLs (µg/L)	MDLs[1] (µg/L)	QLs (µg/L)
Dichlorodifluoromethane	75-71-8	NS	0.50	NS	5.00	0.412	0.50
Chloromethane	74-87-3	NS	1.00	NS	5.00	0.546	1.00
Vinyl chloride	75-01-4	NS	0.50	NS	5.00	0.453	0.50
Bromomethane	74-83-9	NS	1.00	NS	5.00	0.660	1.00
Chloroethane	75-00-3	NS	0.50	NS	5.00	0.492	0.50
Trichlorofluoromethane	75-69-4	NS	1.00	NS	5.00	0.504	1.00
1,1-Dichloroethene	75-35-4	NS	0.50	NS	5.00	0.066	0.50
Methylene chloride	75-09-2	NS	0.50	NS	5.00	0.077	0.50
Carbon disulfide	75-15-0	NS	0.50	NS	5.00	0.079	0.50
Methyl tert-butyl ether	1634-04-4	NS	0.50	NS	5.00	0.038	0.50
trans-1,2-Dichloroethene	156-60-5	NS	0.50	NS	5.00	0.040	0.50
1,1-Dichloroethane	75-34-3	NS	0.50	NS	5.00	0.065	0.50
2,2-Dichloropropane	594-20-7	NS	0.50	NS	5.00	0.151	0.50
cis-1,2-Dichloroethene	156-59-2	NS	0.50	NS	5.00	0.042	0.50
Chloroform	67-66-3	NS	0.50	NS	5.00	0.062	0.50
1,1-Dichloropropene	563-58-6	NS	0.50	NS	5.00	0.076	0.50
1,2-Dichloroethane	107-06-2	NS	0.50	NS	5.00	0.087	0.50
1,1,1-Trichloroethane	71-55-6	NS	0.50	NS	5.00	0.078	0.50
Carbon tetrachloride	56-23-5	NS	0.50	NS	5.00	0.077	0.50
Benzene	71-43-2	NS	0.50	NS	5.00	0.062	0.50
Trichloroethene	79-01-6	NS	0.50	NS	5.00	0.073	0.50
1,2-Dichloropropane	78-87-5	NS	0.50	NS	5.00	0.062	0.50
Bromodichloromethane	75-27-4	NS	0.50	NS	5.00	0.054	0.50
Dibromomethane	74-95-3	NS	0.50	NS	5.00	0.057	0.50
cis-1,3-Dichloropropene	10061-01-5	NS	0.50	NS	5.00	0.067	0.50
trans-1,3-Dichloropropene	10061-02-6	NS	0.50	NS	5.00	0.107	0.50

QAPP Worksheet #15-3
Reference Limits and Evaluation Table

Matrix: Groundwater collected by SP-16 methodology for screening only.
Analytical Group: VOA
Concentration Level: Trace

Analyte	CAS Number	Project Action Limit (µg/L) For Screening Only	Project Quantitation Limit[2] (µg/L)	SERAS Method 1806/ EPA/SW846/8000B and 8260B Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	Method QLs (µg/L)	MDLs[1] (µg/L)	QLs (µg/L)
1,1,2-Trichloroethane	79-00-5	NS	0.50	NS	5.00	0.097	0.50
1,3-Dichloropropane	142-28-9	NS	0.50	NS	5.00	0.057	0.50
Dibromochloromethane	124-48-1	NS	0.50	NS	5.00	0.065	0.50
1,2-Dibromoethane	106-93-4	NS	0.50	NS	5.00	0.083	0.50
Bromoform	75-25-2	NS	0.50	NS	5.00	0.081	0.50
Toluene	108-88-3	NS	0.50	NS	5.00	0.072	0.50
Tetrachloroethene	127-18-4	NS	0.50	NS	5.00	0.060	0.50
Chlorobenzene	108-90-7	NS	0.50	NS	5.00	0.057	0.50
1,1,1,2-Tetrachloroethane	630-20-6	NS	0.50	NS	5.00	0.071	0.50
Ethylbenzene	100-41-4	NS	0.50	NS	5.00	0.049	0.50
m,p-Xylene	108-38-3/ 106-42-3	NS	1.00	NS	10.0	0.108	1.00
o-Xylene	95-47-6	NS	0.50	NS	5.00	0.031	0.50
Styrene	100-42-5	NS	0.50	NS	5.00	0.050	0.50
Isopropylbenzene	98-82-8	NS	0.50	NS	5.00	0.056	0.50
1,1,2,2-Tetrachloroethane	79-34-5	NS	0.50	NS	5.00	0.072	0.50
1,2,3-Trichlorpropane	96-18-4	NS	0.50	NS	5.00	0.130	0.50
n-Propylbenzene	103-65-1	NS	0.50	NS	5.00	0.057	0.50
Bromobenzene	108-86-1	NS	0.50	NS	5.00	0.042	0.50
1,3,5-Trimethylbenzene	108-67-8	NS	0.50	NS	5.00	0.048	0.50
2-Chlorotoluene	95-49-8	NS	0.50	NS	5.00	0.081	0.50
4-Chlorotoluene	106-43-4	NS	0.50	NS	5.00	0.111	0.50
tert-Butylbenzene	98-06-6	NS	0.50	NS	5.00	0.048	0.50
1,2,4-Trimethylbenzene	95-63-6	NS	0.50	NS	5.00	0.051	0.50
sec-Butylbenzene	135-98-8	NS	0.50	NS	5.00	0.046	0.50
p-Isopropyltoluene	99-87-6	NS	0.50	NS	5.00	0.050	0.50

QAPP Worksheet #15-3
Reference Limits and Evaluation Table

Matrix: Groundwater collected by SP-16 methodology for screening only.
Analytical Group: VOA
Concentration Level: Trace

Analyte	CAS Number	Project Action Limit (µg/L) For Screening Only	Project Quantitation Limit[2] (µg/L)	SERAS Method 1806/ EPA/SW846/8000B and 8260B Analytical Method		Achievable Laboratory Limits	
				MDLs (µg/L)	Method QLs (µg/L)	MDLs[1] (µg/L)	QLs (µg/L)
1,3-Dichlorobenzene	541-73-1	NS	0.50	NS	5.00	0.047	0.50
1,4-Dichlorobenzene	106-46-7	NS	0.50	NS	5.00	0.070	0.50
n-Butylbenzene	104-51-8	NS	0.50	NS	5.00	0.065	0.50
1,2-Dichlorobenzene	95-50-1	NS	0.50	NS	5.00	0.056	0.50
1,2,4-Trichlorobenzene	120-82-1	NS	0.50	NS	5.00	0.069	0.50
Hexachlorobutadiene	87-68-3	NS	0.50	NS	5.00	0.090	0.50
Naphthalene	91-20-3	NS	0.50	NS	5.00	0.073	0.50
1,2,3-Trichlorobenzene	87-61-6	NS	0.50	NS	5.00	0.075	0.50

NS = Not Specified
[1] Based on LOD Study dated 1/14/11 on system C

QAPP Worksheet #15-4
Reference Limits and Evaluation Table

Matrix: Water
Analytical Group: Pesticides/PCBs
Concentration Level: Low

Analyte	CAS Number	Project Action Limit [1] (µg/L) NYS Drinking Water MCLs[1]	Project Quantitation Limit (µg/L)	Analytical Method SW-846 Methods 8081A & 8082 SERAS SOP #1801/1808		Achievable Laboratory Limits	
				MDLs(µg/L)	Method QLs(µg/L)	MDLs[2] (µg/L)	QLs (µg/L)
Aroclor 1016	12674-11-2	0.5	0.250	NS	0.250	0.0533	0.250
Aroclor 1221	11104-28-2	0.5	0.500	NS	0.500	NA	0.500
Aroclor 1232	11141-16-5	0.5	0.250	NS	0.250	NA	0.250
Aroclor 1242	53469-21-9	0.5	0.250	NS	0.250	NA	0.250
Aroclor 1248	12672-29-6	0.5	0.250	NS	0.250	NA	0.250
Aroclor 1254	11097-69-1	0.5	0.250	NS	0.250	NA	0.250
Aroclor 1260	11096-82-5	0.5	0.250	NS	0.250	NA	0.250
Aroclor 1268	11100-14-4	0.5	0.250	NS	0.250	0.0781	0.250
Toxaphene	8001-35-2	3	0.500	NS	0.500	0.142	0.500
a-BHC	319-84-6	NS	0.0200	NS	0.0200	0.00401	0.0200
g-BHC	58-89-9	NS	0.0200	NS	0.0200	0.00590	0.0200
b-BHC	319-85-7	NS	0.0200	NS	0.0200	0.00547	0.0200
d-BHC	319-86-8	NS	0.0200	NS	0.0200	0.00250	0.0200
Heptachlor	76-44-8	0.4	0.0200	NS	0.0200	0.00455	0.0200
Aldrin	309-00-2	NS	0.0200	NS	0.0200	0.00433	0.0200
Heptachlor epoxide	1024-57-3	0.2	0.0200	NS	0.0200	0.00571	0.0200
g-Chlordane	5103-74-2	2	0.0200	NS	0.0200	0.00683	0.0200
a-Chlordane	5104-71-9	2	0.0200	NS	0.0200	0.00731	0.0200
Endosulfan I	959-98-8	NS	0.0200	NS	0.0200	0.00485	0.0200
p,p'-DDE	72-55-9	NS	0.0200	NS	0.0200	0.00622	0.0200
Dieldrin	60-57-1	NS	0.0200	NS	0.0200	0.00601	0.0200
Endrin	72-20-8	2	0.0200	NS	0.0200	0.00600	0.0200
p,p'-DDD	72-54-8	NS	0.0200	NS	0.0200	0.00685	0.0200
Endosulfan II	33213-65-9	NS	0.0200	NS	0.0200	0.00504	0.0200
Endrin aldehyde	7421-93-4	2	0.0200	NS	0.0200	0.0166	0.0200
p,p'-DDT	50-29-3	NS	0.0200	NS	0.0200	0.00487	0.0200

QAPP Worksheet #15-4
Reference Limits and Evaluation Table

Matrix: Water
Analytical Group: Pesticides/PCBs
Concentration Level: Low

Analyte	CAS Number	Project Action Limit [1] (µg/L) NYS Drinking Water MCLs[1]	Project Quantitation Limit (µg/L)	Analytical Method SW-846 Methods 8081A & 8082 SERAS SOP #1801/1808		Achievable Laboratory Limits	
				MDLs(µg/L)	Method QLs(µg/L)	MDLs[2] (µg/L)	QLs (µg/L)
Endosulfan sulfate	1031-07-8	NS	0.0200	NS	0.0200	0.00411	0.0200
Methoxychlor	72-43-5	40	0.0200	NS	0.0200	0.00705	0.0200
Endrin ketone	53494-70-5	2	0.0200	NS	0.0200	0.00857	0.0200

NA = Not Available
NS = Not Specified
1. Maximum Contaminant Levels as detailed in New York State Regulations Part 5, Subpart 5-1 Public Water Systems, Table 3.
2. From LOD Study on ECD4, column XLB, 01/10/11

QAPP Worksheet #15-5
Reference Limits and Evaluation Table

Matrix: Water – Collected using SP-16 methodology for screening only.
Analytical Group: Pesticides/PCBs
Concentration Level: Low

Analyte	CAS Number	Project Action Limit [1] (µg/L) Screening Only	Project Quantitation Limit (µg/L)	Analytical Method SW-846 Methods 8081A & 8082 SERAS SOP #1801/1808		Achievable Laboratory Limits	
				MDLs(µg/L)	Method QLs(µg/L)	MDLs[2] (µg/L)	QLs (µg/L)
Aroclor 1016	12674-11-2	NS	0.250	NS	0.250	0.0533	0.250
Aroclor 1221	11104-28-2	NS	0.500	NS	0.500	NA	0.500
Aroclor 1232	11141-16-5	NS	0.250	NS	0.250	NA	0.250
Aroclor 1242	53469-21-9	NS	0.250	NS	0.250	NA	0.250
Aroclor 1248	12672-29-6	NS	0.250	NS	0.250	NA	0.250
Aroclor 1254	11097-69-1	NS	0.250	NS	0.250	NA	0.250
Aroclor 1260	11096-82-5	NS	0.250	NS	0.250	NA	0.250
Aroclor 1268	11100-14-4	NS	0.250	NS	0.250	0.0781	0.250
Toxaphene	8001-35-2	NS	0.500	NS	0.500	0.142	0.500
a-BHC	319-84-6	NS	0.0200	NS	0.0200	0.00401	0.0200
g-BHC	58-89-9	NS	0.0200	NS	0.0200	0.00590	0.0200
b-BHC	319-85-7	NS	0.0200	NS	0.0200	0.00547	0.0200
d-BHC	319-86-8	NS	0.0200	NS	0.0200	0.00250	0.0200
Heptachlor	76-44-8	NS	0.0200	NS	0.0200	0.00455	0.0200
Aldrin	309-00-2	NS	0.0200	NS	0.0200	0.00433	0.0200
Heptachlor epoxide	1024-57-3	NS	0.0200	NS	0.0200	0.00571	0.0200
g-Chlordane	5103-74-2	NS	0.0200	NS	0.0200	0.00683	0.0200
a-Chlordane	5104-71-9	NS	0.0200	NS	0.0200	0.00731	0.0200
Endosulfan I	959-98-8	NS	0.0200	NS	0.0200	0.00485	0.0200
p,p'-DDE	72-55-9	NS	0.0200	NS	0.0200	0.00622	0.0200
Dieldrin	60-57-1	NS	0.0200	NS	0.0200	0.00601	0.0200
Endrin	72-20-8	NS	0.0200	NS	0.0200	0.00600	0.0200
p,p'-DDD	72-54-8	NS	0.0200	NS	0.0200	0.00685	0.0200
Endosulfan II	33213-65-9	NS	0.0200	NS	0.0200	0.00504	0.0200
Endrin aldehyde	7421-93-4	NS	0.0200	NS	0.0200	0.0166	0.0200
p,p'-DDT	50-29-3	NS	0.0200	NS	0.0200	0.00487	0.0200

QAPP Worksheet #15-5
Reference Limits and Evaluation Table

Matrix: Water – Collected using SP-16 methodology for screening only.
Analytical Group: Pesticides/PCBs
Concentration Level: Low

Analyte	CAS Number	Project Action Limit [1] (µg/L) Screening Only	Project Quantitation Limit (µg/L)	Analytical Method SW-846 Methods 8081A & 8082 SERAS SOP #1801/1808		Achievable Laboratory Limits	
				MDLs(µg/L)	Method QLs(µg/L)	MDLs[2] (µg/L)	QLs (µg/L)
Endosulfan sulfate	1031-07-8	NS	0.0200	NS	0.0200	0.00411	0.0200
Methoxychlor	72-43-5	NS	0.0200	NS	0.0200	0.00705	0.0200
Endrin ketone	53494-70-5	NS	0.0200	NS	0.0200	0.00857	0.0200

NA = Not Available
NS = Not Specified
1. Maximum Contaminant Levels as detailed in New York State Regulations Part 5, Subpart 5-1 Public Water Systems, Table 3.
2. From LOD study on ECD4, column XLB, 01/10/11

QAPP Worksheet #15-6
Reference Limits and Evaluation Table

Matrix: Water
Analytical Group: SVOC
Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L) Federal MCLs	Project Action Limit (µg/L) NYS Drinking Water MCLs[1]	Project Quantitation Limit (µg/L)	Analytical Method SW-846 Method 8270C SERAS SOP #1804		Achievable Laboratory Limits	
					MDLs	Method QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Phenol	108-95-2	NS	50	10	NA	10	1.65	10
bis(-2-Chloroethyl)Ether	111-44-4	NS	50	10	NA	10	2.34	10
2-Chlorophenol	95-57-8	NS	50	10	NA	10	2.08	10
1,3-Dichlorobenzene	541-73-1	NS	5[4]	10	NA	10	1.47	10
1,4-Dichlorobenzene	106-46-7	NS	5[4]	10	NA	10	1.44	10
Benzyl alcohol	100-51-6	NS	50	10	NA	10	1.95	10
1,2-Dichlorobenzene	95-50-1	NS	5[4]	10	NA	10	1.59	10
2-Methylphenol	95-48-7	NS	50	10	NA	10	1.67	10
bis(2-Chloroisopropyl)ether	39638-32-9	NS	50	10	NA	10	2.57	10
4-Methylphenol	106-44-5	NS	50	10	NA	10	1.73	10
N-Nitroso-Di-n-propylamine	621-64-7	NS	50	10	NA	10	3.01	10
Hexachloroethane	67-72-1	NS	50	10	NA	10	1.87	10
Nitrobenzene	98-95-3	NS	50	10	NA	10	2.37	10
Isophorone	78-59-1	NS	50	10	NA	10	2.34	10
2-Nitrophenol	88-75-5	NS	50	10	NA	10	2.37	10
2,4-Dimethylphenol	105-67-9	NS	50	10	NA	10	3.33	10
bis(2-Chloroethoxy)methane	111-91-1	NS	50	10	NA	10	2.55	10
2,4-Dichlorophenol	120-83-2	NS	50	10	NA	10	2.01	10
1,2,4-Trichlorobenzene	120-82-1	70	5[4]	10	NA	10	1.80	10
Naphthalene	91-20-3	NS	50	10	NA	10	2.04	10
4-Chloroaniline	106-47-8	NS	50	10	NA	10	1.57	10
Hexachlorobutadiene	87-68-3	NS	5[4]	10	NA	10	1.86	10
4-Chloro-3-methylphenol	59-50-7	NS	50	10	NA	10	2.07	10
2-Methylnaphthalene	91-57-6	NS	50	10	NA	10	1.97	10

QAPP Worksheet #15-6
Reference Limits and Evaluation Table

Matrix: Water
Analytical Group: SVOC
Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L) Federal MCLs	Project Action Limit (µg/L) NYS Drinking Water MCLs[1]	Project Quantitation Limit (µg/L)	Analytical Method SW-846 Method 8270C SERAS SOP #1804		Achievable Laboratory Limits	
					MDLs	Method QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Hexachlorocyclopentadiene	77-47-4	50	50	10	NA	10	1.60	10
2,4,6-Trichlorophenol	88-06-2	NS	50	10	NA	10	1.86	10
2,4,5-Trichlorophenol	95-95-4	NS	50	10	NA	10	1.97	10
2-Chloronaphthalene	91-58-7	NS	50	10	NA	10	1.93	10
2-Nitroaniline	88-74-4	NS	50	10	NA	10	1.82	10
Dimethylphthalate	131-11-3	NS	50	10	NA	10	1.72	10
Acenaphthylene	208-96-8	NS	50	10	NA	10	1.91	10
2,6-Dinitrotoluene	606-20-2	NS	50	10	NA	10	1.94	10
3-Nitroaniline	99-09-2	NS	50	10	NA	10	1.57	10
Acenaphthene	88-32-9	NS	50	10	NA	10	1.93	10
2,4-Dinitrophenol	51-28-5	NS	50	10	NA	10	8.39	10
4-Nitrophenol	10-02-7	NS	50	10	NA	10	1.64	10
Dibenzofuran	132-64-7	NS	50	10	NA	10	1.76	10
2,4-Dinitrotoluene	121-14-2	NS	50	10	NA	10	2.44	10
Diethylphthalate	84-66-2	NS	50	10	NA	10	1.57	10
4-Chlorophenyl-phenylether	7005-72-3	NS	50	10	NA	10	1.66	10
Fluorene	86-73-7	NS	50	10	NA	10	1.78	10
4-Nitroaniline	100-01-6	NS	50	10	NA	10	1.92	10
4,6-Dinitro-2-methylphenol	534-30-6	NS	50	10	NA	10	4.60	10
N-Nitrosodiphenylamine	88-30-6	NS	50	10	NA	10	1.80	10
4-Bromophenyl-phenylether	101-55-3	NS	50	10	NA	10	1.36	10
Hexachlorobenzene	118-74-1	1 [3]	1[3]	10	NA	10	1.60	10
Pentachlorophenol	87-86-5	1 [3]	1[3]	10	NA	10	3.41	10
Phenanthrene	85-01-8	NS	50	10	NA	10	1.61	10

QAPP Worksheet #15-6
Reference Limits and Evaluation Table

Matrix: Water
Analytical Group: SVOC
Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L) Federal MCLs	Project Action Limit (µg/L) NYS Drinking Water MCLs[1]	Project Quantitation Limit (µg/L)	Analytical Method SW-846 Method 8270C SERAS SOP #1804		Achievable Laboratory Limits	
					MDLs	Method QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Anthracene	120-12-7	NS	50	10	NA	10	1.57	10
Carbazole	86-74-8	NS	50	10	NA	10	2.02	10
Di-n-butylphthalate	84-74-2	NS	50	10	NA	10	1.69	10
Fluoranthene	206-44-0	NS	50	10	NA	10	1.74	10
Pyrene	129-00-0	NS	50	10	NA	10	1.99	10
Butylbenzylphthalate	85-68-7	NS	50	10	NA	10	1.43	10
Benzo(a)anthracene	55-55-3	NS	50	10	NA	10	1.55	10
3,3'-Dichlorobenzidine	91-94-1	NS	50	10	NA	10	2.60	10
Chrysene	218-01-9	NS	50	10	NA	10	1.44	10
Bis(2-Ethylhexyl)phthalate	117-81-7	NS	50	10	NA	10	1.10	10
Di-n-octylphthalate	117-84-0	NS	50	10	NA	10	1.35	10
Benzo(b)fluoranthene	205-99-2	NS	50	10	NA	10	2.32	10
Benzo(k)fluoranthene	207-08-9	NS	50	10	NA	10	2.26	10
Benzo(a)pyrene	50-32-8	0.2[3]	0.2[3]	10	NA	10	1.90	10
Indeno(1,2,3-cd)pyrene	465-73-6	NS	NS	10	NA	10	1.30	10
Dibenzo(a,h)anthracene	53-70-3	NS	NS	10	NA	10	1.65	10
Benzo(g,h,i)perylene	191-24-2	NS	NS	10	NA	10	1.45	10

1. Referenced for NYS DW MCLs
2. From MDL study 1/20/11 on instrument Smyrna II
3. Since the benchmark is < both the MDL and the RL, any concentration found in the samples between the MDL and the RL will be flagged "J" – estimated.
4. Since the benchmark is < the RL but > the MDL, any concentration found in the samples between the MDL and the RL will be flagged "J" – estimated.

NS = Not Specified
NA = Not Available

QAPP Worksheet #15-7
Reference Limits and Evaluation Table

Matrix: Water – Collected by SP-16 methodology for screening only
Analytical Group: SVOC
Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L) Screening Only	Project Quantitation Limit (µg/L)	Analytical Method SW-846 Method 8270C SERAS SOP #1804		Achievable Laboratory Limits	
				MDLs	Method QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Phenol	108-95-2	NS	10	NA	10	1.65	10
bis(-2-Chloroethyl)Ether	111-44-4	NS	10	NA	10	2.34	10
2-Chlorophenol	95-57-8	NS	10	NA	10	2.08	10
1,3-Dichlorobenzene	541-73-1	NS	10	NA	10	1.47	10
1,4-Dichlorobenzene	106-46-7	NS	10	NA	10	1.44	10
Benzyl alcohol	100-51-6	NS	10	NA	10	1.95	10
1,2-Dichlorobenzene	95-50-1	NS	10	NA	10	1.59	10
2-Methylphenol	95-48-7	NS	10	NA	10	1.67	10
bis(2-Chloroisopropyl)ether	39638-32-9	NS	10	NA	10	2.57	10
4-Methylphenol	106-44-5	NS	10	NA	10	1.73	10
N-Nitroso-Di-n-propylamine	621-64-7	NS	10	NA	10	3.01	10
Hexachloroethane	67-72-1	NS	10	NA	10	1.87	10
Nitrobenzene	98-95-3	NS	10	NA	10	2.37	10
Isophorone	78-59-1	NS	10	NA	10	2.34	10
2-Nitrophenol	88-75-5	NS	10	NA	10	2.37	10
2,4-Dimethylphenol	105-67-9	NS	10	NA	10	3.33	10
bis(2-Chloroethoxy)methane	111-91-1	NS	10	NA	10	2.55	10
2,4-Dichlorophenol	120-83-2	NS	10	NA	10	2.01	10
1,2,4-Trichlorobenzene	120-82-1	NS	10	NA	10	1.80	10
Naphthalene	91-20-3	NS	10	NA	10	2.04	10
4-Chloroaniline	106-47-8	NS	10	NA	10	1.57	10
Hexachlorobutadiene	87-68-3	NS	10	NA	10	1.86	10
4-Chloro-3-methylphenol	59-50-7	NS	10	NA	10	2.07	10
2-Methylnaphthalene	91-57-6	NS	10	NA	10	1.97	10
Hexachlorocyclopentadiene	77-47-4	NS	10	NA	10	1.60	10

QAPP Worksheet #15-7
Reference Limits and Evaluation Table

Matrix: Water – Collected by SP-16 methodology for screening only
Analytical Group: SVOC
Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L) Screening Only	Project Quantitation Limit (µg/L)	Analytical Method SW-846 Method 8270C SERAS SOP #1804		Achievable Laboratory Limits	
				MDLs	Method QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
2,4,6-Trichlorophenol	88-06-2	NS	10	NA	10	1.86	10
2,4,5-Trichlorophenol	95-95-4	NS	10	NA	10	1.97	10
2-Chloronaphthalene	91-58-7	NS	10	NA	10	1.93	10
2-Nitroaniline	88-74-4	NS	10	NA	10	1.82	10
Dimethylphthalate	131-11-3	NS	10	NA	10	1.72	10
Acenaphthylene	208-96-8	NS	10	NA	10	1.91	10
2,6-Dinitrotoluene	606-20-2	NS	10	NA	10	1.94	10
3-Nitroaniline	99-09-2	NS	10	NA	10	1.57	10
Acenaphthene	88-32-9	NS	10	NA	10	1.93	10
2,4-Dinitrophenol	51-28-5	NS	10	NA	10	8.39	10
4-Nitrophenol	10-02-7	NS	10	NA	10	1.64	10
Dibenzofuran	132-64-7	NS	10	NA	10	1.76	10
2,4-Dinitrotoluene	121-14-2	NS	10	NA	10	2.44	10
Diethylphthalate	84-66-2	NS	10	NA	10	1.57	10
4-Chlorophenyl-phenylether	7005-72-3	NS	10	NA	10	1.66	10
Fluorene	86-73-7	NS	10	NA	10	1.78	10
4-Nitroaniline	100-01-6	NS	10	NA	10	1.92	10
4,6-Dinitro-2-methylphenol	534-30-6	NS	10	NA	10	4.60	10
N-Nitrosodiphenylamine	88-30-6	NS	10	NA	10	1.80	10
4-Bromophenyl-phenylether	101-55-3	NS	10	NA	10	1.36	10
Hexachlorobenzene	118-74-1	NS	10	NA	10	1.60	10
Pentachlorophenol	87-86-5	NS	10	NA	10	3.41	10
Phenanthrene	85-01-8	NS	10	NA	10	1.61	10
Anthracene	120-12-7	NS	10	NA	10	1.57	10
Carbazole	86-74-8	NS	10	NA	10	2.02	10

QAPP Worksheet #15-7
Reference Limits and Evaluation Table

Matrix: Water – Collected by SP-16 methodology for screening only
Analytical Group: SVOC
Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L) Screening Only	Project Quantitation Limit (µg/L)	Analytical Method SW-846 Method 8270C SERAS SOP #1804		Achievable Laboratory Limits	
				MDLs	Method QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Di-n-butylphthalate	84-74-2	NS	10	NA	10	1.69	10
Fluoranthene	206-44-0	NS	10	NA	10	1.74	10
Pyrene	129-00-0	NS	10	NA	10	1.99	10
Butylbenzylphthalate	85-68-7	NS	10	NA	10	1.43	10
Benzo(a)anthracene	55-55-3	NS	10	NA	10	1.55	10
3,3'-Dichlorobenzidine	91-94-1	NS	10	NA	10	2.60	10
Chrysene	218-01-9	NS	10	NA	10	1.44	10
Bis(2-Ethylhexyl)phthalate	117-81-7	NS	10	NA	10	1.10	10
Di-n-octylphthalate	117-84-0	NS	10	NA	10	1.35	10
Benzo(b)fluoranthene	205-99-2	NS	10	NA	10	2.32	10
Benzo(k)fluoranthene	207-08-9	NS	10	NA	10	2.26	10
Benzo(a)pyrene	50-32-8	0.2	10	NA	10	1.90	10
Indeno(1,2,3-cd)pyrene	465-73-6	NS	10	NA	10	1.30	10
Dibenzo(a,h)anthracene	53-70-3	NS	10	NA	10	1.65	10
Benzo(g,h,i)perylene	191-24-2	NS	10	NA	10	1.45	10

From MDL study 1/20/11 on instrument Smyrna II
NS = Not Specified
NA = Not Available

QAPP Worksheet #15-8
Reference Limits and Evaluation Table

Matrix: Groundwater
Analytical Group: ICP Metals
Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L) Federal MCLs	Project Action Limit [1] (µg/L) NYS Drinking Water MCLs	Project Quantitation Limit (µg/L)	Analytical Method SERAS SOP 1811, Rev. 4.0		Achievable Laboratory Limits (µg/L) [a]	
					MDLs (µg/L)	Method QLs (µg/L)	MDLs[2] (µg/L)	QLs (µg/L)
Aluminum	7429-90-5	NS	NS	90	NS	100	22.4	90
Antimony	7440-36-0	6 [3]	6 [3]	10	NS	10	1.91	10
Arsenic	7440-38-2	10 [3]	10 [3]	19	NS	20	2.45	19
Barium	7440-39-3	2,000	2,000	3	NS	2	0.31	3
Beryllium	7440-41-7	4	4	2	NS	2	0.18	2
Boron	7440-42-8	NS	NS	10	NS	10	0.65	10
Cadmium	7440-43-9	5	5	2	NS	2	0.1	2
Calcium	7440-70-2	NS	NS	100	NS	60	44.3	100
Chromium	7440-47-3	100	100	3	NS	3	0.48	3
Cobalt	7440-48-4	NS	NS	2	NS	2	0.16	2
Copper	7440-50-8	1,300	NS	8	NS	5	0.48	8
Iron (2599)	7439-89-6	NS	300	40	NS	35	9.03	40
Iron (2714)	7439-89-6	NS	300	300	NS	300	48.0	300
Lead	7439-92-1	15	NS	10	NS	10	1.76	10
Magnesium	7439-95-4	NS	NS	200	NS	160	15.6	200
Manganese	7439-96-5	NS	300	2	NS	2	0.11	2
Mercury	7439-97-6	2	2	0.200	NS	0.200	NA	0.200
Molybdenum	7439-98-7	NS	NS	5	NS	5	0.39	5
Nickel	7440-02-0	NS	NS	3	NS	3	0.64	3
Potassium	7440-09-7	NS	NS	250	NS	250	52.1	250
Selenium	7782-49-2	50	50	18	NS	15	4.43	18
Silver	7440-22-4	NS	100	8	NS	5	0.84	8
Sodium	7440-23-5	NS	NS	200	NS	200	10.4	200
Strontium	7440-24-6	NS	NS	2	NS	2	0.15	2
Thallium	7440-28-0	2 [3]	2 [3]	17	NS	17	1.26	17
Tin	7440-31-5	NS	NS	10	NS	10	0.76	10

QAPP Worksheet #15-8
Reference Limits and Evaluation Table

Matrix: Groundwater
Analytical Group: ICP Metals
Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L) Federal MCLs	Project Action Limit [1] (µg/L) NYS Drinking Water MCLs	Project Quantitation Limit (µg/L)	Analytical Method SERAS SOP 1811, Rev. 4.0		Achievable Laboratory Limits (µg/L) [a]	
					MDLs (µg/L)	Method QLs (µg/L)	MDLs[2] (µg/L)	QLs (µg/L)
Vanadium	7440-62-2	NS	NS	3	NS	2	0.75	3
Zinc	7440-66-6	NS	5,000	22	NS	20	5.05	22

[a] Achievable Laboratory Limits based on digestion of 45 mL sample to 50 mL final volume.
NS = Not Specified
NA = Not Applicable

[1] Maximum Contaminant Levels as detailed in New York State Regulations Part 5, Subpart 5-1 Public Water Systems, Table 3.
[2] Based on LOD Study dated 12/16/10 for the iCAP 6500 using hot block digestion
[3] QLs exceed the benchmarks. For the first round of sampling, the QLs will be reported even though they exceed the benchmarks.

QAPP Worksheet #15-9
Reference Limits and Evaluation Table

Matrix: Groundwater – Collected using SP-16 Methodology for screening only.
Analytical Group: ICP Metals
Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L) Screening Only	Project Quantitation Limit (µg/L)	Analytical Method SERAS SOP 1811, Rev. 4.0		Achievable Laboratory Limits (µg/L) [a]	
				MDLs (µg/L)	Method QLs (µg/L)	MDLs[1] (µg/L)	QLs (µg/L)
Aluminum	7429-90-5	NS	90	NS	100	22.4	90
Antimony	7440-36-0	NS	10	NS	10	1.91	10
Arsenic	7440-38-2	NS	19	NS	20	2.45	19
Barium	7440-39-3	NS	3	NS	2	0.31	3
Beryllium	7440-41-7	NS	2	NS	2	0.18	2
Boron	7440-42-8	NS	10	NS	10	0.65	10
Cadmium	7440-43-9	NS	2	NS	2	0.1	2
Calcium	7440-70-2	NS	100	NS	60	44.3	100
Chromium	7440-47-3	NS	3	NS	3	0.48	3
Cobalt	7440-48-4	NS	2	NS	2	0.16	2
Copper	7440-50-8	NS	8	NS	5	0.48	8
Iron (2599)	7439-89-6	NS	40	NS	35	9.03	40
Iron (2714)	7439-89-6	NS	300	NS	300	48.0	300
Lead	7439-92-1	NS	10	NS	10	1.76	10
Magnesium	7439-95-4	NS	200	NS	160	15.6	200
Manganese	7439-96-5	NS	2	NS	2	0.11	2
Mercury		NS	0.200	NS	0.200	NA	0.200
Molybdenum	7439-98-7	NS	5	NS	5	0.39	5
Nickel	7440-02-0	NS	3	NS	3	0.64	3
Potassium	7440-09-7	NS	250	NS	250	52.1	250
Selenium	7782-49-2	NS	18	NS	15	4.43	18
Silver	7440-22-4	NS	8	NS	5	0.84	8
Sodium	7440-23-5	NS	200	NS	200	10.4	200
Strontium	7440-24-6	NS	2	NS	2	0.15	2
Thallium	7440-28-0	NS	17	NS	17	1.26	17

QAPP Worksheet #15-9
Reference Limits and Evaluation Table

Matrix: Groundwater – Collected using SP-16 Methodology for screening only.
Analytical Group: ICP Metals
Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L) Screening Only	Project Quantitation Limit (µg/L)	Analytical Method SERAS SOP 1811, Rev. 4.0		Achievable Laboratory Limits (µg/L) [a]	
				MDLs (µg/L)	Method QLs (µg/L)	MDLs[1] (µg/L)	QLs (µg/L)
Tin	7440-31-5	NS	10	NS	10	0.76	10
Vanadium	7440-62-2	NS	3	NS	2	0.75	3
Zinc	7440-66-6	NS	22	NS	20	5.05	22

[a] Achievable Laboratory Limits based on digestion of 45 mL sample to 50 mL final volume.
NS = Not Specified
NA = Not Applicable
[1] Based on LOD Study dated 12/16/10 for the iCAP 6500 using hot block digestion

QAPP Worksheet #15-10
Reference Limits and Evaluation Table

Matrix: Air
Analytical Group: VOCs by Photovac GC
Concentration Level: Low

Analyte	CAS Number	Project Action Limit (applicable units)	Project Quantitation Limit (ppbv)	Analytical Method		Achievable Laboratory Limits	
		See Note 2		MDL	Method QL	MDL[1] (ppbv)	QL (ppbv)
cis-1,2-Dichloroethene	156-59-2	10	10	NA	NA	2.71	10
Trichloroethene	79-01-6	10	10	NA	NA	3.73	10
Tetrachloroethene	127-18-4	10	10	NA	NA	3.53	10

[1] Based on LOD/LOQ Study conducted on 5/20/11 on the Voyager GC using the probe
[2.] Project Action limit is based on presence/absence of contaminants of concern in vapor stream, and is therefore equal to the quantitation limit.

QAPP Worksheet 15-11 (February 2012 Mobilization)
Reference Limits and Evaluation Table

Matrix: Soil Gas (SUMMA® Canister)

Analytical Group: VOA

Concentration Level: Low Level Scan

Analyte	CAS Number	Project Action Limit [1] (ppbv)	Project Quantitation Limit (ppbv)	SERAS SOP 1814 Analytical Method		Achievable Laboratory Limits	
				MDLs[2]	Method QLs	MDL s[3]	QLs
Trichloroethene	79-01-6	13.9	0.070	NS	0.030 ppbv	0.0070 ppbv	0.030 ppbv
Tetrachloroethene	127-18-4	3.7	0.070	NS	0.030 ppbv	0.0048 ppbv	0.030 ppbv
1,1-Dichloroethene	75-35-4	NS	0.070	NS	0.030 ppbv	0.0082 ppbv	0.030 ppbv
1,1-Dichloroethane	75-34-3	NS	0.070	NS	0.030 ppbv	0.0076 ppbv	0.030 ppbv
1,2-Dichloroethane	107-06-2	NS	0.070	NS	0.030 ppbv	0.0056 ppbv	0.030 ppbv
cis-1,2-Dichloroethene	156-59-2	NS	0.070	NS	0.030 ppbv	0.0084 ppbv	0.030 ppbv
trans-1,2-Dichloroethene	156-60-5	NS	0.070	NS	0.030 ppbv	0.0066 ppbv	0.030 ppbv
Vinyl chloride	75-01-4	NS	0.070	NS	0.030 ppbv	0.0078 ppbv	0.030 ppbv

[1] Based on correspondence between ERT and Region II. NS = not specified.
[2] Not Specified in SOP 1814.
[3]Based on LOD study conducted on Instrument#2 Air Toxics dated 8/19/11
µg/m^3 = microgram per cubic meter ppbv = parts per billion by volume NL = Not listed in Table 4 of Method TO-15

QAPP Worksheet 15-12 (February 2012 Mobilization)
Reference Limits and Evaluation Table

Matrix: Indoor and Ambient Air (SUMMA® Canister)

Analytical Group: VOA

Concentration Level: Low Level Scan

Analyte	CAS Number	Project Action Limit [1] (ppbv)	Project Quantitation Limit (ppbv)	SERAS SOP 1814 Analytical Method		Achievable Laboratory Limits	
				MDLs[2]	Method QLs	MDL s[3]	QLs
Trichloroethene	79-01-6	1.39	0.070	NS	0.030 ppbv	0.0070 ppbv	0.030 ppbv
Tetrachloroethene	127-18-4	0.37	0.070	NS	0.030 ppbv	0.0048 ppbv	0.030 ppbv
1,1-Dichloroethene	75-35-4	NS	0.070	NS	0.030 ppbv	0.0082 ppbv	0.030 ppbv
1,1-Dichloroethane	75-34-3	NS	0.070	NS	0.030 ppbv	0.0076 ppbv	0.030 ppbv
1,2-Dichloroethane	107-06-2	NS	0.070	NS	0.030 ppbv	0.0056 ppbv	0.030 ppbv
cis-1,2-Dichloroethene	156-59-2	NS	0.070	NS	0.030 ppbv	0.0084 ppbv	0.030 ppbv
trans-1,2-Dichloroethene	156-60-5	NS	0.070	NS	0.030 ppbv	0.0066 ppbv	0.030 ppbv
Vinyl chloride	75-01-4	NS	0.070	NS	0.030 ppbv	0.0078 ppbv	0.030 ppbv

[1] Based on correspondence between ERT and Region II. NS = not specified.
[2] Not Specified in SOP 1814.
[3]Based on LOD study conducted on Instrument#2 Air Toxics dated 8/19/11
µg/m^3 = microgram per cubic meter ppbv = parts per billion by volume NL = Not listed in Table 4 of Method TO-15

QAPP Worksheet 15-13 (February 2012 Mobilization)
Reference Limits and Evaluation Table

Matrix: Soil Gas

Analytical Group: VOA

Concentration Level: Low

Analyte	CAS Number	Project Action Limit * (ppbv)	Project Quantitation Limit (ppbv)	SERAS SOP 1814 Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs (ppbv)	MDLs[1] (ppbv)	QLs (ppbv)
Trichloroethene	79-01-6	3.7	0.070	NS	0.030	0.0070	0.030
Tetrachloroethene	127-18-4	13.9	0.070	NS	0.030	0.0048	0.030
1,1-Dichloroethane	75-34-3	NS	0.070	NS	0.030	0.0076	0.030
1,1-Dichloroethene	75-35-4	NS	0.070	NS	0.030	0.0082	0.030
Cis-1,2-Dichloroethene	156-59-2	NS	0.070	NS	0.030	0.0084	0.030
Trans-1,2-Dichloroethene	156-60-5	NS	0.070	NS	0.030	0.0066	0.030
1,1,1-Trichloroethane	71-55-6	NS	0.070	NS	0.030	0.0068	0.030
Methylene chloride	75-09-2	NS	0.070	NS	0.030	0.0071	0.030
1,2-Dichlorobenzene	95-50-1	NS	0.070	NS	0.030	0.0089	0.030
1,2-Dichloropropane	78-87-5	NS	0.070	NS	0.030	0.0103	0.030
1,3-Dichlorobenzene	541-73-1	NS	0.070	NS	0.030	0.0088	0.030
1,4-Dichlorobenzene	106-46-7	NS	0.070	NS	0.030	0.0127	0.030
cis-1,3-Dichloropropene	10061-01-5	NS	0.070	NS	0.030	0.0091	0.030
Trichlorofluoromethane	75-69-4	NS	0.070	NS	0.030	0.0070	0.030
trans-1,3-Dichloropropene	10061-02-6	NS	0.070	`NS	0.030	0.0092	0.030
Propylene	115-07-1	NS	0.070	NS	0.030	0.0240	0.030
Dichlorodifluoromethane	75-71-8	NS	0.070	NS	0.030	0.0143	0.030
Chloromethane	74-87-3	NS	0.070	NS	0.030	0.0096	0.030
Dichlorotetrafluoroethane	76-14-2	NS	0.070	NS	0.030	0.0056	0.030
Vinyl Chloride	75-01-4	NS	0.070	NS	0.030	0.0111	0.030
1,3-Butadiene	106-99-0	NS	0.070	NS	0.030	0.0040	0.030
Bromomethane	74-83-9	NS	0.070	NS	0.030	0.0117	0.030
Chloroethane	75-00-3	NS	0.070	NS	0.030	0.0162	0.030

QAPP Worksheet 15-13 (February 2012 Mobilization)
Reference Limits and Evaluation Table

Matrix: Soil Gas

Analytical Group: VOA

Concentration Level: Low

Analyte	CAS Number	Project Action Limit * (ppbv)	Project Quantitation Limit (ppbv)	SERAS SOP 1814 Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs (ppbv)	MDLs[1] (ppbv)	QLs (ppbv)
Acetone	67-64-1	NS	0.070	NS	0.030	0.0179	0.030
Isopropyl Alcohol	78-83-1	NS	0.070	NS	0.030	0.0141	0.030
Trichlorotrifluoroethane	76-13-1	NS	0.070	NS	0.030	0.0053	0.030
MTBE	1634-04-4	NS	0.070	NS	0.030	0.0068	0.030
Vinyl Acetate	108-05-4	NS	0.070	NS	0.030	0.0111	0.030
2-Butanone	78-93-3	NS	0.070	NS	0.030	0.0054	0.030
Ethyl Acetate	141-78-6	NS	0.070	NS	0.030	0.0040	0.030
Hexane	110-54-3	NS	0.070	NS	0.030	0.0119	0.030
Chloroform	67-66-3	NS	0.070	NS	0.030	0.0101	0.030
Tetrahydrofuran	109-99-9	NS	0.070	NS	0.030	0.0108	0.030
Benzene	71-43-2	NS	0.070	NS	0.030	0.0059	0.030
Carbon Tetrachloride	56-23-5	NS	0.070	NS	0.030	0.0035	0.030
Cyclohexane	110-82-7	NS	0.070	NS	0.030	0.0083	0.030
1,4-Dioxane	123-91-1	NS	0.070	NS	0.030	0.0083	0.030
Heptane	142-82-5	NS	0.070	NS	0.030	0.0090	0.030
Methyl Isobutyl Ketone	108-10-1	NS	0.070	NS	0.030	0.0110	0.030
1,1,2-Trichloroethane	79-00-5	NS	0.070	NS	0.030	0.0036	0.030
Toluene	108-88-3	NS	0.070	NS	0.030	0.0041	0.030
2-Hexanone	591-78-6	NS	0.070	NS	0.030	0.0145	0.030
Dibromochloromethane	124-48-1	NS	0.070	NS	0.030	0.083	0.030
1,2-Dibromoethane	106-93-4	NS	0.070	NS	0.030	0.0040	0.030
Chlorobenzene	108-90-7	NS	0.070	NS	0.030	0.0060	0.030
Ethylbenzene	100-41-4	NS	0.070	NS	0.030	0.0058	0.030

QAPP Worksheet 15-13 (February 2012 Mobilization)
Reference Limits and Evaluation Table

Matrix: Soil Gas

Analytical Group: VOA

Concentration Level: Low

Analyte	CAS Number	Project Action Limit * (ppbv)	Project Quantitation Limit (ppbv)	SERAS SOP 1814 Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs (ppbv)	MDLs[1] (ppbv)	QLs (ppbv)
m&p-Xylene	108-38-3/ 106-42-3	NS	0.070	NS	0.030	0.0065	0.030
Bromoform(Tribromomethane)	75-25-2	NS	0.070	NS	0.030	0.0080	0.030
Styrene	100-42-5	NS	0.070	NS	0.030	0.0069	0.030
1,1,2,2-Tetrachloroethane	79-34-5	NS	0.070	`NS	0.030	0.0080	0.030
o-Xylene	95-47-6	NS	0.070	NS	0.030	0.0051	0.030
Ethyltoluene	622-96-8	NS	0.070	NS	0.030	0.0062	0.030
1,3,5-trimethylbenzene	108-67-8	NS	0.070	NS	0.030	0.0073	0.030
1,2,4-Trimethylbenzene	95-63-6	NS	0.070	NS	0.030	0.0084	0.030

[1] Based on correspondence between ERT and Region II. NS = not specified.
[2] Not Specified in SOP 1814.
[3]Based on LOD study conducted on Instrument#2 Air Toxics dated 8/19/11
µg/m^3 = microgram per cubic meter ppbv = parts per billion by volume NL = Not listed in Table 4 of Method TO-15

QAPP Worksheet 15-14 (February 2012 Mobilization)
Reference Limits and Evaluation Table

Matrix: Indoor and Ambient Air

Analytical Group: VOA

Concentration Level: Low

Analyte	CAS Number	Project Action Limit * (ppbv)	Project Quantitation Limit (ppbv)	SERAS SOP 1814 Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs (ppbv)	MDLs[1] (ppbv)	QLs (ppbv)
Trichloroethene	79-01-6	0.37	0.070	NS	0.030	0.0070	0.030
Tetrachloroethene	127-18-4	1.39	0.070	NS	0.030	0.0048	0.030
1,1-Dichloroethane	75-34-3	NS	0.070	NS	0.030	0.0076	0.030
1,1-Dichloroethene	75-35-4	NS	0.070	NS	0.030	0.0082	0.030
Cis-1,2-Dichloroethene	156-59-2	NS	0.070	NS	0.030	0.0084	0.030
Trans-1,2-Dichloroethene	156-60-5	NS	0.070	NS	0.030	0.0066	0.030
1,1,1-Trichloroethane	71-55-6	NS	0.070	NS	0.030	0.0068	0.030
Methylene chloride	75-09-2	NS	0.070	NS	0.030	0.0071	0.030
1,2-Dichlorobenzene	95-50-1	NS	0.070	NS	0.030	0.0089	0.030
1,2-Dichloropropane	78-87-5	NS	0.070	NS	0.030	0.0103	0.030
1,3-Dichlorobenzene	541-73-1	NS	0.070	NS	0.030	0.0088	0.030
1,4-Dichlorobenzene	106-46-7	NS	0.070	NS	0.030	0.0127	0.030
cis-1,3-Dichloropropene	10061-01-5	NS	0.070	NS	0.030	0.0091	0.030
Trichlorofluoromethane	75-69-4	NS	0.070	NS	0.030	0.0070	0.030
trans-1,3-Dichloropropene	10061-02-6	NS	0.070	`NS	0.030	0.0092	0.030
Propylene	115-07-1	NS	0.070	NS	0.030	0.0240	0.030
Dichlorodifluoromethane	75-71-8	NS	0.070	NS	0.030	0.0143	0.030
Chloromethane	74-87-3	NS	0.070	NS	0.030	0.0096	0.030
Dichlorotetrafluoroethane	76-14-2	NS	0.070	NS	0.030	0.0056	0.030
Vinyl Chloride	75-01-4	NS	0.070	NS	0.030	0.0111	0.030
1,3-Butadiene	106-99-0	NS	0.070	NS	0.030	0.0040	0.030
Bromomethane	74-83-9	NS	0.070	NS	0.030	0.0117	0.030

QAPP Worksheet 15-14 (February 2012 Mobilization)
Reference Limits and Evaluation Table

Matrix: Indoor and Ambient Air

Analytical Group: VOA

Concentration Level: Low

Analyte	CAS Number	Project Action Limit * (ppbv)	Project Quantitation Limit (ppbv)	SERAS SOP 1814 Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs (ppbv)	MDLs[1] (ppbv)	QLs (ppbv)
Chloroethane	75-00-3	NS	0.070	NS	0.030	0.0162	0.030
Acetone	67-64-1	NS	0.070	NS	0.030	0.0179	0.030
Isopropyl Alcohol	78-83-1	NS	0.070	NS	0.030	0.0141	0.030
Trichlorotrifluoroethane	76-13-1	NS	0.070	NS	0.030	0.0053	0.030
MTBE	1634-04-4	NS	0.070	NS	0.030	0.0068	0.030
Vinyl Acetate	108-05-4	NS	0.070	NS	0.030	0.0111	0.030
2-Butanone	78-93-3	NS	0.070	NS	0.030	0.0054	0.030
Ethyl Acetate	141-78-6	NS	0.070	NS	0.030	0.0040	0.030
Hexane	110-54-3	NS	0.070	NS	0.030	0.0119	0.030
Chloroform	67-66-3	NS	0.070	NS	0.030	0.0101	0.030
Tetrahydrofuran	109-99-9	NS	0.070	NS	0.030	0.0108	0.030
Benzene	71-43-2	NS	0.070	NS	0.030	0.0059	0.030
Carbon Tetrachloride	56-23-5	NS	0.070	NS	0.030	0.0035	0.030
Cyclohexane	110-82-7	NS	0.070	NS	0.030	0.0083	0.030
1,4-Dioxane	123-91-1	NS	0.070	NS	0.030	0.0083	0.030
Heptane	142-82-5	NS	0.070	NS	0.030	0.0090	0.030
Methyl Isobutyl Ketone	108-10-1	NS	0.070	NS	0.030	0.0110	0.030
1,1,2-Trichloroethane	79-00-5	NS	0.070	NS	0.030	0.0036	0.030
Toluene	108-88-3	NS	0.070	NS	0.030	0.0041	0.030
2-Hexanone	591-78-6	NS	0.070	NS	0.030	0.0145	0.030
Dibromochloromethane	124-48-1	NS	0.070	NS	0.030	0.083	0.030
1,2-Dibromoethane	106-93-4	NS	0.070	NS	0.030	0.0040	0.030
Chlorobenzene	108-90-7	NS	0.070	NS	0.030	0.0060	0.030

QAPP Worksheet 15-14 (February 2012 Mobilization)
Reference Limits and Evaluation Table

Matrix: Indoor and Ambient Air

Analytical Group: VOA

Concentration Level: Low

Analyte	CAS Number	Project Action Limit * (ppbv)	Project Quantitation Limit (ppbv)	SERAS SOP 1814 Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs (ppbv)	MDLs[1] (ppbv)	QLs (ppbv)
Ethylbenzene	100-41-4	NS	0.070	NS	0.030	0.0058	0.030
m&p-Xylene	108-38-3/ 106-42-3	NS	0.070	NS	0.030	0.0065	0.030
Bromoform(Tribromomethane)	75-25-2	NS	0.070	NS	0.030	0.0080	0.030
Styrene	100-42-5	NS	0.070	NS	0.030	0.0069	0.030
1,1,2,2-Tetrachloroethane	79-34-5	NS	0.070	`NS	0.030	0.0080	0.030
o-Xylene	95-47-6	NS	0.070	NS	0.030	0.0051	0.030
Ethyltoluene	622-96-8	NS	0.070	NS	0.030	0.0062	0.030
1,3,5-trimethylbenzene	108-67-8	NS	0.070	NS	0.030	0.0073	0.030
1,2,4-Trimethylbenzene	95-63-6	NS	0.070	NS	0.030	0.0084	0.030

[1] Based on correspondence between ERT and Region II. NS = not specified.
[2] Not Specified in SOP 1814.
[3]Based on LOD study conducted on Instrument#2 Air Toxics dated 8/19/11
µg/m^3 = microgram per cubic meter ppbv = parts per billion by volume NL = Not listed in Table 4 of Method TO-15

QAPP Worksheet 15-15 (March 2013 Mobilization)
Reference Limits and Evaluation Table

Matrix: Soil Gas
Analytical Group: VOA
Concentration Level: SIM

Analyte	CAS Number	Project Action Limit * (ppbv)	Project Quantitation Limit (ppbv)	EPA TO-15 Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs (ppbv)	MDLs (ppbv)	QLs[1] (ppbv)
Trichloroethene	79-01-6	3.7	0.030	NS	0.030	Lab-specific	0.010
Tetrachloroethene	127-18-4	13.9	0.030	NS	0.030	Lab-specific	0.008
1,1-Dichloroethane	75-34-3	NS	0.030	NS	0.030	Lab-specific	0.012
1,1-Dichloroethene	75-35-4	NS	0.030	NS	0.030	Lab-specific	0.012
cis-1,2-Dichloroethene	156-59-2	NS	0.030	NS	0.030	Lab-specific	0.012
trans-1,2-Dichloroethene	156-60-5	NS	0.030	NS	0.030	Lab-specific	0.012
1,1,1-Trichloroethane	71-55-6	NS	0.030	NS	0.030	Lab-specific	0.010
Methylene chloride	75-09-2	NS	0.030	NS	0.030	Lab-specific	0.058
1,2-Dichlorobenzene	95-50-1	NS	0.030	NS	0.030	Lab-specific	0.008
1,2-Dichloropropane	78-87-5	NS	0.030	NS	0.030	Lab-specific	0.010
1,3-Dichlorobenzene	541-73-1	NS	0.030	NS	0.030	Lab-specific	0.008
1,4-Dichlorobenzene	106-46-7	NS	0.030	NS	0.030	Lab-specific	0.008
cis-1,3-Dichloropropene	10061-01-5	NS	0.030	NS	0.030	Lab-specific	0.012
Trichlorofluoromethane (Freon 11)	75-69-4	NS	0.030	NS	0.030	Lab-specific	0.008
trans-1,3-Dichloropropene	10061-02-6	NS	0.030	NS	0.030	Lab-specific	0.012
Dichlorodifluoromethane	75-71-8	NS	0.030	NS	0.030	Lab-specific	0.010
Chloromethane	74-87-3	NS	0.030	NS	0.030	Lab-specific	0.024
Vinyl Chloride	75-01-4	NS	0.030	NS	0.030	Lab-specific	0.020
Bromomethane	74-83-9	NS	0.030	NS	0.030	Lab-specific	0.012
Chloroethane	75-00-3	NS	0.030	NS	0.030	Lab-specific	0.018
Trichlorotrifluoroethane	76-13-1	NS	0.030	NS	0.030	Lab-specific	0.006
Chloroform	67-66-3	NS	0.030	NS	0.030	Lab-specific	0.040
Benzene	71-43-2	NS	0.030	NS	0.030	Lab-specific	0.046
Carbon Tetrachloride	56-23-5	NS	0.030	NS	0.030	Lab-specific	0.008
1,1,2-Trichloroethane	79-00-5	NS	0.030	NS	0.030	Lab-specific	0.036

QAPP Worksheet 15-15 (March 2013 Mobilization)
Reference Limits and Evaluation Table

Matrix: Soil Gas
Analytical Group: VOA
Concentration Level: SIM

Analyte	CAS Number	Project Action Limit * (ppbv)	Project Quantitation Limit (ppbv)	EPA TO-15 Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs (ppbv)	MDLs (ppbv)	QLs[1] (ppbv)
Toluene	108-88-3	NS	0.030	NS	0.030	Lab-specific	0.054
1,2-Dibromoethane	106-93-4	NS	0.030	NS	0.030	Lab-specific	0.006
Chlorobenzene	108-90-7	NS	0.030	NS	0.030	Lab-specific	0.044
Ethylbenzene	100-41-4	NS	0.030	NS	0.030	Lab-specific	0.046
m&p-Xylene	108-38-3/ 106-42-3	NS	0.030	NS	0.030	Lab-specific	0.046
Bromodichloromethane	75-27-4	NS	0.030	NS	0.030	Lab-specific	0.008
1,1,2,2-Tetrachloroethane	79-34-5	NS	0.030	`NS	0.030	Lab-specific	0.008
o-Xylene	95-47-6	NS	0.030	NS	0.030	Lab-specific	0.046
Naphthalene	91-20-3	NS	0.030	NS	0.030	Lab-specific	0.038
1,2,4-Trichlorobenzene	120-82-1	NS	0.030	NS	0.030	Lab-specific	0.006
1,2-dichlorethane	107-06-2	NS	0.030	NS	0.030	Lab-specific	0.012

[1] From ALS Laboratory. QLs assume a pressurization dilution factor of 2.
NS = not specified.
µg/m^3 = microgram per cubic meter
ppbv = parts per billion by volume

QAPP Worksheet 15-16 (March 2013 Mobilization)
Reference Limits and Evaluation Table

Matrix: Air
Analytical Group: VOA
Concentration Level: SIM

Analyte	CAS Number	Project Action Limit * (ppbv)	Project Quantitation Limit (ppbv)	EPA TO-15 Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs (ppbv)	MDLs (ppbv)	QLs[1] (ppbv)
Trichloroethene	79-01-6	0.37	0.030	NS	0.030	Lab-specific	0.010
Tetrachloroethene	127-18-4	1.39	0.030	NS	0.030	Lab-specific	0.008
1,1-Dichloroethane	75-34-3	NS	0.030	NS	0.030	Lab-specific	0.012
1,1-Dichloroethene	75-35-4	NS	0.030	NS	0.030	Lab-specific	0.012
cis-1,2-Dichloroethene	156-59-2	NS	0.030	NS	0.030	Lab-specific	0.012
trans-1,2-Dichloroethene	156-60-5	NS	0.030	NS	0.030	Lab-specific	0.012
1,1,1-Trichloroethane	71-55-6	NS	0.030	NS	0.030	Lab-specific	0.010
Methylene chloride	75-09-2	NS	0.030	NS	0.030	Lab-specific	0.058
1,2-Dichlorobenzene	95-50-1	NS	0.030	NS	0.030	Lab-specific	0.008
1,2-Dichloropropane	78-87-5	NS	0.030	NS	0.030	Lab-specific	0.010
1,3-Dichlorobenzene	541-73-1	NS	0.030	NS	0.030	Lab-specific	0.008
1,4-Dichlorobenzene	106-46-7	NS	0.030	NS	0.030	Lab-specific	0.008
cis-1,3-Dichloropropene	10061-01-5	NS	0.030	NS	0.030	Lab-specific	0.012
Trichlorofluoromethane (Freon 11)	75-69-4	NS	0.030	NS	0.030	Lab-specific	0.008
trans-1,3-Dichloropropene	10061-02-6	NS	0.030	`NS	0.030	Lab-specific	0.012
Dichlorodifluoromethane	75-71-8	NS	0.030	NS	0.030	Lab-specific	0.010
Chloromethane	74-87-3	NS	0.030	NS	0.030	Lab-specific	0.024
Vinyl Chloride	75-01-4	NS	0.030	NS	0.030	Lab-specific	0.020
Bromomethane	74-83-9	NS	0.030	NS	0.030	Lab-specific	0.012
Chloroethane	75-00-3	NS	0.030	NS	0.030	Lab-specific	0.018
Trichlorotrifluoroethane	76-13-1	NS	0.030	NS	0.030	Lab-specific	0.006
Chloroform	67-66-3	NS	0.030	NS	0.030	Lab-specific	0.040
Benzene	71-43-2	NS	0.030	NS	0.030	Lab-specific	0.046
Carbon Tetrachloride	56-23-5	NS	0.030	NS	0.030	Lab-specific	0.008
1,1,2-Trichloroethane	79-00-5	NS	0.030	NS	0.030	Lab-specific	0.036

QAPP Worksheet 15-16 (March 2013 Mobilization)
Reference Limits and Evaluation Table

Matrix: Air
Analytical Group: VOA
Concentration Level: SIM

Analyte	CAS Number	Project Action Limit * (ppbv)	Project Quantitation Limit (ppbv)	EPA TO-15 Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs (ppbv)	MDLs (ppbv)	QLs[1] (ppbv)
Toluene	108-88-3	NS	0.030	NS	0.030	Lab-specific	0.054
1,2-Dibromoethane	106-93-4	NS	0.030	NS	0.030	Lab-specific	0.006
Chlorobenzene	108-90-7	NS	0.030	NS	0.030	Lab-specific	0.044
Ethylbenzene	100-41-4	NS	0.030	NS	0.030	Lab-specific	0.046
m&p-Xylene	108-38-3/ 106-42-3	NS	0.030	NS	0.030	Lab-specific	0.046
Bromodichloromethane	75-27-4	NS	0.030	NS	0.030	Lab-specific	0.008
1,1,2,2-Tetrachloroethane	79-34-5	NS	0.030	`NS	0.030	Lab-specific	0.008
o-Xylene	95-47-6	NS	0.030	NS	0.030	Lab-specific	0.046
Naphthalene	91-20-3	NS	0.030	NS	0.030	Lab-specific	0.038
1,2,4-Trichlorobenzene	120-82-1	NS	0.030	NS	0.030	Lab-specific	0.006
1,2-dichloroethane	107-06-2	NS	0.030	NS	0.030	Lab-specific	0.012

[1] From ALS Laboratory. QLs assume a pressurization dilution factor of 2.
NS = not specified.
µg/m^3 = microgram per cubic meter
ppbv = parts per billion by volume

QAPP Worksheet #16-1
Project Schedule Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Preparation of QAPP	SERAS	5/2/2011	6/5/2011	UFP-QAPP	6/6/2011
Health and Safety Plan	SERAS	6/3/2011	6/6/2011	Health and Safety Plan	6/6/2011
RFQ for Geoprobe Sampling Assistance	SERAS	5/2/2011	5/9/2011	RFQ	5/9/2011
Preliminary Work Assignment	SERAS	6/2/2011	6/2/2011	PWA	6/2/2011
Soil Gas Sampling Event	SERAS	6/13/2011	6/17/2011	NA	NA
Groundwater/Soil Sampling Event	SERAS	TBD	TBD	NA	NA
Preliminary Data Package	SERAS	Upon receipt of Samples	2 weeks from receipt of last sample.	Unvalidated Data Package	2 weeks from receipt of last sample.
Final Validated Analytical Results	SERAS	Receipt of Unvalidated Data Package	2 weeks from receipt of Unvalidated Data Package	Validated Data Package	2 weeks from receipt of Unvalidated Data Package
Draft Final Report	SERAS	Receipt of Validated Data Package	2 weeks from receipt of Validated Data Package	Draft Final Report	2 weeks from receipt of Validated Data Package
Final Report	SERAS	Receipt of comments from WAM regarding Draft Final Report	1 week from receipt of comments from WAM	Final Report	1 week from receipt of comments from WAM
Conceptual Site Model	SERAS	TBD	TBD	CSM	TBD

QAPP Worksheet #16-2 (February 2012 Mobilization)
Project Schedule Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Preparation of QAPP	SERAS	2/23/2011	2/27/2012	UFP-QAPP	2/27/2012
Health and Safety Plan	SERAS	2/24/2012	2/24/2012	Health and Safety Plan	2/24/2012
Preliminary Work Assignment	SERAS	2/23/2012	2/23/2012	PWA	2/23/2012
Sampling Event	SERAS	2/28/2012	3/3/2012	NA	NA
Preliminary Data Package	SERAS	Upon receipt of Samples	5 Business days from receipt of last sample.	Unvalidated Data Package	5 Business days from receipt of last sample.
Final Validated Analytical Results	SERAS	Receipt of Unvalidated Data Package	1 weeks from receipt of Unvalidated Data Package	Validated Data Package	1 week from receipt of Unvalidated Data Package
Draft Final Report	SERAS	Receipt of Validated Data Package	2 weeks from receipt of Validated Data Package	Draft Final Report	2 weeks from receipt of Validated Data Package
Final Report	SERAS	Receipt of comments from WAM regarding Draft Final Report	1 week from receipt of comments from WAM	Final Report	1 week from receipt of comments from WAM

QAPP Worksheet #16-3 (March 2013 Mobilization)
Project Schedule Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Sampling Event	SERAS	3/18/2013	3/27/2013	NA	NA
Preliminary Data Package	SERAS	3/28/2013	10 Business days from receipt of last sample.	Unvalidated Data Package	10 Business days from receipt of last sample.
Final Validated Analytical Results	SERAS	Receipt of Unvalidated Data Package	2 weeks from receipt of Unvalidated Data Package	Validated Data Package	2 weeks from receipt of Unvalidated Data Package
Draft Trip Report	SERAS	Receipt of Validated Data Package	3 weeks from receipt of Validated Data Package	Draft Trip Report	3 weeks from receipt of Validated Data Package
Final Trip Report	SERAS	Receipt of comments from WAM regarding Draft Final Report	1 week from receipt of comments from WAM	Final Trip Report	1 week from receipt of comments from WAM

QAPP Worksheet #17
Sampling Design and Rationale

Describe and provide a rationale for choosing the sampling approach (e.g., grid system, biased statistical approach): Sampling locations will be judgmentally chosen by the Region 2 RPM and WAM based on historical research into possible contamination sources. At each suspected source, soil gas samples will be collected from both inside (sub-slab soil gas) or around the property. When the field screening results indicate the presence of PCE, TCE or cis 1,2 DCE content, further sampling may be requested by the WAM or RPM. Results from field screening soil gas samples will also be used to determine future sampling of sub-surface soils for use in the CSM. Groundwater samples will be collected from previously installed monitoring wells and public water sources. These will be determined by the Region 2 RPM and WAM. Temporary well points using SP-16 methodology may be used to collect groundwater samples around suspected source areas. Groundwater results will be used to augment existing data for the RI and will assist in the generation of the CSM.

For the February 2012 sampling event, previous soil gas sampling results have indicated the presence of PCE, TCE and some of the breakdown products at the properties to be sampled.

For the March 2013 sampling event, previous soil gas sampling results have indicated the presence of PCE, TCE and some of the breakdown products at a property previously sampled. Two new properties will be sampled.

Describe the sampling design and rationale in terms of what matrices will be sampled, what analytical groups will be analyzed and at what concentration levels, the sampling locations (including QC, critical, and background samples), the number of samples to be taken, and the sampling frequency (including seasonal considerations) [May refer to map or Worksheet #18 for details]:
Soil gas is the primary matrix to be sampled during the initial field event. The soil gas will be collected in Tedlar bags and analyzed on-site. Ten percent of the soil gas locations will be sampled by collecting a grab sample in a SUMMA canister and submitted to the ERT/SERAS Laboratory ofr confirmation analysis. Approximately 60 soil gas locations have been planned, as detailed in Worksheets 18 and 19. Samples will be located at approximately 8 separate areas within the city of Cabo Rojo.

Groundwater samples will be collected from approximately 50 locations (exact details to be determined by RPM and WAM). Water samples may contain VOC levels from trace to high. Should the source be located, it would be assumed that percent levels of contaminant could be present.

Soil samples will be collected (up to 50) from suspected source areas to assist with the delineation of the source area as well as the quantity of impacted soils.

For the February 2012 mobilization, ambient air, indoor air and soil gas sampling will be performed during this sampling event. Six locations have been identified for sampling based upon previous sample events. Approximately 66 Summa samples will be collected for VOC analysis. Approximately 25 samples from a school and a near-by print shop will be analyzed for a full TO-15 list. Of thise 25 sample approximately 6 will be ambient air samples, 8 will be soil gas samples and 10 will be indoor air samples. The trip blank will also be analyzed for a full TO-15 list. The remaing 41 samples will be collected at four other locations and analyzed fro PCE, TCE and six other breakdown products. Approximately 9 ambient air samples, 20 soil gas samples and 12 indoor air samples will be collected.

In March 2013, twenty-four hour soil gas, indoor air and ambient air samples will be collected in SUMMA® canisters to determine if chemicals present in the soil gas or nearby industrial sources are affecting indoor air or ambient air. Samples collected will be analyzed by ALS Laboratories (formerly Columbia) for 36 compound SIM VOC list.

QAPP Worksheet #18-1
Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ID Number	Matrix	Depth ( )	Analytical Group	Concentration Level	Number of Samples (identify field duplicates	Sampling SOP Reference[1]	Rationale for Sampling Location
To Be Determined	Soil Gas	TBD	PCE, TCE, cis 1,2 DCE	Low	35(4)	SERAS SOP #2042	Judgmental
To Be Determined	Soil Gas	Sub-Slab	PCE, TCE, cis 1,2 DCE	Low	25(3)	SERAS SOP #2082	Judgmental
To Be Determined	Soil Gas	Varies	VOCs	Low	6	SERAS SOP #1704	Judgmental
To Be Determined	Groundwater	Varies	VOCs	Trace	50(5)	SERAS SOP #2007	Judgmental
		Varies	TAL Metals	Low	25(3)	SERAS SOP #2007	Judgmental
		Varies	PCBs/Pesticides	Low	25(3)	SERAS SOP #2007	Judgmental
		Varies	SVOCs	Low	25(3)	SERAS SOP #2007	Judgmental
To Be Determined	Soil	Varies (<20 feet)	VOC	Low	20(2)	SERAS SOP #2012	Judgmental

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #21)

QAPP Worksheet #18-2 (February 2012 Mobilization)
Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ID Number	Matrix	Depth ( )	Analytical Group	Concentration Level	Number of Samples (identify field duplicates	Sampling SOP Reference[1]	Rationale for Sampling Location
S2A	Soil Gas	Sub-Slab	PCE, TCE, VC, 1,1-DCE, 1,1-DCA, 1,2-DCA, cis-1,2- DCE, trans-1,2-DCE	ppb to ppm levels	4	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	2		
S2B	Soil Gas	Sub-Slab	PCE, TCE, VC, 1,1-DCE, 1,1-DCA, 1,2-DCA, cis-1,2- DCE, trans-1,2-DCE	ppb to ppm levels	3	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	2+1		
	Ambient Air	Breathing height		Low	3		
DEC	Soil Gas	Sub-Slab	PCE, TCE, VC, 1,1-DCE, 1,1-DCA, 1,2-DCA, cis-1,2- DCE, trans-1,2-DCE	ppb to ppm levels	5	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	3		
	Ambient Air	Breathing height		Low	1		
CRPDC	Soil Gas	Sub-Slab	PCE, TCE, VC, 1,1-DCE, 1,1-DCA, 1,2-DCA, cis-1,2- DCE, trans-1,2-DCE	ppb to ppm levels	3	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	2		
	Ambient Air	Breathing height		Low	1		
EQP	Soil Gas	Sub-Slab	VOCs	ppb to ppm levels	10	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	9+2		
	Ambient Air	Breathing height		Low	5		
MHS	Soil Gas	Sub-Slab	TCE, PCE, VC, 1,1-DCE, trans-1,2-DCE,	ppb to ppm levels	7	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	8		

QAPP Worksheet #18-2 (February 2012 Mobilization)
Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ID Number	Matrix	Depth ( )	Analytical Group	Concentration Level	Number of Samples (identify field duplicates	Sampling SOP Reference[1]	Rationale for Sampling Location
	Ambient Air	Breathing height	1,1-DCA, cis-1,2-DCE, 1,2-DCA	Low	2		
CSA	Soil Gas	Sub-Slab	TCE, PCE, VC, 1,1-DCE, trans-1,2-DCE, MeCl2, 1,1-DCA, cis-1,2-DCE, CHCl3, 1,2-DCA, benzene, toluene, Ethylbenzene, 1,2,4-TMB	ppb to ppm levels	7	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	8		
	Ambient Air	Breathing height		Low	1		
FH 44A 44B 115 J4 L 112	Soil Gas	Sub-Slab	TCE, PCE, VC, 1,1-DCE, trans-1,2-DCE, MeCl2, 1,1-DCA, cis-1,2-DCE, CHCl3, 1,2-DCA, benzene, toluene, Ethylbenzene, 1,2,4-TMB	ppb to ppm levels	20	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	20		
10AF 115ACX J2	Soil Gas	Sub-Slab	PCE, TCE, VC, 1,1-DCE, 1,1-DCA, 1,2-DCA, cis-1,2-DCE, trans-1,2-DCE	ppb to ppm levels	3	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	3		
	Ambient Air	Breathing height		Low	3		

QAPP Worksheet #18-2 (February 2012 Mobilization)
Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ID Number	Matrix	Depth ( )	Analytical Group	Concentration Level	Number of Samples (identify field duplicates	Sampling SOP Reference[1]	Rationale for Sampling Location
3AF 46C J3 15CX J1	Soil Gas	Sub-Slab	PCE, TCE, VC, 1,1-DCE, 1,1-DCA, 1,2-DCA, cis-1,2-DCE, trans-1,2-DCE	ppb to ppm levels	5	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	10		
NC 53DC 12AF 52H 8AF 55H 53H 53C 49C 51C 50H 115 J4 13CX CX6	Soil Gas	Sub-Slab	PCE, TCE, VC, 1,1-DCE, 1,1-DCA, 1,2-DCA, cis-1,2-DCE, trans-1,2-DCE	ppb to ppm levels	15	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	15		
PS	Soil Gas	Sub-Slab	TCE, PCE, VC, 1,1-DCE, trans-1,2-DCE, MeCl2, 1,1-DCA, cis-1,2-DCE, CHCl3, 1,2-DCA, benzene, toluene, Ethylbenzene, 1,2,4-TMB	ppb to ppm levels	2	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	2		
	Ambient Air	Breathing height		Low	1		
PFCS	Soil Gas	Sub-Slab	PCE, TCE, VC, 1,1-DCE, 1,1-DCA,	Low	7	SERAS SOP #1704	Judgmental

QAPP Worksheet #18-2 (February 2012 Mobilization)
Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ID Number	Matrix	Depth ( )	Analytical Group	Concentration Level	Number of Samples (identify field duplicates	Sampling SOP Reference[1]	Rationale for Sampling Location
	Indoor Air	Breathing height	1,2-DCA, cis-1,2-DCE, trans-1,2-DCE	Low	8		
	Ambient Air	Breathing height		Low	1		

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #21)

QAPP Worksheet #18-3 (March 2013 Mobilization)
Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ID Number	Matrix	Depth ( )	Analytical Group	Concentration Level	Number of Samples (identify field duplicates	Sampling SOP Reference[1]	Rationale for Sampling Location
EQP	Soil Gas	Sub-Slab	VOCs by TO-15 SIM	ppb to ppm levels	2	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	2 + 1 collocated		
	Ambient Air	Breathing height		Low	1 + 1 collocated		
SRHS	Soil Gas	Sub-Slab	VOCs by TO-15 SIM	ppb to ppm levels	2	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	1		
	Ambient Air	Breathing height		Low	1		
RCS	Soil Gas	Sub-Slab	VOCs by TO-15 SIM	ppb to ppm levels	3	SERAS SOP #1704	Judgmental
	Indoor Air	Breathing height		Low	2		
	Ambient Air	Breathing height		Low	1		
	Trip Blank	NA		Low	1		

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #21)

QAPP Worksheet #19
Analytical SOP Requirements Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference [1]	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Soil Gas	VOA	Low	EPA Method TO-15/SERAS SOP #1814	4-5 Liters	1, 6-L SUMMA®, Grab and 24-hour	none	30 days
Soil Gas	VOA	Low	Voyager Portable Gas Chromatograph User's Manual	5-50 mL	1-L Tedlar bag (1)	Protect from light	24 hours
Soil	VOA	Low	EPA SW-846 Method 8260B/SERAS SOP#1807	5 g (Terracore)	3 40-mL preweighed VOA vials with stirring bar + 4oz jar for Moisture content	4C	14 Days
Groundwater	VOA	Trace	SERAS SOP #1806	120 mL	3 – 40 mL VOA vials	1:1 HCl to pH <2, 4C	14 Days
Groundwater	PCBs	Low	SERAS SOP #1801	1 Liter	1, 1-Liter Amber Round Bottle	4C, Protected from light	Sample -7 Days Extract – 40 Days
Groundwater	SVOCs	Low	SERAS SOP #1804	1 Liter	1, 1-Liter Amber Round Bottle	4C, Protected from light	Sample -7 Days Extract – 40 Days
Groundwater	Pesticides	Low	SERAS SOP #1808	1 Liter	1, 1-Liter Amber Round Bottle	4C, Protected from light	Sample -7 Days Extract – 40 Days
Groundwater	TAL Metals (Including Hg)	Low	SERAS SOP #1811/SOP #1832	1 Liter	1 Liter Poly Bottle	HNO_3 to pH <2 4C	6 Months 28 days (Hg)
Indoor and Ambient Air	VOA	Low	EPA Method TO-15/SERAS SOP #1814	4-5 Liters	1, 6-L SUMMA®, 24-hour	none	30 days

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23)

QAPP Worksheet #20
Field Quality Control Sample Summary Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation SOP Reference[1]	No. of Sampling Locations	No. of Field Duplicate Pairs	No. of MS	No. of Field Blanks	No. of Trip Blanks	No. of PT Samples	Total No. of Samples to Lab
Soil Gas	VOA	Low	EPA Method TO-15	2	NA	NA	NA	1	NA	3
Soil Gas	VOA	Low	Voyager Portable Gas Chromatograph User's Manual	89	4	NA	NA	NA	NA	93
Soil	VOA	Low	EPA SW-846 Method 8260B/SERAS SOP#1807	20	1	2	NA	NA	NA	23
Groundwater	VOA	Trace	SERAS SOP #1806	50	3	5	1 per day	1 per shipment	NA	Up to 68
Groundwater	PCBs	Low	SERAS SOP #1801	25	2	3	1 per day	NA	NA	Up to 35
Groundwater	SVOCs	Low	SERAS SOP #1804	25	2	3	1 per day	NA	NA	Up to 35
Groundwater	Pesticides	Low	SERAS SOP #1808	25	2	3	1 per day	NA	NA	Up to 35
Groundwater	TAL Metals (Including Hg)	Low	SERAS SOP #1811/SOP #1832	25	2	3	1 per day	NA	NA	Up to 35
Soil Gas	VOA	Low	EPA Method TO-15	62	NA	NA	NA	NA	NA	62
Indoor and Ambient Air	VOA	Low	EPA Method TO-15	77/18	2	NA	NA	3	NA	98
Soil Gas	VOA	Low	EPA Method TO-15	7	NA	NA	NA	NA	NA	7
Indoor and Ambient Air	VOA	Low	EPA Method TO-15	5/3	1/1	NA	NA	1	NA	11

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23)

QAPP Worksheet #21
Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Check if yes)	Comments
1704	*SUMMA® Canister Sampling*	SERAS	6-L SUMMA[7]	☐	
2001	*General Field Sampling Guidelines*	SERAS	General Sampling	☐	
2002	*Sample Documentation*	SERAS	NA	☐	
2003	*Sample Storage, Preservation and Handling*	SERAS	Sample Handling	☐	
2004	*Sample Packaging and Shipment*	SERAS	Sample Handling	☐	
2005	*Quality Assurance/Quality Control Samples*	SERAS	NA	☐	
2006	*Sampling Equipment Decontamination*	SERAS	Sampling Equipment	☐	
2007	*Groundwater Well Sampling*	SERAS	Sampling Equipment	☐	
2012	*Soil Sampling*	SERAS	Direct Push	☐	
2042	*Soil Gas Sampling*	SERAS	1-L Tedlar Bag	☐	
2082	*Construction and Installation of Permanent Sub-Slab Soil Gas Wells*	SERAS	Ports	☐	
2102	*Tedlar Bag Sampling*	SERAS	1-L Tedlar Bag	☐	
4001	*Logbook Documentation*	SERAS	Site Activities	☐	
4005	*Chain of Custody Procedures*	SERAS	Sample Handling	☐	

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

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
Flow controller	NA	Clean	Check flow Analyze*	Check fittings	As needed	<RL	Remove from service	Lab Analyst	EPA Method TO-15
SUMMA® canisters	NA	Clean/Certify canister	Analyze*	Check for leaks	As cleaned and tested	< RL	Reclean and reanalyze	Lab Analyst	EPA Method TO-15
Electronic Flow Meter	Calibration by manufacturer	NA	NA	NA	Annual	Manufacturer's specifications	Recalibrate	Manufacturer or designated vendor	Manufacturer's operating guide
MultiRAE 10.6eV PID	Zero and Span Cal	Clean PID sensor and lamp as needed	Bump	Check keypad, LCD screen working, Check datalogger	Calibrate before use/monthly/ as needed	+/- 10%	Check gas concentration. Recalibrate, or clean sensor and lamp and recalibrate	Field Personnel	
Global Position System Receiver	NA	Keep GPS Clean and Charged	Verify operation	Prior to deployment in field, visual inspection	Daily	Varies with satellite reception.	Charge Batteries/ Replace	Task Leader	Per Manufacturer's instructions
YSI 650 MDS	Temperature		Compare temperature sensor reading to NIST thermometer measurement		Annually	±0.15 degree celsius	Contact manufacturer	Biologist	Manufacturer's manual
YSI 650 MDS	pH	Calibrate probe using standards that bracket expected values (pH 4, 7 and 10)	After performing 3-point calibration, immerse probe I pH 7 buffer to make sure it is reading correctly		As necessary	±0.05	Recalibrate	Biologist	Manufacturer's manual
YSI 650 MDS	Specific Conductance	Calibrate at a temperature of 25 degree Celsius			As necessary	±10%	Recalibrate	Biologist	Manufacturer's manual

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

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
YSI 650 MDS	Turbidity	2-point calibration	Insert probe in 10.0 NTU standard		As necessary	Between 9.5 and 10.0 NTU	Recalibrate	Biologist	Manufacturer's manual

[1]Specify the appropriate reference letter or number from the Project Sampling SOP References table (Worksheet #21)

QAPP Worksheet #23
Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?
Part No. 380301, Rev C	Voyager Portable Digital Gas Chromatograph User's Manual	Screening	VOA	Voyager GC	ERT/SERAS	☐
SERAS SOP#1811	Determination of Metals by Inductively Coupled Plasma (ICP) Methods, 3/17/06	Definitive	TAL Metals	ICP-AES	ERT/SERAS Laboratory, Edison, NJ	☐
SERAS SOP#1832	Determination of Mercury by Cold-Vapor Atomic Absorption (CVAA) 3/17/06	Definitive	Mercury	CVAA	ERT/SERAS Laboratory, Edison, NJ	☐
SERAS SOP#1807	Volatile Organic Analysis in Soil/Sediment by GC/MS, 1/23/06	Definitive	VOA	GC/MS	ERT/SERAS Laboratory, Edison, NJ	☐
SERAS SOP#1806	Volatile Organic Analysis in Water Samples by GC/MS, 1/12/06	Definitive	VOA	GC/MS	ERT/SERAS Laboratory, Edison, NJ	☐
SERAS SOP#1801	Routine Analysis of PCBs in Water and Soil/Sediment Samples by GC/ECD 1/23/06	Definitive	PCBs	GC/ECD	ERT/SERAS Laboratory, Edison, NJ	☐
SERAS SOP#1808	Routine Analysis of Pesticides in Water Samples by GC/ECD 1/23/06	Definitive	Pesticides	GC/ECD	ERT/SERAS Laboratory, Edison, NJ	☐
SERAS SOP#1804	Routine Analysis of Semi-volatiles in Water by GC/MS 1/23/06	Definitive	SVOCs	GC/MS	ERT/SERAS Laboratory, Edison, NJ	☐
SERAS SOP #1814	GC/MS Analysis of Sorbent Tubes and Canisters	Definitive	VOAs	GC/MS	ERT/SERAS Laboratory, Edison, NJ	☐
EPA Method TO-15	Determination of VOCs in air collected in specially prepared canisters and analyzed by Gas Chromatography Mass Spectrometry (GCMS)	Definitive	VOC	GC/MS	ALS Laboratory, Simi Valley, CA	☐

QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
Photovac Voyager GC (Air)	Initial calibration (IC), minimum 4-points	Each day	r>0.995	Inspect system for problems; perform maintenance. Rerun IC	Analyst	Photovac Voyager Digital gas Chromatograph User's Manual/ Attachment 1
Photovac Voyager GC (Air)	Continuing calibration (CC)	Every 20 samples	Percent difference (%D) ±40%,	Rerun CC once. If needed, inspect system for problems, perform maintenance, rerun IC	Analyst	Photovac Voyager Digital gas Chromatograph User's Manual/ Attachment 1
GC/MS (Air)	Initial calibration (IC), minimum 5-points	Initially	Relative standard deviation (RSD) =< 30%, two compounds may exceed up to 40%	Inspect system for problems; perform maintenance (i.e. ion source cleaning, column replacement, etc.). Rerun IC	Analyst	EPA Method TO - 15
GC/MS (Air)	Daily continuing calibration check (CCC)	Every 24 hours	Percent difference (%D) = ±30%	Rerun CCC. If needed, inspect system for problems, perform maintenance (i.e. ion source cleaning, column replacement, etc.), rerun IC	Analyst	EPA Method TO - 15
GC/MS	Initial Calibration Verification (ICV)	Immediately following an initial calibration	Percent recovery (%R) = ±30%	Rerun ICV. If needed, inspect system for problems, perform maintenance (i.e. ion source cleaning, column replacement, etc.), rerun IC	Analyst	EPA Method TO - 15

QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC/MS (GW SVOCs)	Initial calibration (IC), minimum 5-points	Initially	Relative standard deviation (RSD) =< 15%, calibration check compounds (CCC) compounds RSD< 30%, or r^2>0.98. Relative response factor (RRF) >0.05.	Inspect system for problems; perform maintenance (i.e. ion source cleaning, column replacement, etc.). Rerun IC	Analyst	SERAS SOP #1804
GC/MS (GW SVOCs)	Daily continuing calibration check (CCC)	Every 12 hours	Percent difference (%D) ±20%, RRF>0.05	Rerun CCC. If needed, inspect system for problems, perform maintenance (i.e. ion source cleaning, column replacement, etc.), rerun IC	Analyst	SERAS SOP #1804
GC/MS (GW VOAs)	Initial calibration (IC), minimum 5-points	Initially	Relative standard deviation (RSD) =< 15%, calibration check compounds (CCC) compounds RSD< 30%, or r^2>0.98. Relative response factor (RRF) >0.05, except system performance check compounds (SPCC)	Inspect system for problems; perform maintenance (i.e. ion source cleaning, column replacement, etc.). Rerun IC	Analyst	SERAS SOP #1806

QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference[1]
GC/MS (GW VOAs)	Daily continuing calibration check (CCC)	Every 12 hours	Percent difference (%D) ±20%, RRF>0.05, except SPCC	Rerun CCC. If needed, inspect system for problems, perform maintenance (i.e. ion source cleaning, column replacement, etc.), rerun IC	Analyst	SERAS SOP #1806
ICP - Metals	Blank and high standard, ICV/CCV every 10 samples	Each day of use	ICV/CCV ±10%	Perform maintenance, rerun calibration	SERAS Analyst	SERAS SOP #1811
CVAA (Mercury)	Initial 5-point, ICV/CCV after every 10 samples	Each day of use	r>0.995 (initial), ICV = ±10%, CCV = ±20%	Perform maintenance, rerun calibration	SERAS Analyst	SERAS SOP #1832
GC/ECD - Pesticides	Initial 5-point, daily mid level continuing cal check and cal check after every 12 Hours	Every 12 hours	%RSD $\leq$ 20%, continuing cal check %D $\leq$ 15%	Perform maintenance, rerun initial cal	Analyst	SERAS SOP #1808
GC/ECD - PCBs	Initial 5-point, daily mid level continuing cal check and cal check after every 12 Hours	Every 12 hours	%RSD $\leq$ 20%, continuing cal check %D $\leq$ 15%	Perform maintenance, rerun initial cal	Analyst	SERAS SOP #1801

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23)

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

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
ICP	Check Argon Supply	NA	NA	With each use	Sufficient Argon for ICP operation	Change tank	Analyst	SERAS SOP# 1811
	Inspect Drainage Container	NA	NA	With each use	Sufficient space	Empty	Analyst	
	Check Cooling System	NA	NA	With each use	Normal operation	Call Service Engineer	Analyst	
	Check RF Power Supply	NA	NA	With each use	Normal operation	Call Service Engineer	Analyst	
	Check Pump Winding Tubing	NA	NA	With each use	NA	Replace as necessary	Analyst	
	Check Argon Pressure to Instrument	NA	NA	With each use	70 psig	Call Service Engineer	Analyst	
	Check Nebulizer Pressure	NA	NA	With each use	Normal spray	Call Service Engineer	Analyst	
	Check Nebulizer Connection to Spray Chamber	NA	NA	With each use	NA	Clean and/or replace spray chamber/O-rings	Analyst	
	Check Torch, Nebulizer, Spray Chamber	NA	NA	As needed	Clean	Ultrasonic, acid or mild soap cleaning as appropriate	Analyst	
	Check exhaust system	NA	NA	With each use	Normal operation	Call Building Maintenance	Analyst	

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

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
GC/MS	Check gas supply daily, bake or change trap as needed, manual tune if 4-Bromofluorobenzene (BFB) not within criteria, cut or change column, change septum as needed.	VOC Analysis	Check ion source, gas supply, septum seal, vacuum, trap	Prior to sample analysis or when instrument does not meet criteria	BFB criteria achieved, Relative standard deviation (RSD) = ≤ 30%, two compounds may exceed up to 40% RSD in the IC	Recalibrate and/or perform necessary instrument maintenance, check calibration standards, re-analyze affected samples.	Analyst	SERAS SOP #1814
Voyager Portable GC	Check reservoir level			Weekly		Fill when necessary	Analyst	Voyager User's Manual
	Check MS ionization gauge			Weekly			Analyst	
	Check purge and trap pressure			Weekly		Adjust	Analyst	
	Check gas pressure			Weekly		Adjust/replace	Analyst	
	Check purge and trap			As needed		Replace	Analyst	
	Check vacuum pump oil level			Monthly		Fill	Analyst	
	Check purge vessel			Monthly		Replace	Analyst	
	GC column			Monthly		Clean	Analyst	
	Ion Source			As needed		Clean	Analyst	
VOA GC/MS	Check reservoir level			Weekly		Fill when necessary	Analyst	SERAS SOP #4001, Logbook Documentation

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

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
VOA GC/MS	Check MS ionization gauge			Weekly			Analyst	SERAS SOP #4001, Logbook Documentation
VOA GC/MS	Check Tekmar pressure			Weekly		Adjust	Analyst	SERAS SOP #4001, Logbook Documentation
VOA GC/MS	Check gas pressure			Weekly		Adjust/replace	Analyst	SERAS SOP #4001, Logbook Documentation
VOA GC/MS	Check Tekmar trap			As needed		Replace	Analyst	SERAS SOP #4001, Logbook Documentation
VOA GC/MS	Check vacuum pump oil level			Monthly		Fill	Analyst	SERAS SOP #4001, Logbook Documentation
VOA GC/MS	Check purge vessel			Monthly		Replace	Analyst	SERAS SOP #4001, Logbook Documentation
VOA GC/MS	GC column			Monthly		Clean	Analyst	SERAS SOP #4001, Logbook Documentation
VOA GC/MS	Ion Source			As needed		Clean	Analyst	SERAS SOP #4001, Logbook Documentation
SVOC GC/MS	Check pump fluid			Weekly		Fill when necessary	Analyst	SERAS SOP #4001, Logbook Documentation
SVOC GC/MS	Check MS ionization gauge			Weekly		Adjust	Analyst	SERAS SOP #4001, Logbook Documentation
SVOC GC/MS	Replace pump fluid			Every 6 months		Replace	Analyst	SERAS SOP #4001, Logbook Documentation

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

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
SVOC GC/MS	Check gas pressure			Weekly		Adjust/replace	Analyst	SERAS SOP #4001, Logbook Documentation
SVOC GC/MS	Check carrier gas trap			As needed		Replace	Analyst	SERAS SOP #4001, Logbook Documentation
SVOC GC/MS	Check diffusion pump fluid			Annual		Replace	Analyst	SERAS SOP #4001, Logbook Documentation
SVOC GC/MS	Check injection port			As needed		Clean	Analyst	SERAS SOP #4001, Logbook Documentation
SVOC GC/MS	GC column			Monthly		Clean	Analyst	SERAS SOP #4001, Logbook Documentation
SVOC GC/MS	Ion Source			As needed		Clean	Analyst	SERAS SOP #4001, Logbook Documentation
Leeman Hg Analyzer	Check argon supply	NA	NA	With each use	NA	Replace	Analyst	SERAS SOP #1832
Leeman Hg Analyzer	Drainage Container	NA	NA	With each use	NA	Empty	Analyst	SERAS SOP #1832
Leeman Hg Analyzer	Check sampling probe	NA	NA	With each use	NA	Replace	Analyst	SERAS SOP #1832
Leeman Hg Analyzer	Check stannous chloride line to pump	NA	NA	With each use	NA	Replace line/clean	Analyst	SERAS SOP #1832
Leeman Hg Analyzer	Check pump winding tube	NA	NA	With each use	NA	Clean/replace	Analyst	SERAS SOP #1832
Leeman Hg Analyzer	Check optical cell	NA	NA	As required	NA	Clean	Analyst	SERAS SOP #1832
Leeman Hg Analyzer	Check autosampler arm	NA	NA	As Required	NA	Lubricate	Analyst	SERAS SOP #1832

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

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
Leeman Hg Analyzer	Check Lamp Alignment	NA	NA	As required	NA	Adjust	Analyst	SERAS SOP #1832
Leeman Hg Analyzer	Check Drying Tube	NA	NA	As required	NA	Replace	Analyst	SERAS SOP #1832
GC/ECD	Check carrier gas pressure			With each use		Replace/adjust	Analyst	SERAS SOP #4001, Logbook Documentation
GC/ECD	Check column			With each use		Cut/clean	Analyst	SERAS SOP #4001, Logbook Documentation
GC/ECD	Check inlet seals			With each use		Replace	Analyst	SERAS SOP #4001, Logbook Documentation
GC/ECD	Check liner			With each user		Clean/replace	Analyst	SERAS SOP #4001, Logbook Documentation
GC/ECD	Check septa			With each use		Replace	Analyst	SERAS SOP #4001, Logbook Documentation
GC/ECD	Check pressure of make-up gas			With each use		Replace	Analyst	SERAS SOP #4001, Logbook Documentation

[1]Specify the appropriate reference letter or number from Analytical SOP References table (Worksheet #23)

QAPP Worksheet #25 (February 2012 and March 2013 Mobilizations)
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[1]
GC/MS	Check gas supply daily, bake or change trap as needed, manual tune if 4-Bromofluorobenzene (BFB) not within criteria, cut or change column, change septum as needed.	VOC Analysis	Check ion source, gas supply, septum seal, vacuum, trap	Prior to sample analysis or when instrument does not meet criteria	BFB criteria achieved, Relative standard deviation (RSD) = ≤ 30%, two compounds may exceed up to 40% RSD in the IC	Recalibrate and/or perform necessary instrument maintenance, check calibration standards, re-analyze affected samples.	Analyst	EPA Method TO – 15

[1]Specify the appropriate reference letter or number from Analytical SOP References table (Worksheet #23)

QAPP Worksheet #26-1
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): Jon McBurney, Scott Grossman, Amy Dubois, Rich Magan, Mike Cartwright, Colleen Steffensen / SERAS Personnel
Sample Packaging (Personnel/Organization): Jon McBurney, Scott Grossman, Amy Dubois, Rich Magan, Mike Cartwright, Colleen Steffensen / SERAS Personnel
Coordination of Shipment (Personnel/Organization): Jon McBurney, Mike Cartwright, Colleen Steffensen / SERAS Personnel
Type of Shipment/Carrier: Hand Carried to Field Laboratory or Federal Express to ERT/SERAS Laboratory in Edison, NJ
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Field Laboratory - Gerald Ball (SERAS), ERT/SERAS Laboratory - Larry Martin (SERAS)
Sample Custody and Storage (Personnel/Organization): Field Laboratory - Gerald Ball (SERAS), ERT/SERAS Laboratory - Larry Martin (SERAS)
Sample Preparation (Personnel/Organization): ERT/SERAS Laboratory - SERAS Chemists
Sample Determinative Analysis (Personnel/Organization): Field Laboratory - Gerald Ball (SERAS), ERT/SERAS Laboratory - SERAS Chemists
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples will be delivered to the Field Laboratory daily. Samples will be shipped to the ERT/SERAS laboratory at the end of the sampling event (5 days) with the exception of Soil and/or groundwater VOA samples. VOA samples will be shipped daily.
Sample Extract/Digestate Storage (No. of days from extraction/digestion): As Per Method Requirements. All samples are to be extracted, digested, and analyzed within holding times mandated by each analytical method.
Biological Sample Storage (No. of days from sample collection): NA
SAMPLE DISPOSAL
Personnel/Organization: Hazardous Waste Coordinator - ERT/SERAS
Number of Days from Analysis: As per laboratory standard procedures. Not less than 60 days for samples shipped to the ERT/SERAS Laboratory in Edison, NJ

QAPP Worksheet #26-2 (March 2013 Mobilization)
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): Philip Solinski, David Adams, Joe Brandine, Colleen Steffensen / SERAS Personnel
Sample Packaging (Personnel/Organization): Philip Solinski, David Adams, Joe Brandine, Colleen Steffensen / SERAS Personnel
Coordination of Shipment (Personnel/Organization): Philip Solinski, David Adams, Joe Brandine, Colleen Steffensen / SERAS Personnel
Type of Shipment/Carrier: Federal Express to ALS Laboratory
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Receiving Technician – ALS Laboratory
Sample Custody and Storage (Personnel/Organization): Sample Receiving Technician – ALS Laboratory
Sample Preparation (Personnel/Organization): ALS Laboratory - ALS Chemists
Sample Determinative Analysis (Personnel/Organization): ALS Laboratory - ALS Chemists
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples will be shipped to the ALS laboratory at the end of the sampling event.
Sample Extract/Digestate Storage (No. of days from extraction/digestion): NA
Biological Sample Storage (No. of days from sample collection): NA
SAMPLE DISPOSAL
Personnel/Organization: Hazardous Waste Coordinator – ALS Laboratory
Number of Days from Analysis: As per laboratory standard procedures.

QAPP Worksheet #27
Sample Custody Requirements

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): Each sample will be individually identified and labeled after collection and hand delivered to the field laboratory. The sample information will be recorded on chain-of-custody (COC) forms. The EPA Scribe program will be used for field documentation, generating labels and COC forms. The sample information will be recorded on COC forms, and the samples shipped to the appropriate laboratory via overnight delivery service, courier, or hand delivered. The EPA Scribe program will be used for field documentation,
Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal): Field laboratory personnel will accept custody of the shipped samples. Disposal of the samples will occur only after analyses and QA/QC checks are completed. Samples shipped to the ERT/SERAS Laboratory or ALS Laboratory will be accepted by the sample receiving technician. Samples will be checked for discrepancies, proper preservation, integrity, etc. If noted, issues will be forwarded to the Analytical Support Leader for corrective action. The sample custodian will relinquish custody to the appropriate department for analysis. At this time, no samples will be archived at the laboratory. Disposal of the samples will occur only after analyses and QA/QC checks are completed.
Sample Identification Procedures: Samples will be identified with unique location identifier based on location (property) name. Also included in sample identification will be SG for soil gas, GW for groundwater, SS for sub-slab soil gas, S for Soil. A progressive number XX will be added for multiple samples collected at a location. Example: Charlie's Cleaners would use CC-SG-01.
Chain-of-custody Procedures: All samples will be documented with SCRIBE and assigned to uniquely numbered chains of custody per SERAS SOP# 4005, *Chain of Custody Procedures.*

QAPP Worksheet #28-1
QC Samples Table

Matrix	Soil
Analytical Group	Volatile Organic Compounds
Concentration Level	Low
Sampling SOP	SERAS SOP #2012
Analytical Method (SOP Reference)	EPA SW-846 Method 6010B/SERAS SOP #1807
Sampler Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS
No. of Sample Locations	20

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Duplicate	1:20 samples	NA	Document in final deliverable	Task Leader	Precision	RPD ±35%
Matrix Spike	1:10 samples	1,1-Dichloroethene (%R=59-172) Trichloroethene (%R=62-137) Benzene (%R=66-142) Toluene (%R=59-139) Chlorobenzene (%R=60-133)	Document outliers in case narrative. Rerun if necessary	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Surrogate Spike	Each sample	1,2-Dichloroethane-d4 (%R=70-121) Toluene-d8 (%R=84-138) p-Bromofluorobenzene (%R=59-113)	Reanalyze sample to confirm matrix effects	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Internal Standard	Each sample	-50% to +100%	Reanalyze sample to confirm	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Laboratory Control Sample	1:20 samples	%R= Within control chart limits	Flag outliers and/or reanalyze	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits

QAPP Worksheet #28-1
QC Samples Table

Matrix	Soil
Analytical Group	Volatile Organic Compounds
Concentration Level	Low
Sampling SOP	SERAS SOP #2012
Analytical Method (SOP Reference)	EPA SW-846 Method 6010B/SERAS SOP #1807
Sampler Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS
No. of Sample Locations	20

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
MS/MSD	1:10 samples	1,1-Dichloroethene (RPD ±22%) Trichloroethene (RPD ±24%) Benzene (RPD ±21%) Toluene (RPD ±21%) Chlorobenzene (RPD ±21%)	Advisory - No Action required	Analyst	Precision	Same as Method/SOP QC Acceptance Limits
Method Blank	Every 12 hour shift	<RL	Reanalyze, flag data	Analyst	Accuracy/Bias (Contamination)	Same as Method/SOP QC Acceptance Limits
LOD/LOQ Study	Annual	LOD - Standard deviation multiplied by 5 must be less than the Reporting Limit LOQ – Second source standard must fall within control chart limits	Adjust RLs	Analyst	Sensitivity	Same as Method/SOP QC Acceptance Limits

QAPP Worksheet #28-2
QC Samples Table

Matrix	Groundwater
Analytical Group	VOA
Concentration Level	Low
Sampling SOP	SERAS SOP #2007
Analytical Method/ SOP Reference	SERAS SOP #1806
Sampler's Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS
No. of Sample Locations	50

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Internal Standards	Each sample	-50% to +100%	Reanalyze sample to confirm	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
LCS	1:20 samples	%R= Within control chart limits	Flag outliers/reanalyze	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
MS/MSD	1:10 samples	1,1-Dichloroethene (RPD ±14%) Trichloroethene (RPD ±14%) Benzene (RPD ±11%) Toluene (RPD ±13%) Chlorobenzene (RPD ±13%)	Advisory - No Action required	Analyst	Precision	Same as Method/SOP QC Acceptance Limits
Method Blank	Every 12 hour shift	<RL	Reanalyze, flag data	Analyst	Accuracy/Bias (Contamination)	Same as Method/SOP QC Acceptance Limits
LOD/LOQ Study	Annual	LOD - Standard deviation multiplied by 5 must be less than the Reporting Limit LOQ – Second source standard must fall within control chart limits	Adjust RLs	Analyst	Sensitivity	Same as Method/SOP QC Acceptance Limits

QAPP Worksheet #28-2
QC Samples Table

Matrix	Groundwater
Analytical Group	VOA
Concentration Level	Low
Sampling SOP	SERAS SOP #2007
Analytical Method/ SOP Reference	SERAS SOP #1806
Sampler's Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS
No. of Sample Locations	50

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Matrix Spike	1:10	1,1-Dichloroethene (%R=61-145) Trichloroethene (%R=71-120) Benzene (%R=76-127) Toluene (%R=76-125) Chlorobenzene (75-130)	Document outliers in case narrative. Rerun if necessary	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Surrogate Spike	Every Sample	1,2-Dichloroethane-d4 (%R=76-114) Toluene-d8 (%R=88-110) p-Bromofluorobenzene ((%R=86-115)	Reanalyze to confirm matrix effects	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Field Duplicate	1:20	NA	NA	NA	Precision	RPD ±20%
Field Blank	1 per day	NA	Flag data	QA/QC Chemist or Task Leader	Accuracy/Bias (Contamination)	<RL
Trip Blank	1 per shipment	NA	Flag data	QA/QC Chemist or Task Leader	Accuracy/Bias (Contamination)	<RL

QAPP Worksheet #28-3
QC Samples Table

Matrix	Water
Analytical Group	Pesticides
Concentration Level	Low
Sampling SOP	SERAS SOP #2007
Analytical Method/ SOP Reference	SERAS SOP #1808
Sampler's Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS
No. of Sample Locations	25

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Matrix Spikes	1:10	Gamma-BHC (%R=56-123) Heptachlor (%R=40-131) Aldrin (%R=40-120) Dieldrin (%R=52-126) Endrin (%R=56-121) 4,4'-DDT (%R=38-127)	If more than half out, the MS/MSD should be reanalyzed	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Surrogate Spike	Each sample	%R=30-150	Reanalyze sample	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Internal Standards	Each sample	50-150%	Reanalyze sample	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
LCS	1:20	Within control chart limits	Reanalyze if more than 3 are out	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
MS/MSD	1:10	Gamma-BHC (RPD±15%) Heptachlor (RPD±20%) Aldrin (RPD±22%) Dieldrin (RPD±18%) Endrin (RPD±21%) 4,4'-DDT (RPD±27%)	Advisory - No Action required	Analyst	Precision	Same as Method/SOP QC Acceptance Limits
Method Blank	1:20	<RL	Reanalyze	Analyst	Accuracy/Bias (Contamination)	Same as Method/SOP QC Acceptance Limits

QAPP Worksheet #28-3
QC Samples Table

Matrix	Water
Analytical Group	Pesticides
Concentration Level	Low
Sampling SOP	SERAS SOP #2007
Analytical Method/ SOP Reference	SERAS SOP #1808
Sampler's Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS
No. of Sample Locations	25

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Field Duplicate	1:20	NA	Document in report	Task Leader	Precision	RPD ±20%
Field Blank	1 per day	NA	Flag data	QA/QC Chemist Or Task Leader	Accuracy/Bias (Contamination)	<RL

QAPP Worksheet #28-4
QC Samples Table

Matrix	Water
Analytical Group	SVOC
Concentration Level	Low
Sampling SOP	SERAS SOP #2007
Analytical Method/ SOP Reference	SERAS SOP #1804
Sampler's Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS Laboratory
No. of Sample Locations	25

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Matrix Spike	1:20 samples	Phenol (%R=12-110) 2-Chlorophenol (%R=27-123) 1,4-dichlorobenzene (%R=36-97) N-Nitroso-di-n-propylamine (%R=41-116) 1,2,4 Trichlorobenzene (%R=39-98) 4-Chloro-3-methylphenol (%R=23-97) Acenaphthene (%R=46-118) 4-Nitrophenol (%R=10-80) 4-Dinitotoluene (%R=24-96) Pentachlorophenol (%R=9-103) Pyrene (%R=26-127)	If more than half out, the MS/MSD should be reanalyzed	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits

QAPP Worksheet #28-4
QC Samples Table

Matrix	Water
Analytical Group	SVOC
Concentration Level	Low
Sampling SOP	SERAS SOP #2007
Analytical Method/ SOP Reference	SERAS SOP #1804
Sampler's Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS Laboratory
No. of Sample Locations	25

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Matrix Spike duplicate	1:20 samples	Phenol RPD ±42% 2-Chlorophenol RPD ±40% 1,4-dichlorobenzene RPD ±28% N-Nitroso-di-n-propylamine RPD ±38% 1,2,4 Trichlorobenzene RPD ±28% 4-Chloro-3-methylphenol RPD ±42% Acenaphthene RPD ±31% 4-Nitrophenol RPD ±50% 2,4-Dinitotoluene RPD ±38% Pentachlorophenol RPD ±50% Pyrene RPD ±31%	If more than half out, the MS/MSD should be reanalyzed	Analyst	Precision	Same as Method/SOP QC Acceptance Limits
Internal Standards	Each sample	50-200%	Reanalyze sample	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Method Blank	1:20 samples	<RL	Reextract batch or flag data	Analyst	Accuracy/Bias (Contamination)	Same as Method/SOP QC Acceptance Limits
Surrogate Spikes	Each Sample	Nitrobenzene-d5 (%R=35-114%) 2-Fluorobiphenyl (%R=43-116%) Terphenyl-d14 (%R=33-141%) Phenol-d5 (%R=10-110%) 2-Fluorophenol (%R=21-110%) 2,4,6-Tribromophenol (%R=10-123%)	Reanalyze sample	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits

QAPP Worksheet #28-4
QC Samples Table

Matrix	Water
Analytical Group	SVOC
Concentration Level	Low
Sampling SOP	SERAS SOP #2007
Analytical Method/ SOP Reference	SERAS SOP #1804
Sampler's Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS Laboratory
No. of Sample Locations	25

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS	1:20 samples	%R= 70-130% or within control chart limits	Qualify data	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Field Blank	1 per day	NA	Flag Data	QA/QC Chemist or Task Leader	Accuracy/Bias (Contamination)	<RL

QAPP Worksheet #28-5
QC Samples Table

Matrix	Water
Analytical Group	Metals
Concentration Level	Low
Sampling SOP	SERAS SOP #2007
Analytical Method/ SOP Reference	SERAS SOP #1811
Sampler's Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS Laboratory
No. of Sample Locations	25

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Matrix Spike	Every 10 samples	%R = 75-125%	Rerun - no reprep is necessary; Qualify data	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
MS/MSD	Every 10 samples (between MS/MSD)	RPD ±20%	Rerun first, reprep if necessary or Qualify data	Analyst	Precision	Same as Method/SOP QC Acceptance Limits
LCS	Every 20 samples of same matrix	%R = 75-125%	Reanalyze first, then rerun batch or Qualify data	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
ICS (Interference Check Sample)	Once each 8-hour shift	± 20%	Rerun or recalibrate	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Method Blank	One per batch of 20 samples/same matrix	< RL	Reprep if concentration in samples is not at least 10X concentration in blank, investigate source of contamination	Analyst	Accuracy/Bias (Contamination)	Same as Method/SOP QC Acceptance Limits
Serial Dilution	5%	%D ±10%	Flag data	Analyst	Precision	Same as Method/SOP QC Acceptance Limits
Field Duplicate	5%	NA	Document in final deliverable	Task Leader	Precision	RPD ±20%
Field Blank	1 per day	NA	Flag or qualify data	QA/QC Chemist or Task Leader	Accuracy/Bias (Contamination)	<RL

QAPP Worksheet #28-6
QC Samples Table

Matrix	Groundwater
Analytical Group	Mercury
Concentration Level	Low
Sampling SOP	SERAS SOP #2007
Analytical Method/ SOP Reference	SERAS SOP #1832
Sampler's Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS
No. of Sample Locations	25

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Matrix Spike	1:10	%R=75-125	Rerun - no reprep is necessary	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
MS/MSD	1:10	RPD ±20 %	Rerun first, reprep if necessary	Analyst/Group Leader	Precision	Same as Method/SOP QC Acceptance Limits
LCS	1:20	%R=75-125% or within vendor PALs	Reanalyze first, then rerun batch	Analyst/Group Leader	Accuracy/Precision	Same as Method/SOP QC Acceptance Limits
Method Blank	One per batch of 20 samples/same matrix	< RL	Reprep if concentration in samples is not at least 10X concentration in blank, investigate source of contamination	Analyst	Accuracy/Bias (Contamination)	Same as Method/SOP QC Acceptance Limits
Field Duplicate	5%	NA	Document in final deliverable	Task Leader	Precision	RPD ±20%
Field Blank	1 per day	NA	Flag or qualify data	QA/QC Chemist or Task Leader	Accuracy/Bias (Contamination)	<RL

QAPP Worksheet #28-7
QC Samples Table

Matrix	Soil Gas (SUMMA® Canister)
Analytical Group	VOA
Concentration Level	Low
Sampling SOP	SERAS SOP #1704
Analytical Method/ SOP Reference	SERAS SOP #1814
Sampler's Name	Jon McBurney
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS Laboratory
No. of Sample Locations	~6

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Internal Standard	Each sample	±40% of daily calibration IS response	Re-analyze sample	Analyst	Precision/Accuracy/Bias	±40% of daily calibration IS response
Instrument Performance Check Samples	Every 24 hours	As per specified method	Clean, repair, re-analyze	Analyst	Sensitivity	As per specified method
LCS	5% of samples	± 30% R or within control chart limits	Clean, repair, re-analyze	Analyst	Accuracy/Bias	± 30% R or within control chart limits
Method Blank	1/24-hour clock	< Reporting Limit	Clean, repair, re-analyze	Analyst	Accuracy/Bias Contamination	< Reporting Limit
Trip Blank	1/shipment	< Reporting Limit	NA	NA	Accuracy/Bias Contamination	< Reporting Limit
LOD/LOQ Study	Annual	LOD = < Reporting Limit LOQ = ±50% or within control chart limits	Clean, repair, re-analyze.	Analyst	Sensitivity	LOD = < Reporting Limit LOQ = ±50% or within control chart limits
Laboratory Duplicates	10%	RPD ± 25%	Reanalyze	Analyst	Precision	RPD ± 25%

NA = Not applicable

QAPP Worksheet #28-8 (February 2012 Mobilization)
QC Samples Table

Matrix	Soil Gas (SUMMA® Canister)
Analytical Group	VOA
Concentration Level	Low
Sampling SOP	SERAS SOP #1704
Analytical Method/ SOP Reference	SERAS SOP #1814
Sampler's Name	Mike Cartwright, Colleen Steffensen
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS Laboratory
No. of Sample Locations	~29

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Internal Standard	Each sample	±40% of daily calibration IS response	Re-analyze sample	Analyst	Precision/Accuracy/Bias	±40% of daily calibration IS response
Instrument Performance Check Samples	Every 24 hours	As per specified method	Clean, repair, re-analyze	Analyst	Sensitivity	As per specified method
LCS	5% of samples	± 30% R or within control chart limits	Clean, repair, re-analyze	Analyst	Accuracy/Bias	± 30% R or within control chart limits
Method Blank	1/24-hour clock	< Reporting Limit	Clean, repair, re-analyze	Analyst	Accuracy/Bias Contamination	< Reporting Limit
Trip Blank	1/shipment	< Reporting Limit	NA	NA	Accuracy/Bias Contamination	< Reporting Limit
LOD/LOQ Study	Annual	LOD = < Reporting Limit LOQ = ±50% or within control chart limits	Clean, repair, re-analyze.	Analyst	Sensitivity	LOD = < Reporting Limit LOQ = ±50% or within control chart limits
Laboratory Duplicates	10%	RPD ± 25%	Reanalyze	Analyst	Precision	RPD ± 25%

NA = Not applicable

QAPP Worksheet #28-9 (February 2012 Mobilization)
QC Samples Table

Matrix	Indoor and Ambient Air (SUMMA® Canister)
Analytical Group	VOA
Concentration Level	Low
Sampling SOP	SERAS SOP #1704
Analytical Method/ SOP Reference	SERAS SOP #1814
Sampler's Name	Mike Cartwright, Colleen Steffensen
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS Laboratory
No. of Sample Locations	~37

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Internal Standard	Each sample	±40% of daily calibration IS response	Re-analyze sample	Analyst	Precision/Accuracy/Bias	±40% of daily calibration IS response
Instrument Performance Check Samples	Every 24 hours	As per specified method	Clean, repair, re-analyze	Analyst	Sensitivity	As per specified method
LCS	5% of samples	± 30% R or within control chart limits	Clean, repair, re-analyze	Analyst	Accuracy/Bias	± 30% R or within control chart limits
Method Blank	1/24-hour clock	< Reporting Limit	Clean, repair, re-analyze	Analyst	Accuracy/Bias Contamination	< Reporting Limit
Trip Blank	1/shipment	< Reporting Limit	NA	NA	Accuracy/Bias Contamination	< Reporting Limit
LOD/LOQ Study	Annual	LOD = < Reporting Limit LOQ = ±50% or within control chart limits	Clean, repair, re-analyze.	Analyst	Sensitivity	LOD = < Reporting Limit LOQ = ±50% or within control chart limits
Laboratory Duplicates	10%	RPD ± 25%	Reanalyze	Analyst	Precision	RPD ± 25%

NA = Not applicable

QAPP Worksheet #28-10 (March 2013 Mobilization)
QC Samples Table

Matrix	Soil Gas (SUMMA® Canister)
Analytical Group	VOA
Concentration Level	SIM
Sampling SOP	SERAS SOP #1704
Analytical Method/ SOP Reference	EPA TO-15
Sampler's Name	Solinski, Adams, Brandine, Steffensen
Field Sampling Organization	SERAS
Analytical Organization	ALS Laboratory
No. of Sample Locations	~8

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Internal Standard	Each sample	±40% of daily calibration IS response	Re-analyze sample	Analyst	Precision/Accuracy/Bias	±40% of daily calibration IS response
Instrument Performance Check Samples	Every 24 hours	As per specified method	Clean, repair, re-analyze	Analyst	Sensitivity	As per specified method
LCS	5% of samples	± 30% R or within control chart limits	Clean, repair, re-analyze	Analyst	Accuracy/Bias	± 30% R or within control chart limits
Method Blank	1/24-hour clock	< Reporting Limit	Clean, repair, re-analyze	Analyst	Accuracy/Bias Contamination	< Reporting Limit
Trip Blank	1/shipment	< Reporting Limit	NA	NA	Accuracy/Bias Contamination	< Reporting Limit
LOD/LOQ Study	Annual	LOD = < Reporting Limit LOQ = ±50% or within control chart limits	Clean, repair, re-analyze.	Analyst	Sensitivity	LOD = < Reporting Limit LOQ = ±50% or within control chart limits
Laboratory Duplicates	10%	RPD ± 25%	Reanalyze	Analyst	Precision	RPD ± 25%

NA = Not applicable

QAPP Worksheet #28-11 (March 2013 Mobilization)
QC Samples Table

Matrix	Indoor and Ambient Air (SUMMA® Canister)
Analytical Group	VOA
Concentration Level	Low
Sampling SOP	SERAS SOP #1704
Analytical Method/ SOP Reference	EPA TO-15
Sampler's Name	Solinski, Adams, Brandine, Steffensen
Field Sampling Organization	SERAS
Analytical Organization	ALS Laboratory
No. of Sample Locations	~10

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Internal Standard	Each sample	±40% of daily calibration IS response	Re-analyze sample	Analyst	Precision/Accuracy/Bias	±40% of daily calibration IS response
Instrument Performance Check Samples	Every 24 hours	As per specified method	Clean, repair, re-analyze	Analyst	Sensitivity	As per specified method
LCS	5% of samples	± 30% R or within control chart limits	Clean, repair, re-analyze	Analyst	Accuracy/Bias	± 30% R or within control chart limits
Method Blank	1/24-hour clock	< Reporting Limit	Clean, repair, re-analyze	Analyst	Accuracy/Bias Contamination	< Reporting Limit
Trip Blank	1/shipment	< Reporting Limit	NA	NA	Accuracy/Bias Contamination	< Reporting Limit
LOD/LOQ Study	Annual	LOD = < Reporting Limit LOQ = ±50% or within control chart limits	Clean, repair, re-analyze.	Analyst	Sensitivity	LOD = < Reporting Limit LOQ = ±50% or within control chart limits
Laboratory Duplicates	10%	RPD ± 25%	Reanalyze	Analyst	Precision	RPD ± 25%
Collocated Field Duplicates	5%	NA	Document in final deliverable	Task Leader	Precision	RPD ±35%

NA = Not applicable

QAPP Worksheet #29
Project Documents and Records Table

Sample Collection Documents and Records	On-site Analysis Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records	Other
Site and Field Logbooks COC Forms Well Sampling Purge Logs Map for sampling locations Field Change Form, if required Well Installation Logs Equipment Calibration logs/checks	Instrument Run Logs Preventive Maintenance Logs Instrument Printouts Data Reduction Records Data Review Records	Sample Receipt Logs Internal and External COC forms Equipment Calibration Logs Sample Analysis Worksheets/Run Logs Laboratory Final Data Package Corrective Action Documents	Data Assessment Forms Data Validation Check Records	Analytical Report Trip Report

QAPP Worksheet #30
Analytical Services Table

Matrix	Analytical Group	Concentration Level	Sample Location/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number
Soil Gas	VOA	Low/High	Refer to Worksheet 18	Voyager GC User's Manual	NA	ERT/SERAS Laboratory 2890 Woodbridge Avenue Edison, NJ 08837 Gerald Ball 732-321-4204	NA
Soil Gas	VOA	Low	Per Worksheet 18	EPA Method TO-15/ SERAS SOP #1814	3 Weeks	ERT/SERAS Laboratory 2890 Woodbridge Avenue Edison, NJ Attn: Vinod Kansal 732-321-4200	NA
Groundwater	VOCs	Low	Per Worksheet 18	SERAS SOP #1806	3 Weeks	ERT/SERAS Laboratory 2890 Woodbridge Avenue Edison, NJ Attn: Vinod Kansal 732-321-4200	NA
Groundwater	TAL Metals/Mercury	Low	Per Worksheet 18	SERAS SOP#1811/ SERAS SOP#1832	3 Weeks	ERT/SERAS Laboratory 2890 Woodbridge Avenue Edison, NJ Attn: Vinod Kansal 732-321-4200	NA
Groundwater	PCBs	Low	Per Worksheet 18	SERAS SOP#1801	3 Weeks	ERT/SERAS Laboratory 2890 Woodbridge Avenue Edison, NJ Attn: Vinod Kansal 732-321-4200	NA
Groundwater	Pesticides	Low	Per Worksheet 18	SERAS SOP#1808	3 Weeks	ERT/SERAS Laboratory 2890 Woodbridge Avenue Edison, NJ Attn: Vinod Kansal 732-321-4200	NA

QAPP Worksheet #30
Analytical Services Table

Matrix	Analytical Group	Concentration Level	Sample Location/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number
Groundwater	SVOCs	Low	As per Worksheet 18	SERAS SOP#1804	3 Weeks	ERT/SERAS Laboratory 2890 Woodbridge Avenue Edison, NJ Attn: Vinod Kansal 732-321-4200	NA
Soil	VOCs	Low	As per Worksheet 18	SERAS SOP#1807	3 Weeks	ERT/SERAS Laboratory 2890 Woodbridge Avenue Edison, NJ Attn: Vinod Kansal 732-321-4200	NA
Soil Gas	VOA	Low	Per Worksheet 18	EPA Method TO-15/ SERAS SOP #1814	5 Business Days for Preliminary data	ERT/SERAS Laboratory 2890 Woodbridge Avenue Edison, NJ Attn: Vinod Kansal 732-321-4200	NA
Indoor and Ambient Air	VOA	Low	Per Worksheet 18	EPA Method TO-15/ SERAS SOP #1814	5 Business Days for Preliminary data	ERT/SERAS Laboratory 2890 Woodbridge Avenue Edison, NJ Attn: Vinod Kansal 732-321-4200	NA
Soil Gas	VOA	SIM	Per Worksheet 18	EPA Method TO-15	10 Business Days for Preliminary data	ALS Environmental Kate Kaneko Aguilera 2655 Park Center Dr Suite A Simi Valley, CA 93065 805-526-7161	NA
Indoor and Ambient Air	VOA	SIM	Per Worksheet 18	EPA Method TO-15	10 Business Days for Preliminary data	ALS Environmental Kate Kaneko Aguilera 2655 Park Center Dr Suite A Simi Valley, CA 93065 805-526-7161	NA

QAPP 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 (CA) (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (Title and Organizational Affiliation)
Laboratory Accreditation Audit	Every 2 years	External	NELAC Accreditation Agency	NJDEP	Deborah Killeen, QA/QC Officer, SERAS	Vinod Kansal, GC/MS Chemist, ERT/SERAS Laboratory	NELAC Accreditation Agency
Laboratory Audit	Annual	Internal	ERT/SERAS Laboratory	Deborah Killeen, QA/QC Officer, SERAS	Vinod Kansal, GC/MS Chemist, ERT/SERAS Laboratory	Laboratory Chemists ERT/SERAS Laboratory	Deborah Killeen, QA/QC Officer, SERAS
Performance Evaluation Sample	Biannual	Internal	ERT/SERAS Laboratory	Deborah Killeen, QA/QC Officer, SERAS	Vinod Kansal, GC/MS Chemist, ERT/SERAS Laboratory	Laboratory Chemists ERT/SERAS Laboratory	Deborah Killeen, QA/QC Officer, SERAS
Laboratory Accreditation Audit	Every 2 years	External	NELAC Accreditation Agency	NJDEP	QA/QC Officer, ALS Laboratory	GC/MS Chemist, ALS Laboratory	NELAC Accreditation Agency
Laboratory Audit	Annual	Internal	ALS Laboratory	QA/QC Officer, ALS Laboratory	GC/MS Chemist, ALS Laboratory	Laboratory Chemists ALS Laboratory	QA/QC Officer, ALS Laboratory
Performance Evaluation Sample	Biannual	Internal	ALS Laboratory	QA/QC Officer, ALS Laboratory	GC/MS Chemist, ALS Laboratory	Laboratory Chemists ALS Laboratory	QA/QC Officer, ALS Laboratory

QAPP Worksheet #32-1
Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Field Observations/ Deviations from Work Plan	Logbook	Jon McBurney/Task Leader/SERAS	Immediately	Field Change Form	Jon McBurney/Task Leader SERAS	Within 24 hours of change
Lab Performance Audits	Audit report	ERT/SERAS Laboratory	Within 30 days	Corrective Action Plan	Regulatory Agency	Within 30 days
Peer Review	In the deliverable	Jon McBurney/Task Leader/SERAS	Prior to deliverable due date	Comments directly in the deliverable	Jon McBurney/Task Leader SERAS	Prior to deliverable due date
Internal Lab Performance Audits	Audit report	Vinod Kansal, GC/MS Chemist, SERAS	Within 45 days	Corrective Action Plan	Deborah Killeen, QA/QC Officer, SERAS	Within 45 days

QAPP Worksheet #32-2 (February 2012 Mobilization)
Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Field Observations/ Deviations from Work Plan	Logbook	Mike Cartwright/Task Leader/SERAS	Immediately	Field Change Form	Mike Cartwright/Task Leader SERAS	Within 24 hours of change
Lab Performance Audits	Audit report	ERT/SERAS Laboratory	Within 30 days	Corrective Action Plan	Regulatory Agency	Within 30 days
Peer Review	In the deliverable	Mike Cartwright/Task Leader/SERAS	Prior to deliverable due date	Comments directly in the deliverable	Mike Cartwright/Task Leader SERAS	Prior to deliverable due date
Internal Lab Performance Audits	Audit report	Vinod Kansal, GC/MS Chemist, SERAS	Within 45 days	Corrective Action Plan	Deborah Killeen, QA/QC Officer, SERAS	Within 45 days

QAPP Worksheet #32-3 (March 2013 Mobilization)
Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Field Observations/ Deviations from Work Plan	Logbook/Data Sheets	Philip Solinski/Task Leader/SERAS	Immediately	Field Change Form	Philip Solinski/Task Leader SERAS	Within 24 hours of change
Lab Performance Audits	Audit report	ERT/SERAS Laboratory	Within 30 days	Corrective Action Plan	Regulatory Agency	Within 30 days
Peer Review	In the deliverable	Philip Solinski /Task Leader/SERAS	Prior to deliverable due date	Comments directly in the deliverable	Philip Solinski/Task Leader SERAS	Prior to deliverable due date

QAPP 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)
Technical Report	Monthly	20th of the month following performance period	Task Leader/SERAS	ERT Project Officer and Work Assignment Manager
QA Report	Quarterly	February, May, August, November	QA/QC Officer/SERAS	ERT Project Officer and Quality Coordinator

QAPP Worksheet #34
Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Chain of Custody Record	Reviewed by Field Sampling Personnel in field and QA/QC Group prior to final analytical report preparation	Internal	SERAS
Laboratory Data Package	Reviewed for measurement performance criteria	Internal External	ERT/SERAS Laboratory or ALS and SERAS QA/QC Group
Analytical Report	Reviewed for accuracy	Internal External	Peer Review Team
Trip Report	Reviewed for accuracy	Internal	Peer Review Team
Completeness Check	Review of Planning Documents, Analytical Data package, Sampling Documents and External Reports, as applicable, using the UFP-QAPP Checklist	Internal	SERAS Task Leader

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

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	SOPs	Ensure that the sampling methods/procedures outlined in the QAPP were followed and any deviations noted	SERAS Task Leader, Work Assignment Manager
IIa	COC Records	Examine COC records and match with requested analyses.	SERAS Task Leader SERAS Sr. Field GC/MS Chemist SERAS QA/QC Group
IIa	Lab Data Package	Examine packages against COC records (holding times, sample handling, methods, sample identifications, qualifiers).	SERAS QA/QC Group
IIb	Lab Data Package	Qualify data based on QC deficiencies (precision/accuracy, %RSD, %D, etc.)	SERAS QA/QC Chemist SERAS QA/QC Officer
IIb	Field Duplicates	Compare results of field duplicate (or replicate) analyses with RPD criteria	SERAS Task Leader, Jon McBurney/Mike Cartwright/ Philip Solinski

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

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIb	Soil Gas (SUMMA® Canister)	VOA	Low	Draft SERAS SOP #1021, *Data Validation for Routine Volatile Organic Compounds in Air by TO-15/TO-17 Analysis*	SERAS QA/QC Group
IIb	Groundwater	VOA	Trace	SERAS SOP #1015, *Data Validation Procedures for Routine Volatile Organic Analysis*	SERAS QA/QC Group
IIb	Groundwater	PCBs	Low	Draft SERAS SOP#1020, *Data Validation Procedures for Routine PCB/Aroclor Analysis*	SERAS QA/QC Group
IIb	Groundwater	Pesticides	Low	Draft SERAS SOP#1018, *Data Validation Procedures for Routine Pesticide Analysis*	SERAS QA/QC Group
IIb	Groundwater	SVOCs	Low	SERAS SOP #1016, *Data Validation Procedures for Routine Semi-Volatile Analysis*	SERAS QA/QC Group
IIb	Groundwater	TAL Metals	Low	SERAS SOP #1017, *Data Validation Procedures for Routine Inorganic Analysis*	SERAS QA/QC Group

X Worksheet Not Applicable EPA Region II will be responsible for assessing the usability of the data.

QAPP Worksheet #37
Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:
Describe the evaluative procedures used to assess overall measurement error associated with the project:
Identify the personnel responsible for performing the usability assessment:
Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies: