QUALITY ASSURANCE PROJECT PLAN
St. John Methyl Bromide Response
St. John, United States Virgin Islands

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

By:
Lockheed Martin/Scientific, Engineering, Response and Analytical Services
Work Assignment Number: SERAS-001

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

March 30, 2015

R2_SirenUSA_CNN_Prim00153_001

TABLE OF CONTENTS

QAPP Worksheet #1. Title and Approval Page 1
QAPP Worksheet #2. QAPP Identifying Information 2
QAPP Worksheet #3. Distribution List 7
QAPP Worksheet #4. Project Personnel Sign-Off Sheet 8
QAPP Worksheet #5. Project Organizational Chart 9
QAPP Worksheet #6. Communication Pathways 10
QAPP Worksheet #7. Personnel Responsibilities and Qualification Table 11
QAPP Worksheet #8. Special Personnel Training Requirements Table 12
QAPP Worksheet #9. Project Scoping Session Participants Sheet 14
QAPP Worksheet #10. Problem Definition 15
QAPP Worksheet #11. Project Quality Objectives/Systematic Planning Process Statements 16
QAPP Worksheet #12. Measurement Performance Criteria Table 18
QAPP Worksheet #13. Existing Data Criteria and Limitations Table 25
QAPP Worksheet #14. Summary of Project Tasks 26
QAPP Worksheet #15. Reference Limits and Evaluation Table 28
QAPP Worksheet #16. Project Schedule Timeline Table 40
QAPP Worksheet #17. Monitoring Design and Rationale 41
QAPP Worksheet #18. Monitoring Locations and Methods/SOP Requirements Table 42
QAPP Worksheet #19. Analytical SOP Requirements Table 44
QAPP Worksheet #20. Field Quality Control Sample Summary Table 45
QAPP Worksheet #21. Project Monitoring SOP References Table 46
QAPP Worksheet #22. Field Equipment Calibration, Maintenance, Testing, and Inspection Table 47
QAPP Worksheet #23. Analytical SOP References Table 48
QAPP Worksheet #24. Analytical Instrument Calibration Table 49
QAPP Worksheet #25. Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table 52
QAPP Worksheet #26. Sample Handling System 54
QAPP Worksheet #27. Sample Custody Requirements 55
QAPP Worksheet #28. QC Samples Table 56
QAPP Worksheet #29. Project Documents and Records Table 70
QAPP Worksheet #30. Analytical Services Table 71
QAPP Worksheet #31. Planned Project Assessments Table 73
QAPP Worksheet #32. Assessment Findings and Corrective Action Responses 75
QAPP Worksheet #33. QA Management Reports Table 76
QAPP Worksheet #34. Verification (Step I) Process Table 77
QAPP Worksheet #35. Validation (Steps IIa and IIb) Process Table 78
QAPP Worksheet #36. Validation (Steps IIa and IIb) Summary Table 79
QAPP Worksheet #37. Usability Assessment 81

QAPP Worksheet #1
Title and Approval Page

Site Name/Project Name: St. John Methyl Bromide Response

Site Location: St. John, United States Virgin Islands (USVI)

Document Title: Quality Assurance Project Plan for the St. John Methyl Bromide Response

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

Preparer's Name and Organizational Affiliation: Deborah Killeen, Lockheed Martin/Scientific, Engineering, Response and Analytical Services (SERAS)

Preparer's Address, Telephone Number, and E-mail Address: 2890 Woodbridge Avenue, Edison, New Jersey 08837, (732) 321-4245, deborah.a.killeen@lmco.com

Preparation Date (Month/Day/Year): March 30, 2015

Investigative Organization's Project Manager/Date: _____
Signature
Printed Name/Organization: Sella Burchette/ERT Work Assignment Manager

Investigative Organization's Response Project Manager/Date: _____
Signature
Printed Name/Organization: Rajeshmal Singhvi/ERT Work Assignment Manager

Investigative Organization's Project QA Officer/Date: _____
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: _____
Signature
Printed Name/Title: Deborah Killeen/SERAS QA/QC Officer

Approval Authority: SERAS

Other Approval Signatures/Date: _____
Signature
Printed Name/Title: Kevin Taylor/SERAS Program Manager

Document Numbering System: SERAS-001-DQAPP-033015

QAPP Worksheet #2
QAPP Identifying Information

Site Name/Project Name: St. John Methyl Bromide Response
Site Location: St. John, USVI
Site Number/Code:
Operable Unit:
Contractor Name: Lockheed Martin
Contractor Number: EP-W-09-031
Contract Title: SERAS
Work Assignment Number: SERAS-001

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 X Project Specific
4. List dates of scoping sessions that were held: NA
5. List dates and titles of QAPP documents written for previous site work, if applicable:

Title	Approval Date

6. List organizational partners (stakeholders) and connection with lead organization:
   EPA/ERT, EPA Region 2, USVI Department of Planning and Natural Resources (DPNR)
7. List data users:
   EPA/ERT, EPA Region 2, USVI DPNR
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:

   WS #13 – No existing data was available for this emergency response.
   WS #22 – No equipment requiring calibration and/or maintenance was used for this project.
   WS #37 – EPA Region 2 will be responsible for assessing the usability of the 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 Existing Data Evaluation	- Sources of Existing Data and Information - Existing Data Criteria and Limitations Table	NA
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	- Monitoring Design and Rationale - Sample Location Map - Monitoring Locations and Methods/SOP Requirements Table - Analytical Methods/SOP Requirements Table - Field Quality Control Sample Summary Table - Sampling SOPs - Project Monitoring SOP References Table - Field Equipment Calibration, Maintenance, Testing, and Inspection Table	17 18 19 20 21 NA
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
Distribution List

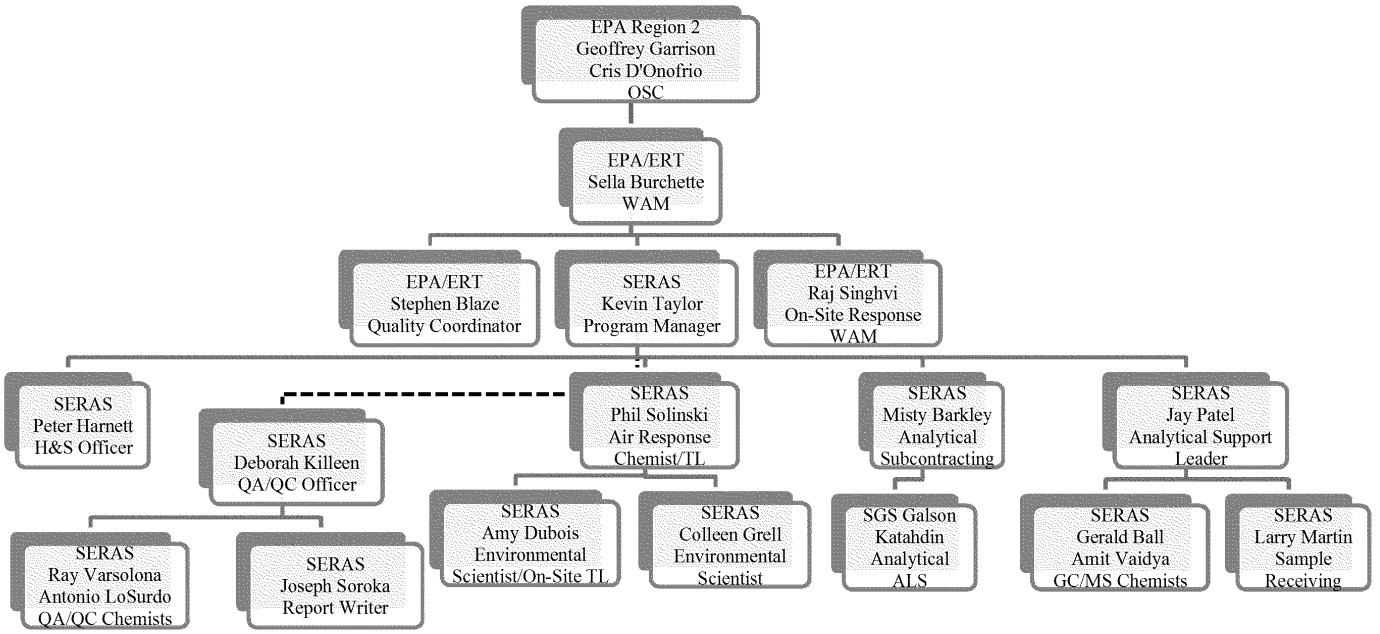
QAPP Recipients	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Sella Burchette	Work Assignment Manager (WAM)	ERT	(732) 321-6726	(732) 321-6724	Burchette.sella@epa.gov	SERAS-001-DQAPP-033015
Raj Singhvi	On-Site Response WAM	ERT	(732) 321-6761	(732) 321-6724	Singhvi.raj@epa.gov	SERAS-001-DQAPP-033015
Stephen Blaze	Quality Coordinator	ERT	(732) 906-6921	(732) 321-6724	Blaze.stephen@.epa.gov	SERAS-001-DQAPP-033015
Philip Solinski	Air Response Chemist/Task Leader (TL)	SERAS	(732) 321-4283	(732) 494-4021	Philip.j.solinski@lmco.com	SERAS-001-DQAPP-033015
Deborah Killeen	Quality Assurance/Quality Control (QA/QC) Officer	SERAS	(732) 321-4245	(732) 494-4021	Deborah.a.killeen@lmco.com	SERAS-001-DQAPP-033015
Kevin Taylor	Program Manager	SERAS	(732) 321-4202	(732) 494-4021	Kevin.c.taylor@lmco.com	SERAS-001-DQAPP-033015

QAPP Worksheet #4
Project Personnel Sign-Off Sheet

Organization: SERAS/ERT/EPA

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Amy Dubois	SERAS Environmental Scientist/On-Site TL	(732) 494-4007		
Colleen Grell	SERAS Environmental Scientist	(732) 321-4211		
Raj Singhvi	ERT On-Site Response WAM	(732) 321-6761		
Geoffrey Garrison	EPA Region 2 On-Scene Coordinator (OSC)	(787) 977-5820		
Cris D'Onofrio	EPA Region 2 OSC	(732) 906-6977		

QAPP Worksheet #5
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 On-Site Response WAM ERT Quality Coordinator SERAS Program Manager SERAS QA/QC Officer SERAS TL	Sella Burchette Raj Singhvi Stephen Blaze Kevin Taylor Deborah Killeen Philip Solinski	(732) 321-6726 (732) 321-6761 (732) 906-6921 (732) 321-4202 (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 SERAS GC/MS Sr. Chemist SERAS GC/MS Chemist	Philip Solinski Sella Burchette Deborah Killeen Gerald Ball Amit Vaidya	(732) 321-4283 (732) 321-6726 (732) 321-4245 (732) 321-4286 (732) 321-4251	Use of the Work Assignment Field Change Form for field issues. Use of the laboratory nonconformance memos to document laboratory deviations and/or deficiencies.
Posting of Deliverables to the ERT-Information Management System (IMS) website	SERAS TL SERAS QA/QC Officer SERAS Administrative Support SERAS On-Site TL	Philip Solinski Deborah Killeen Eileen Ciambotti Amy Dubois	(732) 321-4283 (732) 321-4245 (732) 321-4255 (732) 494-4007	As per work assignment, posting of deliverables to ERT-IMS website constitutes delivery to the WAM.
Work Assignment	SERAS Program Manager	Kevin C. Taylor	(732) 321-4202	Describes scope of work to SERAS personnel from the ERT WAM.
Health and Safety On-Site Meeting	SERAS Environmental Scientist and/or Site Health and Safety Officer	Amy Dubois	(732) 494-4007	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	TL/Air Response Chemist	SERAS	Field Operations	Minimum BS degree plus 14 years related experience/ Lockheed Martin Employee Files
Amy Dubois	SERAS Environmental Scientist	SERAS	Field Operations	Minimum BS degree plus 8 years related experience/ Lockheed Martin Employee Files
Colleen Steffensen	SERAS Environmental Scientist	SERAS	Field Operations	Minimum BS degree plus 3 years related experience/ Lockheed Martin Employee Files
Deborah Killeen	QA/QC Officer	SERAS	QA Oversight	Minimum BS degree plus 14 years related experience/ Lockheed Martin Employee Files
Sella Burchette	WAM (ER Work Assignment)	ERT	Project Oversight	EPA job-related responsibilities/EPA Employee Files
Raj Singhvi	On-Site Response WAM	ERT	Technical Support/Direction	EPA job-related responsibilities/EPA Employee Files
Stephen Blaze	Quality Coordinator	ERT	QA Oversight	EPA job-related responsibilities/EPA Employee Files
Geoffrey Garrison	OSC	EPA	Project Coordination	EPA job-related responsibilities/EPA Employee Files
Cris D'Onofrio	OSC	EPA	Project Coordination	EPA job-related responsibilities/EPA Employee Files
Gerald Ball	Sr. GC/MS Chemist	SERAS	Volatile Organic Compound (VOC) Analysis (Air)	Minimum BS degree plus 14 years related experience/ Lockheed Martin Employee Files
Amit Vaidya	GC/MS Chemist	SERAS	VOC Analysis (Water)	Minimum BS degree plus 8 years related experience/ Lockheed Martin Employee Files
Ray Varsolona or Tony LoSurdo	QA/QC Chemist	SERAS	Data Validation	Minimum BS degree plus 8 years related experience/ Lockheed Martin Employee Files
Joseph Soroka	Report Writer	SERAS	Analytical Report & EDD Preparation	Minimum BS degree plus 8 years related experience/ Lockheed Martin Employee Files

EDD – electronic data deliverable

QAPP Worksheet #8
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
Task Leader	Task Leader Training	REAC	2002	Philip Solinski	Air Response Chemist/TL/ SERAS	Quality Files
Task Leader	Task Leader Training	REAC	2002	Amy Dubois	Environmental Scientist/on-Site TL/ SERAS	Quality Files
Site Health & Safety, Field Operations	OSHA 40 hour + 8-hour refresher	SERAS	Aug 2014	Amy Dubois	Environmental Scientist/SERAS	Health & Safety Files
Site Health & Safety, Field Operations	OSHA 40 hour + 8-hour refresher	SERAS	Feb 2015	Colleen Steffensen	Environmental Scientist/SERAS	Health & Safety Files
QA Oversight	Uniform Federal Policy for Quality Assurance Project Plans	Advanced Systems	Jan 2006	Deborah Killeen	QA/QC Officer/SERAS	Quality Files
QA Oversight	Lead Auditor Training	IT Corp	Sep 1991	Deborah Killeen	QA/QC Officer/SERAS	Quality Files
QA Oversight	Changes to Environmental Laboratory Accreditation	Advanced Systems	May 2009	Deborah Killeen	QA/QC Officer/SERAS Analytical Support Chemist/SERAS	Quality Files
QA Oversight	Data Review & Validation	Laboratory Data Consultants	Jan 2007	Deborah Killeen	QA/QC Officer/SERAS	Quality Files
Data Validation	Data Integrity and Peak Integration Training	SERAS	Jan 2014`	Ray Varsolona Tony LoSurdo	QA/QC Chemist/SERAS	Quality Files
Analytical Report & EDD Preparation	Data Integrity and Peak Integration Training	SERAS	Mar 2015`	Joseph Soroka	Report Writer/SERAS	Quality Files
VOC Analysis	Demonstration of Capability (DOC)	SERAS	Jun 2014	Gerald Ball	Sr. GC/MS Chemist/SERAS	Quality Files

QAPP Worksheet #8
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
VOC Analysis	DOC	SERAS	Mar 2015	Amit Vaidya	GC/MS Chemist/SERAS	Quality Files
VOC Analysis	Data Integrity and Peak Integration Training	SERAS	Mar 2015	Gerald Ball Amit Vaidya	Sr. GC/MS Chemist/SERAS GC/MS Chemist/SERAS	Quality Files

☑ Worksheet Not Applicable (State Reason) Since this was an emergency response, no scoping meeting was held prior to mobilization.

QAPP Worksheet #9
Project Scoping Session Participants Sheet

Project Name: Projected Date(s) of Sampling: Project Manager:	Site Name: Site Location:
Date of Session: **Scoping Session Purpose:**	

Name	Title	Affiliation	Phone Number	E-Mail Address	Project Role

Comments/Decisions:

.

QAPP Worksheet #10
Problem Definition

The problem to be addressed by the project: On March 20, 2015, paramedics responded to a call that four people staying at the Sirenusa Condominium Resort in Cruz Bay, St. John became very ill. These family members were experiencing seizures and were subsequently hospitalized. It is suspected that the family may have been exposed to the pesticide methyl bromide after it was used to fumigate a room at the complex on Wednesday, March 18, 2015. EPA is working closely with the USVI government to investigate this incident. ERT was requested by EPA Region 2 to provide technical expertise to assess the incident and provide sampling and analysis support.
The environmental questions being asked: Is methyl bromide present in the unit where the family became ill and if so, at what concentrations? Are any other pesticide-related compounds present in the samples and if so, at what concentrations? Are there any other volatile organic compounds present in the samples and if so, at what concentrations?
Observations from any site reconnaissance reports: Not Applicable.
A synopsis of existing data or information from site reports It is known that the condo below the unit where the family stayed was recently treated for pests by a licensed professional.
The possible classes of contaminants and the affected matrices: Methyl bromide, organochlorine pesticides and VOCs in air, VOCs and bromide in water and residue on wipe samples
The rationale for inclusion of chemical and nonchemical analyses: After consulting with local personnel, it was determined that VOCs, methyl bromide and organochlorine pesticides were the compounds of interest.
Information concerning various environmental indicators: Not Applicable.
Project decision conditions ("If..., then..." statements): This emergency response (ER) phase of the project is investigative to determine if methyl bromide is present in the samples and at what concentrations. Currently no benchmarks have been derived for this project and the Regional Screening Levels (RSLs) are being used for guidance. It is assumed that the reporting limits (RLs) may or may not be appropriate for Regional decisions and are based on the laboratory's achievable limits. Once this project transitions from an ER to a follow-up monitoring and/or assessment, benchmarks (project action limits) will need to be derived.

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

Who will use the data? EPA Region 2, ERT
What will the data be used for? Data will be used to establish whether methyl bromide was associated with the incident.
What type of data is needed? (target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques). VOCs including tentatively identified compounds (TICs) in Air – Off-Site Laboratory – SUMMA Canisters Pesticides in Air – Off-Site Laboratory – Polyurethane Foam (PUF) media Methyl bromide in Air – Off-Site Laboratory – Anasorb 747 Charcoal Media Hydrogen Bromide by Ion Chromatography (IC) – Off-Site Laboratory – Teflon Wipes Pesticides – Off-Site Laboratory – Gauze Wipes VOCs – Off-Site Laboratory – Waters Bromide by Ion Chromatography (IC) – Off-Site Laboratory - Waters
How "good" does the data need to be in order to support the environmental decision? All data will be Definitive and will be validated.
How much data are needed? (number of samples for each analytical group, matrix, and concentration) Up to 10 air samples for VOCs + TICs in SUMMA canisters Up to 10 air samples for methyl bromide Up to 10 air samples for pesticides Up to 20 samples for pesticides – Wipes Up to 20 samples for hydrogen bromide – Wipes Up to 5 samples for VOCs – Water Up to 5 samples for bromide by IC - Water
Where, when, and how should the data be collected/generated? Data will be collected from three designated locations (Upper, Lower and Unfumigated Units) plus an outside air location.
Who will collect and generate the data? SERAS personnel will collect all samples. The following laboratories will analyze samples: ERT/SERAS Laboratory in Edison, New Jersey (NJ) will analyze all VOC in air and water samples; ALS located in Simi Valley, California (CA) will analyze air samples for pesticides; Katahdin Analytical in Scarborough, Maine (ME) will analyze wipe samples for pesticides and water samples for bromide; and SGS/Galson located in East Syracuse, New York (NY) will analyze wipe samples for hydrogen bromide by IC and methyl bromide in air.
How will the data be reported? Validated data will be reported in a final analytical report prepared in accordance with SERAS Standard Operating Procedure (SOP) #4020, *Analytical Report Preparation*. A final Trip Report, prepared in accordance with SERAS SOP #4017, *Preparation of Trip Reports*, will be the final deliverable to the EPA/ERT WAM. Data will be disseminated to EPA Region 2 by the ERT WAM.

How will the data be archived?
Hard copies of all deliverables will be stored in SERAS Central Files and electronic copies will be stored on the SERAS Local Area Network (LAN). Data will be archived by SERAS in accordance with Administrative Procedure (AP) #34, *Archiving Electronic Files*. All laboratory data will be archived by the SERAS QA/QC Group.

QAPP Worksheet 12-1
Measurement Performance Criteria Table

Matrix	Indoor and Ambient Air (SUMMA® Canister)
Analytical Group	VOC + TICs
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	SERAS SOP #1814	Precision	Relative Percent Difference (RPD) ± 25%	Laboratory Duplicates	A
		Accuracy/Bias	±30% Recovery (R) 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 ≥ Reporting Limit (RL)	Method Blank Trip Blank	A S & A
		Sensitivity/Accuracy	LOD - Standard deviation of 7 replicates x Student's t-factor <RL LOQ ±30% or within control chart limits	Limit of Detection/Limit of Quantitation (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 12-2
Measurement Performance Criteria Table

Matrix	Indoor and Ambient Air (Anasorb 747)
Analytical Group	Methyl Bromide
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)
OSHA PV2040	OSHA PV2040	Precision	RPD – Within control chart limits	Blank Spike (BS)/BS Duplicate (BSD)	A
		Accuracy/Bias	% R - Within control chart limits	BS	A
		Accuracy/Bias Contamination	No target compound ≥ RL	Media Blank	A
		Completeness	> 90% SUMMA® sampling, > 90% laboratory analysis	Data Completeness Check	S & A
		Sensitivity	LOD - Standard deviation of 7 replicates x Student's t-factor <RL	LOD Study	A
		Accuracy/Bias (Contamination)	<RL	Field Blank	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)
OSHA = Occupational Safety and Health

QAPP Worksheet 12-3
Measurement Performance Criteria Table

Matrix	Indoor and Ambient Air
Analytical Group	Pesticides
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)
EPA-TO-10A	EPA TO-10A	Precision	RPD – ±15%	BS/BSD	A
		Accuracy/Bias	% R – 70-130	BS	A
		Accuracy/Bias Contamination	No target compound ≥ RL	Process Blank	A
		Accuracy/Bias Contamination	No target compound ≥ RL	Solvent Process Blank	A
		Completeness	> 90% SUMMA® sampling, > 90% laboratory analysis	Data Completeness Check	S & A
		Sensitivity	LOD - Standard deviation of 7 replicates x Student's t-factor <RL	LOD Study	A
		Accuracy/Bias (Contamination)	<RL	Field Blank	S & A
		Accuracy/Bias	%R – 60-120	Surrogates	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	Wipes
Analytical Group	Hydrogen Bromide (HBR)
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 #2011	NIOSH 7903	Precision	RPD – Within control chart limits or 75-125%	BS/BSD	A
		Accuracy/Bias	% Recovery - Within control chart limits	BS	A
		Accuracy/Bias Contamination	No target compound ≥ RL	Media Blank	A
		Completeness	> 90% SUMMA® sampling, > 90% laboratory analysis	Data Completeness Check	S & A
		Sensitivity	LOD - Standard deviation of 7 replicates x Student's t-factor <RL	LOD Study	A
		Accuracy/Bias (Contamination)	<RL	Field Blank	S & A
		Accuracy/Bias	%R = 70-130%	Detection Limit (DL) Standard	A

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

NIOSH – National Instiute for Occupational Safety and Health

QAPP Worksheet 12-5
Measurement Performance Criteria Table

Matrix	Wipes
Analytical Group	Pesticides
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 #2011	Mod. EPA 8081A	Precision	RPD – Within control chart limits	BS/BSD	A
		Accuracy/Bias	% R 75-125 or within control chart limits	BS	A
		Accuracy/Bias Contamination	No target compound ≥ RL	Media Blank	A
		Completeness	> 90% SUMMA® sampling, > 90% laboratory analysis	Data Completeness Check	S & A
		Sensitivity/Accuracy	LOD - Standard deviation of 7 replicates x Student's t-factor <RL LOQ ±30% or within control chart limits	LOD/LOQ	A
		Accuracy/Bias (Contamination)	<RL	Field Blank	S & A
		Accuracy/Bias	%R within control chart limits	Surrogates	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	Water
Analytical Group	VOC + TICs
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)
Direct Collection	SERAS SOP #1806 (EPA SW-846 Method 8260B)	Accuracy/Bias	%R = Within control chart limits	Surrogates	A
		Precision (Laboratory)	RPD ±20%	Matrix Spike (MS)/Matrix Spike Duplicate (MSD)	S & 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	%R = Within control chart limits	MS	S & A
		Accuracy/Bias Contamination	<RL	Method Blank	A
		Completeness	> 90% 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 #12-7
Measurement Performance Criteria Table

Matrix	Water
Analytical Group	Bromide
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)
Direct Collection	EPA Method 300.0	Accuracy/Bias (Contamination)	<RL	Laboratory Reagent Blank (LRB)	A
		Accuracy/Bias	%R = 90-110 or within more stringent control chart limits	Laboratory Fortified Blank (LFB)	A
		Accuracy/Bias	%R = 90-110	Laboratory Fortified Matrix	S & A
		Precision	RPD – Within laboratory designated limits	Sample Duplicate	A
		Accuracy/Bias (Contamination)	<RL	Field Blank	S & A
		Accuracy/Bias	%R = 90-110	Linear Calibration Range (LCR) Standard	A
		Accuracy/Bias	%R = 90-110	Quality Control Sample (QCS)	A
		Sensitivity	MDL = 7 replicates of fortified reagent water at concentration 2-3 times the instrument detection limit (IDL)	Method Detection Limit (MDL) Study	A
		Completeness	> 90% sampling > 90% laboratory analysis	Data Completeness Check	S & A

☑ Worksheet Not Applicable (State Reason) Since this is an emergency response, no previous data are available.

QAPP Worksheet #13
Existing Data Criteria and Limitations Table

Existing 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

QAPP Worksheet #14
Summary of Project Tasks

Sampling Tasks: Methyl Bromide in Air (Anasorb Tubes) - Ambient and indoor air sampling will be conducted following OSHA Method PV2040, *Methyl Bromide*. The sampling train will consist of glass sampling tubes packed with two sections of Anasorb 747 containing 400 milligrams (mg) in the front section and 200 mg in the back section connected in series to a low-flow personal sampling pump (SKC). The sampling pump will be calibrated to collect approximately 1.0 liter per minute (L/min) of air through the sorbent tube for 12 hours for a total of 720 liters (L). To ensure sufficient data are collected and no breakthrough occurs, air will be drawn through a series of tubes on two different sampling days at 0.1 L/min for 4 hours. Organochlorine Pesticides in Air (PUF) – Ambient and indoor air sampling will be conducted following EPA Compendium Method TO-10A, *Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air Using Low Volume Polyurethane Foam (PUF) Sampling Followed by Gas Chromatographic/Multi-Detector Detection (GC/MD).* The sampling train will consist of a PUF absorbent retained in a glass sampling cartridge connected to a low-flow personal sampling pump. The sampling pump will be calibrated to collect approximately 1.0 (L/min of air through the sorbent tube for 12 hours for a total of 720 L. VOCs in Air (SUMMA Canister) – Grab samples of indoor and ambient air will be collected using an evacuated SUMMA canister in accordance with SERAS SOP #1704, *SUMMA Canister Sampling.* Organochlorine Pesticides Using Wipes – Gauze wipes wetted with hexane will be used to collect a wipe sample from areas within a 10 centimeter (cm) by 10 cm area designated by the WAM and/or OSC. The surface will be wiped both horizontally and vertically to ensure adequate coverage of the area. Bromide Using Teflon Wipes - A wipe sample will be collected from areas within a 10 cm by 10 cm area designated by the WAM and/or OSC using Teflon wipes. The surface will be wiped both horizontally and vertically to ensure adequate coverage of the area. VOCs in Water – Samples will be collected directly from the tap into 40-milliliter (mL) vials. Bromide in Water – Samples will be collected directly from the tap into 40-mL vials.
Analysis Tasks: Methyl Bromide in Air – OSHA PV2040 Organochlorine Pesticides in Air – EPA Compendium Method TO-10A VOCs in Air – SERAS SOP #1814 Organochlorine Pesticides on Wipe Samples – Modified EPA SW-846 Method 8081A Hydrogen Bromide by IC on Wipe Samples – NIOSH 7903 VOCs in Water – SERAS SOP #1806 Bromide in Water – EPA Method 300.0
Quality Control Tasks: Field QC samples are described in Worksheet #20. Analytical QC samples are described in Worksheets #12 and 28. Trip blanks will be submitted with each shipment of VOC air samples. For organochlorine pesticides and methyl bromide in air, field blanks will be collected each sampling day. For the wipe samples, a field blank for each sampling day will be submitted for analysis. For VOCs in water, a field blank for each day of sampling and a trip blank for each shipment will be collected. For bromide in water, a field blank will be collected at the frequency of one per day.

Existing Data: NA
Data Management Tasks: All sampling locations will be identified by a field assigned number. Field sampling data will be recorded on field sampling worksheets. All samples will be delivered under chain of custody (COC) to the respective laboratories listed on Worksheet #14. Scribe will be used for data management activities. All deliverables will be generated in accordance to the appropriate SERAS SOP and posted to the ERT/IMS website upon completion. Posting to the ERT-IMS site will be considered as completion of the deliverable.
Documentation and Records: All documentation will be recorded in accordance with SERAS SOP #4001, *Logbook Documentation* and SOP #2002, *Sample Documentation*. Documents and records that may be generated during this project include: WP, QAPP, HASP, Laboratory Logbooks, Site Map, Sample Labels, COC Records, Custody Seals, Air Sampling Work Sheets, Data Review Records, Data Reduction Records, Data Assessment Forms, Data Validation Records, Instrument Printouts, Laboratory Analytical Reports, Scribe Database, Final Trip Report, Final Analytical Report, Field Change Form (if required)
Assessment/Audit Tasks: No performance audits of field operations are anticipated for this project. The tasks associated with this QAPP are assessed using peer reviews and management system reviews. Peer review enables the field chemist 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 will be validated in accordance with th methods listed on Worksheet #36. All project deliverables will receive an internal peer review prior to release, per guidelines established in the SERAS AP #22, *Peer Review of SERAS Deliverables*.

QAPP Worksheet #15-1
Reference Limits and Evaluation Table

Matrix: Indoor/ Ambient Air

Analytical Group: VOC + TICs

Concentration Level: Low

Analyte	CAS Number	Project Action Limit[1] (µg/m³/ ppbv)	Project Quantitation Limit (ppbv)	SERAS SOP #1814 Analytical Method		SERAS Achievable Laboratory Limits	
				MDLs (ppbv)	Method QLs (ppbv)	MDLs[2] (ppbv)	QLs (ppbv)
Propylene	115-07-1	3100/1800	0.0200	NS	0.0200	0.00475	0.0200
Dichlorodifluoromethane	75-71-8	100/20.2	0.0200	NS	0.0200	0.00163	0.0200
Chloromethane	74-87-3	94/45.5	0.0200	NS	0.0200	0.00260	0.0200
1,2-Dichlorotetrafluoroethane	76-14-2	NS	0.0200	NS	0.0200	0.00103	0.0200
Vinyl chloride	75-01-4	0.17/0.067	0.0200	NS	0.0200	0.00295	0.0200
1,3-Butadiene	106-99-0	0.094/0.042	0.0200	NS	0.0200	0.01192	0.0200
Bromomethane	**74-83-9**	**5.2/1.34**	**0.0200**	**NS**	**0.0200**	**0.00279**	**0.0200**
Chloroethane	75-00-3	10000/3790	0.0200	NS	0.0200	0.00311	0.0200
Acetone	67-64-1	32000/13500	0.200	NS	0.200	0.0230	0.200
Trichlorofluoromethane	75-69-4	730/130	0.0200	NS	0.0200	0.00111	0.0200
Isopropyl Alcohol	67-63-0	210/85.5	0.200	NS	0.200	0.00509	0.200
1,1-Dichloroethene	75-35-4	210/53	0.0200	NS	0.0200	0.00182	0.0200
Methylene chloride	75-09-2	100/28.8	0.0200	NS	0.0200	0.00207	0.0200
1,1,2-Trichlorotrifluoromethane	76-13-1	31000/4045	0.0200	NS	0.0200	0.00385	0.0200
trans-1,2-Dichloroethene	156-60-5	NS	0.0200	NS	0.0200	0.00242	0.0200
1,1-Dichloroethane	75-34-3	1.8/0.45	0.0200	NS	0.0200	0.00219	0.0200
Methyl tert-butyl ether	1634-04-4	11/3.1	0.0200	NS	0.0200	0.00186	0.0200
Vinyl Acetate	108-05-4	210/59.6	0.0200	NS	0.0200	0.00374	0.0200
2-Butanone	78-93-3	5200/1760	0.200	NS	0.200	0.00350	0.200
cis-1,2-Dichloroethene	156-59-2	NS	0.0200	NS	0.0200	0.00349	0.0200
Ethyl Acetate	141-78-6	73/20.26	0.0200	NS	0.0200	0.00654	0.0200
Hexane	110-54-3	730/207	0.0200	NS	0.0200	0.00252	0.0200
Chloroform	67-66-3	0.12/0.025	0.0200	NS	0.0200	0.00275	0.0200

QAPP Worksheet #15-1
Reference Limits and Evaluation Table

Matrix: Indoor/ Ambient Air

Analytical Group: VOC + TICs

Concentration Level: Low

Analyte	CAS Number	Project Action Limit[1] (µg/m^3/ ppbv)	Project Quantitation Limit (ppbv)	SERAS SOP #1814 Analytical Method		SERAS Achievable Laboratory Limits	
				MDLs (ppbv)	Method QLs (ppbv)	MDLs[2] (ppbv)	QLs (ppbv)
Tetrahydrofuran	109-99-9	2100/712	0.0200	NS	0.0200	0.00226	0.0200
1,2-Dichloroethane	107-06-2	0.11/0.027	0.0200	NS	0.0200	0.00150	0.0200
1,1,1-Trichloroethane	71-55-6	5200/953	0.0200	NS	0.0200	0.00184	0.0200
Benzene	71-43-2	0.36/0.113	0.0200	NS	0.0200	0.00219	0.0200
Carbon Tetrachloride	56-23-5	0.47/0.075	0.0200	NS	0.0200	0.00225	0.0200
Cyclohexane	110-82-7	6300/1830	0.0200	NS	0.0200	0.00508	0.0200
1,2-Dichloropropane	78-87-5	0.28/0.061	0.0200	NS	0.0200	0.00329	0.0200
1,4-Dioxane	123-91-1	0.56/0.155	0.0200	NS	0.0200	0.00135	0.0200
Trichloroethene	79-01-6	0.48/0.089	0.0200	NS	0.0200	0.00398	0.0200
Heptane	142-82-5	NS	0.0200	NS	0.0200	0.00403	0.0200
cis-1,3-Dichloropropene	10061-01-5	0.71[(a)]/0.156[(a)]	0.0200	NS	0.0200	0.00227	0.0200
Methyl Isobutyl Ketone	108-10-1	3100/757	0.0200	NS	0.0200	0.00275	0.0200
trans-1,3-Dichloro-propene	10061-02-6	0.71[(a)]/0.156[(a)]	0.0200	NS	0.0200	0.00202	0.0200
1,1,2-Trichloroethane	79-00-5	0.18/0.033	0.0200	NS	0.0200	0.00202	0.0200
Toluene	108-88-3	5200/1380	0.0200	NS	0.0200	0.00265	0.0200
2-Hexanone	591-78-6	31/7.6	0.0200	NS	0.0200	0.00287	0.0200
Dibromochloromethane	124-48-1	0.10/0.012	0.0200	NS	0.0200	0.00120	0.0200
1,2-Dibromoethane	106-93-4	0.0047/0.00061	0.0200	NS	0.0200	0.00167	0.0200
Tetrachloroethene	127-18-4	11/1.62	0.0200	NS	0.0200	0.00125	0.0200
Chlorobenzene	108-90-7	52/11.3	0.0200	NS	0.0200	0.00143	0.0200
Ethylbenzene	100-41-4	1.1/0.253	0.0200	NS	0.0200	0.00117	0.0200
m,p-Xylene	108-38-3/ 106-42-3	200/46.1	0.0200	NS	0.0200	0.00230	0.0200

SERAS-001-DQAPP-033015_St John Methyl Bromide Response

QAPP Worksheet #15-1
Reference Limits and Evaluation Table

Matrix: Indoor/ Ambient Air

Analytical Group: VOC + TICs

Concentration Level: Low

Analyte	CAS Number	Project Action Limit[1] (µg/m^3/ ppbv)	Project Quantitation Limit (ppbv)	SERAS SOP #1814 Analytical Method		SERAS Achievable Laboratory Limits	
				MDLs (ppbv)	Method QLs (ppbv)	MDLs[2] (ppbv)	QLs (ppbv)
Bromoform	75-25-2	2.6/0.252	0.0200	NS	0.0200	0.00109	0.0200
Styrene	100-42-5	1000/235	0.0200	NS	0.0200	0.00233	0.0200
1,1,2,2-Tetrachloroethane	79-34-5	0.048/0.0070	0.0200	NS	0.0200	0.00248	0.0200
o-Xylene	95-47-6	100/23	0.0200	NS	0.0200	0.00113	0.0200
Ethyltoluene	622-96-8	NS	0.0200	NS	0.0200	0.000910	0.0200
1,3,5-Trimethylbenzene	108-67-8	NS	0.0200	NS	0.0200	0.00128	0.0200
1,2,4-Trimethylbenzene	95-63-6	7.3/1.49	0.0200	NS	0.0200	0.000728	0.0200
1,3-Dichlorobenzene	541-73-1	NS	0.0200	NS	0.0200	0.00195	0.0200
1,4-Dichlorobenzene	106-46-7	0.26/0.043	0.0200	NS	0.0200	0.00164	0.0200
1,2-Dichlorobenzene	95-50-1	210/34.9	0.0200	NS	0.0200	0.00162	0.0200
Naphthalene	91-20-3	0.083/0.016	0.0200	NS	0.0200	0.00173	0.0200

NS = Not Specified
[1] Regional Screening Level (RSL) Resident Air Supporting Table, November 2014 – lower of the carcinogenic target risk and the noncancer hazard index; Updated Jan 2015; http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_run_NOV2014.pdf
(a) Total cis/trans-1,3-dichloropropene
[2]Based on LOD/LOQ study dated 06/17/14 for instrument Air1
Bold indicates potential contaminant of concern

QAPP Worksheet #15-2
Reference Limits and Evaluation Table

Matrix: Indoor/Ambient Air

Analytical Group: Methyl Bromide

Concentration Level: Low Level

Analyte	CAS Number	Project Action Limit[1] (µg/m[3]/ ppbv)	Project Quantitation Limit (µg/m3)	OSHA PV2040 Analytical Method		SGS/Galson Achievable Laboratory Limits	
				MDLs (µg/m3)	Method QLs (µg/m3)	MDLs[3] (µg/m3)	QLs (µg/m3)2
Bromomethane	74-83-9	5.2/1.34	6.9	NA	740	Lab-Specific	6.9

NS = Not Specified
[1] Regional Screening Level (RSL) Resident Air Supporting Table, November 2014 and updated January 2015– lower of the carcinogenic target risk and the non-cancer hazard index http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/resair_sl_table_run_NOVEMBER2014.pdf, updated January 2015
[2]Based on 720 L of sample volume

QAPP Worksheet #15-3
Reference Limits and Evaluation Table

Matrix: Air

Analytical Group: Pesticides

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/m^3)	Project Quantitation Limit (µg/m^3)	Analytical Method		Achievable Laboratory Limits	
				MDLs(ng)	Method QLs (ng/PUF))	MDLs (µg/m3)[1]	QLs (µg/m3)[1]
a-BHC	319-84-6	NS	0.0694	NS	50	Lab-Specific	0.0694
g-BHC	58-89-9	NS	0.0694	NS	50	Lab-Specific	0.0694
b-BHC	319-85-7	NS	0.0694	NS	50	Lab-Specific	0.0694
d-BHC	319-86-8	NS	0.0694	NS	50	Lab-Specific	0.0694
Heptachlor	76-44-8	NS	0.0694	NS	50	Lab-Specific	0.0694
Aldrin	309-00-2	NS	0.0694	NS	50	Lab-Specific	0.0694
Heptachlor Epoxide	1024-57-3	NS	0.0694	NS	50	Lab-Specific	0.0694
g-Chlordane	5103-74-2	NS	0.0694	NS	50	Lab-Specific	0.0694
a-Chlordane	5104-71-9	NS	0.0694	NS	50	Lab-Specific	0.0694
Endosulfan I	959-98-8	NS	0.0694	NS	50	Lab-Specific	0.0694
p,p'-D D E	72-55-9	NS	0.0694	NS	50	Lab-Specific	0.0694
Dieldrin	60-57-1	NS	0.0694	NS	50	Lab-Specific	0.0694
Endrin	72-20-8	NS	0.0694	NS	50	Lab-Specific	0.0694
p,p'-D D D	72-54-8	NS	0.0694	NS	50	Lab-Specific	0.0694
Endosulfan II	33213-65-9	NS	0.0694	NS	50	Lab-Specific	0.0694
Endrin Aldehyde	7421-93-4	NS	0.0694	NS	50	Lab-Specific	0.0694
p,p'-D D T	50-29-3	NS	0.0694	NS	50	Lab-Specific	0.0694
Endosulfan Sulfate	1031-07-8	NS	0.0694	NS	50	Lab-Specific	0.0694
Methoxychlor	72-43-5	NS	0.0694	NS	50	Lab-Specific	0.0694
Endrin ketone	53494-70-5	NS	0.0694	NS	50	Lab-Specific	0.0694

NA = Not Available
NS = Not Specified
[1]Based on a total volume of 720L

QAPP Worksheet #15-4
Reference Limits and Evaluation Table

Matrix: Wipes

Analytical Group: Hydrogen Bromide

Concentration Level: Low Level

Analyte	CAS Number	Project Action Limit[1] (µg/wipe)	Project Quantitation Limit (µg/wipe)	Galson II-N7903 Analytical Method		SGS/Galson Achievable Laboratory Limits	
				MDLs (µg/wipe)	Method QLs (µg/wipe)	MDLs[3] (µg/wipe)	QLs (µg/wipe)
Hydrogen Bromide	10035-10-6	NS	5.0	NA	5.0	Lab-Specific	5.0

NS = Not Specified
NA = Not Applicable

QAPP Worksheet #15-5
Reference Limits and Evaluation Table

Matrix: Wipes

Analytical Group: Pesticides

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/wipe)	Project Quantitation Limit (µg/wipe)	Analytical Method		Achievable Laboratory Limits	
				MDLs(µg)	Method QLs (µg/wipe)	MDLs (µg/wipe)[1]	QLs (µg/wipe)
a-BHC	319-84-6	NS	0.125	NS	0.125	Lab-Specific	0.125
g-BHC	58-89-9	NS	0.125	NS	0.125	Lab-Specific	0.125
b-BHC	319-85-7	NS	0.125	NS	0.125	Lab-Specific	0.125
d-BHC	319-86-8	NS	0.125	NS	0.125	Lab-Specific	0.125
Heptachlor	76-44-8	NS	0.125	NS	0.125	Lab-Specific	0.125
Aldrin	309-00-2	NS	0.125	NS	0.125	Lab-Specific	0.125
Heptachlor Epoxide	1024-57-3	NS	0.125	NS	0.125	Lab-Specific	0.125
g-Chlordane	5103-74-2	NS	0.125	NS	0.125	Lab-Specific	0.125
a-Chlordane	5104-71-9	NS	0.125	NS	0.125	Lab-Specific	0.125
Endosulfan I	959-98-8	NS	0.125	NS	0.125	Lab-Specific	0.125
p,p'-D D E	72-55-9	NS	0.25	NS	0.25	Lab-Specific	0.25
Dieldrin	60-57-1	NS	0.25	NS	0.25	Lab-Specific	0.25
Endrin	72-20-8	NS	0.25	NS	0.25	Lab-Specific	0.25
p,p'-D D D	72-54-8	NS	0.25	NS	0.25	Lab-Specific	0.25
Endosulfan II	33213-65-9	NS	0.25	NS	0.25	Lab-Specific	0.25
Endrin Aldehyde	7421-93-4	NS	0.25	NS	0.25	Lab-Specific	0.25
p,p'-D D T	50-29-3	NS	0.25	NS	0.25	Lab-Specific	0.25
Endosulfan Sulfate	1031-07-8	NS	0.25	NS	0.25	Lab-Specific	0.25
Methoxychlor	72-43-5	NS	1.25	NS	1.25	Lab-Specific	1.25
Endrin ketone	53494-70-5	NS	0.25	NS	0.25	Lab-Specific	0.25
Toxaphene	8001-35-2	NS	2.5	NS	2.5	Lab-Specific	2.5

NA = Not Available
NS = Not Specified

QAPP Worksheet #15-6
Reference Limits and Evaluation Table

Matrix: Tap Water

Analytical Group: VOC + TICs

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L)	Project Quantitation Limit (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	5.00	NS	5.00	Lab-Specific	5.00
Chloromethane	74-87-3	NS	5.00	NS	5.00	Lab-Specific	5.00
Vinyl chloride	75-01-4	NS	5.00	NS	5.00	Lab-Specific	5.00
Bromomethane	**74-83-9**	**7.50**	**5.00**	**NS**	**5.00**	Lab-Specific	**5.00**
Chloroethane	75-00-3	NS	5.00	NS	5.00	Lab-Specific	5.00
Trichlorofluoromethane	75-69-4	NS	5.00	NS	5.00	Lab-Specific	5.00
Acetone	67-64-1	NS	20.0	NS	20.0	Lab-Specific	20.0
1,1-Dichloroethene	75-35-4	NS	5.00	NS	5.00	Lab-Specific	5.00
Methylene chloride	75-09-2	NS	5.00	NS	5.00	Lab-Specific	5.00
Carbon disulfide	75-15-0	NS	5.00	NS	5.00	Lab-Specific	5.00
Methyl tert-butyl ether	1634-04-4	NS	5.00	NS	5.00	Lab-Specific	5.00
trans-1,2-Dichloroethene	156-60-5	NS	5.00	NS	5.00	Lab-Specific	5.00
1,1-Dichloroethane	75-34-3	NS	5.00	NS	5.00	Lab-Specific	5.00
2-Butanone	78-93-3	NS	5.00	NS	5.00	Lab-Specific	5.00
2,2-Dichloropropane	594-20-7	NS	5.00	NS	5.00	Lab-Specific	5.00
cis-1,2-Dichloroethene	156-59-2	NS	5.00	NS	5.00	Lab-Specific	5.00
Chloroform	67-66-3	NS	5.00	NS	5.00	Lab-Specific	5.00
1,1-Dichloropropene	563-58-6	NS	5.00	NS	5.00	Lab-Specific	5.00
1,2-Dichloroethane	107-06-2	NS	5.00	NS	5.00	Lab-Specific	5.00
1,1,1-Trichloroethane	71-55-6	NS	5.00	NS	5.00	Lab-Specific	5.00
Carbon tetrachloride	56-23-5	NS	5.00	NS	5.00	Lab-Specific	5.00

QAPP Worksheet #15-6
Reference Limits and Evaluation Table

Matrix: Tap Water

Analytical Group: VOC + TICs

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L)	Project Quantitation Limit (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)
Benzene	71-43-2	NS	5.00	NS	5.00	Lab-Specific	5.00
Trichloroethene	79-01-6	NS	5.00	NS	5.00	Lab-Specific	5.00
1,2-Dichloropropane	78-87-5	NS	5.00	NS	5.00	Lab-Specific	5.00
Bromodichloromethane	75-27-4	NS	5.00	NS	5.00	Lab-Specific	5.00
Dibromomethane	74-95-3	NS	5.00	NS	5.00	Lab-Specific	5.00
cis-1,3-Dichloropropene	10061-01-5	NS	5.00	NS	5.00	Lab-Specific	5.00
trans-1,3-Dichloropropene	10061-02-6	NS	5.00	NS	5.00	Lab-Specific	5.00
1,1,2-Trichloroethane	79-00-5	NS	5.00	NS	5.00	Lab-Specific	5.00
1,3-Dichloropropane	142-28-9	NS	5.00	NS	5.00	Lab-Specific	5.00
Dibromochloromethane	124-48-1	NS	5.00	NS	5.00	Lab-Specific	5.00
1,2-Dibromoethane	106-93-4	NS	5.00	NS	5.00	Lab-Specific	5.00
Bromoform	75-25-2	NS	5.00	NS	5.00	Lab-Specific	5.00
4-Methyl-2-pentanone	108-10-1	NS	5.00	NS	5.00	Lab-Specific	5.00
Toluene	108-88-3	NS	5.00	NS	5.00	Lab-Specific	5.00
2-Hexanone	591-78-6	NS	5.00	NS	5.00	Lab-Specific	5.00
Tetrachloroethene	127-18-4	NS	5.00	NS	5.00	Lab-Specific	5.00
Chlorobenzene	108-90-7	NS	5.00	NS	5.00	Lab-Specific	5.00
1,1,1,2-Tetrachloroethane	630-20-6	NS	5.00	NS	5.00	Lab-Specific	5.00
Ethylbenzene	100-41-4	NS	5.00	NS	5.00	Lab-Specific	5.00
m,p-Xylene	108-38-3/ 106-42-3	NS	10.0	NS	10.0	Lab-Specific	10.0

QAPP Worksheet #15-6
Reference Limits and Evaluation Table

Matrix: Tap Water

Analytical Group: VOC + TICs

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L)	Project Quantitation Limit (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)
o-Xylene	95-47-6	NS	5.00	NS	5.00	Lab-Specific	5.00
Styrene	100-42-5	NS	5.00	NS	5.00	Lab-Specific	5.00
Isopropylbenzene	98-82-8	NS	5.00	NS	5.00	Lab-Specific	5.00
1,1,2,2-Tetrachloroethane	79-34-5	NS	5.00	NS	5.00	Lab-Specific	5.00
1,2,3-Trichloropropane	96-18-4	NS	5.00	NS	5.00	Lab-Specific	5.00
n-Propylbenzene	103-65-1	NS	5.00	NS	5.00	Lab-Specific	5.00
Bromobenzene	108-86-1	NS	5.00	NS	5.00	Lab-Specific	5.00
1,3,5-Trimethylbenzene	108-67-8	NS	5.00	NS	5.00	Lab-Specific	5.00
2-Chlorotoluene	95-49-8	NS	5.00	NS	5.00	Lab-Specific	5.00
4-Chlorotoluene	106-43-4	NS	5.00	NS	5.00	Lab-Specific	5.00
tert-Butylbenzene	98-06-6	NS	5.00	NS	5.00	Lab-Specific	5.00
1,2,4-Trimethylbenzene	95-63-6	NS	5.00	NS	5.00	Lab-Specific	5.00
sec-Butylbenzene	135-98-8	NS	5.00	NS	5.00	Lab-Specific	5.00
p-Isopropyltoluene	99-87-6	NS	5.00	NS	5.00	Lab-Specific	5.00
1,3-Dichlorobenzene	541-73-1	NS	5.00	NS	5.00	Lab-Specific	5.00
1,4-Dichlorobenzene	106-46-7	NS	5.00	NS	5.00	Lab-Specific	5.00
n-Butylbenzene	104-51-8	NS	5.00	NS	5.00	Lab-Specific	5.00
1,2-Dichlorobenzene	95-50-1	NS	5.00	NS	5.00	Lab-Specific	5.00
1,2-Dibromo-3-chloropropane	96-12-8	NS	5.00	NS	5.00	Lab-Specific	5.00
1,2,4-Trichlorobenzene	120-82-1	NS	5.00	NS	5.00	Lab-Specific	5.00

QAPP Worksheet #15-6
Reference Limits and Evaluation Table

Matrix: Tap Water

Analytical Group: VOC + TICs

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L)	Project Quantitation Limit (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)
Hexachlorobutadiene	87-68-3	NS	5.00	NS	5.00	Lab-Specific	5.00
Naphthalene	91-20-3	NS	5.00	NS	5.00	Lab-Specific	5.00
1,2,3-Trichlorobenzene	87-61-6	NS	5.00	NS	5.00	Lab-Specific	5.00

NS = Not Specified
[1] To be determined prior to the analysis of samples

QAPP Worksheet #15-7
Reference Limits and Evaluation Table

Matrix: Water

Analytical Group: Bromide

Concentration Level: Low Level

Analyte	CAS Number	Project Action Limit[1] (µg/L)	Project Quantitation Limit (µg/L)	EPA 300 Analytical Method		Katahdin Achievable Laboratory Limits	
				MDLs (µg/L)	Method QLs (µg/L)	MDLs (µg/L)	QLs (µg/L)
Methyl Bromide	10035-10-6	NS	50	10	50	Lab-Specific	50

NS = Not Specified
[1] Regional Screening Level (RSL) Residential Tapwaters Supporting Table, November 2014 and updated January 2015

QAPP Worksheet #16
Project Schedule Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Field Activities	SERAS	Marrch 23, 2015	March 30, 2015	Trip Report	2 weeks after reciept of analytical data
Laboratory Prelims	ERT/SERAS SGS/Galson Katahdin Analytical ALS	March 27, 2015	April 3, 2015	Data Package	Within 10 business days after receipt of samples
Validation & Report Preparation	SERAS	April 3, 2015	April 10, 2015	Analytical Report	Within 5 business days after receipt of all data

☐ Worksheet Not Applicable (State Reason)

QAPP Worksheet #17
Sampling Design and Rationale

Describe and provide a rationale for choosing the sampling approach (e.g., grid system, biased statistical approach): Selection of samples will be based on professional judgment and prior information. This type of approach is helpful during emergency response situations when time is of the essence.
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): Indoor and ambient air, wipes and tap water will be sampled, Since the potential contaminant of concern was methyl bromide, the sampling design was based on this chemical as well as other pesticide and VOCs. Indoor air samples will be collected from the lower unit that had been fumigated, the upper unit where the family resided and an un-fumigated unit as background. Outside ambient air will also be sampled to assess if concentrations outside the unit could have an impact on the indoor air concentrations. Indoor and ambient air samples will be collected and analyzed for methyl bromide, VOCs + TICs and pesticides; wipe samples for hydrogen bromide and pesticides; and tap water for bromide and VOCs + TICs.

QAPP Worksheet #18
Monitoring 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	Rationale for Sampling Location
55000/Kitchen	Air	NA	VOC + TICs	Low	1	SERAS SOP #1704	Judgmental
55001/Outside A/C	Air	NA	VOC + TICs	Low	1	SERAS SOP #1704	Judgmental
55002/MBR	Air	NA	VOC + TICs	Low	1	SERAS SOP #1704	Judgmental
55004/BR2	Air	NA	VOC + TICs	Low	1	SERAS SOP #1704	Judgmental
TBD/Upper	Air	NA	Methyl Bromide	Low	3	OSHA PV2040	Judgmental
TBD/Ambient	Air	NA	Methyl Bromide	Low	1	OSHA PV2040	Judgmental
TBD/Lower	Air	NA	Methyl Bromide	Low	2	OSHA PV2040	Judgmental
TBD/Upper	Air	NA	Pesticides	Low	3	EPA TO-10A	Judgmental
TBD/Ambient	Air	NA	Pesticides	Low	1	EPA TO-10A	Judgmental
TBD/Lower	Air	NA	Pesticides	Low	2	EPA TO-10A	Judgmental
TBD/Upper	Wipes	NA	Pesticides	Low	10	SERAS SOP #2011	Judgmental
TBD/Lower	Wipes	NA	Pesticides	Low	5	SERAS SOP #2011	Judgmental
TBD/Upper	Wipes	NA	Hydrogen Bromide	Low	10	Laboratory-Supplied Teflon Wipes	Judgmental
TBD Lower	Wipes	NA	Hydrogen Bromide	Low	5	Laboratory-Supplied Teflon Wipes	Judgmental
TBD/Unfumigated Unit	Air	NA	VOC + TICs	Low	2	SERAS SOP #1704	Judgmental
TBD/Unfumigated Unit	Wipes	NA	Hydrogen Bromide	Low	2	Laboratory-Supplied Teflon Wipes	Judgmental
TBD/Upper	Water	NA	VOC + TICs	Low	2	Direct Collection	Judgmental

NA = Not Applicable

QAPP Worksheet #18
Monitoring 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	Rationale for Sampling Location
TBD/Upper	Water	NA	Bromide	Low	1	Direct Collection	Judgmental
TBD/Lower	Water	NA	VOC + TICs	Low	2	Direct Collection	Judgmental
TBD/Lower	Water	NA	Bromide	Low	1	Direct Collection	Judgmental

NA = Not Applicable

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)
Air	VOC + TICs	Low	SERAS SOP #1814	4 to 5-L	6-L SUMMA® Canister	None	30 days
Air	Methyl Bromide	Low	OSHA PV2040	720L	2 - Anasorb 747 sorbent tubes in series	Separate tubes, cap and store at ≤6°C	14 days
Air	Pesticides	Low	EPA TO-10A	720 L	PUF plug	Wrap in foil & store at ≤6°C	7 days for extraction & 40 days for analysis
Wipes	Pesticides	Low	Mod. EPA 8081A	100 cm^2	Gauze Wipe with hexane	Store at ≤6°C	14 days for extraction & 40 days for analysis
Wipes	Hydrogen Bromide	Low	Mod. NIOSH 7903	100 cm^2	Dry Teflon Wipes	Place in vial, store at 25°C	21 Days
Water	VOCs	Low	SERAS SOP #1806	5 mL	3 – 40-mL vials	Store at ≤6°C	7 days
Water	Bromide	Low	EPA 300.0	5 mL	40-mL vial	None Required	28 days

☑ Worksheet Not Applicable (State Reason)

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 BS/MS	No. of Trip Blanks	No. of Field Blanks	No. of PT Samples	Total No. of Samples to Lab
Air	VOC + TICs	Low	SERAS SOP #1814	9	NA	NA	2	NA	NA	11
Air	Methyl Bromide	Low	OSHA PV2040	6	NA	1	1	2	NA	9
Air	Pesticides	Low	EPA TO-10A	6	NA	1	NA	2	NA	8
Wipes	Pesticides	Low	Mod. EPA 8081A	15	NA	1	NA	2	NA	17
Wipes	Hydrogen Bromide	Low	Mod. NIOSH 7903	17	NA	1	NA	2	NA	19
Water	VOCs	Low	SERAS SOP #1806	4	NA	1	1	2	NA	7
Water	Bromide	Low	EPA 300.0	2	NA	1	NA	2	NA	4

☐ Worksheet Not Applicable (State Reason)

QAPP Worksheet #21
Project Monitoring SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Check if yes)	Comments
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	NA	☐	
2005	*Quality Assurance/Quality Control Samples*	SERAS	NA	☐	
2008	*General Air Sampling Guidelines*	SERAS	NA	☐	
4001	*Logbook Documentation*	SERAS	Site Activities	☐	
4005	*Chain of Custody Procedures*	SERAS	NA	☐	

☑ Worksheet Not Applicable (State Reason) Only sampling and analysis will be conducted for this project.

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

Field Equipment/ Instrument	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]

[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?
SERAS SOP #1814	Analysis of Volatile Organic Compounds (VOCs) in SUMMA Canister Air Samples by Gas Chromatography/Mass Spectrometry (GC/MS)	Definitive	VOC + TICs	GC/MS	ERT/SERAS Laboratory	No
EPA Method TO-10A	Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air Using Low Volume Polyurethane Foam (PUF) Sampling Followed by Gas Chromatographic/Multi-Detector Detection (GC/MD)	Definitive	Pesticides	GC/ECD	ALS	No
OSHA PV2040	Methyl Bromide	Definitive	Methyl Bromide	GC/FID	SGS/Galson	No
Mod. EPA Method 8081A	Organochlorine Pesticides by Gas Chromatography	Definitive	Pesticides	GC/ECD	Katahdin	No
Mod NIOSH 7903	Acids, Inorganic	Definitive	Hydrogen Bromide	IC	SGS/Galson	No
SERAS SOP #1806	Volatile Organic Compound Analysis in Water by GC/MS	Definitive	VOC + TICs	GC/MS	ERT/SERAS Laboratory	No
EPA Method 300.0	Determination of Inorganic Anions by Ion Chromatography	Definitive	Bromide	IC	Katahdin	No

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	BFB Tune	Every 24 hours before any standards, blanks or samples are analyzed	Within the tune performance criteria	Retune if ion abundances are outside criteria	Analyst	SERAS SOP #1814
GC/MS	Initial calibration (IC), minimum 5-points for all analytes	Initially prior to sample analysis. After changes to instrument and when instrument does not meet method criteria.	Relative standard deviation (RSD) = ≤ 30%, two compounds may exceed up to 40% RSD	Inspect system for problems; perform maintenance (i.e. ion source cleaning, column replacement, etc.), check calibration standards. Rerun IC, reanalyze affected samples	Analyst	SERAS SOP #1814
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	SERAS SOP #1814
GC/MS	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	SERAS SOP #1814
GC/FID	IC, minimum of 5 points, ICV beginning and end of the run, very 20 injections or 12 hours	Annually/Every 12 hours	Correlation Coefficient (r) >0.994,	Rerun IC	Analyst	OSHA PV2040

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]
IC	IC, minimum of 5 points, ICV beginning and end of the run, very 20 injections or 12 hours	Annually/Every 12 hours	Correlation Coefficient (r) >0.994,	Rerun IC	Analyst	Mod. NIOSH 7903
GC/ECD	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	Mod EPA Method 8081A
GC/ECD	6 point- ICs followed by ICV	Prior to initial analysis	RSD $\leq$20% (Primary Column) RSD$\leq$25% (Second Column) ICV – 85-115%	Rerun IC	Analyst	EPA TO-10A
GC/ECD	CCAL at the beginning and end of each day and after every 10 samples	Each day of analysis	RPD ±15%	Rerun once, if not acceptable, rerun IC	Analyst	EPA TO-10A
IC	IC, minimum of 3 concentrations and a blank	Prior to analysis	R $\geq$0.995	Rerun IC	Analyst	EPA 300.0
IC	CCAL (mid range) each working day and after every 20 samples.	Each day	%R = 90-110%	Rerun once, if not acceptable, rerun IC	Analyst	EPA 300.0

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	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
GC/MS	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

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

☐ Worksheet Not Applicable (State Reason)

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.	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
GC/FID	In accordance with SGS/Galson's standard procedures	In accordance with SGS/Galson's standard procedures	In accordance with SGS/Galson's standard procedures	In accordance with SGS/Galson's standard procedures	In accordance with SGS/Galson's standard procedures	In accordance with SGS/Galson's standard procedures	Analyst	OSHA PV2040
IC	In accordance with SGS/Galson's standard procedures	In accordance with SGS/Galson's standard procedures	In accordance with SGS/Galson's standard procedures	In accordance with SGS/Galson's standard procedures	In accordance with SGS/Galson's standard procedures	In accordance with SGS/Galson's standard procedures	Analyst	Mod. NIOSH 7903
GC/ECD	In accordance with ALS standard procedures	In accordance with ALS standard procedures	In accordance with ALS standard procedures	In accordance with ALS standard procedures	In accordance with ALS standard procedures	In accordance with ALS standard procedures	Analyst	EPA TO-10A
GC/ECD	In accordance with Katahdin's standard procedures	In accordance with Katahdin's standard procedures	In accordance with Katahdin's standard procedures	In accordance with Katahdin's standard procedures	In accordance with Katahdin's standard procedures	In accordance with Katahdin's standard procedures	Analyst	Mod. SW-846 Method 8081A

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]
IC	In accordance with Katahdin's standard procedures	In accordance with Katahdin's standard procedures	In accordance with Katahdin's standard procedures	In accordance with Katahdin's standard procedures	In accordance with Katahdin's standard procedures	In accordance with Katahdin's standard procedures	Analyst	EPA 300.0
GC/MS	Check reservoir level			Weekly		Fill when necessary	Analyst	SERAS SOP # 1806
GC/MS	Check MS ionization gauge			Weekly			Analyst	SERAS SOP # 1806
GC/MS	Check Tekmar pressure			Weekly		Adjust	Analyst	SERAS SOP # 1806
GC/MS	Check gas pressure			Weekly		Adjust/replace	Analyst	SERAS SOP # 1806
GC/MS	Check Tekmar trap			As needed		Replace	Analyst	SERAS SOP # 1806
GC/MS	Check vacuum pump oil level			Monthly		Fill	Analyst	SERAS SOP # 1806
GC/MS	Check purge vessel			Monthly		Replace	Analyst	SERAS SOP # 1806
GC/MS	GC column			Monthly		Clean	Analyst	SERAS SOP # 1806
GC/MS	Ion Source			As needed		Clean	Analyst	SERAS SOP # 1806

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

QAPP Worksheet #26
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization: Amy Dubois & Colleen Grell/SERAS
Sample Packaging (Personnel/Organization): Amy Dubois & Colleen Grell/SERAS
Coordination of Shipment (Personnel/Organization): Amy Dubois & Colleen Grell/SERAS
Type of Shipment/Carrier: Overnight carrier to appropriate laboratory.
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Larry Martin, Sample Receiving Technician, ERT/SERAS Laboratory, Edison, NJ, Sample Receiving Personnel at ALS, Katahdin and SGS/Galson
Sample Custody and Storage (Personnel/Organization): Larry Martin, Sample Receiving Technician ,Amit Vaidya, GC/MS Chemist and Gerald Ball, Sr. GC/MS Chemist, ERT/SERAS Laboratory, Edison, NJ; Sample Receiving Personnel at ALS, Katahdin and SGS/Galson
Sample Preparation (Personnel/Organization): Amit Vaidya, GC/MS Chemist and Gerald Ball, Sr. GC/MS Chemist, ERT/SERAS Laboratory, Edison, NJ; sample preparation personnel at ALS, Katahdin and SGS/Galson
Sample Determinative Analysis (Personnel/Organization): Amit Vaidya, GC/MS Chemist and Gerald Ball, Sr. GC/MS Chemist, ERT/SERAS Laboratory, Edison, NJ
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples will be store on ice in the field as appropriate and shipped for delivery to the ERT/SERAS Laboratory, ALS, Katahdin Analytical and SGS/Galson laboratories
Sample Extract/ Digestate Storage (No. of days from extraction/digestion): In accordance with the method's requirements
Biological Sample Storage (No. of days from sample collection): Not applicable
SAMPLE DISPOSAL
Personnel/Organization: Not applicable
Number of Days from Analysis: Not applicable

☐ Worksheet Not Applicable (State Reason)

QAPP Worksheet #27
Sample Custody Requirements

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): Each sample will be affixed with a label identifying the sample number, sample location, collection date, collection time, matrix, and requested analysis. The samples will be stored and mobilized in shipping containers. Scribe will be used for sample management, as well as generation of sample documentation, such as labels and COC Records. All COC records will receive a peer review prior to relinquishment in accordance with SERAS SOP # 4005, *Chain of Custody Procedures.* The samples collected by SERAS personnel will be mobilized to Edison, NJ and relinquished under the COC to the respective laboratories for analysis in accordance with SERAS SOP #2004, *Sample Packaging and Shipment.*
Laboratory Sample Custody Procedures (receipt of samples, archiving, and disposal): Samples delivered to the laboratories will be accepted by sample receiving personnel. Samples will be checked for discrepancies, integrity, etc. If noted, issues will be forwarded to the appropriate manager 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. Procedures outlined in SERAS SOP #2002, *Sample Documentation* will be applied (refer to Worksheet #21).
Chain-of-custody Procedures: Chain-of-custody records will be generated for all samples submitted for analysis using Scribe database software. Procedures outlined in SERAS SOP #4005, *Chain of Custody Procedures* will be applied.

QAPP Worksheet #28-1
QC Samples Table

Matrix	Indoor/Ambient Air (SUMMA® Canister)
Analytical Group	VOC
Concentration Level	Low Level Scan
Sampling SOP	SERAS SOP#1704
Analytical Method/ SOP Reference	SERAS SOP #1814
Sampler's Name	Amy Dubois Colleen Grell
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	Accuracy/Bias	±40% of daily calibration IS response
LCS	5% of samples	%R – 80 – 130% or within control chart limits	Clean, repair, re-analyze	Analyst	Accuracy/Bias	%R – 80 – 130% or within control chart limits
Method Blank	1/24-hour clock	<RL	Clean, repair, re-analyze	Analyst	Accuracy/Bias	<RL
Trip Blank	1/shipment	NS	Qualify Data	QA/QC Chemist	Accuracy/Bias/ Contamination	<RL
Lab Duplicates	1/10 samples	RPD ±25%	Reanalyze, document in case narrative	Analyst	Precision	RPD ±25%

QAPP Worksheet #28-1
QC Samples Table

Matrix	Indoor/Ambient Air (SUMMA® Canister)
Analytical Group	VOC
Concentration Level	Low Level Scan
Sampling SOP	SERAS SOP#1704
Analytical Method/ SOP Reference	SERAS SOP #1814
Sampler's Name	Amy Dubois Colleen Grell
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
LOD/LOQ Study	Annual	LOD – Standard deviation of 7 replicates multiplied by the students T-factor <RL LOQ - %R ±30% or within control chart limits	Clean, repair, re-analyze.	Analyst	Sensitivity/Accuracy	LOD – Standard deviation of 7 replicates multiplied by the students T-factor <RL LOQ - %R ±30% or within control chart limits

NS = Not specified

QAPP Worksheet #28-2
QC Samples Table

Matrix	Indoor/ Ambient Air
Analytical Group	Methyl Bromide
Concentration Level	Low
Sampling SOP	OSHA PV2040
Analytical Method/ SOP Reference	OSHA PV2040
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	SGS/Galson
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
BS/BSD	Each batch of 50 samples	RPD – Within control chart limits	Document in case narrative	Analyst	Precision	RPD – Within control chart limits
BS	Each batch of 50 samples	% Recovery - Within control chart limits	Document in case narrative	Analyst	Accuracy/Bias	% Recovery - Within control chart limits
Media Blank	With each batch of 50 samples	No target compound ≥ RL	Document in case narrative	Analyst	Accuracy/Bias (Contamination)	No target compound ≥ RL
Limit of Detection (LOD) Study	Prior to use of the method	LOD - Standard deviation of 7 replicates x Student's t-factor <RL	Adjust calibration curve if necessary	Analyst	Sensitivity	LOD - Standard deviation of 7 replicates x Student's t-factor <RL
Field Blank	1 per sampling day	<RL	Document in final analytical report; Qualify data	QA/QC Chemist	Accuracy/Bias (Contamination)	<RL

NS = Not specified

QAPP Worksheet #28-3
QC Samples Table

Matrix	Indoor/Ambient Air
Analytical Group	Pesticides
Concentration Level	Low
Sampling SOP	EPA TO-10A
Analytical Method/ SOP Reference	EPA TO-10A
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	ALS
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
BS/BSD	Each sample	RPD – ±15%	Document in case narrative	Analyst	Precision	RPD – Within control chart limits
BS	5% of samples	% Recovery – 70-130 or within control chart limits	Document in case narrative	Analyst	Accuracy/Bias	% Recovery – 70-125 or within control chart limits
Process Blank	1/24-hour clock	No target compound ≥ RL	Document in case narrative	Analyst	Accuracy/Bias (Contamination)	No target compound ≥ RL
Solvent Process Blank	1/shipment	No target compound ≥ RL	Document in case narrative	Analyst	Accuracy/Bias (Contamination)	No target compound ≥ RL
LOD Study	Annual	LOD - Standard deviation of 7 replicates x Student's t-factor <RL	Adjust calibration curve if necessary	Analyst	Sensitivity	LOD - Standard deviation of 7 replicates x Student's t-factor <RL

QAPP Worksheet #28-3
QC Samples Table

Matrix	Indoor/Ambient Air
Analytical Group	Pesticides
Concentration Level	Low
Sampling SOP	EPA TO-10A
Analytical Method/ SOP Reference	EPA TO-10A
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	ALS
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
Field Blank	1 per sampling day	<RL	Document in final analytical report; Qualify data	QA/QC Chemist	Accuracy/Bias (Contamination)	<RL
Surrogates	Each Sample	%R – 60-120 or within control chart limits	Reanalyze to confirm	Analyst	Accuracy/Bias	%R – 60-120 or within control chart limits

NS = Not specified

QAPP Worksheet #28-4
QC Samples Table

Matrix	Wipes
Analytical Group	Hydrogen Bromide
Concentration Level	Low
Sampling SOP	Mod. NIOSH 7903
Analytical Method/ SOP Reference	Mod. NIOSH 7903
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	SGS/Galson
No. of Sample Locations	~ 17

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
BS/BSD	1 per batch of 50 samples	RPD – Within control chart limits or 75-125%	Document in case narrative	Analyst	Precision	RPD – Within control chart limits or 75-125%
BS	1 per batch of 50 samples	% Recovery - Within control chart limits	Document in case narrative	Analyst	Accuracy/Bias	% Recovery - Within control chart limits
Media Blank	1 per batch of 50 samples	No target compound ≥ RL	Document in case narrative	Analyst	Accuracy/Bias (Contamination)	No target compound ≥ RL
LOD Study	Prior to analysis of samples	LOD - Standard deviation of 7 replicates x Student's t-factor <RL	Document in case narrative	Analyst	Sensitivity	LOD - Standard deviation of 7 replicates x Student's t-factor <RL
Field Blank	1 per sampling day	NA	Document in final analytical report; Qualify data	QA/QC Chemist	Accuracy/Bias (Contamination)	<RL

QAPP Worksheet #28-4
QC Samples Table

Matrix	Wipes
Analytical Group	Hydrogen Bromide
Concentration Level	Low
Sampling SOP	Mod. NIOSH 7903
Analytical Method/ SOP Reference	Mod. NIOSH 7903
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	SGS/Galson
No. of Sample Locations	~ 17

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
DL Standard	Each set of samples or once every 24 hours	%R = 70-130%	Reanalyze	Analyst	Accuracy/Bias	%R = 70-130%

NS = Not specified

QAPP Worksheet #28-5
QC Samples Table

Matrix	Wipes
Analytical Group	Pesticides
Concentration Level	Low
Sampling SOP	SERAS SOP #2011
Analytical Method/ SOP Reference	Mod. EPA 8081A
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	Katahdin
No. of Sample Locations	~ 15

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
BS/BSD	Each sample	RPD – Within control chart limits	Document in case narrative	Analyst	Precision	RPD – Within control chart limits
BS	5% of samples	% Recovery – 75-125 or within control chart limits	Document in case narrative	Analyst	Accuracy/Bias	% Recovery – 75-125 or within control chart limits
Media Blank	1/24-hour clock	No target compound ≥ RL	Document in case narrative	Analyst	Accuracy/Bias (Contamination)	No target compound ≥ RL
LOD/LOQ	Annual	LOD - Standard deviation of 7 replicates x Student's t-factor <RL LOQ±30% or within control chart limits	Adjust calibration curve if necessary	Analyst	Sensitivity/Accuracy	LOD - Standard deviation of 7 replicates x Student's t-factor <RL LOQ ±30% or within control chart limits

QAPP Worksheet #28-5
QC Samples Table

Matrix	Wipes
Analytical Group	Pesticides
Concentration Level	Low
Sampling SOP	SERAS SOP #2011
Analytical Method/ SOP Reference	Mod. EPA 8081A
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	Katahdin
No. of Sample Locations	~ 15

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 Blank	1 per sampling day	NA	Document in final analytical report; Qualify data	QA/QC Chemist	Accuracy/Bias (Contamination)	<RL
Surrogates	Each Sample	%R – Within control chart limits	Reanalyze to confirm	Analyst	Accuracy/Bias	%R – Within control chart limits

QAPP Worksheet #28-6
QC Samples Table

Matrix	Water
Analytical Group	VOC
Concentration Level	Low
Sampling SOP	Direct Collection
Analytical Method/ SOP Reference	SERAS SOP 1806
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS
No. of Sample Locations	4

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	1:20 samples	%R = Within control chart limits	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 ±30%	Adjust RLs	Analyst	Sensitivity	Same as Method/SOP QC Acceptance Limits

QAPP Worksheet #28-6
QC Samples Table

Matrix	Water
Analytical Group	VOC
Concentration Level	Low
Sampling SOP	Direct Collection
Analytical Method/ SOP Reference	SERAS SOP 1806
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	ERT/SERAS
No. of Sample Locations	4

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	%R = Within control chart limits	Document outliers in case narrative. Rerun if necessary	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Surrogate Spike	Every Sample	%R = Within control chart limits	Reanalyze to confirm matrix effects	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Field Blank	1 per day	NA	Document in final analytical report; Qualify data	QA/QC Chemist	Accuracy/Bias (Contamination)	<RL
Trip Blank	1 per shipment	NA	Document in final analytical report; Qualify data	QA/QC Chemist	Accuracy/Bias (Contamination)	<RL

QAPP Worksheet #28-7
QC Samples Table

Matrix	Water
Analytical Group	Bromide
Concentration Level	Low
Sampling SOP	Direct Collection
Analytical Method/ SOP Reference	EPA 300.0
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	Katahdin
No. of Sample Locations	~ 2

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Reagent Blank (LRB)	1 per batch	<RL	Investigate laboratory or reagent contamination before continuing analysis	Analyst	Accuracy/Bias (Contamination)	<RL
Laboratory Fortified Blank (LFB)	1 per batch	%R = 90-110 or within more stringent control chart limits	Identify source of problem and resolve prior to continuing analysis	Analyst	Accuracy/Bias	%R = 90-110 or within more stringent control chart limits
Laboratory Fortified Matrix	1 per 10 samples	%R = 90-110	Document in case narrative	Analyst	Accuracy/Bias	%R = 90-110

QAPP Worksheet #28-7
QC Samples Table

Matrix	Water
Analytical Group	Bromide
Concentration Level	Low
Sampling SOP	Direct Collection
Analytical Method/ SOP Reference	EPA 300.0
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	Katahdin
No. of Sample Locations	~ 2

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Sample Replicates	Minimum quarterly	RPD – Within laboratory designated limits	Add to control chart to document data quality	Analyst	Precision	RPD – Within laboratory designated limits
Field Blank	1 per sampling day	NA	Document in final analytical report; Qualify data	QA/QC Chemist	Accuracy/Bias (Contamination)	<RL
Linear Calibration Range (LCR) Standard	Initially and every 6 months	%R = 90-110	Re-establish linearity	Analyst	Accuracy/Bias (Contamination)	%R = 90-110
Quality Control Sample (QCS)	Quarterly or as needed to meet data quality needs	%R = 90-110	Identify source of problem	Analyst	Accuracy/Bias	%R = 90-110

QAPP Worksheet #28-7
QC Samples Table

Matrix	Water
Analytical Group	Bromide
Concentration Level	Low
Sampling SOP	Direct Collection
Analytical Method/ SOP Reference	EPA 300.0
Sampler's Name	Amy Dubois Colleen Grell
Field Sampling Organization	SERAS
Analytical Organization	Katahdin
No. of Sample Locations	~ 2

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Sensitivity	MDL = 7 replicates of fortified reagent water at concentration 2-3 times the instrument detection limit (IDL)	Method Detection Limit (MDL) Study	Sensitivity	MDL = 7 replicates of fortified reagent water at concentration 2-3 times the instrument detection limit (IDL)	Sensitivity	Method Detection Limit (MDL) Study

NS = Not specified

QAPP Worksheet #29
Project Documents and Records Table

Sample Collection Documents and Records	Monitoring Data Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records	Other
Chain of custody records Sample Labels Custody Seals SUMMA® Sampling Worksheets Air Sampling Worksheets Wipe Sampling Worksheets Field Change Form (if necessary)		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 UFP-QAPP Checklist	Scribe Database Analytical Report Trip Report

☐ Worksheet Not Applicable (State Reason)

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
Indoor/ Ambient Air (SUMMA® Canister)	VOC + TICs	Low Level Scan	See Worksheet #18	SERAS SOP #1814	Preliminary Data – 24-48 hours Data validation and Analytical Report in 5 business days from receipt of data package	ERT/SERAS Laboratory Lockheed Martin – SERAS 2890 Woodbridge Ave Edison, NJ 08837 732-321-4200 Jay Patel, Analytical Support Leader Gerald Ball Sr. GC/MS Chemist	NA
Indoor/ Ambient Air	Methyl Bromide	Low	See Worksheet #18	OSHA PV2040	Preliminary Data – 5 Business Days Data validation and analytical report – 5 business days from receipt of data package	SGS/Galson Laboratories 6601 Kirkville Road East Syracuse, NY 13057 315-432-5227 Attn.: Pam Weaver	NA
Indoor/ Ambient Air	Pesticides	Low	See Worksheet #18	EPA TO-10A	Preliminary Data – 5 Business Days Data validation and analytical report – 5 business days from receipt of data package	ALS Environmental 2655 Park Center Drive Suite A Simi Valley, CA 805-526-7161 Attn: Kate Aguilera	NA
Wipes	Pesticides	Low	See Worksheet #18	Modified EPA 8081A	Preliminary Data – 5 Business Days Data validation and analytical report – 5 business days from receipt of data package	Katahdin Analytical Services 600 Technology Way Scarborough, ME 04074 207-874-2400 Attn.: Jennifer Obrin	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
Wipes	Hydrogen Bromide	Low	See Worksheet #18	Modified NIOSH 7903	Preliminary Data – 5 Business Days Data validation and analytical report – 5 business days from receipt of data package	SGS/Galson Laboratories 6601 Kirkville Road East Syracuse, NY 13057 315-432-5227 Attn.: Pam Weaver	NA
Water	VOC + TICs	Low	See Worksheet #18	SERAS SOP #1806	Preliminary Data – 24-48 hours Data validation and Analytical Report in 5 business days from receipt of data package	ERT/SERAS Laboratory Lockheed Martin – SERAS 2890 Woodbridge Ave Edison, NJ 08837 732-321-4200 Jay Patel, Analytical Support Leader Amit Vaidya GC/MS Chemist	NA
Water	Bromide	Low	See Worksheet #18	EPA 300.0	Preliminary Data – 24-48 hours Data validation and Analytical Report in 5 business days from receipt of data package	Katahdin Analytical Services 600 Technology Way Scarborough, ME 04074 207-874-2400 Attn.: Jennifer Obrin	NA

NA = Not applicable

☐ Worksheet Not Applicable (State Reason)

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	Jay Patel, Analytical Support Leader/SERAS	NJDEP
Laboratory Accreditation Audit	Every 2 years	External	NELAC Accreditation Agency	NELAP Accrediting Authority	ALS, QA/QC Officer	ALS Laboratory Management	NELAP Accreditation Agency
Laboratory Accreditation Audit	Every 2 years	External	NELAC Accreditation Agency	NELAP Accrediting Authority	Katahdin, QA/QC Officer	Katahdin Laboratory Management	NELAP Accreditation Agency
Laboratory Accreditation Audit	In accordance with AIHA protocol	External	Laboratory Accreditation Program (LAP)	American Industrial Hygiene Association (AIHA)	SGS/Galson, QA/QC Officer	SGS/Galson Laboratory Management	AIHA Accrediting Agency
Internal Laboratory Audit	Annual	Internal	SERAS	Deborah Killeen, QA/QC Officer - SERAS	Jay Patel, Analytical Support Leader/SERAS	Jay Patel, Analytical Support Leader/SERAS	Deborah Killeen, QA/QC Officer - SERAS
Internal Laboratory Audit	Annual	Internal	SGS/Galson	SGS/Galson QA/QC Officer	SGS/Galson Laboratory Management	SGS/Galson Laboratory Management	SGS/Galson QA/QC Officer
Internal Laboratory Audit	Annual	Internal	ALS Environmental	ALS QA/QC Officer	ALS Laboratory Management	ALS Laboratory Management	ALS QA/QC Officer
Internal Laboratory Audit	Annual	Internal	Katahdin	Katahdin QA/QC Officer	Katahdin Laboratory Management	Katahdin Laboratory Management	Katahdin QA/QC Officer
Performance Evaluation Samples	Annual (Air) Biannual (Water)	External	NELAP PT Provider	NELAP PT Provider	Deborah Killeen, QA/QC Officer - SERAS	Jay Patel, Analytical Support Leader/SERAS	NJDEP

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)
Performance Evaluation Samples	Annual (Air)	External	NELAP PT Provider	NELAP PT Provider	ALS QA/QC Officer	ALS Laboratory Management	NELAP Accrediting Authority
Performance Evaluation Samples	Biannual (Water)	External	NELAP PT Provider	NELAP PT Provider	Katahdin QA/QC Officer	Katahdin Laboratory Management	NELAP Accrediting Authority

☐ Worksheet Not Applicable (State Reason)

QAPP Worksheet #32
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	Amy Dubois TL/SERAS	Immediately	Field Change Form	Amy Dubois/TL, SERAS	Within 24 hours of change
Peer Review	In the deliverable	Amy Dubois TL/SERAS	Prior to deliverable due date	Comments directly in the deliverable	Amy Dubois/TL SERAS	Prior to deliverable due date
Internal Lab Performance Audit	Audit report	Jay Patel, Analytical Support Leader/SERAS	Within 45 days	Corrective Action Plan	Deborah Killeen, QA/QC Officer, SERAS	Within 45 days
Internal Lab Performance Audit	Audit report	SGS/Galson Laboratory Management	Within SGS/Galson's QA Manual or SOP	Corrective Action Plan	SGS/Galson QA/QC Officer	Within SGS/Galson's QA Manual or SOP
Internal Lab Performance Audit	Audit report	Katahdin Laboratory Management	Within Katahdin's QA Manual or SOP	Corrective Action Plan	Katahdin QA/QC Officer	Within Katahdin's QA Manual or SOP
Internal Lab Performance Audit	Audit report	ALS Laboratory Management	Within ALS' QA Manual or SOP	Corrective Action Plan	ALS QA/QC Officer	Within ALS' QA Manual or SOP
External Lab Performance Audit	Audit Report	Deborah Killeen, SERAS QA/QC Officer	Within 30 days	Corrective Action Plan	NJDEP	Within 30 days
External Lab Performance Audit	Audit Report	SGS/Galson, QA/QC Officer	Within 30 days	Corrective Action Plan	NELAP Accrediting Authority	Within 30 days
External Lab Performance Audit	Audit Report	Katahdin, QA/QC Officer	Within 30 days	Corrective Action Plan	NELAP Accrediting Authority	Within 30 days
External Lab Performance Audit	Audit Report	ALS, QA/QC Officer	Within 30 days	Corrective Action Plan	NELAP Accrediting Authority	Within 30 days

☐ Worksheet Not Applicable (State Reason)

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	Phil Solinski TL/SERAS	ERT Project Officer and WAM
QA Report	Quarterly	February, May, August, and November	QA/QC Officer/SERAS	ERT Project Officer and Quality Coordinator

☐ Worksheet Not Applicable (State Reason)

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	SERAS Analytical Support Leader ALS Analytical Personnel SGS/Galson Analytical Personnel Katahdin Analytical Personnel SERAS QA/QC Chemist
Analytical Report	Reviewed for accuracy	Internal	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 TL SERAS QA/QC Chemist

☐ Worksheet Not Applicable (State Reason)

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 TL, WAM
IIa	COC Records	Examine COC records and match with requested analyses.	SERAS TL SERAS QA/QC Chemist SERAS Sr. GC/MS Chemist SERAS GC/MS Chemist ALS Laboratory Personnel Katahdin Laboratory Personnel SGS/Galson Laboratory Personnel
IIa	Lab Data Package	Examine packages against COC records (holding times, sample handling, methods, sample identifications, qualifiers).	SERAS Sr. GC/MS Chemist SERAS GC/MS Chemist ALS Laboratory Personnel Katahdin Laboratory Personnel SGS/Galson Laboratory Personnel SERAS QA/QC Chemist
IIb	Lab Data Package	Qualify data based on QC deficiencies (precision/accuracy, %RSD, %D, etc.)	SERAS QA/QC Chemist SERAS QA/QC Officer

☐ Worksheet Not Applicable (State Reason)

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	Indoor/Ambient Air (SUMMA® Canister)	VOC	Low Level Scan	Draft SOP #1021, *Data Validation Procedures for Routine Volatile Organic Analysis in Air by TO-15*	SERAS QA/QC Chemist
IIb	Water	VOC	Low	SOP #1015, *Data Validation Procedures for Routine Volatile Organic Compounds*	SERAS QA/QC Chemist
IIb	Indoor/Ambient Air	Methyl Bromide	Low	Modified SOP #1021, *Data Validation Procedures for Routine Volatile Organic Compounds by TO-15*	SERAS QA/QC Chemist
IIb	Indoor/Ambient Air	Pesticides	Low	Modified Draft SOP #1018, *Data Validation Procedures for Pesticide Analysis*	SERAS QA/QC Chemist
IIb	Wipes	Pesticides	Low	Modified Draft SOP #1018, *Data Validation Procedures for Pesticide Analysis*	SERAS QA/QC Chemist
IIb	Wipes	Hydrogen Bromide	Low	Modified SOP #1017, *Data Validation Procedure for Routine Inorganic Analysis*	SERAS QA/QC Chemist
IIb	Water	VOC	Low	SOP #1015, *Data Validation Procedures for Routine Volatile Organic Compounds*	SERAS QA/QC Chemist

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	Water	Bromide	Low	Modified SOP #1017, *Data Validation Procedure for Routine Inorganic Analysis*	SERAS QA/QC Chemist

√ Worksheet Not Applicable (State Reason)

EPA Region 2 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: Region 3
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: