FINAL
QUALITY ASSURANCE PROJECT PLAN

FOR

SPLIT SAMPLING AND ANALYSIS OF LANDFILL GAS AT HUNTERS POINT SHIPYARD SAN FRANCISCO, CALIFORNIA

Submitted to:

Craig Cooper
Remedial Project Manager
U.S. Environmental Protection Agency
Region IX, SFD-8-3
75 Hawthorne Street
San Francisco, California 94105

Submitted by:

TechLaw, Inc.
90 New Montgomery Street, Suite 710
San Francisco, California 94105

Contract No.:	EP-W-07-066
Task Order No.:	066-25-09P3
TechLaw TOM:	Karla Brasaemle
Telephone No.:	415-762-0566
EPA Remedial Project Manager:	Craig Cooper
Telephone No.:	415-947-4148

August 29, 2012

Introduction

All environmental monitoring and measurement efforts mandated or supported by the United States Environmental Protection Agency (EPA) are subject to a centrally managed quality assurance (QA) system. A QA system is a structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products, and services. The EPA QA system is based on an American National Standard, ANSI/ASQC E4-1994.

The Uniform Federal Policy for Implementing Environmental Quality Systems (UFP) was developed as a joint initiative between the EPA, the Department of Defense (DOD), and the Department of Energy (DOE), to consistently implement the quality system requirements of ANSI/ASQC E4-1994. The UFP was transmitted to EPA Regional Administrators in June 2005 (EPA Directive 9272.0-17) from the Office of Solid Waste and Emergency Response (OSWER). The directive determined the scope of the UFP to include mainly federal facilities, but also extends the UFP documentation more broadly for data collection projects conducted under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA). EPA Directive 9272.0-17 also states that Regions are strongly encouraged to consider the use of the UFP for other purposes including the RCRA corrective action program, as well as data collection related to the active management of hazardous waste generated by RCRA facilities. On December 21, 2005, OSWER issued a Memorandum informing Regional Science and Policy Directors that QA Project Plans prepared and approved according to the UFP meet all the QA Project Plan requirements issued by the Office of Environmental Information (QA/R-5).

In response to these directives and QA requirements, TechLaw has prepared this site-specific QA Project Plan (QAPP) which presents the overall project description, project organization, responsibilities, and QA objectives for the project. This project-specific QAPP complies with all QA requirements and has undergone peer-review. This document was developed through a transparent and collaborative process including intra- and inter-agency use and sharing, and sharing and distributing information in correspondence directed to certain key individuals and persons.

The purpose of this project is to support EPA Region 9 by collecting and analyzing split samples of landfill gas to be collected by the Navy's contractor, CKY Incorporated. CKY will collect the samples and TechLaw will provide canisters and tedlar bags for split samples and send them to Air Toxics for analysis of volatile organic compounds (VOCs), including tentatively identified compounds (TICs) by TO 15, non-methane organic compounds (NMOC), and total petroleum hydrocarbons (TPH) as gasoline by TO-15; atmospheric and organic gases by ASTM D-1946; and hydrogen sulfide (H_2S) by ASTM D-5504.

TechLaw

TABLE OF CONTENTS

QAPP Worksheet #1 Title and Approval Page

Site Name/Project Name: Split Sampling and Analysis of Landfill Gas at HPS

Site Location: Hunters Point Shipyard, San Francisco, California

Document Title: Draft Quality Assurance Project Plan, Split Sampling and Analysis of Landfill Gas at Hunters Point Shipyard, San Francisco, California

Lead Organization: U.S. Environmental Protection Agency (EPA)

Preparer's Name and Organizational Affiliation: Amy Dahl, TechLaw

Preparer's Address, Telephone Number, and E-mail Address: 101 Yesler Way, Suite 600, Seattle, WA, 98104, 206-577-3050, adahl@techlawinc.com

Preparation Date: August 2012

Investigative Organization's Program Manager/Date: Terry Zdon 8/29/12
Signature

Printed Name/Title: Terry Zdon, TechLaw

Investigative Organization's Project Manager/Date: Karla Brasaemle 8/29/12
Signature

Printed Name/Organization: Karla Brasaemle, TechLaw

Investigative Organization's QA Officer/Date: Judy Manley 8/29/12
Signature

Printed Name/Organization: Judy Manley, TechLaw

Lead Organization's RPM/Date: Craig Cooper 8/31/12
Signature

Printed Name/Organization: Craig Cooper, EPA Region 9

Lead Organization's QA Officer/Date: Eugenia McNaughton 9/5/2012
Signature

Printed Name/Title: ~~Joseph Eidelberg~~ EUGENIA McNAUGHTON, EPA Region 9 QA Office

Document Control Numbering System: HPS590

QAPP Worksheet #2 QAPP Identifying Information

Site Name/Project Name: Split Sampling and Analysis of Landfill Gas at HPS
Site Location: Hunters Point Shipyard, San Francisco, California
Site Number/Code: NA
Operable Unit: NA
Contractor Name: TechLaw
Contractor Number: EP-W-07-066
Contract Title: Regional Oversight Contract Region 9
Task Order Number: 066-25-09P3

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

2. Identify approval entity: EPA

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

4. List dates of scoping sessions that were held: June 28, 2012 and July 19, 2012

5. List dates and titles of QAPP documents written for previous site work, if applicable: Final Sampling and Analysis Plan, Interim Monitoring and Maintenance Program for the Landfill Gas Control System Parcel E-2 Industrial Landfill, IR-01/21, dated February 27, 2012

6. List organizational partners (stakeholders) and connection with lead organization: California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region; California Department of Toxic Substances Control (DTSC); California Department of Resources Recycling and Recovery (CalRecycle); Navy Base Realignment and Closure Program Management Office (BRAC PMO); Naval Facilities Engineering Command (NAVFAC)

7. List data users: The EPA contractor (TechLaw, Inc.), the EPA, and the Navy and its contractors will use the data. This data will also be made available for use by the State of California and the general public.

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:

   Worksheets #31 and #32 are not applicable because no assessments are planned at this time.

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	Worksheet #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	Worksheet #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	Worksheets #3 and #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	Worksheets #5-#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)	Worksheets #9 and #10 Figures
2.6 Project Quality Objectives and Measurement Performance Criteria Development of Project Quality Objectives Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	- Site-Specific PQOs - Measurement Performance Criteria Table	Worksheets #11 and #12

QAPP IDENTIFYING INFORMATION
(CONTINUED)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
2.7 Secondary Data Evaluation	- Sources of Secondary Data and Information - Secondary Data Criteria and Limitations Table	Worksheet #13
2.8 Project Overview and Schedule 2.8.1 Project Overview 2.8.2 Project Schedule	- Summary of Project Tasks - Reference Limits and Evaluation Table - Project Schedule/Timeline Table	Worksheets #14, #15 and #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 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures Supply Inspection and Acceptance Procedures 3.1.2.6 Field Documentation Procedures	- Sampling Design and Rationale - Sample Location Map - Sampling Locations and Methods/SOP Requirements Table - Analytical Methods/SOP Requirements Table - Field Quality Control Sample Summary Table - Sampling SOPs - Project Sampling SOP References Table - Field Equipment Calibration, Maintenance, Testing, and Inspection Table	Worksheets #14, #15, #17-#22, Figures and Appendices A and B
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	Worksheets #23-#25 Appendices A and B

QAPP IDENTIFYING INFORMATION
(CONTINUED)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Required Documents
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	Worksheets #26 and #27 Appendices A and B
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	Worksheet #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	Worksheets #29 and #30
Assessment/Oversight		
4.1 Assessments and Response Actions 4.1.1 Planned Assessments Assessment Findings and Corrective Action Responses	- Assessments and Response Actions - Planned Project Assessments Table - Audit Checklists - Assessment Findings and Corrective Action Responses Table	Not Applicable
4.2 QA Management Reports	- QA Management Reports Table	Worksheet #33
4.3 Final Project Report		Worksheets #16, #29, and #33

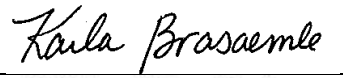
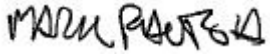
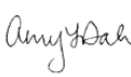
QAPP IDENTIFYING INFORMATION
(CONTINUED)

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	Worksheets #34-#36
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		Worksheet #37

QAPP Worksheet #3 Distribution List

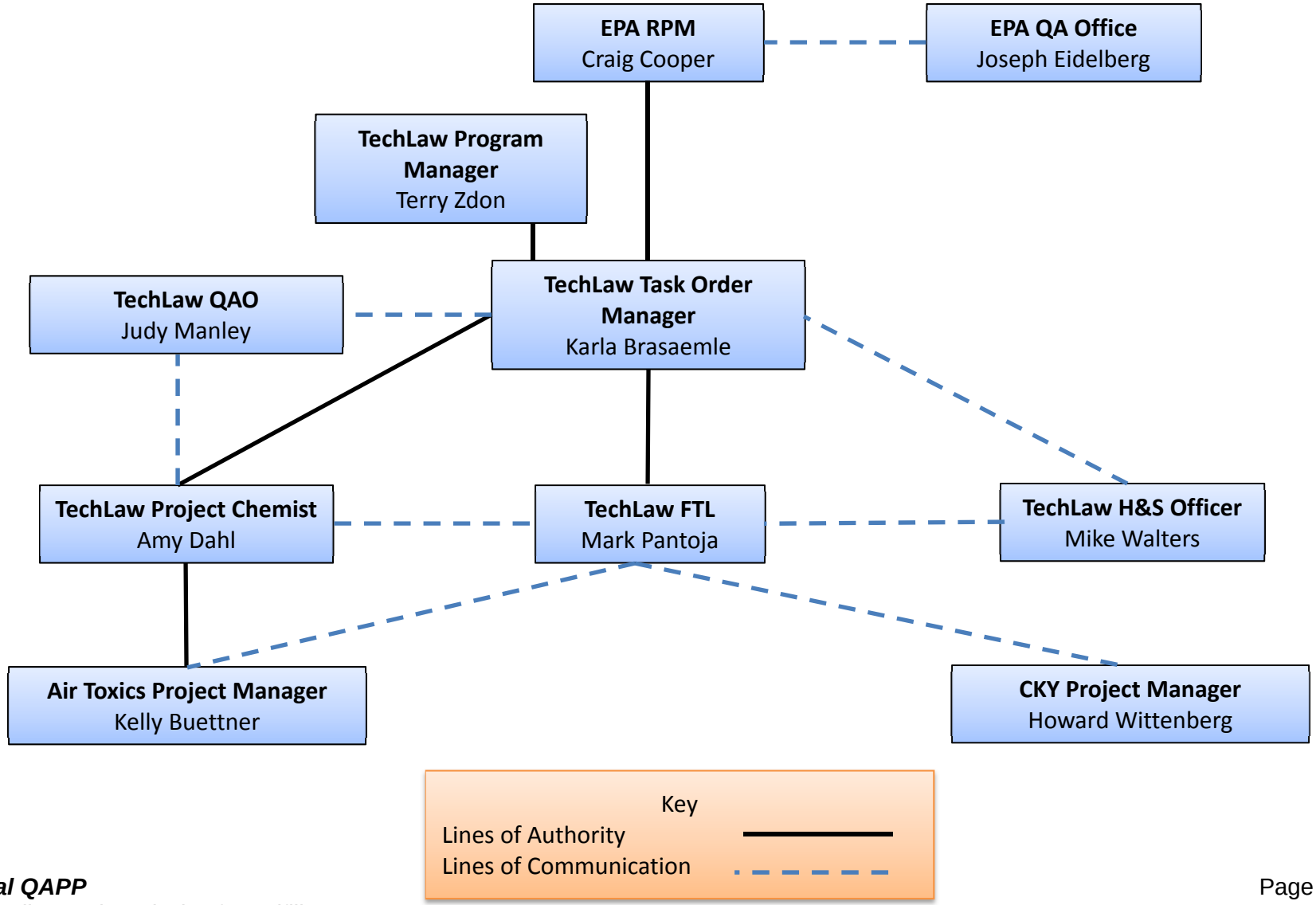
QAPP Recipients	Title	Organization	Telephone Number	E-mail Address
Craig Cooper	Remedial Project Manager	EPA Region 9	415-947-4148	cooper.craig@epa.gov
Joseph Eidelberg	QA Office	EPA Region 9	415-972-3809	Eidelberg.joseph@epa.gov
Terry Zdon	Program Manager	TechLaw	303-552-5807	tzdon@techlawinc.com
Karla Brasaemle	Task Order Manager	TechLaw	415-762-0566	kbrasaemle@techlawinc.com
Mark Pantoja	Field Team Leader (FTL)	TechLaw	415-762-0565	mpantoja@techlawinc.com
Judy Manley	Quality Assurance Officer (QAO)	TechLaw	703-818-3233	jmanley@techlawinc.com
Amy Dahl	Project Chemist	TechLaw	206-577-3050	adahl@techlawinc.com
Kelly Buettner	Project Manager	Air Toxics	916-985-1000	kbuettner@airtoxics.com

QAPP Worksheet #4 Project Personnel Sign-off Sheet

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Craig Cooper	Remedial Project Manager	415-947-4148		
Joseph Eidelberg	QA Office	415-972-3809		
Judith Manley	TechLaw QAO	703-818-3233		8/29/12
Karla Brasaemle	Task Order Manager	415-762-0566		8/29/12
Mark Pantoja	FTL	415-762-0565		8/29/12
Amy Dahl	Project Chemist	206-577-3050		8/29/12

Signatures will be provided with the Final QAPP.

QAPP Worksheet #5 Project Organizational Chart



QAPP Worksheet #6 Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Significant modification to combined QAPP/Work Plan	TL QAO and Task Order Manager	Judith Manley and Karla Brasaemle	703-818-3233 415-762-0566	Modifications to the QAPP and/or Work Plan will be communicated to EPA ASAP (within 48 hours) via e-mail and telephone.
Change in sampling location or other sampling deviation	FTL and Task Order Manager	Mark Pantoja and Karla Brasaemle	415-762-0565 415-762-0566	FTL / TechLaw Project Manager notifies EPA TOCOR as soon as possible (i.e., within 24 hours) via e-mail or telephone.
Weather related change in field sampling	FTL and Task Order Manager	Mark Pantoja and Karla Brasaemle	415-762-0565 415-762-0566	FTL / TechLaw Project Manager notifies EPA TOCOR as soon as possible (i.e., within 24 hours) via e-mail or telephone.
Laboratory related issues	Project Chemist	Amy Dahl	206-577-3050	FTL / TechLaw Project Manager notifies QAO within 1 business day via e-mail or telephone. EPA notified as soon as possible (i.e., within 24 hours) for any significant issues via e-mail or telephone.
Stop work related issues	TechLaw FTL TL Task Order Manager	Mark Pantoja Karla Brasaemle	415-762-0565 415-762-0566	TechLaw FTL and Task Order Manager immediately (within 24 hours) notify EPA by phone and/or e-mail of stop work issues.

QAPP Worksheet #7 Personnel Responsibilities and Qualification Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Terry Zdon	Program Manager	TechLaw	ROC 9 Program Management	Resume available upon request.
Karla Brasaemle	Task Order Manager	TechLaw	Overall Project Management	Resume available upon request.
Mark Pantoja	FTL	TechLaw	Write sampling portions of QAPP; coordinate all field activities	Resume available upon request.
Amy Dahl	Project Chemist	TechLaw	Write QA portions of QAPP and interface with laboratory, as needed	Resume available upon request.
Judith Manley	QAO	TechLaw	Quality assurance	Resume available upon request.
Mike Walters	H & S Officer	TechLaw	Project H & S	Resume available upon request.
Kelly Buettner	Project Manager	Air Toxics	Oversees sample analysis and compiles analytical reports	Resume available upon request.
Howard Wittenberg	Project Manager	CKY, Inc.	Navy contractor	Resume available upon request.

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
TechLaw Field personnel	40 Hour OSHA HAZWOPER Training and 8 Hour Refresher First Aid/CPR	Varies	Varies	All field personnel	All field personnel	Available upon request
FTL	8 Hour OSHA Site Supervisor	Varies	Varies	FTL	TechLaw FTL	Available upon request

QAPP Worksheet #9 Project Scoping Session Participants Sheet

Project Name: Sampling and Analysis of Landfill Gas at HPS EPA RPM: Craig Cooper				Site Name: Hunters Point Shipyard Site Location: San Francisco, CA
Date of Session: June 28, 2012 **Scoping Session Purpose: Preliminary meeting**				
Name	**Title**	**Affiliation**	**Phone #**	**E-mail Address**
Craig Cooper	RPM	EPA Region 9	415-947-4148	cooper.craig@epa.gov
Karla Brasaemle	Task Order Manager	TechLaw	415-762-0566	kbrasaemle@techlawinc.com

Comments/Decisions:

- Discussed goal of collecting split samples (has not been done since 2004)
- Discussed the need to identify TICs

Action Items:

- Mr. Cooper will check with Region 9 laboratory to see if they can analyze the samples and if they can identify TICs

Consensus Decisions:
None

Project Name: Sampling and Analysis of Landfill Gas at HPS EPA RPM: Craig Cooper				Site Name: Hunters Point Shipyard Site Location: San Francisco, CA
Date of Session: July 19, 2012 **Scoping Session Purpose: Work out sampling and analysis details**				
Name	**Title**	**Affiliation**	**Phone #**	**E-mail Address**
Craig Cooper	RPM	EPA Region 9	415-947-4148	cooper.craig@epa.gov
Karla Brasaemle	Task Order Manager	TechLaw	415-762-0566	kbrasaemle@techlawinc.com

Comments/Decisions:

- Selected sampling locations
- Region 9 laboratory can only do TO-15 analysis
- The questions being asked are: what is in the Parcel E-2 landfill gas? How toxic is the landfill gas?

Action Items:

- TechLaw to contact subcontract laboratories to obtain quotes for general gases, light hydrocarbons, and VOCs/TICs by TO-15
- TechLaw will identify the cost of identifying the top ten TICs versus all TICs

Consensus Decisions:
None

QAPP Worksheet #10 Problem Definition

Problem Definition:

Prior to Navy ownership, Hunters Point Shipyard (HPS) was established in 1869 as the first dry dock on the Pacific Coast, in southeastern San Francisco, California, adjacent to San Francisco Bay. In 1940, the Navy obtained ownership of the shipyard for ship building, repair and maintenance activities. After World War II, activities shifted from ship repair to submarine servicing and testing. The Navy operated Hunters Point Annex as a shipbuilding and repair facility from 1941 until 1976, when the base closed. Between 1976 and 1986, the Navy leased most of the shipyard to Triple A, a private ship-repair company. The shipyard was an annex of Naval Station Treasure Island until 1974 when the Navy's Engineering Field Activity West assumed the management of it. The shipyard consists of 936 acres: 493 on land and 443 under water in San Francisco Bay. Various media at the site have been contaminated by past industrial operations. In 1987, polychlorinated biphenyls (PCBs), trichloroethylene and other solvents, pesticides, petroleum hydrocarbons, and metals including lead were confirmed at a number of shipyard locations. This finding resulted in the EPA placing Hunters Point Shipyard on the National Priorities List in 1989. In 1991, the Department of Defense listed the shipyard for closure.

HPS is currently divided into 10 parcels. In 1992, the Navy divided HPS into five contiguous parcels (A through E). In 1996, the Navy added a sixth parcel (Parcel F), which encompasses immediately adjacent areas of the San Francisco Bay. In September 2004, the Navy divided Parcel E into two parcels (Parcels E and E-2) to facilitate closure of the Parcel E-2 landfill and its adjacent areas. Parcel E-2 contains the Industrial Landfill, which is a 22-acre area where the Navy disposed of various shipyard and industrial wastes (paints, solvents, fuels, oils, repair operations and machine shop wastes) during the mid-1950s to the early 1970s. As refuse in the landfill slowly decomposes, it generates methane and lesser amounts of non-methane organic compounds (NMOCs). Landfill gas can migrate from the landfill and pose a potential health threat to local receptors.

In August 2000, a surface brush fire of unknown origin occurred on the Parcel E (now E-2) landfill. Fire crews extinguished the surface brush fire the same day it was discovered. However, several days later, smoke and other evidence of smoldering indicated that the fire had spread to below ground. No air monitoring was conducted during the early days of the fire. The subsurface landfill fire continued to smolder for many weeks. At EPA's direction, the Navy set up an extensive air monitoring network around the perimeter of the landfill and established a community outreach program to alert and inform workers and nearby residents about the landfill fire. The Navy held public meetings and sent out several fact sheets regarding the fire. The Agency for Toxic Substances and Diseases Registry (ATSDR) prepared a consultation report on the fire and subsequent air monitoring data and concluded that there was no threat to human health posed by the fire. In order to fully extinguish the subsurface fire, the Navy constructed an interim landfill cap, which was completed in early 2001. The Navy asserted the

subsurface fire to be out at a public meeting held in March 2001. In June 2001, EPA issued a letter to the Navy per the FFA imposing stipulated penalties of $25,000 for the Navy's failure to notify EPA immediately upon discovery of the fire. This stipulated penalty issue was settled in 2002.

In August 2002, the Navy determined that landfill gas had migrated offsite and was found under an adjacent property. The Navy conducted an emergency removal action to address this landfill gas. Under this emergency action, the Navy constructed a barrier wall and trench to stop further offsite movement and to prevent future build up of landfill gas. Further, the Navy has installed an active landfill gas extraction system to extract methane and volatile organic compounds (VOCs), treat the VOCs and vent the methane to the atmosphere in order to extract and remove the landfill gas that had already migrated and accumulated under the adjacent University of California, San Francisco (UCSF) property. The Navy's active landfill gas extraction system is ongoing and appears to have successfully removed the offsite landfill gas and now successfully prevents further landfill gas migration to offsite areas. Subsequent monitoring has indicated low level gas migrations. In response the Navy has periodically reactivated the active extraction with the goal to maintain methane levels migrating off site to meet State requirements. The Navy continues to monitor for migrating gas and periodic operation of the active extraction system on an as-needed basis. Long term monitoring for landfill gas is also being conducted by the Navy.

EPA has tasked TechLaw with conducting split sampling to test the composition of the Parcel E-2 landfill gas.

The EPA is performing an independent verification of the Navy's implementation of the Interim Monitoring and Maintenance Program. In addition, EPA seeks to answer the following environmental questions:

1. On a percentage by volume basis, what does Parcel E-2 landfill gas contain (e.g., VOCs including TICs, NMOC, TPH, atmospheric and organic gases, hydrogen sulfide)?
2. What chemical contaminants are present in the Parcel E-2 landfill gas?
3. Do any of the Parcel E-2 landfill gas constituents exceed regulatory standards?
   a. Do concentrations of methane gas exceed 5 percent by volume in air at the facility boundary?
4. Does the landfill gas present an immediate or long-term threat to human health and the environment?
5. Is Parcel E-2 landfill gas migrating off-site and likely coming in contact with the local community?

Observations from any site reconnaissance reports/A synopsis of secondary data or information from site reports: Historical activities have been documented and summarized in the "Final Interim Landfill Gas Monitoring and Control Plan" (MCP) (TTEMI 2004). Much of the land at HPS was developed during the 1940s. The landfill received industrial and municipal type waste from the 1950s to the early 1970s. Therefore, waste has been in the landfill for approximately 40 to 60 years. Waste that was placed over 25 years ago usually generates low amounts of landfill gas.
The possible classes of contaminants and the affected matrices: Likely classes of landfill gas being generated by the Parcel E-2 landfill: VOCs for which routine laboratory methods are available, TPH and NMOCs, atmospheric gases, methane and other organic gases, and hydrogen sulfide are targeted in this investigation. The affected medium to be tested is landfill gas.
The rationale for inclusion of chemical and nonchemical analyses: Analyses for the most prevalent and most toxic classes of landfill gases being generated by the Parcel E-2 landfill are being targeted in this investigation.
Information concerning various environmental indicators: The current condition of the project area is described previously in this worksheet and in the documents listed in Worksheet #13. The lateral extent of the study area is the northern and western perimeters of the Parcel E-2 landfill. These perimeter areas are being targeted because workers occupy property immediately beyond this perimeter area. In addition, the closest residential area is approximately 800 feet beyond this perimeter area (corrected for elevation). The screened depths of the wells to be sampled (listed on Worksheet #18) comprise the vertical extent of the study area. The temporal boundary is expected to be one day of field sampling. Sampling will not be performed during or within 5 days of a significant rain event (1/2 inch or greater) or during passage of weather frontal systems.
Project decision conditions (“If..., then...” statements): 1. At each sample location, if the total NMOC result varies by more than 50% from the Navy's PID reading, then EPA will request that the Navy collect further Parcel E-2 landfill gas samples in SUMMA™ canisters for TO-15 analysis for landfill gas monitoring and further

comparison with EPA's landfill gas TO-15 data set.

2. At each sample location, if the total methane result varies by more than 50% from the Navy's data set reading, then EPA will request that the Navy collect further Parcel E-2 methane gas samples for further comparison with EPA's methane gas data set.
3. If any contaminant is detected in the Parcel E-2 landfill gas above action levels (as specified in the Navy's Soil Gas Action Levels [SGALs] document [ChaduxTt, Revised Final Memorandum: Approach for Developing Soil Gas Action Levels For Vapor Intrusion Exposure at Hunters Point Naval Shipyard, dated November 2011]), then the EPA will request the Navy to collect further Parcel E-2 landfill gas samples in SUMMA™ canisters for TO-15 analysis for landfill gas monitoring and further comparison with EPA's landfill gas data set.
4. If an unexpected TIC is detected at a significant concentration, then the EPA may recommend an additional split-sampling event to confirm the identity and concentration of the TIC.
5. If any landfill gas contaminant appears to be migrating away from the Parcel E-2 landfill footprint, then EPA will request that the Navy activate its landfill gas extraction system and, if necessary consider further steps to assess threats to public health that may be posed by the landfill gas.
6. If any landfill gas contaminant (including a VOC TIC) is identified as potentially incompatible with the landfill gas treatment technologies identified in the Navy's Record of Decision for Parcel E-2, then the EPA will request the Navy to consider additional landfill gas treatment technologies as appropriate.
7. If isopropyl alcohol, which will be used as a leak test compound, is detected in the sample, a leak will be suspected and results will be qualified as estimated with low bias.

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

Who will use the data? The EPA contractor (TechLaw, Inc.), the EPA, and the Navy and its contractors will use the data. This data will also be made available for use by the State of California and the general public.
What will the data be used for? The data will be used to corroborate the Navy's characterization (i.e., type and concentration of contaminants) of the landfill gas and to ensure compliance with 27 California Code of Regulations (CCR) for the protection of public health and safety and the environment. The data will also be used by EPA to review and comment on the Navy's upcoming Parcel E-2 remedial design documentation, including but not limited to landfill gas treatment technologies.
What types of data are needed? (target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques) To accomplish the objectives of this QAPP existing gas monitoring probes (GMPs) and ports on the gas extraction wells will be utilized to collect samples. The Navy's contractor will make other quantitative field measurements to screen methane and NMOCs. Landfill gas samples will be collected from nine gas extraction wells or GMPs and sent to an offsite laboratory for the analysis of VOCs, methane, and other gases. In addition, and one atmospheric (ambient blank) will be collected for the same analyses. Worksheets #12, #14, #19 and #20 of this QAPP present additional information that identifies the number of samples, field and laboratory parameters, analytical methods, recommended sample containers, matrices, holding times, and preservatives for these sampling activities.
How "good" do the data need to be in order to support the environmental decision? The data shall meet all QA/quality control (QC) criteria as defined within this document.
How much data are needed? (number of samples for each analytical group, matrix, and concentration) See above.
Where, when, and how should the data be collected/generated? Landfill gas sample collection from nine gas extraction wells or GMPs at HPS is anticipated to occur in September 2012. See Figure 1 for sample locations and Worksheet #14 for sampling procedures. All landfill gas samples will be collected and shipped to the laboratory for 10-business day turnaround analysis.
Who will collect and generate the data? Landfill gas samples will be collected by the Navy contractor (CKY) and the EPA contractor (TechLaw) personnel. Any sample collected by the Navy contractor will be under the oversight of the EPA contractor or EPA staff. All landfill gas samples collected pursuant to this SAP will be analyzed by Air Toxics laboratory.
How will the data be reported? Raw data and all associated quality control results, including manual integrations, will be reported by the laboratory in a full Contract Laboratory Program (CLP) type data package. TechLaw will transmit summarized data to EPA per the schedule provided in Worksheet #16.

How will the data be archived? Electronic copies will be backed up and stored on CD. Paper copies will be maintained as per contract requirements.

QAPP Worksheet #12 Measurement Performance Criteria Table – VOCs and TICs

Matrix	Landfill Gas
Analytical Group	VOCs/TICs
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP 1	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)
See Worksheet #14	SOP#83/TO-15	Precision	RPD < 30%	Field Duplicate	S & A
		Accuracy Contamination	< RL	Ambient Air Blank	S & A
		Precision, Accuracy/Bias-Contamination	%R and RPD = within laboratory control limits	Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)	A
		Accuracy Contamination	< RL	Method Blank	A
		Field Completeness	90% completeness	Actual samples/proposed samples	S
		Lab Completeness	95% completeness	Valid data/total data	A

1 See Worksheet #15 for RLs and laboratory QC limits

QAPP Worksheet #12 Measurement Performance Criteria Table – Gases by FID

Matrix	Landfill Gas
Analytical Group	Gases by FID
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP 1	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)
See Worksheet #14	SOP #8/ASTM D-1946	Precision-Bias	RPD < 30%	Field Duplicate	S & A
		Accuracy Contamination	< RL	Ambient Air Blank	S & A
		Precision, Accuracy/Bias-Contamination	%R and RPD = within laboratory control limits	LCS/LCSD	A
		Accuracy Contamination	< RL	Method Blank	A
		Field Completeness	90% completeness	Actual samples/proposed samples	S
		Lab Completeness	95% completeness	Valid data/total data	A

1 See Worksheet #15 for RLs and laboratory QC limits

QAPP Worksheet #12 Measurement Performance Criteria Table – Hydrogen Sulfide

Matrix	Landfill Gas
Analytical Group	Sulfur Compounds
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP 1	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)
See Worksheet #14	SOP #13/ASTM D-5504	Precision-Bias	RPD < 30%	Field Duplicate	S & A
		Precision, Accuracy/Bias-Contamination	%R and RPD = within laboratory control limits	LCS/ LCSD	A
		Accuracy Contamination	< RL	Method Blank	A
		Field Completeness	90% completeness	Actual samples/proposed samples	S
		Lab Completeness	95% completeness	Valid data/total data	A

1 See Worksheet #15 for RLs and laboratory QC limits

QAPP Worksheet #13 Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
Results from remedial investigation, historical information regarding locations and use, geology and hydrogeology, and risk assessments	Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard, San Francisco, California, May 2011.	Engineering/Remediation Resources Group, Inc.	For description of site and remedial action objectives	None
	Parcel E Remedial Investigation, Draft Final Report, Hunters Point Shipyard, San Francisco, California. October 27, 1997.	Tetra Tech, Levine-Fricke-Recon, and Uribe & Associates		
	Final Parcel E Nonstandard Data Gaps Investigation Landfill Gas Characterization, Hunters Point Shipyard, San Francisco, California. December 23, 2003.	TTEMI	For description of site and risk assessment results	
Procedures, requirements, action levels for monitoring and maintenance activities	Extraction, Monitoring and Maintenance Plan, Landfill Gas Removal Action, Parcel E, Industrial Landfill, Site IR-01/21, Hunters Point Naval Shipyard, San Francisco, California. October 2002.	TTEMI	For monitoring and maintenance procedures	None
	Final Interim Landfill Gas Monitoring and Control Plan, Parcel E, Industrial Landfill, Hunters Point Shipyard, San Francisco, California. August 13, 2004.		For action levels and monitoring requirements	
	Revised Final Memorandum: Approach for Developing Soil Gas Action Levels For Vapor Intrusion Exposure at Hunters Point Naval Shipyard, November 2011.	ChaduxTt	For soil gas action levels	

Information in this worksheet is reproduced from the Navy SAP except the SGAL document

QAPP Worksheet #14 Summary of Project Tasks

Pre-sampling Tasks:

Prior to sampling, field personnel will read all necessary work plans and health and safety plans (HASPs) and obtain any specialized training required. Field supplies will be ordered and laboratories will be notified of upcoming sampling events. Site access and or disturbance permits will be obtained, if necessary.

Rainfall or barometric pressure fluctuations may negatively affect soil gas sampling (CalRecycle 2011). Therefore, soil gas sampling should not be conducted during or within 5 days of a significant rain event (1/2 inch or greater) or during passage of weather frontal systems.

Sampling Tasks:

The following sections list the sampling procedures and sample handling protocols to be used for sampling activities for the landfill gas monitoring program at the HPS Parcel E-2 Industrial Landfill.

Field Sampling and Analysis Procedures:
CKY will perform all field sampling protocols. TechLaw will provide canisters to CKY for collecting split samples under TechLaw's supervision.

Collection of Samples for Laboratory Analysis:

Gas samples will be collected using evacuated SUMMA™ canisters, tedlar bags, Teflon tubing, a "Y" fitting, a "T" fitting, and the GMP sampling train in accordance with the approved procedures used in the previous site monitoring events (TTEMI 2004c) and described below. Samples will be analyzed by Air Toxics. The SUMMA™ canisters are "self-filling" vacuum samplers that draw in an air sample (flow rate between 150 and 200 mL) when they are opened; no sampling pumps will be required to fill the canisters. Pumps will be used to evacuate the Teflon tubing. Y-shaped tubing with a central valve will be used to allow the purge pump and the SUMMA™ canister to be connected at the same time without the need to disconnect and reconnect after purging. Teflon tubing avoids the possibility of cross contamination from sampling equipment, and the "T" fitting is used to collect two samples simultaneously (to facilitate duplicate sampling). In addition, the SKC Vac-U-Chamber and PCXR-4 sample pump or equivalent will be used to collect tedlar bag samples.

For each probe, the well head and entire sampling train (valves, tubing, fittings, laboratory-provided soil vapor manifold, gauges and SUMMA™

canister) will have leak testing will be conducted in accordance with the California Environmental Protection Agency (CalEPA) Advisory – Active Soil Gas Investigation (CalEPA 2012). A cloth saturated with isopropyl alcohol will be used for leak testing. This cloth will be placed on the ground near the SUMMA™ Canister. TechLaw will measure and record the post-sampling pressure reading on the canister pressure valve. TechLaw will label the canister or tedlar bag and its corresponding field datasheet with the sample number. Decontamination All sampling equipment will be disposable or cleaned and certified by the laboratory.
Analysis Tasks: Air Toxics will analyze all samples. Laboratory SOPs are listed in Worksheet #23 and provided in Appendix B of this QAPP.

Quality Control Tasks: QC samples will be obtained in the field as follows: field duplicate samples at a frequency of ten percent (%) or 1 for every 10 samples. It is anticipated that one duplicate sample will be collected for this project. One ambient air blank will be collected. All samples will be properly shipped to the laboratory in well-sealed, labeled coolers. Custody seals will be placed on the outside lids of the coolers. The shipping and chain of custody (COC) procedures are described below, and further detail is provided in Appendix A SOPs and Worksheet #27. The containers, preservatives, and holding times for each analytical parameter are summarized in Worksheet #19. Where applicable, all analytical methods will perform: calibrations, tuning, reagent blanks, surrogates, replicates, LCS, and all other method required QC.
Secondary Data: See Worksheet #13.
Data Management Tasks: Analytical data will be provided by the laboratory electronically and will be summarized in analytical data tables by TechLaw. If manual entry of data is necessary, a secondary review of data entered into the tables will be performed for verification purposes.

Documentation and Records: All field measurements and records for each sample collected will be documented in the field log book. Possession must be traceable from the time the samples are collected until their derived data are introduced as evidence in legal proceedings. To ensure that samples are secure from tampering, COC documentation is utilized to provide a traceable record of sample custody. See TechLaw's SOPs (02-05-03, Field Procedures – Chain-of-Custody; and 04-02-02, Packing and Shipping Procedures – Environmental Samples) for additional information. Field Custody: The sampling team members are responsible for the care and custody of the samples collected until they are properly transferred to the shipping company or laboratory. In addition, the sampling team members will ensure that samples are collected, maintained, and transferred in accordance with approved SOPs and COC requirements as follows: Collect only the number of samples needed to represent the media being sampled. To the extent possible, determine the quantity and types of samples and sample locations prior to the actual fieldwork. As few people as possible should handle samples. Sample labels will be completed for each sample, using waterproof ink. Maintain custody in the field by ensuring the samples are accompanied by the COC documentation and are kept in a cooler that is within the line of sight or in a locked storage location from the time of collection until relinquished by signature and physical custody to the shipper. Sample Numbering Scheme: Landfill gas samples will be labeled using the unique Hunters Point identifier for each existing gas extraction well or GMPs. The gas extraction wells and GMPs are identified in Figure 1. Field duplicates will be identified as an additional sample location and recorded on the COC with arbitrary sample collection times. The associated locations of the field duplicate samples will be recorded in the field log book with the appropriate sample collection times along with the laboratory blind identifiers. All other QC samples will be identified using the following designations: AB = Ambient Air Blank
Assessment/Audit Tasks: Field sampling SOPs and this QAPP will be reviewed during the course of sampling to ensure consistency, and to account for any changes in the plan that need to be documented.
Data Review Tasks: Data will be reviewed and comparisons made with project objectives. Data will be placed into tables, charts, and graphs as necessary for data review and interpretations.

QAPP Worksheet #15 Reporting Limits and Evaluation Table – VOCs

Matrix: Landfill Gas
Analytical Group: VOCs, TICs, NMOC, TPH
Concentration Level: Low

Analyte Description	Project Action Limit* ($\mu g/m^3$)	RL ($\mu g/m^3$)	Acceptance Criteria	
			ICV/LCS (%R)	Precision Limits (Max. RPD)
1,1,2,2-Tetrachloroethane	NA	0.69	70 - 130	≤ 25
1,1,2-Trichloroethane	NA	0.54	70 - 130	≤ 25
1,1-Dichloroethane	NA	0.40	70 - 130	≤ 25
1,1-Dichloroethene	70	0.40	70 - 130	≤ 25
1,2,4-Trichlorobenzene	NA	3.7	70 - 130	≤ 25
1,2,4-Trimethylbenzene	NA	0.49	70 - 130	≤ 25
1,2-Dibromoethane (EDB)	0.8	0.77	70 - 130	≤ 25
1,2-Dichlorobenzene	NA	0.60	70 - 130	≤ 25
1,2-Dichloroethane	400	0.40	70 - 130	≤ 25
1,2-Dichloropropane	NA	0.46	70 - 130	≤ 25
1,3,5-Trimethylbenzene	NA	0.49	70 - 130	≤ 25
1,3-Dichlorobenzene	NA	0.60	70 - 130	≤ 25
1,4-Dichlorobenzene	800	0.60	70 - 130	≤ 25
Benzene	60	0.32	70 - 130	≤ 25
Bromomethane	5	0.39	70 - 130	≤ 25
Carbon Tetrachloride	40	0.63	70 - 130	≤ 25
Chlorobenzene	1000	0.46	70 - 130	≤ 25

Analyte Description	Project Action Limit* ($\mu g/m^3$)	RL ($\mu g/m^3$)	Acceptance Criteria	
			ICV/LCS (%R)	Precision Limits (Max. RPD)
Chloroethane	NA	1.3	70 - 130	≤ 25
Chloroform	300	0.49	70 - 130	≤ 25
Chloromethane	NA	0.21	70 - 130	≤ 25
α-Chlorotoluene (Benzyl Chloride)	NA	0.52	70 - 130	≤ 25
cis-1,2-Dichloroethene	NA	0.40	70 - 130	≤ 25
cis-1,3-Dichloropropene	NA	0.45	70 - 130	≤ 25
Methylene Chloride	400	0.69	70 - 130	≤ 25
Ethylbenzene	2000	0.43	70 - 130	≤ 25
Freon 11 (Trichlorofluoromethane)	700	0.56	70 - 130	≤ 25
Freon 113 (Trichlorotrifluoroethane)	700	0.77	70 - 130	≤ 25
Freon 114	NA	0.70	70 - 130	≤ 25
Freon 12 (Dichlorodifluoromethane)	700	0.49	70 - 130	≤ 25
Hexachlorobutadiene	NA	5.3	70 - 130	≤ 25
m,p-Xylene	700	0.43	70 - 130	≤ 25
Methyl Chloroform (1,1,1-Trichloroethane)	1000	0.54	70 - 130	≤ 25
o-Xylene	700	0.43	70 - 130	≤ 25
Styrene	900	0.42	70 - 130	≤ 25
Tetrachloroethene	35	0.68	70 - 130	≤ 25
Toluene	300	0.38	70 - 130	≤ 25
trans-1,3-Dichloropropene	NA	0.45	70 - 130	≤ 25
Trichloroethene	600	0.54	70 - 130	≤ 25
Vinyl Chloride	26	0.26	70 - 130	≤ 25

Analyte Description	Project Action Limit* ($\mu g/m^3$)	RL ($\mu g/m^3$)	Acceptance Criteria	
			ICV/LCS (%R)	Precision Limits (Max. RPD)
1,3-Butadiene	20	0.22	60 - 140	≤ 25
1,4-Dioxane	3000	0.36	60 - 140	≤ 25
2-Butanone (Methyl Ethyl Ketone)	1000	1.5	60 - 140	≤ 25
2-Hexanone	NA	2.0	60 - 140	≤ 25
4-Ethyltoluene	NA	0.49	60 - 140	≤ 25
4-Methyl-2-Pentanone (MIBK)	NA	0.41	60 - 140	≤ 25
Acetone	NA	1.2	60 - 140	≤ 25
Bromodichloromethane	NA	0.67	60 - 140	≤ 25
Bromoform	NA	1.0	60 - 140	≤ 25
Carbon Disulfide	800	1.6	60 - 140	≤ 25
Cyclohexane	NA	0.34	60 - 140	≤ 25
Dibromochloromethane	NA	0.85	60 - 140	≤ 25
Ethanol	NA	0.94	60 - 140	≤ 25
Heptane	NA	0.41	60 - 140	≤ 25
Hexane	NA	0.35	60 - 140	≤ 25
Isopropanol (2-Propanol, isopropyl alcohol)**	NA	1.2	60 - 140	≤ 25
Methyl t-Butyl Ether (MTBE)	8000	0.36	60 - 140	≤ 25
Tetrahydrofuran	NA	1.5	60 - 140	≤ 25
trans-1,2-Dichloroethene	NA	0.40	60 - 140	≤ 25
2,2,4-Trimethylpentane	NA	2.3	60 - 140	≤ 25
Cumene	NA	0.49	60 - 140	≤ 25
Propylbenzene	NA	0.49	60 - 140	≤ 25

Analyte Description	Project Action Limit* ($\mu g/m^3$)	RL ($\mu g/m^3$)	Acceptance Criteria	
			ICV/LCS (%R)	Precision Limits (Max. RPD)
3-Chloroprene	NA	1.6	60 - 140	≤ 25
Naphthalene	NA	2.7	60 - 140	≤ 25
Vinyl acetate	200	1.76	60 - 140	≤ 25
TPH (Gasoline)	NA	10 ppbv	ICV Only: 60-140	≤ 25
NMOC (Hexane/Heptane)	5 ppmv	2 ppbv	NA	≤ 25

Notes:
ICV = Initial calibration verification
LCS = Laboratory Control Sample
NA = Not available (not established by Navy SAP)
ppbv = parts per billion per volume
ppmv= parts per million per volume
RL = Air Toxics Reporting Limits
RPD = Relative Percent Difference
* Project action limits reproduced from Navy SAP
** Isopropanol is not a target analyte for this investigation, but will be used as a leak testing compound in the field. See Worksheet #14 for additional details regarding the procedure for leak testing.

QAPP Worksheet #15 Reporting Limits and Evaluation Table – Gases by FID

Matrix: Landfill Gas
Analytical Group: Gases by FID
Concentration Level: Low

Analyte Description	Project Action Limit* (ppmv)	RL (%)	Laboratory Acceptance Criteria	
			LCS (%R)	Precision Limits (Max. RPD)
Carbon dioxide	NA	0.010	85 - 115	± 25%
Carbon monoxide	NA	0.010	85 - 115	± 25%
Methane	25,000 (2.5%)	0.00010	85 - 115	± 25%
Ethene	NA	0.0010	85 - 115	± 25%
Ethane	NA	0.0010	85 - 115	± 25%
Nitrogen	NA	0.10	85 - 115	± 25%
Oxygen	NA	0.10	85 - 115	± 25%

Notes:
FID = Flame ionization detector
LCS = Laboratory Control Sample
NA = Not available (not established by Navy SAP)
RL = Air Toxics Reporting Limits
RPD = Relative Percent Difference
* Project action limits reproduced from Navy SAP

QAPP Worksheet #15 Reporting Limits and Evaluation Table – Hydrogen Sulfide

Matrix: Landfill Gas
Analytical Group: Hydrogen Sulfide
Concentration Level: Low

Analyte Description	RL (ppbv)	Project Action Limit*	Acceptance Criteria	
			ICV/LCS (%R)	Precision Limits (Max. RPD)
Hydrogen Sulfide	4.00	NA	70-130	≤ 25

Notes:
LCS = Laboratory Control Sample
NA = Not available (not established by Navy SAP)
RL = Air Toxics Reporting Limits
RPD = Relative Percent Difference
* Project action limits reproduced from Navy SAP

QAPP Worksheet #16 Project Schedule Timeline Table

Activities	Organization	Dates (MM/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Draft QAPP	TechLaw	July 2012	August 2012	Draft QAPP	August 6, 2012
Final QAPP	TechLaw	August 2012	September 2012	Final QAPP	September 4, 2012
Sampling	TechLaw/CK	September 2012	September 2012	NA	NA
Sample Analysis	Air Toxics	September 2012	October 2012	Full data package and electronic data deliverable	10 days after receipt of samples
Data Validation	TechLaw	October 2012	October 2012	Data Validation Report	Submitted with Final Report
Draft Report	TechLaw	October 2012	October 2012	Draft Report	30 days after completion of field activities
Final Report	TechLaw	October 2012	October 2012	Final Report	5 days after receiving EPA comments

Note: The proposed schedule is approximate and contingent upon fulfilling data quality requirements and project plans. Schedule may be modified or extended as necessary to reflect time requirements for any additional data collection or analysis activities.

QAPP Worksheet #17 Sampling Design and Rationale

In order for the EPA to corroborate and evaluate the Navy's "Final Interim Landfill Gas Monitoring and Control Plan" (MCP) (TTEMI 2004) data needs to be collected from the Navy's Monitoring Network (Gas Monitoring Probes, Passive Vents). Nine (9) sampling locations have been selected to cover most of the E-2 Landfill Monitoring Network in order to characterize Landfill gas released by natural decomposition of the landfill refuse. Five (5) locations have been selected on the E-2 Landfill extent of Solid Waste, two (2) on the UCSF Property, one (1) outside the extent of Solid Waste (but still within Parcel E-2), and one (1) off-site on Crisp Road. These locations will be sampled for landfill gas in order to accomplish the goals of the SAP, specifically to answer the question of what, if any, contaminants (i.e., VOCs including TICs, NMOC and TPH, atmospheric and organic gases, and hydrogen sulfide) are present in landfill gas that may impact local health, safety, and the environment. Four locations have been chosen to evaluate whether hydrogen sulfide is present in landfill gas; these locations include the most likely locations for detecting this gas like the passive vents, a location where landfill gas has been detected frequently off-site, and one gas monitoring probe located in an area where the landfill is uncapped. An ambient air blank will be collected from an uncapped area of the landfill just west of where the interim cap ends.

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

Sampling Location	Sample ID	Matrix	Screened Depth (feet)	Analytical Suite	Number of Samples	Sampling SOP Reference	Rationale for Sampling Location
GMP08A	GMP08A-MMYY	landfill gas	6.0 to 12.5	VOCs, TICs, NMOC, TPH, Gases by FID, temperature	1	See Worksheet 14	Historically High Concentrations; bounds the East corner of the Parcel E-2 Landfill
GMP10	GMP10-MMYY	landfill gas	4.0 to 6.5	VOCs, TICs, NMOC, TPH, Gases by FID, H2S, temperature	1	See Worksheet 14	Historically High Concentrations; bounds the Western edge of the Parcel E-2 Landfill
GMP20	GMP10-MMYY	landfill gas	3.5 to 4.5	VOCs, TICs, NMOC, TPH, Gases by FID, temperature	1	See Worksheet 14	Monitoring Off-Site Migration; Along the Western edge of the Parcel E-2 Landfill
GMP23	GMP23-MMYY	landfill gas	6.0 to 13.5	VOCs, TICs, NMOC, TPH, Gases by FID, H2S, temperature	1	See Worksheet 14	Historically High Concentrations; Along the Northern edge of the extent of Solid Waste along the UCSF property; On site of the UCSF Property
GMP24	GMP24-MMYY	landfill gas	6.0 to 13.0	VOCs, TICs, NMOC, TPH, Gases by FID, temperature	1	See Worksheet 14	Historically High Concentrations; On site of the UCSF Property
GMP34	GMP34-MMYY	landfill gas	6.0 to 21.0	VOCs, TICs, NMOC, TPH, Gases by FID, temperature	1	See Worksheet 14	Historically High Concentrations; Offsite locations along Crisp Road
PV-01	PV-01-MMYY	landfill gas	NA	VOCs, TICs, NMOC, TPH, Gases by FID, temperature	1	See Worksheet 14	Historically High Concentrations; bounds the Northern corner of the Approximate Extent of Solid Waste of the Parcel E-2 Landfill

PV-02	PV-02-MMYY	landfill gas	NA	VOCs, TICs, NMOC, TPH, Gases by FID, H2S, temperature	1	See Worksheet 14	Historically High Concentrations; bounds the Approximate Northern Extent of Solid Waste of the Parcel E-2 Landfill
PV-03	PV-03-MMYY	landfill gas	NA	VOCs, TICs, NMOC, TPH, Gases by FID, H2S, temperature	1	See Worksheet 14	Historically High Concentrations; bounds the North-East extent of Solid Waste of the Parcel E-2 Landfill

QAPP Worksheet #19 Analytical SOP Requirements Table

Matrix	Analytical Group	Concentration Level	Analytical Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (prep/ analysis)
Landfill Gas	VOCs/TICs	Low	GC/MS, SOP #83	1L	SUMMA™ Canister	None	30 days to analysis
Landfill Gas	Gases	Low	GC/TCD/FID, SOP #08	1L*	SUMMA™ Canister	None	30 days to analysis
Landfill Gas	Sulfur Compounds	Low	GC/SCD, SOP #13	1L	Tedlar bag	None	3 days

* One 1L SUMMA™ canister will be used for VOCs/TICs/Gases by FID

QAPP Worksheet #20 Field Quality Control Sample Summary Table

Matrix	Analytical Group	Conc. Level	Analytical and Preparation SOP Reference	No. of Sampling Locations	No. of Field Duplicate Pairs	No. of MS/MSDs	No. of Field Blanks	No. of Equip. Blanks	No. of Air Blanks	No. of Trip Blanks	Total No. of Samples to Lab
Landfill Gas	VOCs, TICs, NMOC, TPH, Gases by FID	Low	#83, #8	9	1	0	0	0	1	0	11
	H_2S		#13	4	0	0	0	0	0	0	4

QAPP Worksheet #21 Project Sampling SOP References Table

Reference Number	Title, Revision, Data and/or Number	Originating Organization	Equipment Type	Modified for Project Work? Yes/No	Comments
SOP 02-05-03	Field Procedures – Chain-of-Custody (3/1/11)-	TechLaw	Custody Forms	No	
SOP 03-01-04	Field Documentation Procedures – Maintaining a Field Log Book (3/1/11)	TechLaw	Logbook	No	
SOP 03-02-04	Field Documentation Procedures – Taking and Documenting Photographs (3/1/11)	TechLaw	Camera Battery	No	
SOP 04-02-02	Packing and Shipping Procedures – Environmental Samples (3/1/11)	TechLaw	Coolers Tape, Packing Material, Custody Seals, Shipping labels	No	

Project sampling SOPs can be found in Appendix A.

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

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference1

Note: Field equipment is not required for this task. CKY will calibrate, maintain, test, and inspect their field equipment according to their Navy-approved QAPP.

QAPP Worksheet #23 Analytical SOP Reference Table

Ref. #	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
SOP #83	Analysis of Volatile Organic Compounds in Summa Polished Canisters by GC/MS Low Level: Modified EPA Methods TO-14A/TO-15, 10/27/11, Revision #8	Definitive	VOCs/TICs	GC/MS	Air Toxics	N
SOP #08	Analysis of Oxygen, Nitrogen, Methane, Ethane, Ethene, Carbon Monoxide, Carbon Dioxide, Hydrogen, and NMOC by Modified ASTM Method D-1946, 04/09/12, Revision #20	Definitive	Gases	GC/TCD/FID	Air Toxics	N
SOP #13	Analysis of Sulfur Compounds ASTM Method D-5504, 05/26/11, Revision #15	Definitive	Sulfur Compounds	GC/SCD	Air Toxics	N

QAPP Worksheet #24 Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/MS	*see SOP #83				Air Toxics analyst	Air Toxics Limited, Standard Operating Procedure #83, Analysis of Volatile Organic Compounds in Summa Polished Canisters by GC/MS Low Level: Modified EPA Methods TO-14A/TO-15, October 27, 2011. Revision #8.
GC/TCD/FID	*see SOP #08				Air Toxics analyst	Eurofins Air Toxics, Inc., Standard Operating Procedure #8, Analysis of Oxygen, Nitrogen, Methane, Ethane, Ethene, Carbon Monoxide, Carbon Dioxide, Hydrogen, and NMOC by Modified ASTM Method D-1946, April 9, 2012. Revision #20.
GC/SCD	*see SOP #13				Air Toxics analyst	Air Toxics Limited, Standard Operating Procedure #13, Analysis of Sulfur Compounds ASTM Method D-5504, May 26, 2011, Revision #15.

*Air Toxics will comply with Method SOPs (see Appendix B)

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

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
GC/MS	*see SOP #83						Air Toxics analyst	Air Toxics Limited, Standard Operating Procedure #83, Analysis of Volatile Organic Compounds in Summa Polished Canisters by GC/MS Low Level: Modified EPA Methods TO-14A/TO-15, October 27, 2011, Revision #8.
GC/TCD/FID	*see SOP #08						Air Toxics analyst	Eurofins Air Toxics, Inc., Standard Operating Procedure #8, Analysis of Oxygen, Nitrogen, Methane, Ethane, Ethene, Carbon Monoxide, Carbon Dioxide, Hydrogen, and NMOC by Modified ASTM Method D-1946, April 9, 2012. Revision #20.
GC/SCD	*see SOP #13						Air Toxics analyst	Air Toxics Limited, Standard Operating Procedure #13, Analysis of Sulfur Compounds ASTM Method D-5504, May 26, 2011, Revision #15.

*Air Toxics will comply with Method SOPs (see Appendix B)

QAPP Worksheet #26 Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): Mark Pantoja, TechLaw FTL
Sample Packaging (Personnel/Organization): Mark Pantoja, TechLaw FTL
Coordination of Shipment (Personnel/Organization): Mark Pantoja, TechLaw FTL
Type of Shipment/Carrier: Overnight delivery service
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Air Toxics Sample Receiving
Sample Custody and Storage (Personnel/Organization): Air Toxics Sample Receiving
Sample Preparation (Personnel/Organization): Air Toxics Analysts
Sample Determinative Analysis (Personnel/Organization): Air Toxics Analysts
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Minimum of 30 days
Sample Extract/Digestate Storage (No. of days from extraction/digestion): NA
SAMPLE DISPOSAL
Personnel/Organization: Air Toxics
Number of Days from Analysis: 90 days

QAPP Worksheet #27 Sample Custody Requirements

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): The field procedures for chain-of-custody are provided in TechLaw SOP 02-05-03.

Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal): The sample receipt, archiving, and disposal procedures are discussed in Section 5.0, Sample Handling, of the Air Toxics QA Program.

Sample Identification Procedures: TechLaw's procedure is discussed in Worksheet #14. The laboratory procedures are discussed in Section 5.0, Sample Handling, of the Air Toxics QA Program.

Chain-of-custody Procedures: TechLaw's COC procedures are discussed in SOP 02-05-03. The laboratory COC procedures are discussed in Section 5.0, Sample Handling, of the Air Toxics QA Program.

QAPP Worksheet #28 QC Sample Tables – VOCs

Matrix	Landfill Gas
Analytical Group	VOCs, TICs, NMOC, TPH
Concentration Level	Low
Sampling SOP	Worksheet #14
Analytical Method/ SOP Reference	SOP #83/TO-15
Sampler's Name	Mark Pantoja
Field Sampling Organization	TechLaw
Analytical Organization	Air Toxics
No. of Sample Locations	See Worksheets #17 and #18

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1/Batch (20 samples)	<1/2RL; common lab contaminants <5xRL	No qualification if sample results >10x blank or ND. Results > DL and <10x blank qualified "U".	Analyst / Section Supervisor	Accuracy/Bias-Contamination	<1/2RL; common lab contaminants <5xRL
LCS/LCSD	1/Batch (20 samples)	Refer to Worksheet #15	Qualify data as needed.	Analyst / Section Supervisor	Accuracy/Bias, Precision	Laboratory %R and RPD Limits

QAPP Worksheet #28 QC Sample Tables – Gases by FID

Matrix	Landfill gas
Analytical Group	Gases by FID
Concentration Level	Low
Sampling SOP	Worksheet #14
Analytical Method/ SOP Reference	SOP #8 /ASTM D-1946
Sampler's Name	Mark Pantoja
Field Sampling Organization	TechLaw
Analytical Organization	Air Toxics
No. of Sample Locations	See Worksheets #17 and #18

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1/Batch (20 samples)	<1/2RL; common lab contaminants <5xRL	No qualification if sample results >10x blank or ND. Results > DL and <10x blank qualified "U".	Analyst / Section Supervisor	Accuracy/Bias-Contamination	<1/2RL; common lab contaminants <5xRL
LCS/LCSD	1/Batch (20 samples)	Refer to Worksheet #15	Qualify data as needed.	Analyst / Section Supervisor	Accuracy/Bias, Precision	Laboratory %R and RPD Limits

QAPP Worksheet #28 QC Sample Tables – Hydrogen Sulfide

Matrix	Landfill gas
Analytical Group	Sulfur Compounds
Concentration Level	Low
Sampling SOP	Worksheet #14
Analytical Method/ SOP Reference	SOP #13 /ASTM D-5504
Sampler's Name	Mark Pantoja
Field Sampling Organization	TechLaw
Analytical Organization	Air Toxics
No. of Sample Locations	See Worksheets #17 and #18

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1/Batch (20 samples)	<1/2RL; common lab contaminants <5xRL	No qualification if sample results >10x blank or ND. Results > DL and <10x blank qualified "U".	Analyst / Section Supervisor	Accuracy/Bias-Contamination	<1/2RL; common lab contaminants <5xRL
LCS/LCSD	1/Batch (20 samples)	Refer to Worksheet #15	Qualify data as needed.	Analyst / Section Supervisor	Accuracy/Bias, Precision	Laboratory %R and RPD Limits

QAPP Worksheet #29 Project Documents and Records Table

Sample Collection Documents and Records	On-site Analysis Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records	Other
Field logbooks/notes Field data collection sheets Chain-of-custody records Custody seals Air bills Corrective action reports	Analysis forms and or logbooks Sample receipt forms/sample tracking forms Tabulated data summary forms and raw data for field samples Other project specific documents, such as telephone logs and corrective action reports	COC records Sample receipt forms/sample tracking forms Preparation and analysis forms and/or logbooks Tabulated data summary forms (electronic and/or hard copy) and raw data for field samples, standards, QC checks, and QC samples Other project specific documents in the laboratory's possession, such as telephone logs, MDL studies, IPA Tests, Laboratory Pre-award Documentation and corrective action reports	Telephone logs Corrective action reports	Final Report

QAPP Worksheet #30 Analytical Services Table

Matrix	Analytical Group	Concentration Level	Sample Locations/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory/ Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/ Organization (Name and Address, Contact Person and Telephone Number)
Landfill Gas	VOCs/TICs	Low	Refer to Worksheet #18 and Figure 1	#83	10 business days	Ms. Kelly Buettner Air Toxics 180 Blue Ravine Road, Suite B Folsom, CA 95630 (916) 985-1000	NA
Landfill Gas	Gases by FID	Low		#8			
Landfill Gas	H_2S	Low		#13			

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)

Note: No formal assessments of the field or analytical activities are planned at this point.

QAPP Worksheet #32 Assessment Findings and Corrective Action Responses Table

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)[1]	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response

Note: No formal assessments of the field or analytical activities are planned at this point.

[1]If significant issues/discrepancies are found, Karla Brasaemle, TechLaw Task Order Manager; Judy Manley, TechLaw QAO; and Craig Cooper, EPA RPM are notified as part of the corrective action process.

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)
Final Report (containing analytical data and Verification/Completeness Review)	Once	October 2012	Karla Brasaemle Task Order Manager TechLaw	Mr. Craig Cooper EPA Region 9 RPM

QAPP Worksheet #34 Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Planning Documents	Identification of personnel, collection of pre-planning documentation will be checked for accuracy, compliance with SOPs, and completeness	Int.	Mark Pantoja, TechLaw FTL
Analytical Data Package	Laboratory-generated documents of analyses will be reviewed to ensure deliverables meet project requirements.	Int. and Ext.	Amy Dahl, TechLaw Project Chemist Kelly Buettner, Air Toxics Project Manager
Sampling Documents	COC, communication logs, field notes, field measurements documentation, sampling reports, including locations and conditions will be checked for compliance with SOPs and for accuracy and completeness	Int.	Mark Pantoja, TechLaw FTL
External Reports	Transfer all documentation to EPA. All deliverables will undergo two levels of QC review.	Ext.	Karla Brasaemle, TechLaw Task Order Manager

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

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization) *
IIa	Sample Collection, Handling	Sample collection and handling will be evaluated by checking COC and lab log-in notes to ensure samples were properly collected, preserved, and shipped to laboratory	
IIa	Field Documentation	Field log books will be checked to ensure all sampling location and condition information was properly recorded and SOPs were followed	
IIa and IIb	Sample analysis	Laboratory data will undergo a verification/completeness review. If concerns are identified during this review, a formal validation may be performed.	
IIb	Reports to EPA	All project documentation will be reviewed against QAPP requirements prior to submittal to EPA.	

*Laboratory data will undergo a verification/completeness review. If concerns are identified during this review, a formal validation may be performed.

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

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria*	Data Validator (title and organizational affiliation)*
Step IIa	Landfill Gas	VOCs/TICs	Low	Appropriate current National Functional Guidelines (NFG) will be used to evaluate and qualify data based on QC results. NFG procedures will be modified when necessary to incorporate laboratory and method limits.	
		Gases by FID			
		H_2S			

*Laboratory data will undergo a verification/completeness review. If concerns are identified during this review, a formal validation may be performed.

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:

TechLaw will review QC summary forms and note significant trends and biases. If any data gaps exist due to samples not being analyzed (i.e., compromised canisters, lost samples, etc.) TechLaw will identify and document them in the final report.

Describe the evaluative procedures used to assess overall measurement error associated with the project:

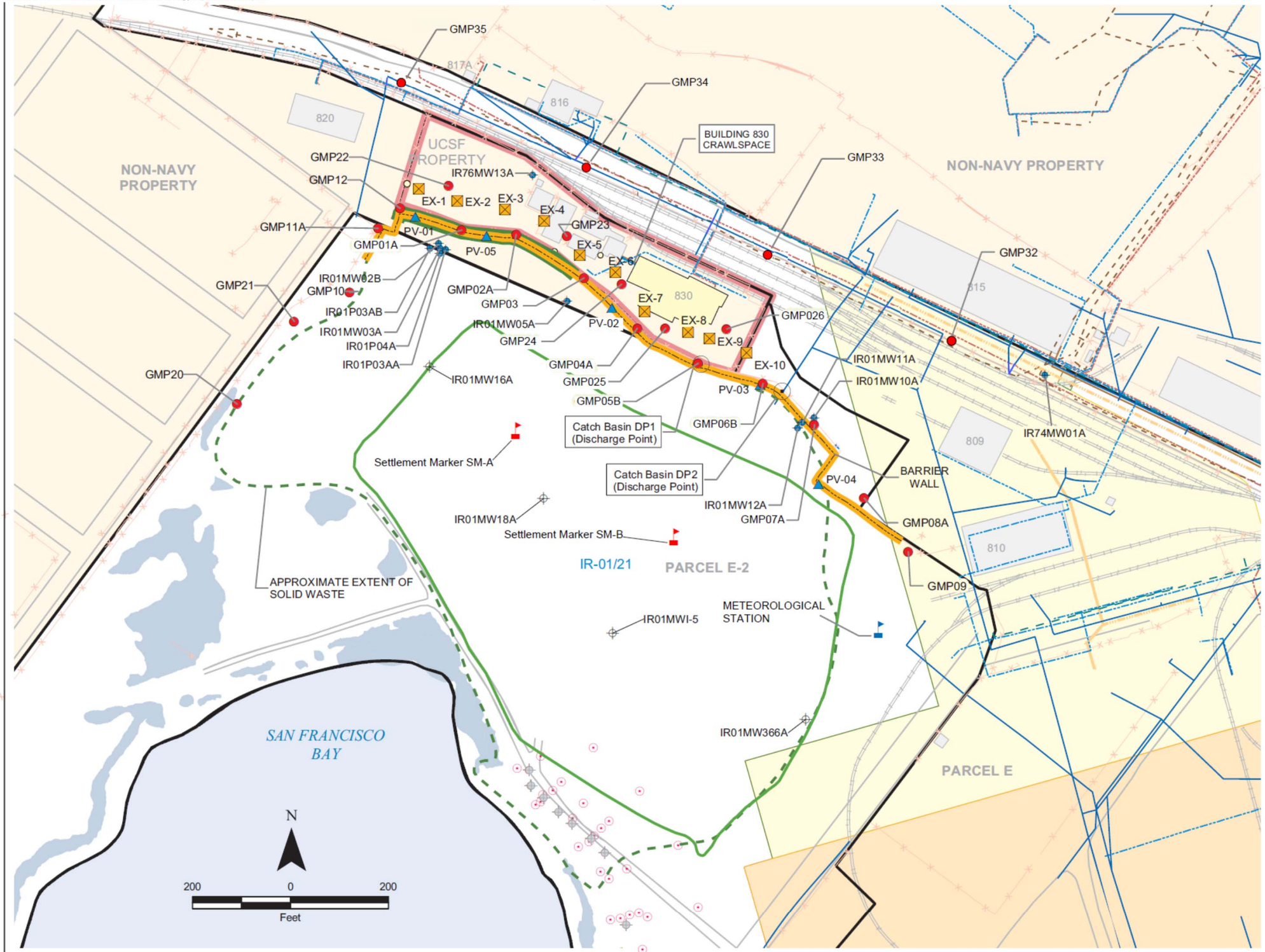
TechLaw will evaluate analytical error by determining if QC sample results are within laboratory limits. TechLaw will determine if samples were collected consistently by evaluating field duplicate precision.

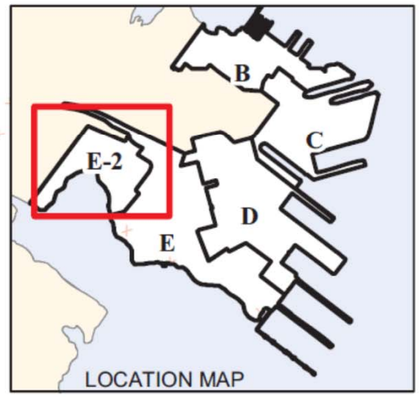
Identify the personnel responsible for performing the usability assessment: TechLaw staff

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:

TechLaw will discuss the findings of the QC review forms in the Final Report.

FIGURES





Legend

- Gas Monitoring Probe
- Gas Extraction Well
- Monitoring Well with Water Level Measurement
- Other Monitoring Well
- Passive Vent
- Catch Basin Discharge Point
- Former Location of Groundwater Extraction System Well/Vault
- Grouted Section of HDPE Barrier Wall
- Groundwater Extraction System Piezometer
- HDPE Barrier Wall and Extraction Trench
- Meteorological Station
- Settlement Marker
- Surface/Building Air Monitoring Location
- Limit of Landfill Cap
- Approximate Extent of Solid Waste
- Storm Water Line
- Water Line
- Saltwater Line
- Steam Line
- Sanitary Sewer Line
- Electric Line
- Gas Line
- Fence Line
- Parcel Boundary
- Wetland (Surveyed in October 2001)
- Building
- Road
- Rail Line
- UCSF Property
- Non-Navy Property
- Industrial
- Open Space
- Research and Development
- Residential

Notes:

EX	Gas extraction well
GMP	Gas monitoring probe
HDPE	High-density polyethylene
IR	Installation Restoration
PV	Passive Vent
UCSF	University of California, San Francisco

CKY Incorporated

Landfill Gas Monitoring System
Hunters Point Naval Shipyard
San Francisco, California

FIGURE 1
Site Map and Split
Landfill Gas Monitoring Locations

APPENDIX A

FIELD STANDARD OPERATING PROCEDURES

FIELD PROCEDURES -
CHAIN-OF-CUSTODY

SOP Number: 02-05-03
Effective Date: 03/01/11

Technical Approval: Tim Fehr Date: 3/1/11

QA Management Approval: Judy Manley Date: 3/1/11

SOP Description

This Standard Operating Procedure (SOP) describes the steps that are to be taken to ensure a correct Chain-Of-Custody (COC) program is followed for every TechLaw project involving sampling activities. The program allows for the tracking of possession and handling of individual samples, from the time of field collection through laboratory analysis. Because samples collected during an investigation could be used as evidence in litigation, possession of the samples must be traceable from the time each sample is collected until analytical results are introduced as evidence in legal proceedings.

This SOP must be used in conjunction with the procedures for packaging and shipping samples as discussed in SOP No. 04-02-XX, Environmental Samples, and SOP No. 04-03-XX, *Hazardous Materials/Dangerous Goods*.

General Procedures

Related SOPs

This SOP is to be used in conjunction with the other relevant or applicable SOPs found in the following SOP categories:

Category No.	Category Title
02	Field Procedures
03	Field Documentation Procedures
04	Packaging and Shipping Procedures
05	Field Equipment Operation and Maintenance Procedures
06	Groundwater Sampling/Monitoring and Analysis Procedures
07	Soil/Sediment Sampling and Analysis Procedures
08	Surface Water Sampling and Analysis Procedures
09	Health and Safety Procedures
10	Regulatory Compliance Procedures
11	Quality Assurance Procedures
12	Incineration/BIF Sampling and Analysis Procedures

13	Waste Sampling and Analysis Procedures
14	Asbestos Handling
15	Region 5 ESAT-Specific SOPs
16	Region 8 ESAT-Specific SOPs

Equipment and Apparatus

- Sample identification labels
- Sample tags (with strings attached)
- Custody seals
- Chain-Of-Custody Records
- Receipt For Samples forms
- Ice chests and ice for sample shipment
- Nylon-reinforced strapping tape
- Clear (packing/strapping) tape
- Plastic zip-lock storage bags
- Pens with permanent water-proof ink
- Large trash bags to line the ice chest (cooler)
- Packaging materials (e.g., vermiculite, bubble wrap, saw dust, etc.)

Additional equipment and apparatus when using FORMS II Lite

- Computer, preferably with internet access
- Three-in-one portable printer
- Sticker labels for printing (such as Avery labels for printing)

Definitions

Sample under Custody

A sample is considered to be "under custody" if one or more of the following criteria are met:

- The sample is in the sampler's or the transferee's actual possession,
- The sample is in the sampler's or transferee's view after being in his/her possession,
- The sample was in the sampler's or transferee's possession and then was locked up in a secure place to prevent tampering, and
- The sample is placed in a designated secure area.

Sampler

The sampler is defined as the person responsible for the collection of the samples. Any person on the sampling team may serve as the sampler.

Transferee

The transferee is the person designated to receive and maintain custody of the samples and coordinate shipment of the samples from the site of collection to the analytical laboratory. Any person on the sampling team may serve as the transferee. In addition, the role of the transferee may be filled by several different people throughout the course of the sampling activities. The basic function of the transferee is to assume the responsibility of custody of the samples from the time the samples are collected until they are relinquished to the shipping company or the analytical laboratory.

Description of Chain-Of-Custody Forms

The COC process requires that specific COC forms and paperwork be prepared to document custody of the samples, from the time they are collected in the field until received by the analytical laboratory. A brief description of each of the forms and/or paperwork follows:

- **Sample Identification Label** - A sample identification label is affixed to each sample container to prevent misidentification of the samples after collection. The labels are usually self-adhesive and are affixed to the sample containers by placing them directly on the container exterior. Information to be provided on each label includes the site identification[1], date, time, preservative used (if any), type of analysis to be performed, name of sampler, and sample control number. The information should be recorded using permanent water-proof ink. The sample labels can be affixed to the sample containers either immediately before or after the sample collection activities. However, care must be taken to ensure that the containers are not mislabeled if the labels are applied after the samples are collected.

  Sample identification labels are usually provided along with the shipment of sample containers, however, they can also be purchased separately. Sample containers and labels may be acquired from either the laboratory contracted to perform the analytical work, or from an independent source. Examples of sample identification labels are provided in Attachment A.

- **Sample Tag** - A sample tag may also be used to identify samples collected in the field. Requirements for using sample tags will be discussed in the QAPP or SAP. A sample tag consists of an identification label which is tied to the neck of the sample container. Information to be provided on each sample tag includes the project code, sample station number, the date and time of sample collection, type of sample (e.g., grab or composite), sample station location, the samplers' signatures, whether or not a preservative was added, type of analysis to be performed, tag number, and lab sample number. A copy of a sample tag is provided in Attachment B.

- **Custody Seal** - A custody seal is affixed over each sample container and lid to provide evidence that the sample was not tampered with during transport to the analytical laboratory. The custody seals are self-adhesive and should be placed such that they cover the sample containers and lids and sample tag strings, but not the writing on the sample labels. The custody seals may contain the date and signature of the sampler; provide space to include the sample number; the name of the individual who breaks the seal; and, the date that the seal is broken. Care must be taken to ensure that all sample identification characters are transcribed correctly on all related documents. Custody seals are also used to

[1] ***Under no circumstances is it acceptable to provide the laboratory with the name, location or other identifying information for the site (this <u>includes</u> listing facility information on the chain-of-custody).*** Facility initials, TechLaw project number or other identifier should be used that will not reveal facility information to the laboratory, but will be evident to TechLaw employees involved with the project.

secure the sample shipping containers and lids. Examples of custody seals are provided in Attachment C.

- **Chain-Of-Custody Record** - A COC Record is used to track and document sample possession from the time of collection until receipt at the analytical laboratory. A completed form must be filled out to accompany each shipment of samples to the laboratory. Information to be recorded on the form may include: the project number, project name[2]; name and address of analytical laboratory; samplers' names and signatures; date and time of sample collection; sample identification numbers; sample description; type of preservative; grab or composite; number of containers included in the shipment; analytical parameters requested; and, sample tag number (if applicable). The bottom portion of the form contains blocks for the signatures of the persons involved in the chain of possession, including dates of possession, and any pertinent remarks. A copy of a COC Record form is provided in Attachment D.

- **Receipt For Samples Form** - RCRA Section 3007 and CERCLA Section 104 require that a "receipt" for all facility samples collected during inspections and investigations be given to the owner/operator of each facility before the field investigator departs the premises. A Receipt For Samples form may be used to satisfy these requirements. In addition, the form may also be used to document that split samples were offered to, and were accepted or rejected by, the owner/operator of the facility, as well as documenting this in the field logbook. A COC Record may also be used to document the collection of split samples and may substitute for the Receipt for Samples form. Information to be entered on the form includes: the project number and name; facility name and location; samplers' signatures; sample station number and description; date and time of sample collection; type of samples collected (e.g., groundwater or soil; grab or composite); sample tag numbers; number of containers; any pertinent remarks; and the signatures of the persons involved in the chain of possession. A copy of a Receipt for Samples form is included as Attachment E.

Chain-Of-Custody Procedures

The field sampling team is responsible for the care and custody of all field samples from the time of collection until shipment to the analytical laboratory. The specific COC procedures to be followed for each sampling event are listed below.

---

[2] ***Under no circumstances is it acceptable to provide the laboratory with the name, location or other identifying information for the site (this <u>includes</u> listing facility information on the chain-of-custody).*** Facility initials, TechLaw project number or other identifier should be used that will not reveal facility information to the laboratory, but will be evident to TechLaw employees involved with the project.

- The sampling team should collect samples in the field such that the most sensitive parameters are addressed before the less sensitive parameters (e.g., volatile organic samples should be collected prior to metals, cyanide, and other parameters). Refer to the SOP "06-," "07-," and "08-," "12-", and "13-" series for specific sampling procedures for groundwater, soil/sediment, surface water, incineration/BIF, and waste, respectively.

- Each sample container should be filled with the sample, and then placed in an ice chest which contains bagged ice.[3] All environmental sample containers must be placed in the ice chest immediately after collection to preserve the integrity of the sample parameters. The ice chest with the samples must remain in view of the samplers in order for the samples to remain in custody.

- After all sample parameters have been collected at a specific sample location, the sampling team travels back to the central staging area, relinquishes control of the samples to the transferee for safekeeping, and prepares for the next sampling location. If only two field samplers are present, samples must be placed on ice and locked in a secure location (e.g., vehicle) before departing for the next sample location.

- The transferee (or other field team members, as appropriate) should inspect the sample containers to ensure they were properly filled and secured. Any problems observed with the sample containers (e.g., broken glass containers, sample bottles not adequately filled, loose lids) should be completely documented in the field logbook.

- If not already affixed, the transferee/field team members should apply sample identification labels and/or sample tags to the sample containers. A layer of clear (packing/strapping) tape may be placed directly over each sample label to prevent the ink from smearing and slippage of the label due to condensation on the outside of the container. After the sample containers have been labeled/tagged, the transferee may secure each sample with custody seals. Samples are then placed into plastic zip-lock type bags. Large sample containers (e.g., one-gallon amber glass jugs) do not need to be placed into plastic bags. The sample containers are then returned to the ice chest.

- After all samples have been collected and the containers appropriately labeled, the transferee then completes the COC Record. If necessary, the transferee and/or sampling team members transfer the sample containers from the sample storage ice chest into the sample shipping container (which may be a different ice chest). The transferee/team

[3] Only environmental samples should be preserved with ice; waste samples are never shipped with ice. Refer to SOP No. 04-02-XX for more information regarding the packaging and shipping procedures for environmental samples.

members must ensure that the samples are properly packaged within the shipping container. Refer to SOP No. 04-02-XX for sample packaging and shipping procedures.

- The original and at least one copy of the COC Record must be placed inside a plastic zip-lock type storage bag and taped to the underside (interior) of the shipping container lid. One copy of the COC Record must be retained by the transferee for placement into the project files.

- The sample shipping container should then be closed and secured with several layers of strapping tape at each end of the shipping container. At least two custody seals must be placed along the front and back edges of the container, where the container body and lid meet. The custody seals should be affixed such that the shipping container cannot be opened without tearing or disturbing the seals. Secure the seals by covering them with tape. The seals should be secured to prevent their accidental removal during shipment. Only one layer of tape should cover the seals to ensure that they remain visible through the tape.

- The shipping airbill should then be completed and attached to the shipping container. The transferee (or other sample team member as designated by the transferee) must personally deliver and release the shipping container to the shipping company or the analytical laboratory.

- If it is not possible to release the sample shipment to the shipping company, or if the samples must be retained overnight, the transferee or designated custodian must maintain custody of the samples until the shipment can be accomplished. Custody is maintained provided that the samples:

  - Remain in the transferee's actual possession.
  - Remain in the transferee's view after being in his/her possession.
  - Are locked up in a secure place to prevent tampering.
  - Are placed in a designated secure area.

  If the shipping delay is of a short duration (less than twenty-four hours in most circumstances), the shipping container should remain closed and sealed. The actual release time to the shipping company should then be entered in the field logbook. If the delay time is of a longer duration, or the conditions where the samples are stored are likely to lead to loss of ice (i.e., if the samples are kept in a locked vehicle on a hot day), the shipping container should be re-opened and additional ice added to the container. In addition, the laboratory should be contacted and informed of any pending shipping delays.

- Prepare a Receipt For Samples form or a COC form and present it to the facility representative prior to departing the facility. Document in the field logbook whether split samples were offered to, and were accepted or rejected by, the facility representative. The transferee must keep one copy of the Receipt For Samples form or COC form for inclusion in the project files.

- Document all field sampling and shipping activities, and COC procedures in the field logbook and photographic record. In addition, any COC deviations from the SAP or this SOP must be documented and justified in the field logbook. Field logbook and photographic log documentation procedures can be found in SOP Nos. 03-01-XX and 03-02-XX, respectively.

The above COC procedures are guidelines that should generally be followed by TechLaw field personnel. However, the site-specific SAP and QAPP should identify any specific requirements based on project or contract requirements. For EPA Superfund contracts, it is often necessary to send the samples to a Superfund's Analytical Services Branch (ASB) Contract Laboratory Program (CLP) Routine Analytical Services (RAS). When a CLP lab is the designated recipient of the samples, the Field Operations Records Management System II Lite (FORMS II Lite) should be used to generate labels, COCs and traffic reports (TRs).

FORMS II Lite is a program that helps automate the field sampling documentation process. Computer-based and web-based training is available at the following web page: http://epa.gov/superfund/programs/clp/f2ltrain.htm. All field personnel are encouraged to take this training.

FORMS II Lite proceeds through a series of logical steps to allow the user to input information. It contains seven steps which ultimately lead to the creation of labels and records. The seven steps are listed below.

Step 1: Enter Site Information

Step 2: Select Sampling Team

Step 3: Select Analysis

Step 4: Station/Location

Step 5: Assign Bottles

Step 6: Assign Lab

Step 7: Assign Carrier

Initiating a project is done in Steps 1 through 3; sample locations are identified in Step 4; numbering and documenting samples is accomplished in Step 5; and shipping information is generated in Steps 6 and 7.

FORMS II Lite generates a Regional COC, which should be sent to the EPA Region that owns the contract under which the sampling is conducted. Depending on the EPA Regional requirements, the following actions may be required after the samples are shipped in accordance with the above general procedures.

- Upload the TR/COC to the EPA Sample Management Office (SMO) website (you should have had exported the TR as an .xml file before executing this action). Access to the SMO website will require a User Name and Password and should be obtained from the TechLaw Project Manager or the EPA Project Manager in advance.

  The SMO website address is: http://epasmoweb.fedcsc.com/scstr/

- Submit the Regional COC/TR to the EPA Region. In some Regions (e.g., Region 3), a scanned (PDF) version of the COC/TR vial email is an acceptable form of submittal. Check with your Region whether email or fax of the COC/TR is acceptable in lieu of shipping the original to the Region.

Health and Safety Section

It is TechLaw's policy to maintain an effective program for control of employee exposure to chemical, radiological, and physical stress which is consistent with OSHA and other applicable and appropriate established standards and requirements.

All field personnel will be provided with appropriate personal protective clothing and safety equipment. At a minimum, this will include a hardhat, hearing protection, full-face respirator, steel-toed safety shoes, and safety glasses. Personnel are required to inspect their PPE prior to entering any job site and replace any damaged items.

A site-specific health and safety plan must be developed by the field team leader or designee and approved by the TechLaw Health and Safety Director prior to implementation in the field. This plan must be reviewed with the field team members prior to beginning work.

Any deviation(s) from an approved site-specific health and safety plan must be documented in the field logbook.

QA/QC Section

None at this time.

Comments/Notes

None at this time.

Attachments

Attachment A - Sample Identification Labels (examples)

Attachment B - Sample Tag (examples)

Attachment C - Custody Seals (examples)

Attachment D - Chain-Of-Custody Record (examples)

Attachment E - Receipt For Samples Form (examples)

References

TechLaw, Corporate Quality Management Plan, most current revision.

TechLaw, Health and Safety Program, most current version.

ATTACHMENT A [Revised 03/01/11]
SOP Number: 02-05-03

SAMPLE IDENTIFICATION LABELS

EAGLE PICHER
ENVIRONMENTAL SERVICES
36 B. J. TUNNELL BLVD. - MIAMI, OK 74354
1-800-331-7425

Specially Cleaned
Sample Container

LOT NO.:

DATE: | TIME: | COLLECTED BY:

SAMPLING SITE:

SAMPLE TYPE:
☐ Grab ☐ Composite ☐ Other _____

TESTS REQUIRED: | PRESERVATIVE

Client _____

Project _____

Location _____

Station _____

Collected by _____

Date _____ Time _____

Preservative(s) A PEST

EA 0447 3/22/89

ATTACHMENT B [Revised 03/01/11]
SOP Number: 02-05-03

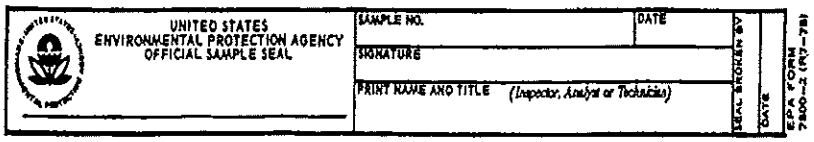
SAMPLE TAG

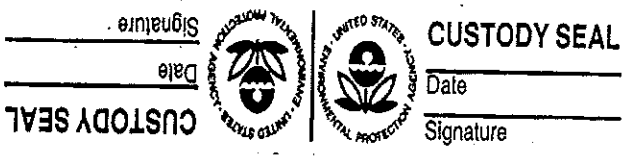
Designate: Grab / Comp.	Samplers (Signatures)	**Preservative:** _____ **Yes** ☐ **No** ☐	
Time		Volatile Organics (VOA)	
Month/Day/Year		Semi Volatiles (ABN)	
Station No.		Pesticides/PCB	
Project Code CLP Case No.	Station Location	_____Metals	
		Cyanide	
		Alkalinity/Hardness	
		TCLP	
		☐ VOA	
		☐ ABN	
		☐ METALS	
		Asbestos	
		Dioxin	
		Oil and Grease	
		Remarks:	
		Concentration: ☐ L ☐ M ☐ H	
Tag Number 6- 215951		Lab Sample No.	

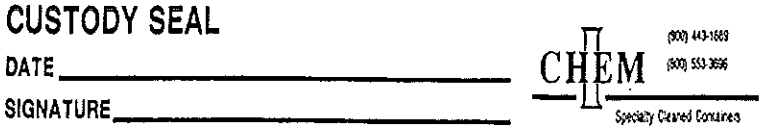
☆ U.S.GPO:1996—761-527

ATTACHMENT C [Revised 03/01/11]
SOP Number: 02-05-03

CUSTODY SEALS

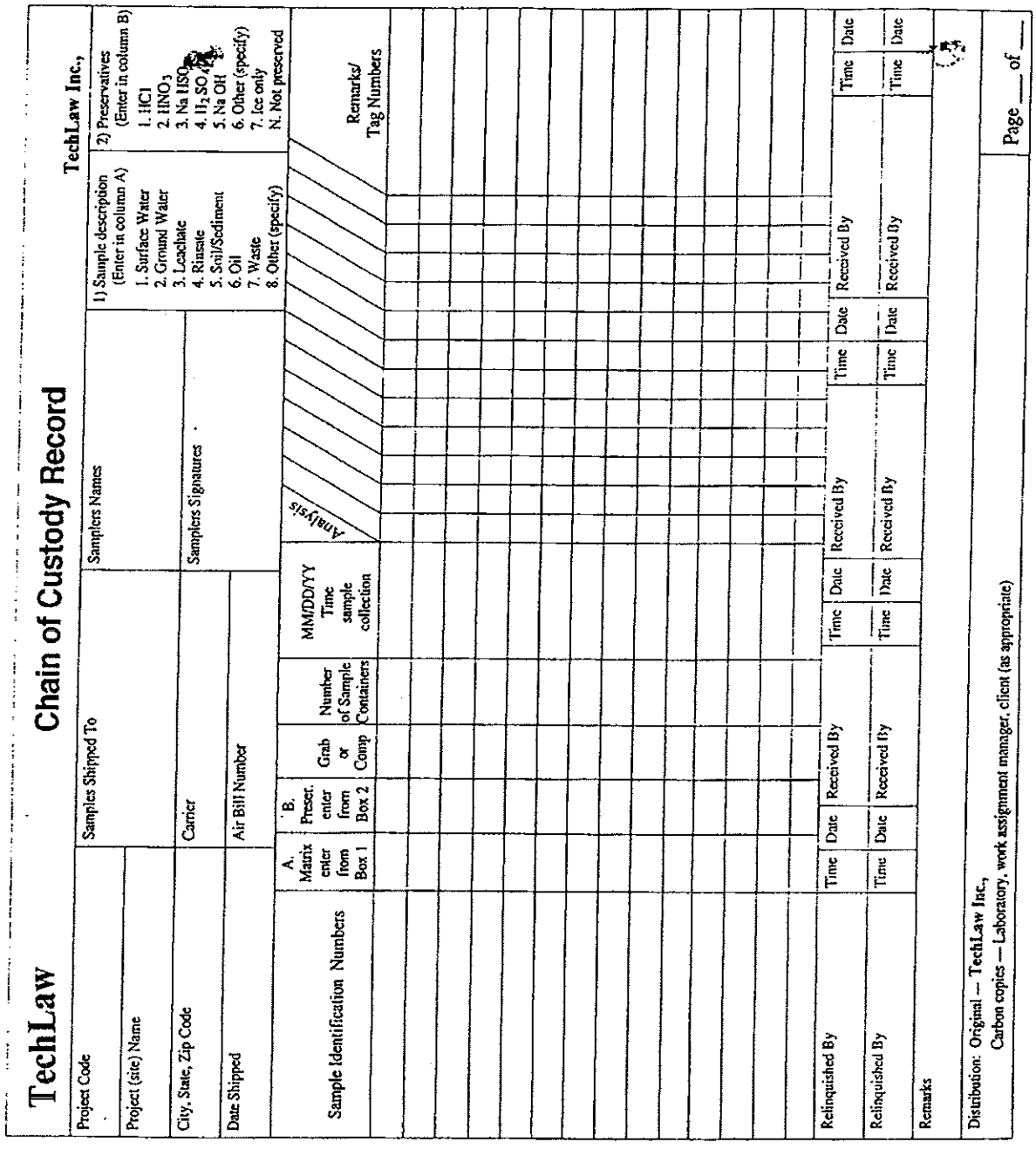






ATTACHMENT D [Revised 03/01/11]
SOP Number: 02-05-03

CHAIN-OF-CUSTODY RECORD



TechLaw

Chain of Custody Record

TechLaw Inc.,

Project Code | Samples Shipped To | Samplers Names | 1) Sample description (Enter in column A): 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil/Sediment, 6. Oil, 7. Waste, 8. Other (specify) | 2) Preservatives (Enter in column B): 1. HCl, 2. HNO_3, 3. Na HSO_4, 4. H_2SO_4, 5. Na OH, 6. Other (specify), 7. Ice only, N. Not preserved

Project (site) Name

City, State, Zip Code | Carrier | Samplers Signatures

Date Shipped | Air Bill Number

Sample Identification Numbers	A. Matrix enter from Box 1	B. Preser. enter from Box 2	Grab or Comp	Number of Sample Containers	MM/DD/YY Time sample collection	Analysis	Remarks/ Tag Numbers

Relinquished By | Time | Date | Received By | Time | Date | Received By | Time | Date | Received By | Time | Date

Relinquished By | Time | Date | Received By | Time | Date | Received By | Time | Date | Received By | Time | Date

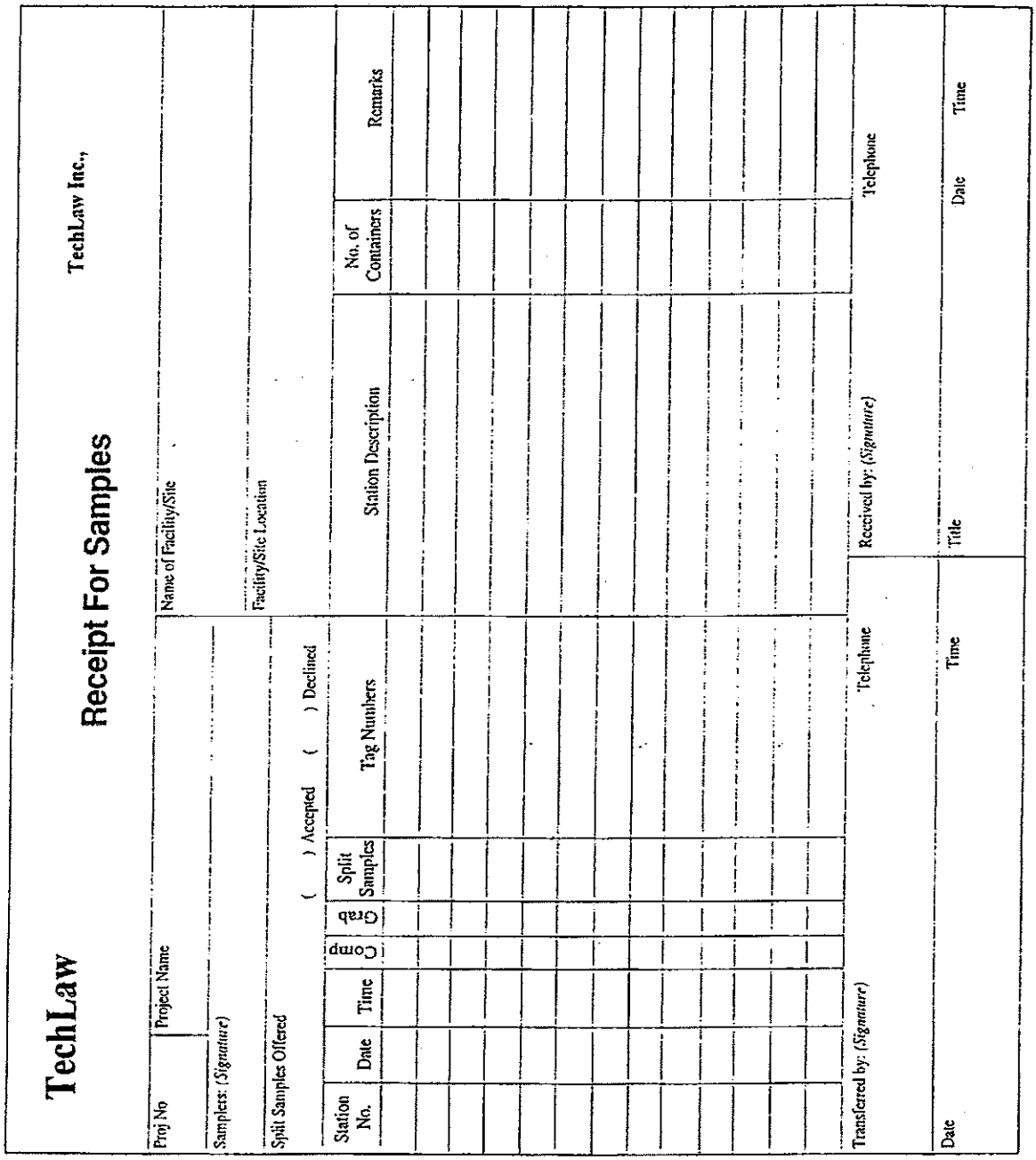
Remarks

Distribution: Original -- TechLaw Inc.,
Carbon copies -- Laboratory, work assignment manager, client (as appropriate)

Page ___ of ___

ATTACHMENT E [Revised 03/01/11]
SOP Number: 02-05-03

RECEIPT FOR SAMPLES FORM



TechLaw

Receipt For Samples

TechLaw Inc.,

Proj No | Project Name | Name of Facility/Site

Samplers: *(Signature)*

Facility/Site Location

Split Samples Offered ( ) Accepted ( ) Declined

Station No.	Date	Time	Comp	Grab	Split Samples	Tag Numbers	Station Description	No. of Containers	Remarks

Transferred by: *(Signature)* Telephone Received by: *(Signature)* Telephone

Date Time Title Date Time

FIELD DOCUMENTATION PROCEDURES - MAINTAINING A FIELD LOGBOOK

SOP Number: 03-01-04
Effective Date: 03/01/11

Technical Approval: Tony Eder Date: 3/1/11

QA Management Approval: Judy Manley Date: 3/1/11

SOP Description

This Standard Operating Procedure (SOP) establishes general practices and requirements for the use of field logbooks during environmental field activities, including, but not limited to, soil/sediment sampling, groundwater sampling, well installations, surface water sampling, environmental assessments, and environmental audits. SOPs for the use of field logbooks during RCRA Visual Site Inspections and oversight of RCRA Facility Investigations and Remedial Investigations are provided in SOP Nos. 03-03-XX and 03-04-XX, respectively.

Logbooks are used by personnel to document all activities and information gathered in the field. The field logbook entries must be legible, factual, detailed and objective. Proper field documentation is crucial in the logbook because the logbook ultimately may become part of the public record and may be used in future legal actions. The field logbook must provide sufficient documentation to enable participants to reconstruct events that occurred and to refresh the memory of the field personnel if called upon to give testimony during legal proceedings.

General Procedures

Related SOPs

This SOP is to be used in conjunction with other relevant or applicable SOPs found in the following SOP categories:

Category No.	Category Title
02	Field Procedures
03	Field Documentation Procedures
04	Packaging and Shipping Procedures
05	Field Equipment Operation and Maintenance Procedures
06	Groundwater Sampling/Monitoring and Analysis Procedures
07	Soil/Sediment Sampling and Analysis Procedures
08	Surface Water Sampling and Analysis Procedures

09	Health and Safety Procedures
10	Regulatory Compliance Procedures
11	Quality Assurance Procedures
12	Incineration/BIF Sampling and Analysis Procedures
13	Waste Sampling and Analysis Procedures
14	Asbestos Handling
15	Region 5 ESAT-Specific SOPs
16	Region 8 ESAT-Specific SOPs

Equipment and Apparatus

- Field logbooks (Minimally one per person.)
- Black or Blue pens with waterproof ink (preferably)
- Compass (preferably)
- Watch

Type of Field Logbook

The field logbook must be bound and preferably waterproof. A standard surveyor's notebook or the "Rite in the Rain"® Weatherproof Transit Book No. 300, J.L. Darling Corporation, Tacoma, Washington, are types of acceptable notebooks that can be used by TechLaw personnel. Other notebooks are acceptable, provided that they are bound prior to use in the field. A supply of field notebooks should be kept in each office location.

Maintenance of Field Logbook

The Field Team Leader is responsible for the field logbooks. Each field team member may be required to maintain a field logbook; in addition, the Field Team Leader may designate a team member as the official record keeper. To ensure consistency in documentation, each logbook is to be maintained by the same person for the duration of the project, if feasible. The Field Team Leader must review the logbooks during the environmental field activities to check that the procedures in this SOP are being followed and that the information is entered correctly. Additionally, it is the responsibility of the Field Team Leader to ensure that RCRA CBI procedures are followed if confidentiality is requested by the facility representative.

Notations in Field Logbook

- All notations in field logbooks should be made in waterproof ink. A standard ball-point pen is acceptable. No erasures may be attempted. Any corrections or deletions are to be made by drawing a single line through the unwanted notation, so that the notation is still legible. The writer then places his/her initials and the date near the deletion. Under no circumstances are pages to be removed from a field logbook.

- All field logbook notations must be legible.

- A separate field logbook must be used for each project. More than one logbook may be used for a single project if the complexity of the site requires that two separate field teams are active on different parts of the facility simultaneously. If more than one logbook is used, each is to be numbered sequentially (e.g., 1 of 3, 2 of 3, 3 of 3). If two or more separate field teams are maintaining logbooks, each team's logbooks are to be numbered sequentially and clearly identifiable (e.g., Team A Book 1 of 2, Team A Book 2 of 2, Team B Book 2 of 2). Each page of the field logbook must be numbered. Each page also must be dated and signed by the writer. For pages only partially filled with text, a diagonal line must be drawn from the end of the text to the bottom of the page. When field activities last more than one day, the next day's documentation begins on the next page of the field logbook. Relevant site information (e.g., weather, site personnel [personnel could change during the course of the field work], strategies) must be listed at the beginning of each day's activities. Also, more than one team member may maintain a logbook, at the discretion of the team leader. The maintenance of a logbook is discussed in more detail in the appropriate Field Documentation SOP (e.g., RCRA VSI, Field Oversight).

- The individual maintaining the logbook must put his/her name and contact information on the inside cover or the first (title) page of the logbook. The first page must include the title of the project, project number, facility name, facility location, EPA Identification Number (if appropriate), date(s) of activity, names and companies of the team members and any other appropriate identifying information. If more than one field logbook is used at a facility, each must contain the required project information on the inside cover or the first (title) page of the logbook.

- Information is generally listed in chronological order in the field logbook and by the time of day. All times are to be entered in a 24-hour format (e.g., 7:00 p.m. is 1900). All factual information obtained during field activities must be recorded in the logbook. Information that is not in or referred to in the logbook may not be used in deliverables associated with the field work. The field logbook contains only factual information--no conclusions are placed in the logbook. Weather conditions are documented at least twice a day and must be noted immediately with any significant weather change (e.g., thunderstorm).

  Often, sketches are preferred to written descriptions (or used in conjunction with), especially where photographs will not be taken. Sketches must include a north arrow, a rough scale and position of buildings, and any other notable features, such as landmarks (trees, streets etc.).

  When photographs are taken, the photograph number is entered into the logbook as well as time of day, compass direction, and a description of what was photographed. Relevant features such as cracks and staining should be documented. See SOP No. 03-02-XX, Taking and Documenting Photographs, for further details.

- The field logbook is the property of the client[1]. The project manager is the custodian of the field logbook for the duration of the project. It must remain in the custody of the project manager (or a designated person) until the conclusion of the field portion of the project. The field logbook is then turned over to the central files.

- Once a field logbook is filled up, the logbook should be scanned and a copy placed in the central files (electronic or hard copy) as soon as possible. Additionally, it is recommended that copies of previous logbooks, instead of original logbooks, are brought into the field to minimize the risk of losing hard copy logbooks.

[1] Work products such as field logbooks that are generated during the performance of government contracts are considered the property of the government client. See SOP No. 11-06-XX for further details regarding document control requirements.

Health and Safety

It is TechLaw's policy to maintain an effective program for control of employee exposure to chemical, radiological, and physical stress which is consistent with OSHA and other applicable and appropriate established standards and requirements.

All field personnel will be provided with appropriate protective clothing and safety equipment. At a minimum, this will include steel-toed shoes, safety glasses, and chemical-resistant gloves.

A site-specific health and safety plan must be developed by the Field Team Leader or designee and approved by the TechLaw Health and Safety Director prior to implementation in the field. This plan must be reviewed prior to beginning work.

Any deviation(s) from an approved site-specific health and safety plan must be documented in the field logbook.

QA/QC

The Field Team Leader or designee is to conduct periodic QC reviews during a site visit to ensure documentation procedures and administrative requirements have been met.

Comments/Notes

None at this time.

Attachments

None at this time.

References

TechLaw, Corporate Quality Management Plan, most current revision.

TechLaw, Health and Safety Program Plan, most current version.

TechLaw, Security Plan for the Control of Confidential Business Information, most current version.

U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, A Compendium of Superfund Field Operations Methods, EPA/540/P-87/001, OSWER Directive 9355.0-14, Washington, D.C., December 1987.

U.S. Environmental Protection Agency, Office of Solid Waste, RCRA Facility Assessment Guidance, October 1986.

FIELD DOCUMENTATION PROCEDURES - TAKING AND DOCUMENTING PHOTOGRAPHS

SOP Number: 03-02-04
Effective Date: 03/01/11

Technical Approval: Tim Fehr Date: 3/1/11

QA Management Approval: Judy Manley Date: 3/1/11

SOP Description

This Standard Operating Procedure (SOP) establishes the practice and requirements for documenting and taking photographs during field activities, including: RCRA Visual Site Inspections (VSIs), oversight of RCRA Facility Investigations (RFIs), oversight of Remedial Investigation/Feasibility Studies (RI/FSs), compliance enforcement inspections (CEIs), comprehensive groundwater monitoring evaluations (CMEs), conduct of sampling activities, and property transfers.

The purpose of these activities is to gather sufficient information and documentation to relay observations to the client and to provide the basis for suggestions for further action or recommendations.

Photographs are taken to obtain visual information concerning unit characteristics, waste characteristics, pollutant migration pathways, releases, and exposure potential. Critical documentation is important because these photographs may eventually be used in enforcement/defense cases, legal actions (as evidence of past releases), or as a basis for property transactions. The photographs could be used months or years later, and must be thoroughly documented.

This SOP indicates the type of information that must be recorded in the field logbook in conjunction with the type of items that must be photographed. The photograph log serves as a visual record of what was seen during the field activities.

General Procedures

Related SOPs

This SOP is to be used in conjunction with other relevant or applicable SOPs found in the following SOP categories:

Category No.	Category Title
01	General Procedures
02	Field Procedures
03	Field Documentation Procedures
04	Packaging and Shipping Procedures
05	Field Equipment Operation and Maintenance Procedures
06	Groundwater Sampling/Monitoring and Analysis Procedures
07	Soil/Sediment Sampling and Analysis Procedures
08	Surface Water Sampling and Analysis Procedures
09	Health and Safety Procedures
10	Regulatory Compliance Procedures
11	Quality Assurance Procedures
12	Incineration/BIF Sampling and Analysis Procedures
13	Waste Sampling and Analysis Procedures
14	Asbestos Handling
15	Region 5 ESAT-Specific SOPs
16	Region 8 ESAT-Specific SOPs

Equipment and Apparatus

- Digital or 35 mm-type camera (If it is a large facility, two cameras may be necessary.)
- Extra batteries
- If 35 mm-type camera is used, 200 ASA speed film, 24 exposures (minimum)
- Compass (preferably)
- Watch
- Ruler/pen/coin (to illustrate scale)

Permission to Take Photographs

When conducting field activities, obtain permission to take photographs from the facility representative prior to the field activities. If there is an appearance of resistance from the facility representative, inform the client and together develop a course of action/strategy to obtain resolution prior to the field activities. In addition, it is the responsibility of the Field Team Leader to ensure that CBI procedures are followed if confidentiality is requested by the facility representative.

Maintenance of the Camera

The following generic operating and maintenance activities must be performed in accordance with specific directions provided with the camera.

- Routine inspection and cleaning are to be conducted prior to the field activities. If unfamiliar with the type of camera, review the general directions provided by the manufacturer. However, prior to field activities, ensure familiarity with such "how to" procedures as:
  - Insert and check the battery
  - Load and rewind the film, if applicable
  - Set the film speed, if applicable
  - Clear memory card, if applicable
  - Set the clock
- Routine testing of batteries must be conducted prior to the field activities and at the beginning of each day in the field. Additional spare camera batteries should be on hand.
- Remedial action in the event of failure or malfunction must be in accordance with the camera warranty (if applicable) and directions for troubleshooting. A malfunction can be caused by shock, humidity, salt, etc. If a camera has been used in the presence of chemicals, it is to be wiped clean. Also, film cameras must not be placed near strong magnetic fields.

General Information Regarding Cameras and Film

Camera Types

Each TechLaw field-ready office location should have a digital and/or 35 mm automatic-focusing/automatic-winding camera or access to one. See SOP No. 02-07-XX for details regarding equipment acquisition, inventory and maintenance if more than one camera is needed. These cameras are relatively simple to use since they do not require manual focusing or shutter speed adjusting. This is advantageous since the photographer may also be tasked with recording the photograph description and picture number, as well as asking questions regarding the purpose of the unit being photographed. These cameras should have an internal clock which records the date and/or time the photograph was taken. Setting the clock is important because it provides additional documentation and also helps in organizing the photographs. The date is a priority. If you can include both settings (i.e., date and time), this is preferred.

Types and Quantities of Film Needed

If a 35 mm type camera is used, the recommended film is 200 ASA speed and 24 exposures (minimum). A sufficient number of rolls of film must be taken on field activities. Since the film rolls are small, a good rule of thumb is to take two rolls for every 10 units or SWMUs identified prior to the field activities. Alternatively, take two rolls for every 25 acres of the site. For sampling visits, one roll for every 6 samples may be sufficient. This would allow for 4 pictures per sample location using a 24-exposure roll. Typical photographs would include one overview, one closer view of the sample collection, one of the filled sample containers, and one extra for other documentation needs. Take as many rolls as you think you will need and then add two as a safety margin. The unused film must be returned to the office.

Quantity of Memory Needed

If a digital camera is used, the camera's memory card should allow for a sufficient number of photographs. Before commencing field activities, it should be ensured that the memory will meet the project needs using the guidelines for film cameras in the section above. If camera memory becomes an issue on site, lower resolution settings can be used.

Treatment and Shipment of Camera and Film

Cameras and film generally are not affected by the X-ray machines at airport security check stations. However, the X-ray machine will have an effect if the film speed is 1000 ASA or if the film is repeatedly exposed to the X-rays (going through the X-ray machine more than four times).

There are no special shipment procedures for the camera or film. The camera and unexposed film can be packed and checked in the suitcase of the field personnel or shipped in an ice chest with other field equipment. In order to prevent loss, it is recommended that the camera's memory card and/or the exposed film rolls be carried onto the plane and kept in one's possession at all times.

Commonly, there will be unexposed photographs on the last roll of film in the camera. Automatic cameras typically do not allow for rewinding the film until all photographs are taken. One option is to open the shutter, place your hand over the lens and shoot the remaining photographs. These will appear as black negatives and usually there is no charge for processing these. Alternatively, photographs of surrounding areas, such as waterways and residences, or overviews of the facility can be taken in order to complete the roll.

Types and Subjects of Photographs

- During field activities, the Field Team Leader selects one team member to take photographs and record the appropriate information in the field logbook. Photographs must be taken of each unit or SWMU identified unless the facility representative denies permission for that particular unit. In these cases, the refusal is to be documented in the field logbook.

- Photographs are taken to document conditions at the facility or sampling activities. The types of pictures taken must include:

  - Representative overall pictures of the facility or site;
  - Posted signs identifying ownership of the facility or site;
  - Evidence of releases (e.g., leachate seeps, pools of liquid, discolored water, and stained soils);
  - Individual units such as lagoons, drums, and landfills;

- Visual evidence of poor facility maintenance;
- Examples of typical facility operation;
- Adjacent land use;
- Sample locations/activities; and
- Areas that unauthorized persons can easily access.

- Information that must be recorded in the field logbook in conjunction with each photograph includes:

  - Photographer's name;
  - Type of camera (e.g., digital or 35 mm);
  - Type of film (if applicable);
  - Photograph number;
  - Date and time;
  - Name and identification number of unit or SWMU;
  - Location of unit or SWMU;
  - Orientation of photograph (i.e., direction photographer is facing);
  - Observed evidence of release (e.g., staining, overflow);
  - Notable features of unit or SWMU that may provide evidence of release (e.g., cracking, obvious lack of integrity of unit);
  - Information to help characterize the unit, or picture; and
  - Other comments (e.g., weather, if a zoom lens was used, etc.).

- When photographs are taken of objects that are small or close up, it is often helpful to use a ruler, pen or coin in the frame to illustrate the scale so one will be able to more easily explain or describe the dimensions or proportions.

- During sampling activities, photographs are to be taken of actual sample collections, conditions of sampling location (e.g., monitoring well head and pad, soil sampling location with respect to surroundings), filled sample containers, and the chain-of-custody seals on the closed and sealed ice chests.

- For engagements conducted for regulatory agencies or in the case of property transactions, permission to take photographs must be obtained from the owner/operator of the facility. Inform the owner/operator that you will point out or explain what you would like to photograph before you actually take the photographs.

Listed below are three possible scenarios, in order of preference, by which photographs are taken and processed:

- You take the photographs using the TechLaw camera and leave with the film and/ or photograph files.
- If permission for you to take the photographs is denied, negotiate with the owner/operator to have them take the photographs using the TechLaw camera.
- The least desirable approach is when permission to take the photographs is denied, or the facility allows you to take the photographs but will not let you leave with the memory card and/or roll(s) of film. In these cases, negotiate with the owner/operator to have the photographs processed, review them, and provide the required number of copies and negatives (if applicable) to you. In these cases, the client (e.g., EPA) must be aware of these arrangements and approve them. Note: There have been instances where photographs were taken by the owner/operator, but were never provided to TechLaw.

Development/Handling of Photographs and Negatives, and Compact Disks

Commercial developing facilities may be utilized for processing digital photos and/or 35 mm film. A minimum of two 4x6 copies of each photograph must be requested - one for submittal to the client and the other for the TechLaw files. Prior to processing, determine how many copies of the photographs are needed through discussions with the client or Project Manager. For example, some clients require two copies; therefore, in order to have a set for the TechLaw files, three copies must be made. On occasion, the facility will request a copy of the photographs. If the client is a regulatory agency (e.g., EPA), this must be approved by the regulator prior to providing the photographs to the facility. Under no circumstances must the original negatives and/or compact disks be sent to or left with the facility. Financial reimbursement must be agreed to prior to photographic duplication. At the end of the assignment, the negatives and/or compact disks are forwarded to the Program Manager or designee for inclusion in the central files.

In instances where a facility requests that the photographs be treated as CBI (or some other form of confidentiality), the photographs and negatives must be designated, logged, handled, stored, and transmitted in the same manner as any other CBI material.

Photo Log

The purpose of a photo log is to present the photographs taken during field activities along with brief documentation describing them. Each write-up is to provide the name and number of the unit (e.g., Storage Tank 11, SWMU 3), a description of the unit or activity, and the compass direction. Note any particular background items that should be brought to the attention of the reader (e.g., note the absorbent materials on the floor around the drum). Notations should be limited to pertinent facts. The photo log format may vary depending upon the client's instructions. Two examples are provided in Attachment A.

In addition, maps and drawings (which contain a scale and compass points) can be appended to provide further clarification of the photographs and field logbook entries. Notations can be made on the maps showing where the photographs were taken and in what compass direction, as well as the number on the roll of film (if applicable).

If any post processing (e.g., cropping or zooming) is done to digital photographs, this must be noted in the photo log. The original print, as well as the post-processed print should be provided to the client. Also, if post-processing is conducted, both the original photograph and the post-processed version must be placed on a CD-ROM or DVD-ROM in TechLaw's central files.

Health and Safety

It is TechLaw's policy to maintain an effective program for control of employee exposure to chemical, radiological, and physical stress which is consistent with OSHA and other applicable and appropriate established standards and requirements.

All field personnel will be provided with appropriate protective clothing and safety equipment. At a minimum, this will include steel-toed shoes, safety glasses, and chemical-resistant gloves.

A site-specific health and safety plan must be developed by the Field Team Leader or designee and approved by the TechLaw Health and Safety Director prior to implementation in the field. This plan must be reviewed prior to beginning work.

Any deviation(s) from an approved site-specific health and safety plan must be documented in the field logbook.

QA/QC

None at this time.

Comments/Notes

Upon project completion, the logbook(s), one set of photographs and all negatives and/or compact disks must be forwarded to the central files.[1]

Attachments

Attachment A - Photograph Log Example

References

TechLaw, Corporate Quality Management Plan, most current revision.

TechLaw, Health and Safety Program Plan, most current version.

TechLaw, Security Plan for the Control of Confidential Business Information, January 2006.

U.S. Environmental Protection Agency, A Compendium of Superfund Field Operations Methods, EPA/540/P-87/001, OSWER Directive 9355.0-14. Washington, D.C., 1987.

U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Characterization of Hazardous Waste Sites - A Methods Manual, Volume 1 - Site Investigations, EPA/600/4-84/075, Las Vegas, NV.

U.S. Environmental Protection Agency, Office of Solid Waste, RCRA Facility Assessment Guidance, October 1986.

U.S. Environmental Protection Agency, Region IV, Environmental Service Division, Engineering Support Branch Standard Operating Policies and Procedures, Georgia, February 1991.

[1] Work products such as photographs and negatives that are generated during the performance of government contracts are considered the property of the client. See SOP No. 11-06-XX for further details regarding document control requirements.

PHOTOGRAPH LOG EXAMPLE

1. Overview of finished monitoring well LF-2, facing southwest. Note drums containing drill cuttings are in contact with the soil.

2. Facing northeast towards finished monitoring well LF-2. Note the well casing has not been grouted around the surface. The drums contain drill cuttings.

3. View (looking east) of the Torit Dust Collector. Note the 55-gallon drums which receive the particulates that are removed from the indoor air. This is a representative unit for the other cyclones in the plant.

4. Close-up view of the Former Oil/Water Separator No. 13. This unit is presently operating as a catch basin for oily wastewater prior to piping to the Building 29-N 40,000-Gallon Oily Wastewater Tank (SWMU A-5).

5. View (looking east) of the removal pipe for Tank W-82. The Waste Oil Vacuum Truck (SWMU L-46) collects the waste oil/jet fuel at this point. Note the staining on and poor condition of the asphalt. The stained building in the background is a test cell.

6. View of Underground Waste Storage Tanks W-89 and W-92 after being exhumed. The hole was cut in the side of the tank to examine the metal for value as scrap. This is not the original location of these tanks.

7. View of surface access area to Underground Waste Oil Storage Tank W-50. Note the oil-stained pavement and absorbent in the area.

8. View (looking north) of the manhole and bermed access area to underground Waste Storage Tank W-53. Note oil staining on berm and in containment area.

9. View of rinsing split spoon sampler, in foreground, with the drill rig in the background. Note the driller in the background is not wearing gloves.

10. Underground Discharge Pipe. Close-up of the asphalt road covering the underground discharge pipe. The location of the pipe is indicated by the parallel cracking. Note: In the background are the former lagoons. View is facing west.

Example

TECHLAW

Contract No. XX-XX-XXXX

[Insert Photo Here]

PHOTO #

SITE NAME\EPA ID # _____

SITE LOCATION _____

PHOTOGRAPHER/WITNESS _____

DATE _____ **TIME** _____ **DIRECTION** _____ **TO#** _____

COMMENTS _____

A second procedure for photograph logs is by using Avery Labels #5163 (or similar). The completed photograph log labels are peeled and placed on the back of the appropriate photograph. The photographs are then placed into a clear plastic photograph storage sheet. See below for an example of the photograph log labels format:

Photo #T1-01 **City:** Tulsa, OK
Site: Name Industries, Inc. **Time:** 1325

Tank 901A, labeled "Used Alkaline Storage".

Photo By: Photographers Name **Date:** 2/24/07
Witness: Witness Name **Direction:** SE

Photo #T1-02 **City:** Tulsa, OK
Site: Name Industries, Inc. **Time:** 1405

Tank 901A. Note: dark material in secondary container. Location for Sample SUI01.

Photo By: Photographers Name **Date:** 2/24/07
Witness: Witness Name **Direction:** SW

Photo #T1-03 **City:** Tulsa, OK
Site: Name Industries, Inc. **Time:** 1410

Drum located next to Tank 901A (just north). Note: no label is observed on the drum. Sample SUI05 collected from this drum.

Photo By: Photographers Name **Date:** 2/24/07
Witness: Witness Name **Direction:** SE

Photo #T1-04 **City:** Tulsa, OK
Site: Name Industries, Inc. **Time:** 1440

Photo of sample jar of sample SUI05. Note: The sample jar is an amber color and does not reflect the color of the material inside.

Photo By: Photographers Name **Date:** 2/24/07
Witness: Witness Name **Direction:** SE

Photo #T1-05 **City:** Tulsa, OK
Site: Name Industries, Inc. **Time:** 1445

Photo of sample jar for sample SUI01. Note: The sample jar is an amber color and does not reflect the color of the material inside.

Photo By: Photographers Name **Date:** 2/24/07
Witness: Witness Name **Direction:** SE

Photo #T1-06 **City:** Tulsa, OK
Site: Name Industries, Inc. **Time:** 1513

Photo of "Used Cyanide Storage" Tank 901B. This is the sample location of Samples SUI02 and SUI03.

Photo By: Photographers Name **Date:** 2/24/07
Witness: Witness Name **Direction:** SW

Photo #T1-07 **City:** Tulsa, OK
Site: Name Industries, Inc. **Time:** 1515

Photo of Acid Tank. Sampling location for sample SUI04.

Photo By: Photographers Name **Date:** 2/24/07
Witness: Witness Name **Direction:** NE

Photo #T1-08 **City:** Tulsa, OK
Site: Name Industries, Inc. **Time:** 1540

Photo of southern portion of the Covered Hazardous Waste Storage Area.

Photo By: Photographers Name **Date:** 2/24/07
Witness: Witness Name **Direction:** SE

PACKAGING AND SHIPPING PROCEDURES - ENVIRONMENTAL SAMPLES

SOP Number: 04-02-02
Effective Date: 03/01/11

Technical Approval: _____ Date: 3/11/11

QA Management Approval: Judy Manley Date: 3/11/11

SOP Description

This Standard Operating Procedure (SOP) describes the procedures involved in the packaging and shipping of environmental samples.

It is the Field Team Leader's responsibility to determine whether the samples meet the definition of environmental or dangerous goods samples and to follow the appropriate packaging and shipping procedures - SOPs and related guidance. Assistance in determining sample categories can be obtained from senior TechLaw staff/managers.

Definitions:

- **Environmental Samples** - normally include drinking water, most groundwater and ambient surface water, soil, sediment, and any samples not containing high levels of hazardous materials or hazardous waste. These types of samples generally are not considered a hazardous waste in 40 CFR 261.3, or hazardous materials under the regulations in 49 CFR 171 through 178. These samples are taken from areas where high concentrations of constituents are not likely to be found.

- **Hazardous Material** - a substance or material, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated. The term includes hazardous substances (40 CFR 302.4), hazardous waste (40 CFR 261), marine pollutants (49 CFR 172.101, Appendix B), and elevated temperature materials (49 CFR 171.8).

- **Dangerous Good** - an article or substance, which is capable of posing a significant risk to health, safety, or property when transported by air, and which meets the criteria of one or more of nine United Nations (UN) hazard classes and, where applicable, to one of three UN packing groups. The nine classes are

related to the *type of hazard*, while the packing groups are related to the *degree of danger* within the class. The nine hazard classes and three packing groups are outlined below. (See SOP 04-03-XX, "Packaging and Shipping Procedures – Hazardous Materials/Dangerous Goods" for a complete description of each hazard class.)

Every effort should be made to determine the category of the sample (environmental or dangerous goods) prior to collection of samples. Use available file information about the site or areas to be sampled. Review any existing analytical data from previous samples collected at the site. Review waste generation data, where wastes have been disposed on site and any waste characteristic information provided by the facility or other sources (e.g., EPA or State agency).

Sample Category Determination:

When making a determination whether samples can be shipped as Environmental samples, ask the following questions:

Does the sample pose an unreasonable risk to health, safety or property when transported in commerce (e.g., is it shock sensitive, does it emit toxic or noxious gases)?;

Does the sample meet the criteria of one or more of 9 UN hazard classes? (Attachment A provides definitions for each class):

Class 1 - Explosive
Class 2 - Gas
Class 3 - Flammable liquid
Class 4 - Flammable solid
Class 5 - Oxidizer
Class 6 - Poisonous (toxic)
Class 7 - Radioactive
Class 8 - Corrosive
Class 9 - Miscellaneous dangerous goods

Is the sample material collected on the list of hazardous material in 49 CFR 172.101 Hazardous Materials Table or the IATA List of Dangerous Goods (IATA Regulations)?; and,

If samples are collected from a drum, tank, impoundment, or other type of source area where hazardous waste/materials are known to be or highly suspected to have been disposed, these samples **DO NOT** qualify as environmental samples. **STOP** and proceed to SOP No. 04-03-XX.

If any of these cases are true, samples must be shipped as a Dangerous Goods. Refer to SOP 04-03-XX for Dangerous Goods Shipping Procedures.

Otherwise, proceed with shipping the environmental samples according to the following procedures.

General Procedures

Environmental samples of solid waste, soil, air or water collected for the sole purpose of testing to determine its characteristics or composition, are excluded from the requirements of 40 CFR 261-270 when: the sample is being transported to a laboratory for purpose of testing; and the shipper complies with DOT, IATA or other applicable shipping requirements.

The appropriate shipping procedures for Environmental samples are detailed in this SOP.

Related SOPs

This SOP is to be used in conjunction with the other relevant or applicable SOPs found in the following SOP categories.

Category No..	Category Title
01	General Standard Operating Procedures
02	General Field Procedures
03	Field Documentation Procedures
04	Packaging and Shipping Procedures
05	Field Equipment Operation and Maintenance Procedures
06	Groundwater Sampling/Monitoring and Analysis Procedures

07	Soil/Sediment Sampling and Analysis Procedures
08	Surface Water Sampling and Analysis Procedures
10	Regulatory Compliance Procedures
11	Quality Assurance Procedures
12	Incineration/BIF Sampling and Analysis Procedures
13	Waste Sampling and Analysis Procedures

Related Documentation

The following documents should be used in conjunction with this SOP regarding the packaging and shipment of environmental samples.

- Field Logbook;
- Site Sampling and Analysis Plan;
- Health and Safety Plan; and
- Other relevant facility/site information.

Procedures for Packaging and Shipping Environmental Samples

The procedures for packaging and shipping environmental samples are split into four sections: pre-field preparation of the coolers; preparation of sample containers for shipment; preparation of coolers for shipment; and preparation of the shipping documentation.

Prior to any field activities requiring shipments of samples via FedEx or other transportation service (e.g., UPS), contact the shipping company and determine the following: nearest location of the transporter's drop-off office to the field activities; and operating hours of the nearest office.

Pre-field Cooler Preparation

(1) Ensure that a sufficient number of coolers have been acquired to allow all samples to be shipped. Use clean, insulated coolers and remove all tape, markings, labels, and custody seals remaining on the outside of the coolers. If possible, the coolers should be washed inside and out prior to use.

As a guide, the approximate number of bottles fit in a 54-quart cooler:

Organic Water			***Inorganic Water***
1 liter ambers:	12	or	500 ml poly and/or
and 40 ml vials:	6		1 liter poly: 18 to 20
	18		

or

Soils
8 oz. glass and 120 ml glass: 30 to 35

Sample Container Preparation

Once samples have been collected, the following steps should be taken in preparing samples for shipment.

(1) Groundwater, surface water and soil environmental samples may require preservation prior to shipment to the laboratory. Refer to SOPs Series Nos. 06-XX-XX, 07-XX-XX and 08-XX-XX for sample preservation techniques and the project-specific Quality Assurance Project Plan (QAPP) requirements.

(2) Label all samples according to the procedures outlined in SOP No. 02-04-XX. Either sample container labels or sample tags may be used.

(3) Wrap each glass bottle with bubble wrap or use bubble wrap bags. Measure out a piece of bubble wrap large enough to surround the entire bottle. The bubble wrap helps protect the sample containers from breakage during transport. Use tape to secure the bubble wrap around the bottle. There is no need to wrap plastic sample containers with bubble wrap.

For VOA sample containers (40 ml vials), spread out a sheet of bubble wrap one or two sheets long. Two to three vials (i.e., one sample) will be wrapped together using the prepared sheet. Place a vial on the top corner, horizontally, on the width end of the bubble wrap. Starting from the vial

end, roll the bottles into the remaining bubble wrap. When complete, bend the long roll into a V, and tape the package.

(4) Place each sample container (with the exception of very large containers, e.g., one-gallon amber jugs) inside a resealable zip-lock-type plastic bag (two resealable zip-lock-type bags may be utilized for the one-gallon amber jars). Custody seal tape may be placed around the bag if additional security is desired. For large containers, if a large zip-lock-type bag is not available, wrap the bottle in bubble wrap and place the container in a clean, unused garbage bag. Tape the opening of the bag closed.

Cooler Preparation

(5) Secure and tape the drain plug on the outside of the cooler with fiber or duct tape to prevent leakage from the plug should a sample container or ice bag leak inside the cooler.

(6) Place each labeled, wrapped and bagged sample container in the cooler in an upright position. Cardboard separators may also be placed between the sample jars at the discretion of the shipper.

(7) Fill several large (quart or gallon size) plastic bags (e.g., zip-lock bags) with ice and place each bag of ice within a second zip-lock bag. Place the zip-lock side of the ice filled bag, down into the second bag. (Ice bags are double-bagged to prevent water leakage when the ice melts during transit.) Dry ice should not be used to cool the samples since it is a regulated dangerous good. If dry ice is required for shipment (as in the case of biological tissue sample shipment), the IATA Dangerous Goods Regulations or SOP 04-03-XX should be consulted for the proper packing and shipping instructions.

Place the ice bags around the sample containers inside the large outer plastic (garbage) bag to keep the samples cool during shipment. Fill the remainder of the cooler with bubble wrap or other appropriate packing material. Remember to place a temperature blank into the cooler prior to sealing and shipping (see project specific QAPP for applicability).

(8) Complete the Chain-of-Custody form and place it along with the necessary sample documentation forms (i.e., Chain-of-Custody, Contract Laboratory Program Traffic reports etc.,) inside a zip-lock plastic bag. The procedures for completing the Chain-of-Custody paperwork are discussed in SOP Nos. 02-05-XX. Tape the plastic bag containing the paperwork to the underside of the cooler lid. Close the cooler lid and tape the cooler latch shut to prevent accidental opening during shipment.

(9) Wrap each end of the outside of the cooler with strapping tape such that it cannot be opened during shipment. Normally, the tape is wound around the outside of the cooler for a total of three (3) turns, at both ends of the cooler. Up to two custody seals should be affixed to each side of the cooler across the lid opening so that the cooler cannot be opened without breaking the seals. To prevent the accidental tearing of the seal during shipment, it is advisable to place clear packaging tape over the seal. This ensures that the custody seal is firmly affixed to the cooler, yet it can be seen through the thin layer of tape.

Shipping Paperwork Preparation

(10) If shipping by air, obtain a standard FedEx airbill. If shipping samples for a government client, use a TechLaw Government FedEx account number.

(11) Attach a label marked as FROM:, containing the name and address of the shipper to the outside of the cooler lid in the upper left hand corner. In the right hand upper or lower corner of outside cooler lid, place another label marked as TO:, containing the name, address and contact person of the recipient of the cooler. These labels are attached to the cooler as added security in case the FedEx label becomes separated from the cooler. See Diagram A for a visual example.

(12) Complete the shipper's airbill with the appropriate information. Be sure to include a TechLaw job number in the FedEx box labeled for 'Internal Billing Reference Information.' See Attachment B for an example. Fill in the weight of the package, if you have it. If not, FedEx will complete the information related to the weight of the package. Once completed, affix a TechLaw FedEx airbill or plastic airbill pouch to the outside, center

of the cooler lid. FedEx has airbills that affix to cooler handles and these may be used in place of other airbills. If an airbill pouch is used, slip the completed FedEx airbill into the pouch. Do not seal the pouch. Make sure you pull the top copy of the FedEx airbill before relinquishing the cooler to FedEx. The copy of the airbill should then be placed into the project files.

Health and Safety Section

It is TechLaw's policy to maintain an effective program for control of employee exposure to chemical, radiological, and physical stress which is consistent with the EPA, DOE, and OSHA established standards and requirements.

All field personnel will be provided with appropriate protective clothing and safety equipment. At a minimum, this will include steel-toed shoes, safety glasses, and chemical-resistant gloves.

Refer to a site-specific health and safety plan for detailed health and safety procedures. This plan should be reviewed prior to beginning any work.

QA/QC Section

Prior to sealing coolers, the Field Team Leader should check all paperwork, address labels and shipping documents for accuracy.

Any deviations in preservation techniques should also be documented in the field logbook and justified. Deviations are to be sufficiently documented to allow repetition of the activity as actually performed.

Comments/Notes

Prior to commencing field activities, ensure that appropriate equipment is readied for the activities. In addition, obtain the location, phone number and office hours of the FedEx office nearest to the field activity site.

Attachments

Attachment A: Sample FedEx Airbill

Attachment B: Diagram of Labeled Cooler.

References

International Air Transport Association (IATA), Dangerous Goods Regulations, Effective from 1/1 to 12/31 of each year.

TechLaw, Corporate Quality Management Plan, most recent version.

TechLaw, Health and Safety Program Plan, most recent version.

U.S. Environmental Protection Agency, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), U.S. EPA Region IV, November 2001.

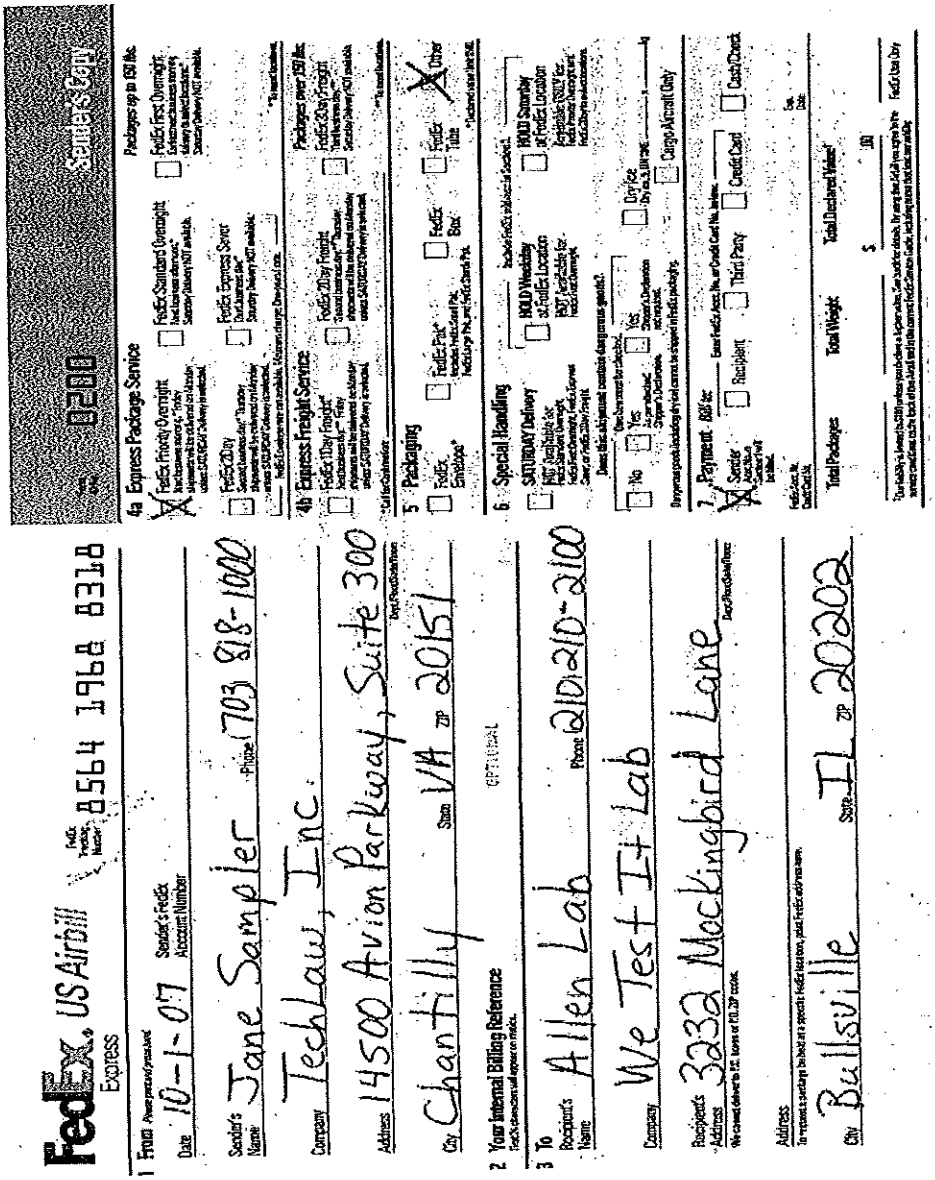
U.S. Environmental Protection Agency, A Compendium of Superfund Field Operations Methods, EPA/540/P-87/001, Washington, D.C., 1987.

U.S. Environmental Protection Agency, Characterization of Hazardous Waste Sites - A Methods Manual, EPA/600/4-84/075, April 1985.

U.S. Environmental Protection Agency, RCRA Groundwater Monitoring Technical Enforcement Guidance Document, OWSER-9950.1, September 1986.

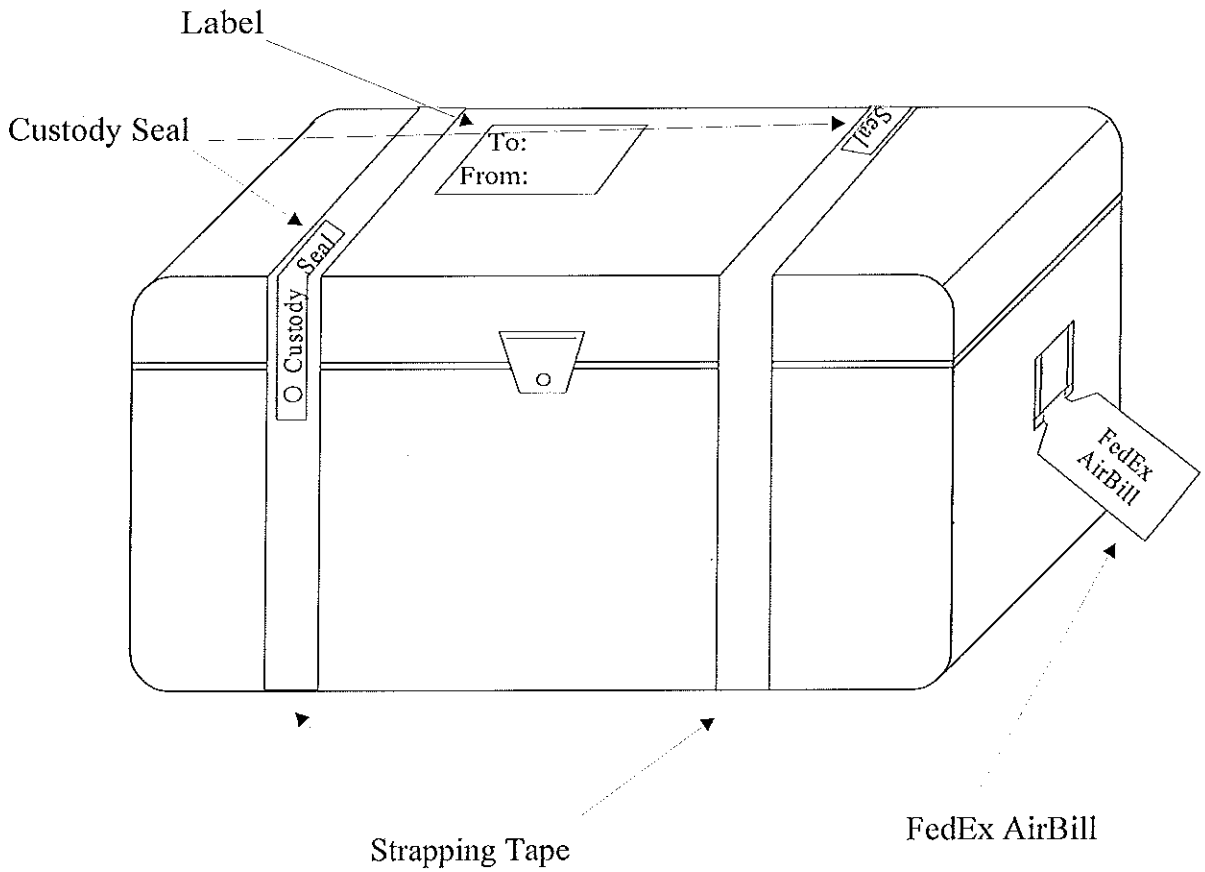
ATTACHMENT A [Revised 03/01/11]
SOP Number: 04-02-02

SAMPLE FEDEX AIRBILL



ATTACHMENT B [Revised 03/01/11]
SOP Number: 04-02-02

SAMPLE COOLER



APPENDIX B

LABORATORY QUALITY ASSURANCE MANUAL AND STANDARD OPERATING PROCEDURES
(Provided by Air Toxics)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

September 4, 2012

MEMORANDUM

SUBJECT: Review of Quality Assurance Project Plan (QAPP) for Split Sampling and Analysis of Landfill Gas at Hunters Point Shipyard, San Francisco, California, EPA QA Office Document Control Number [DCN] P3CA0021QV1)

FROM: Joe Eidelberg, Chemist
Quality Assurance Office, MTS-3

THROUGH: Eugenia McNaughton, Ph.D., Manager
Quality Assurance Office, MTS-3

TO: Craig Cooper, Remedial Project Manager
Federal Facilities Section 1, SFD8-1

A limited review of the subject QAPP, dated August 29, 2012 and prepared by Techlaw, Inc., was performed. This review was based on information provided in the following documents: "EPA Requirements for Quality Assurance Project Plans" (EPA QA/R-5, March 2001) and "Guidance for the Data Quality Objectives Process" (EPA QA/G-4, August 2000).

The subject QAPP is approved.

Please direct comments or questions about this review to Joe Eidelberg by email at <eidelberg.joseph@epa.gov> or by phone at 415-972-3809.