Blaine Mini Mart Confirmational Sampling
2530 Peace Portal Drive
Blaine, WA

Sampling and Analysis Plan /
Quality Assurance Project Plan

Prepared for

DEPARTMENT OF ECOLOGY
State of Washington

Washington State Department of Ecology
Toxics Cleanup Program
Northwest Regional Office
Bellevue, Washington

Prepared by

SAIC
From Science to Solutions

Science Applications International Corporation
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

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List of Acronyms

CCV	continuing calibration verification
COC	chain of custody
CUL	cleanup level
dCAP	Draft Cleanup Action Plan
Ecology	Washington State Department of Ecology
EIM	Environmental Information Management
EPA	Environmental Protection Agency
ESN	Environmental Services Division
FM	field manager
GIS	Geographic Information Systems
GPM	Government Project Manager
GPS	Global Positioning System
HSP	Health and Safety Plan
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MS	matrix spike
MSD	matrix spike duplicate
MTBE	methyl tertiary-butyl ether
MTCA	Model Toxics Control Act
NAD83	North American Datum 1983
PID	Photoionization Detector
PPE	personal protective equipment
ppm	parts per million
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
RL	reporting limit
RPD	relative percent difference
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
TEE	terrestrial ecological evaluation
TPH	Total Petroleum Hydrocarbon
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
VOA	volatile organic aromatic
VOC	volatile organic compound

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1.0 Introduction

The Blaine Mini Mart is an active gas station located at 2530 Peace Portal Drive within the city limits of Blaine, Washington. The property is a one-half acre triangular lot bounded by Peace Portal Drive on the southwest and Bell Road to the west. Vacant land is present between the property and Interstate 5 to the north, and an abandoned former Rocky Mountain Trading Post building is located on the southeast. The property is located within a mixed commercial/ residential area and was previously identified as 1828 Peace Portal Drive. The property is entirely covered with asphalt, concrete, or structures, and the surface slopes gently to the southwest, toward Peace Portal Drive. Dakota Creek is located approximately 1,000 feet south of the property and discharges to Drayton Harbor of Puget Sound, roughly 1,500 feet southwest of the site (Environmental Associates 2005). Shallow groundwater at the site generally flows in a south to southwest direction (SAIC 2010a).

The Washington State Department of Ecology (Ecology) is leading the efforts to perform remedial excavation, per Draft Cleanup Action Plan (dCAP) (SAIC 2010b), on the Blaine Mini Mart property. Ecology has tasked Science Applications International Corporation (SAIC) to complete confirmational sampling of approximately 60 soil samples and submit a Cleanup Report.

This document provides the rationale for the selection of the confirmational soil sampling locations and descriptions of the sample collection and handling procedures, analytical methods, data quality objectives, and quality assurance/quality control (QA/QC) requirements for this study.

1.1 Purpose and Objectives

The purpose of this study is to determine the final boundaries of the remedial excavations and to characterize the extent of contamination remaining adjacent to the Blaine Mini Mart property. The dCAP (SAIC 2010b) defines the following two excavation pits:

- Excavation 1 (eastern plume) is located directly south of the storage garage. Approximately 69 cubic yards of soil will be removed from excavation 1.
- Excavation 2 (western plume) is located along the eastern boundary of the Peace Portal Drive right-of-way. Approximately 2,003 cubic yards of soil is anticipated to be removed from excavation 2.

1.2 Sample Collection Summary

SAIC plans to collect approximately 60 confirmational soil samples from the two excavation pits. Approximately 10 confirmational soil samples will be collected from excavation 1, and approximately 50 confirmational soil samples will be collected from excavation 2. Modifications to this sampling and analysis plan/quality assurance project plan (SAP/QAPP) may be made during field or analytical operations and will be documented in the field notebook and/or laboratory reports. All deviations to this SAP/QAPP will be discussed in the final

Cleanup Report. The purpose of this SAP/QAPP is to define the procedures used to meet the following objectives of the study:

- Ensure that all confirmational samples collected along the final sidewalls and base of the excavations have no chemical concentrations above cleanup levels, thereby indicating that the extent of the contaminated soil was removed during the excavation.
- Characterize the chemical concentrations of the soil remaining after excavation under Peace Portal Drive and along the western edge of excavation 2 along Peace Portal Drive.

2.0 Project Organization and Responsibilities

SAIC and its subcontractors will implement this SAP/QAPP under the direction of Ecology. The following sections describe the key roles and responsibilities of the project team.

2.1 Project Planning and Coordination

Isaac Standen of Ecology will serve as the Government Project Manager (GPM) who will conduct overall project coordination, supply government-furnished services, review reports, and coordinate with contractors. Glen T. Vedera will serve as the SAIC project manager and be responsible for executing the approved SAP/QAPP, overseeing the collection and analysis of field samples, and reporting analytical results.

SAIC
Glen T. Vedera
18912 North Creek Parkway, Suite 101
Bothell, WA
Phone: (425) 482-3329
Fax: (425) 487-1491
glen.t.vedera@saic.com

2.2 Sample Collection

Alisa J. Wells and/or Michael A. Pagel of SAIC will serve as field manager (FM) responsible for the collection of confirmational soil samples, transporting samples to the analytical laboratories for analysis, and oversight of the mobile laboratory and/or other field staff when present onsite. The FM will ensure that all sampling equipment and field procedures are in accordance with the SAP/QAPP and/or otherwise agreed upon and documented.

2.3 Laboratory Coordination, QA/QC Oversight, and Data Management

Marina I. Mitchell of SAIC will serve as project chemist, laboratory coordinator, and data manager. She is responsible for ensuring that all established QA/QC protocols are followed for decontamination, sample preservation, holding times, chain-of-custody (COC), analytical testing, data reporting, and data validation. She will provide quality assurance oversight to the subcontracted laboratories and data validation firms, and ensure that the analytical data meet the QA/QC objectives of this study.

2.4 Health and Safety Manager

Alisa J. Wells and/or Michael A. Pagel of SAIC will serve as the designated SAIC Health and Safety Manager. The Health and Safety Manager is responsible for ensuring that SAIC personnel are properly trained, fully aware of potential site hazards, conduct all work in a safe manner, wear appropriate personal protective equipment (PPE), and abide by the conditions set forth in the site-specific Health and Safety Plan (HSP).

2.5 Subcontractor Support

The SAIC project team will include the following subcontractors to provide the laboratory analytical services and data validation:

- Analytical Chemistry

  Environmental Service Network (ESN), Northwest Division
  Mike Korosec
  14140 NE 21st St.
  Bellevue, WA 98005
  Phone: (360) 459-4670 for Mike Korosec
  Phone: (425) 957-9872 for Bellevue laboratory
  mike@esnnw.com

- Data Validation

  EcoChem, Inc.
  Chris Ransom
  710 Second Avenue
  Suite 660
  Seattle, WA 98104
  Phone: (206) 233-9332 x110
  Fax: (206) 233-0114
  cransom@ecochem.net

2.6 Project Schedule

The project schedule is as follows:

- A project kickoff meeting took place on April 13, 2011.
- Field preparation began in mid April during the development of this SAP/QAPP.
- Field work associated with excavation 1 (eastern plume) is scheduled to begin on April 25, 2011, and is expected to last one day.
- The confirmation sampling for excavation 1 is expected to be completed on April 25, 2011. Immediately following the completion of sample collection at excavation 1, the samples will be delivered to ESN's laboratory in Bellevue, WA. Analytical results are due within 24 hours of sample receipt at the laboratory.
- Field sampling of excavation 2 (western plume) is scheduled to begin on May 2, 2011. Soil sampling from excavation 2 is anticipated to be completed by May 13, 2011.
- ESN will provide onsite mobile laboratory analytical services for all confirmational soil samples collected during excavation 2. Samples will be analyzed in the mobile laboratory immediately upon sample receipt, and analytical results will be reported to SAIC as they become available, on the same day, or within 24 hours. The mobile laboratory is expected to be on site from May 2, 2011, through May 13, 2011. Full data packages with documentation

supporting the analytical results will be due from ESN within two weeks of the completion of sampling, on May 27, 2011.

- EcoChem will complete data validation on all analytical results within three weeks of receiving the last data package. The data validation report and validated electronic data deliverable(s) are due to SAIC on approximately June 17, 2011.
- After SAIC receives the validated data from EcoChem, the Draft Cleanup Report will be submitted to Ecology by the end of August 2011.
- Ecology's comments are due within four days of receiving the Draft Cleanup Report. SAIC will then submit the Final Cleanup Report to Ecology four days after receiving the comments, but no later than the end of August.

3.0 Field Sampling Plan

The purpose of the field sampling plan is to describe the procedures by which sample collection will be performed. This section describes the procedures for positioning, sample collection, processing, identification, documentation, equipment decontamination, and sample handling for the field investigation. The laboratory methods for chemical analysis are presented in Section 4.0.

3.1 Soil Sampling

SAIC will collect soil samples for both screening purposes and for submittal to a laboratory for chemical analysis. Approximately 60 soil samples will be collected for field screening, and at least 60 samples will be collected for laboratory analysis. Samples will be collected directly from the soil retained in the excavator bucket.

3.1.1 Sample Location and Frequency

The soil samples collected along the sidewalls and base of each excavation will be collected in 15-foot intervals, with one exception. The soil samples collected along the shoring will be collected at 20-foot intervals. Prior to subsurface disturbance, a 10-foot grid will be placed within the excavation boundaries. The grid will provide an X/Y coordinate system for measuring sampling locations. The positioning and recording of 10-foot grid marks will be accomplished using a Trimble GeoXH Global Positioning System (GPS) unit with a hurricane antenna. The GPS coordinates will be recorded by latitude and longitude to the decimal minute and State Plane Coordinates (NAD 83) and will be differentially corrected during data processing.

The sampling locations for soil samples collected along excavation sidewalls will be determined using a tape measure and the established X/Y grid system and/or by GPS. Sampling locations for soil samples collected at the base of the excavation will be determined using a tape measure and the established X/Y coordinates of the grid. Vertical position (i.e., Z coordinate) will be determined using a tape measure and/or by premeasured increments on the excavator arm. Target sample locations are displayed on Figure 2. All soil samples will be analyzed per the dCAP (SAIC 2010b). Table 1 list the analytes, site-specific soil cleanup levels (CULs), and reference method used to determine the CULs. Final reporting limits (RLs) for non-detected chemicals must be below the CULs.

Sample Collection and Handling Methods

This section describes the procedures for sample collection, identification, documentation, and equipment decontamination. During excavation 1, a field laboratory will be established to provide a secure, clean area for storage of equipment and sampling supplies. A mobile laboratory will be used during excavation 2.

All collected soil samples will be logged by an SAIC environmental scientist/geologist in accordance with the procedures outlined below. Soil descriptions will be recorded in the field note book using the Unified Soil Classification System ("USCS"). All field deviations to the following procedures will be noted in the field notebook.

Table 1. Analytes, Site Specific Soil CULs, and Reference

Analyte	Site-Specific Soil CULs (mg/kg dw)	CUL Reference
Benzene	0.03	MTCA Method A
Toluene	7	MTCA Method A
Ethylbenzene	6	MTCA Method A
Total Xylenes	9	MTCA Method A
MTBE	0.1	MTCA Method A
Total Naphthalenes	5	MTCA Method A
TPH-gasoline	30	MTCA Method A
TPH-diesel	460	TEE
TPH-heavy oil	460	TEE

CUL = cleanup level; TEE = terrestrial ecological evaluation; MTBE = methyl tertiary-butyl ether; MTCA = Model Toxics Control Act; TPH = total petroleum hydrocarbon.

Field Screening Soil Sample Collection and Testing

Soil samples collected from the excavations will be field screened for both headspace vapor and sheen in accordance with the following procedures:

Headspace Vapor: A handheld photoionization detector (PID) will be used to screen the presence of volatile organic compounds (VOCs). Soil will be placed in a zip-locked bag with approximately one inch of headspace for the organic vapors to collect, if present. The bag will then be sealed to allow the air in the headspace to equilibrate with the soil sample at ambient air temperature. Following a minimum of 3 minutes of equilibration time, the bag will be punctured or slightly unsealed, and the PID intake probe inserted through this opening into the headspace. The PID reading of the organic vapor in the headspace of the bag is then recorded in the field notebook. Soil samples producing a PID reading equal to or greater than 40 ppm or presenting other indications of contamination (e.g., odor, visual observation, sheen testing) will be treated as contaminated soil and placed with other contaminated soil for offsite disposal. Laboratory testing will be performed on contaminated soils.

Sheen Testing: Sheen testing will be performed by placing approximately 10 grams of soil in a pan of water and gently swirling/mixing. The surface of the water is then visually examined for the presence of sheen. Sheens will be classified as follows:

- **Slight Sheen:** Light, colorless, dull sheen. The spread is irregular and dissipates rapidly.
- **Moderate Sheen:** Light to heavy sheen, may show color/iridescence. The spread is irregular to flowing. Few remaining areas of no sheen evident on the water surface.
- **Heavy Sheen:** Heavy sheen with color/iridescence. The spread is rapid and the entire water surface may be covered with sheen.

The results of the headspace vapor screening and sheen testing will be recorded in the field notebook. Soils exhibiting visible hydrocarbon sheen will be treated as contaminated and placed with contaminated soil for offsite disposal. Laboratory testing will not be performed on contaminated soils. Soil samples not exhibiting signs of contamination based on the results of headspace screening, sheen testing, and other field observations (e.g., odor) will be selected for laboratory analysis.

Excavator Bucket Soil Sample Collection

Soil samples will be collected from the base and sidewalls of the excavations for chemical analysis at a laboratory using the following procedure:

1. The sampler will don clean, unused, nitrile disposable gloves immediately prior to the collection of each soil sample. All soil samples will be collected directly from the excavator bucket and in accordance with the safety procedures detailed in the Site-specific Health and Safety Plan.
2. Prior to sample collection, all pertinent information related to the sample, such as GPS coordinates, X,Y measurement, and vertical depth, will be recorded in the field note book. The sampling location will also be photographed.
3. Soil samples will be collected from the center interior of the excavator bucket. Every sample will be field screened for odor, sheen, staining, and PID headspace readings. The field screening results and the soil lithology will be recorded in the field notebook. If a sample is not selected for laboratory analysis based on the field screening results, the soil will be left in the excavator bucket, and the operator will be directed to either load the soil into a truck or stockpile for disposal. If a sample is collected for laboratory analysis, the procedures in step 4 will be followed.
4. Soil subsamples collected for the analysis of VOCs and TPH-G will be collected in accordance with EPA Method 5035 from unhomogenized soil. For fixed laboratory analyses, a syringe sampler will be used to collect a 5-gram soil subsample. The subsample will be immediately extruded from the syringe into an unpreserved pre-weighed 40 mL volatile organic aromatic (VOA) vial; this process will be repeated to create a second vial for backup for each sample. For mobile laboratory analysis, unhomogenized soil will be packed into a 2 or 4 oz unpreserved glass jar with Teflon lined septa with zero headspace or no obvious air pockets. These unpreserved soil subsamples will be preserved and extracted with methanol at the laboratories within 24 hours.
5. Samples for TPH-Dx and total solids analysis will be collected using a pre-cleaned sample spoon or scoop and immediately placed in an unpreserved 4 oz wide-mouth glass jar and homogenized by stirring the sample directly in the jar.
6. Samples from excavation 1 will be immediately placed in a pre-chilled cooler on ice following sample collection, and will be shipped to the offsite laboratory at 0–6°C. Samples collected from excavation 2 will be immediately transported by hand to the onsite laboratory within 10 minutes of collection; therefore, these samples will not have time to chill to 0–6°C before delivery to the laboratory.

3.2 Equipment Decontamination

Field equipment used during excavation and sampling will be decontaminated prior to use and during sampling in accordance with the guidelines and procedures set forth in this section in order to prevent the introduction of contamination and reduce the potential for cross-contamination. These procedures will be implemented to ensure quality control in the

decontamination of field equipment and to serve as a means to identify and correct potential errors in sample collection and sample handling procedures.

3.2.1 Equipment and Material

Equipment and materials that will be used to decontaminate sampling equipment are listed below:

- Distilled water
- Potable water
- 5-gallon buckets
- Scrub brushes and long handled bottle brushes
- Trash receptacles
- Aluminum foil
- Plastic sheeting
- Liquinox

3.2.2 Procedure

All reusable field sampling equipment, field instruments, and sample processing containers will be decontaminated after use and documented in the field notebook. Decontamination will be performed in the designated contamination reduction zones specified in the site-specific HSP. New, disposable nitrile gloves will be worn when handling clean sampling equipment and monitoring well construction materials to ensure that the equipment does not become contaminated.

All non-disposable sampling equipment used for soil and groundwater sampling will be decontaminated prior to sample collection at each sampling location using the following procedure:

- Rinse thoroughly with potable water.
- Scrub with Liquinox and water to remove any visible dirt.
- Rinse thoroughly with potable water.
- Rinse thoroughly with distilled water.
- Store in a clean area on plastic sheeting.

Sample containers will be pre-cleaned and supplied by the analytical lab performing the sample analyses.

3.2.3 Waste Disposal

Material wastes (e.g., disposable gloves, paper towels, and aluminum foil) that cannot be recycled will be placed in plastic storage bags and disposed of as municipal waste. Only municipal waste is anticipated during field sampling.

3.2.4 Sample Identification, Containers, and Labels

All samples collected during this investigation will be labeled clearly and legibly. Sample labels will be affixed to the sample jar with self-adhering, waterproof material. Indelible ink will be used to complete each label. Each sample label will contain the project name, sample identification, date and time of collection, complete list of analyses to be conducted, and the initials of the person preparing the sample.

Soil samples will be identified with the excavation number "EX1-" or "EX2-"; followed by an "S" or "B" to indicate a sidewall or base sample, respectively; followed by a number increasing sequentially to indicate the first, second, third, etc. sample collected (e.g., "1-", "2-", or "3-", etc.); followed by a number indicating the depth of sample collection in feet (e.g., "5"). Field duplicate samples will be assigned the same ID as the original sample followed by "-2".

For example:

EX1-S1-5 *is the first sidewall soil sample collected within excavation 1; sample was collected at a depth of 5 feet.*

EX1-S1-5-2 *is the field duplicate sample of the first sidewall soil sample collected within excavation 1; sample was collected at a depth of 5 feet.*

EX2-B3-10 *is the third base soil sample collected within excavation 2; sample was collected at a depth of 10 feet.*

EX2-B6-20-2 *is the field duplicate sample of the sixth base soil sample collected within excavation 2; sample was collected at a depth of at 20 feet.*

Table 2 lists the analytical methods, sample container, preservation, and holding time requirements for all analyses.

Table 2. Analytical Methods, Sample Containers, Preservation and Holding Time Requirements

Analyte Group	Analytical Method	Sample Container – Fixed Laboratory	Sample Container – Mobile Laboratory	Field Preservation[a]	Holding Time
VOCs[b]	EPA 8260C	Two of the following: 5-gram soil subsample collected with syringe into 40 mL unpreserved pre-weighed VOA vial	2 or 4 oz glass jar with Teflon lined septa and zero headspace	cool (0-6°C)	48 hours to preservation/extraction; 14 days to analysis
TPH-G	NWTPH-G			cool (0-6°C)	14 days
TPH-Dx (diesel and motor oil)	NWTPH-Dx with silica gel cleanup	4 oz glass jar	4 oz glass jar	cool (0-6°C)	14 days to extract, 40 days to analyze
Total solids	EPA 160.3			cool (0-6°C)	14 days

TPH-G = total petroleum hydrocarbon – gasoline; TPH-Dx = total petroleum hydrocarbon – diesel extended; VOA = volatile organic aromatics; VOC = volatile organic compounds

a Samples collected from excavation 2 will be delivered to an onsite laboratory for analysis immediately following sample collection and will, therefore, not have sufficient time to cool to 0 - 6°C.

b VOCs include: benzene, toluene, ethylbenzene, m,p-xylene, o-xylene, MTBE, naphthalene, 1-methylnapthalene, and 2-methylnapthalene

3.2.5 Sample Storage and Delivery

Immediately following sample collection, all samples will be placed on ice or frozen gel-packs (i.e., at 0–6°C), stored, and transported in sturdy, insulated coolers. The COC will be signed by the individual relinquishing samples to the laboratory representative. Upon receipt of samples at the laboratory, the condition of the samples will be recorded. Field personnel will be responsible for:

- Labeling the jars accurately with the appropriate, unique sample ID;
- Securing the labels with clear packaging tape;
- Ensuring that the jars are securely capped and have no residual material on the outside of the container;
- Packaging the samples for shipment and/or hand delivery;
- Signing the COC before placing inside the cooler and/or delivering samples to ESN;
- Notifying the laboratory coordinator of when the samples are being delivered to the laboratory; and
- Storing samples under the proper chain-of-custody procedures and thermal preservation requirements until they are delivered to the laboratory.

Samples collected from excavation 1 (eastern plume) will be delivered to ESN's fixed laboratory in Bellevue, WA. These samples will be delivered by courier or shipped overnight via FedEx immediately following the completion of the sampling effort at excavation 1 (i.e., within 24 hours). These samples will be packed and shipped as follows:

- Place individual sample containers in plastic bubble-pack bags, or zip-lock and wrap in bubble wrap and secure with packaging tape or rubber bands.
- Prepare an empty insulated cooler by placing three to four ice packs at the bottom of the cooler; it is recommended to place the ice packs in a garbage bag first to prevent leakage during ice melt. Place sample containers in the garbage bag on ice (if applicable) and fill the cooler with jars and additional packing material to ensure adequate protection to prevent breakage. Add additional bags of ice as needed to surround the sample containers (or the garbage bag containing samples).
- Seal the cooler on two sides with strapping tape and custody seals. The field personnel will be responsible for packaging the samples; signing the COC form before placing inside the cooler to be sealed; applying a shipping label, an air bill, a custody seal, and strapping tape to the cooler; and shipping the samples in accordance with the maximum holding time allowed for the analyses to be performed.

The ESN mobile laboratory will be on site in Blaine for the duration of excavation 2 (western plume). Samples collected from excavation 2 will be hand-delivered to the mobile laboratory by the SAIC FM immediately following sample collection (i.e., within 10 minutes).

3.3 Field Documentation

A complete record of field activities will be maintained. Documentation necessary to meet QA objectives for this project include field logbooks and field forms, sample container labels (as

discussed in Section 3.3.1), and COC forms. The field documentation will provide descriptions of all sampling activities, sampling personnel, and weather conditions, and will record all modifications, decisions, and/or corrective actions to the study design and procedures identified in this SAP/QAPP.

3.3.1 Field Logbooks and Forms

Field logbook(s) will be kept on site during field operations. Daily activities will be recorded in a bound field logbook or in a three ring binder, with paper made of water-resistant paper. All entries will be made legibly, in indelible ink, and will be signed and dated. Information recorded will include the following:

- Date, time, place, and location of sampling;
- Onsite personnel and visitors;
- Daily safety discussion and any safety issues;
- Field QC samples (i.e., duplicate samples);
- Observations about site, location, and samples (i.e., weather, odors, appearance, etc.);
- Daily site activities (e.g., number and type of trucks for soil disposal or backfill, decommission of storage tanks or dispenser islands, compaction, shoring, etc.); and
- Equipment decontamination verification.

Field logbooks are intended to provide sufficient data and observations to enable participants to reconstruct events that occur during project field activities. Entries will be factual, detailed, and objective. Unless restricted by weather conditions, all original data recorded in field logbooks and on sample identification tags, COC records, and field forms will be written in waterproof ink. If an error is made, the individual responsible may make corrections simply by crossing out the error, recording the correct information, and initialing and dating the correction. The erroneous information must not be obliterated or written over. All documentation, including voided entries, must be maintained within project files.

3.3.2 Chain-of-Custody Procedures

The field crew will keep all samples securely in their possession at all times until the samples are delivered to the laboratory. COC forms will be initiated during sample collection to ensure that all collected samples are properly documented and traceable through storage, transport, and analysis. When all line items on the form are completed or when the samples are relinquished, the sample collection custodian will sign and date the form, list the time, and confirm the completeness of all descriptive information contained on the form. Each individual who subsequently assumes responsibility for the sample will sign the COC form and provide the reason for assuming custody. The COC responsibilities of the field crew terminates when the laboratory receives the samples and signs the COC. Copies of completed, signed COC forms will be retained in the project files. An example COC form is in Appendix B.

3.4 Laboratory Analyses

ESN's fixed laboratory in Bellevue will analyze soil samples collected from excavation 1. ESN's mobile laboratory will analyze soil samples collected from excavation 2 while on site in

Blaine. All soil samples will be analyzed for VOCs, TPH-G, and TPH-Dx. If a sample has a result that exceeds CULs for any chemical as listed in Table 1, then the laboratory must immediately notify the SAIC laboratory coordinator and FM via verbal communication followed by email. The laboratory may then be instructed to cancel additional analyses on that specific sample (i.e., total solids analysis, secondary dilutions for chemicals exceeding calibration range, or any other requested analyses not yet completed or reported). Such decisions will be made on a case by case basis. Alternately, if a sample has no results exceeding CULs, then total solids analysis and secondary dilutions must be performed on that sample so that all results are reported in dry weight units from result within the calibrated range of the instrument.

All chemical analyses will be conducted in accordance with the QA/QC requirements of the Ecology or United States Environmental Protection Agency (USEPA) test methods, the laboratory's internal QA Plan, written standard operating procedures, and this SAP/QAPP.

Results from the analysis of soil samples must be delivered to SAIC within 24 hours of sample receipt, including but not limited to the following:

- Analyte concentrations;
- RLs for each sample and chemical;
- Laboratory qualifiers and a summary of qualifier definitions;
- Cover letter detailing any problems encountered during analysis, protocol modifications, and/or corrective actions taken;
- All method references used during analyses;
- Method blank results;
- Laboratory control sample (LCS) results, applicable to VOCs only;
- Surrogate recovery results and control limits;
- Matrix spike/matrix spike duplicate (MS/MSD) results and control limits, applicable to VOCs only;
- Calibration verification spike sample results for TPH-G and TPH-Dx only;
- Laboratory duplicate results and control limits; and
- Sample results in an electronic data deliverable in a format to be determined.

Data deliverable packages will be required for all results within 2 weeks of the completion of field sampling. Data deliverable packages must include all items required for a summary level data validation to enable independent reviewers to evaluate the quality of the data. All data packages must include the elements listed above and the additional following items:

- Case narrative including any problems encountered, protocol modifications, and/or corrective actions taken;
- Internal standard recovery results and control limits, applicable to VOCs only;
- Initial and continuing calibration results and control limits; and
- Sample custody records (including original COC forms).

A minimum of one data deliverable package must contain all items required for full-level data validation, including all raw data, bench sheets, spectra, and chromatograms to enable

independent reviewers to evaluate the quality of the data and recalculate results. The SAIC project chemist will select the sample delivery group requiring a full-level data deliverable at random. The full-level data deliverable package must include all of the elements listed above for the 24-hour turn results, summary-level data packages, and the following additional items:

- Instrument blank results;
- Initial calibration summary forms;
- Chromatograms for each gas chromatography sample and QA/QC sample analysis;
- Mass spectra of detected target compounds for each sample and associated library spectra for gas chromatography/mass spectrometry analysis;
- Raw data quantification reports for each sample; and
- Bench sheets, including preparatory logs, extraction logs, and analytical run logs.

4.0 Quality Assurance Project Plan

The purpose of the project QAPP is to provide confidence in the analytical results through a system of QA/QC performance checks with respect to data collection methods, laboratory analysis, data reporting, and appropriate corrective actions. Results and analytical procedures must be in compliance with established performance and data quality criteria. This section presents the QA/QC procedures used to ensure that the investigation's data are defensible and usable for their intended purpose.

4.1 Measurements of Data Quality

The quality of the analytical results will be assessed using accuracy, precision, representativeness, completeness, and comparability as described below.

Accuracy is the degree to which a sample concentration agrees with an accepted reference or true value concentration. Accuracy is a measure of the potential bias in the analytical system and is expressed as percent recoveries of spiked analytes in MS/MSD. Accuracy will also be evaluated through the surrogate spikes in each sample during organic chemistry analysis. The performance-based laboratory control limits for accuracy will be used for the project unless otherwise specified in the test method.

Precision is a measure of the reproducibility of detected concentrations of a chemical in similar samples analyzed under the same conditions. Precision is assessed by comparing the results of MS/MSD samples, field duplicate samples, and LCS/laboratory control sample duplicate (LCSD) samples. The calculated relative percent differences (RPDs) for field duplicate and MS/MSD pairs provide information on the precision of sampling and analytical procedures, and the RPDs for LCS/LCSD pairs provide information on precision of the analytical procedures.

Representativeness expresses the degree to which data accurately and precisely represent an actual condition or characteristic at a particular sampling point. Representativeness is achieved by collecting samples representative of the matrix at the time of collection. Representativeness can be evaluated using replicate samples and blanks.

Completeness is calculated as the number of valid (i.e., not rejected) data points achieved divided by the total number of data points expected. For this project, completeness objectives have been established at 95 percent.

Comparability will be achieved through the use of standard, well established methods for the analysis of the target chemicals on this project. The analytical parameters used by the laboratories have been demonstrated to produce quality results. The analysts will follow their written standard operating procedures to ensure reproducibility and comparability of the data.

4.2 Quality Assurance and Quality Control

Field and laboratory QA/QC samples will be used to evaluate the data precision, accuracy, representativeness, and comparability of the analytical results. The field QA samples to be collected are described in Section 4.2.1. The laboratory QA samples are discussed in Section 4.2.2.

4.2.1 Field QA/QC Samples

Field duplicate samples will be collected during sampling at the discretion of the FM to quantitatively measure and ensure the quality of the sampling effort and the analytical data. Field duplicate samples will be handled in the same manner as the environmental samples collected. Field duplicate samples will be collected at a rate of one per twenty normal samples collected for analysis, or one per day, whichever is more frequent. Field duplicate samples will be collected at the same time and analyzed for the same chemicals as the original sample. Field duplicate sample results are used to assess the precision of the sample collection process and to help determine the representativeness of the sample. If the results of the field duplicate samples exceed QA/QC criteria for precision, this information will be discussed in the data validation report, but data qualifiers will not be applied to the associated results.

4.2.2 Laboratory QA/QC Samples

Laboratory calibration and QA/QC sample requirements are defined in the test methods. One laboratory method blank will be analyzed in every analytical batch to assess potential laboratory contamination. An LCS will be analyzed for VOCs in every analytical batch to assess the accuracy of the analysis. An MS/MSD pair will be analyzed for VOCs at a rate of one per twenty samples to assess the accuracy and precision of the analysis relative to the matrix. All VOCs will be spiked in the MS/MSD except 1-methylnapthalene and 2-methylnapthalene. A laboratory duplicate sample will be analyzed for total solids for every batch of 20 samples or less. Laboratory QA/QC sample and calibration requirements are listed in Table 3.

Table 3. Laboratory QA/QC Requirements

Analysis Type	Initial Calibration	CCV	LCS	Method Blanks	Lab Duplicate	MS/MSD	Surrogates
VOCs [a]	prior to analysis	start of 12 hour analytical batch	one per analytical batch	one per analytical batch	na	MS/MSD at rate of 5% of samples collected	every sample
TPH-G	prior to analysis	start and end of analytical batch	na	one per analytical batch	One at rate of 10% of samples collected	na	every sample
TPH-Dx	prior to analysis	start and end of analytical batch	one per analytical batch [b]	one per prep batch	One at rate of 10% of samples collected	na	every sample
Total Solids	na	na	na	na	one per batch of 20 samples or less	na	na

a 1-methylnapthalene and 2-methylnapthalene are not spiked in the LCS or MS/MSD samples.
b An LCS is recommended, but not required.
CCV = continuing calibration verification
MS/MSD = matrix spike/matrix spike duplicate

Table 4 list the specific chemical, analytical test methods, target reporting limits (RLs), and control limits for accuracy and precision. All target RLs are below the CULS listed in Table 1. The laboratory must have established method detection limits to support the RLs, although the sample results for this project need only be reported at concentrations equal to or greater than the RL.

Table 4. Chemicals, Target RLs, and Control Limits for Accuracy and Precision

Analyte	Analytical Method	Target RL (mg/kg dw)	Accuracy Limits for LCS and MS/MSD	Precision Limits for Field and Lab Duplicates
VOCs				
Benzene	EPA 8260	0.020	68-136 %	50 %
Toluene	EPA 8260	0.050	61-143 %	50 %
Ethylbenzene	EPA 8260	0.050	63-148 %	50 %
o-Xylene	EPA 8260	0.050	68-139 %	50 %
m,p-Xylenes	EPA 8260	0.050	68-136 %	50 %
MTBE	EPA 8260	0.050	45-150 %	50 %
Naphthalene	EPA 8260	0.10	11-150 %	50 %
1-Methylnaphthalene	EPA 8260	0.25	na [a]	50 %
2-Methylnaphthalene	EPA 8260	0.25	na [a]	50 %
Petroleum				
TPH-gasoline	NW-TPHG	10	na [a]	50 %
TPH-diesel	NW-TPHDx	100	na [a]	50 %
TPH-heavy oil	NW-TPHDx	100	na [a]	50 %
Conventionals				
total solids	EPA 160.3	0.1 %	na	25 %

MTBE = methyl tertiary-butyl ether; TPH = total petroleum hydrocarbon

Note: Actual RLs will vary based on the sample volumes used for analysis, percent moisture, dilution factors, analytical conditions at the time of analysis, and matrix interferences. Results from the mobile laboratory will be evaluated to the RL only.

a These chemicals are not spiked in the LCS or MS/MSD samples; therefore, all calibration requirements must be met, as required by the test method, and verified by the laboratory analyst before sample analysis begins.

4.3 Data Validation

All chemical results gathered during this investigation will undergo independent data validation by EcoChem, Inc. of Seattle, WA. A summary-level Stage 2B data validation will be performed for all standard sediment chemistry; a full-level Stage 4 data validation will be performed on one data package selected by the project chemist at random. Data validation will be performed following USEPA guidance (USEPA 2008, 2009). If data quality concerns are noted additional information may be requested from the laboratory, and the samples may be reanalyzed, the data qualified, and/or the issues discussed in the data validation report. EcoChem will discuss the results of the data validation in a data validation report, which will be included as an appendix to the data report.

The analytical laboratories will provide one electronic (i.e., pdf) data package to EcoChem and one electronic (i.e., pdf) copy to SAIC. The data packages must contain sufficient information to allow for the required level of data validation and review of all sample and laboratory QC sample results (i.e., method blanks, LCS, surrogates, internal standards, and MS/MSD).

5.0 Data Analysis, Recordkeeping, and Reporting Requirements

5.1 Analysis of Chemistry Data

The chemical data results will be summarized and presented in data tables indicating locations and detected contaminants, along with any data qualifiers assigned by the laboratory or during data validation.

5.2 Recordkeeping

At the conclusion of the study, all records including field records, laboratory analytical data, reports, and reviews will be transmitted to Ecology for archive.

5.3 Data Report

A written data report documenting all activities associated with collection and chemical analyses of samples will be prepared. At a minimum, the following will be included in the data report:

- Description of sampling and analysis activities;
- Protocols used during sampling and testing and an explanation of any deviations from the sampling plan protocols or the approved SAP;
- COC records;
- Chemistry results and laboratory reports;
- QA/QC summary and data validation report; and
- Chemical concentrations, which will be compared to the action limits for this site.

SAIC will provide all deliverables electronically in MS Word or Excel formats as appropriate and Adobe .pdf format for all documents. Additionally, three hardcopies of both the draft and final data reports will be submitted to Ecology. SAIC will provide georeferenced data files in the appropriate format specified by Ecology for all figures created with CAD or GIS software.

In addition, the validated chemistry data from the investigation will be uploaded into Ecology's Environmental Information Management (EIM) database. Information for entering environmental data into EIM can be found on Ecology's website: http://www.ecy.wa.gov/eim/.

6.0 References

Environmental Associates, Inc. 2005. Subsurface Sampling and Testing Blaine Mini Mart (Gas Station and Convenience Store). December 08, 2005.

SAIC. 2010a. Site Characterization Report, Blaine Mini Mart, Blaine, Washington. Submitted to Ecology, July 21, 2010.

SAIC. 2010b. Draft Cleanup Action Plan, Blaine, Washington, Submitted to Ecology, September 14, 2010.

USEPA, Office of Emergency and Remedial Response. June 2008. *USEPA Contract Laboratory Program, National Functional Guidelines for Organic Data Review*. EPA-540-R-08-01. Washington, DC.

USEPA, Office of Emergency and Remedial Response. January 2009. *Guidance for labeling externally validated laboratory analytical data for Superfund use.* EPA-540-R-08-005. Washington, DC.

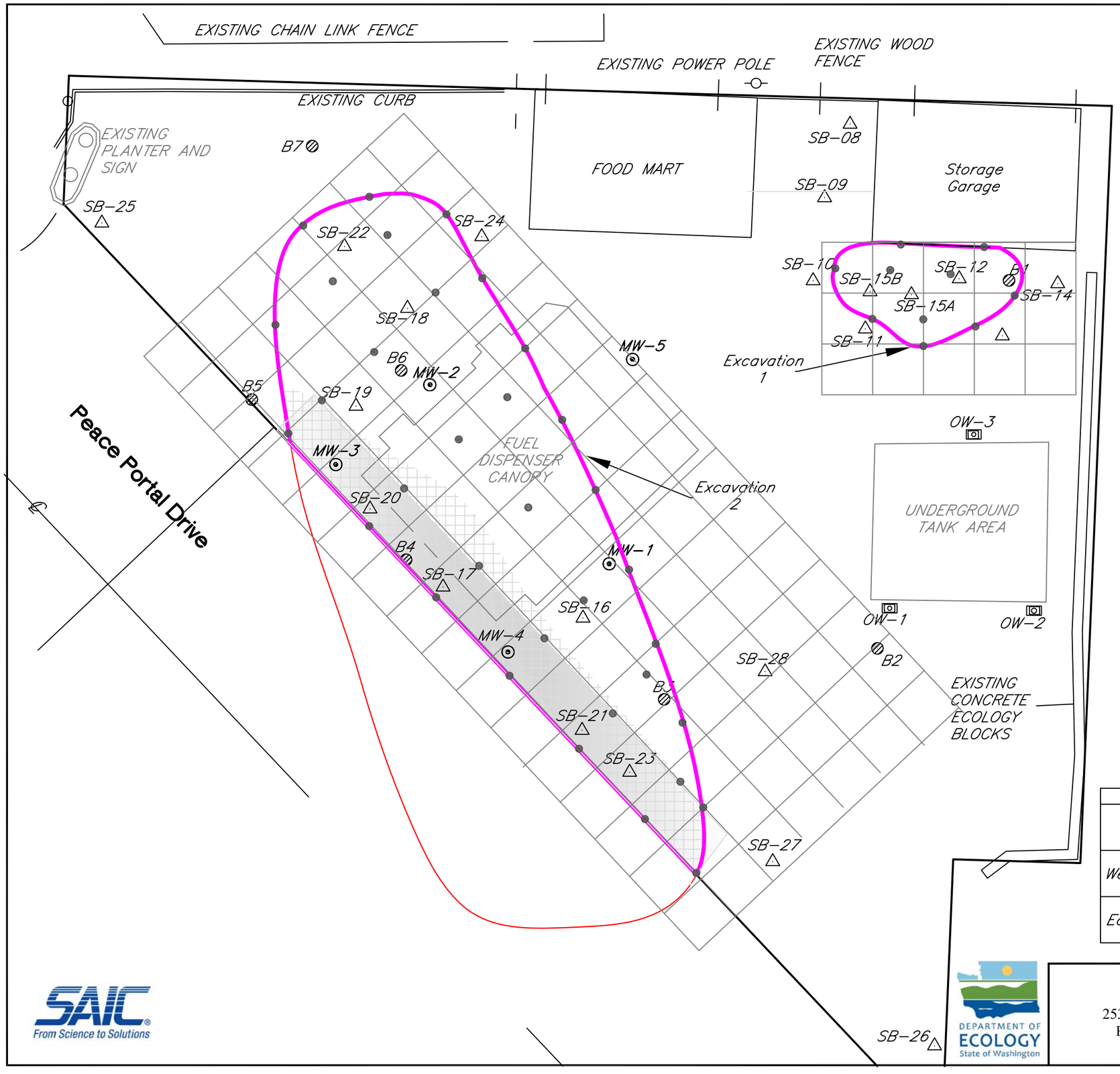
LIMITATIONS

As part of this report, SAIC's investigation was restricted to collection and analyses of a limited number of environmental samples, visual observations and field data, in addition to summarizing available information from previous site documents. Because the current investigation consisted of evaluating a limited supply of information, SAIC may not have identified all potential items of concern. This report is intended to be used in its entirety; taking or using excerpts from this report is discouraged.

Figures

DEPARTMENT OF ECOLOGY
State of Washington

Figure 1. Location Map for the Blaine Mini Mart Site



LEGEND

B2	2005 Boring Locations
SB-21	2010 Boring Locations
MW-1	Groundwater Monitoring Well Locations
	Area of Contamination, Lateral Extent of combined MTCA Cleanup Level Exceedances (Approximate Location)
	Approximate Location of Soil to be Excavated
	Approximate Area of ORC Application
	Approximate Area for Shored Excavation
	Approximate Locations of Confirmational Samples

Estimated Excavation Areas and Volumes

	Area (sq ft)	Volume (cu yd)	Volume (tons)
Western Plume	4836	2003	3125
Eastern Plume	620	69	108

SAIC From Science to Solutions

DEPARTMENT OF ECOLOGY State of Washington

Blaine Mini-Mart
2530 Peace Portal Drive
Blaine, Washington

FIGURE 2
Site Map -
Approximate Locations of Confirmational Soil Samples

DATE:04/18/2011 | DRAWING: Figure 2 SAP.dwg

Appendix A
Health and Safety Plan

Confirmational Sampling and Cleanup
Blaine Mini Mart Site
Blaine, WA

Health and Safety Plan

Prepared for

DEPARTMENT OF ECOLOGY
State of Washington

Washington State Department of Ecology
Toxics Cleanup Program
Northwest Regional Office
Bellevue, Washington

Prepared by

SAIC
From Science to Solutions

Science Applications International Corporation
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

April 12, 2011

Location: : 2530 Peace Portal Drive, Blaine, Washington

Site Description:

The Blaine Mini Mart is located at 2530 Peace Portal Drive, a rural community in Blaine, Washington. The Blaine Mini Mart (subject site) is a one-half acre, triangularly shaped lot bounded on the south by Peace Portal Drive, Bell Road to the west, vacant land to the north, and an abandoned former Rocky Mountain Trading Post building to the east. The property is located within a commercial/ residential area and is an active gas station and mini mart. The property is covered entirely with asphalt, concrete, or structures including two buildings, a convenience store, and storage space, four fuel dispensers (covered by a canopy), and three underground storage tanks (USTs). The property surface slopes gently to the southwest. Shallow groundwater at the property flows generally to the south-southwest, toward the Dakota Creek, ultimately discharging to Drayton Harbor of Puget Sound, approximately 1,500 feet away.

SAIC reviewed documents from limited exploratory activities occurring between October 21, 1997, and April 22, 2008. Four USTs were removed in 1980 from a tank basin in front of the current Mini Mart. Sampling results suggested that soil and groundwater contamination may be remaining at the Blaine site. In 2005, four new dispenser islands and an island canopy were constructed. Ecology records indicate the permanent closure of four USTs. The remaining USTs on the property include three 10,000-gallon USTs in a tank pit on the east-central portion of the property. A former waste oil tank was decommissioned and abandoned on the east side of the Mini Mart. The nature and extent of contamination remaining on the Blaine Mini Mart property was fully characterized by SAIC in March 2010.

The activities to be performed for this study are intended to monitor and confirm the effectiveness of remedial action (soil excavation) on the property.

Scope of work to be performed by SAIC and subcontractors:

SAIC

SAIC's objective is to successfully complete the remediation of petroleum-impacted soil on the Blaine Mini Mart property. To achieve this objective, SAIC is sampling to determine clean margins during DE contractor excavation/construction activities at the site, including the following tasks:

- Screening of soil samples for organic vapors, noting any odors or sheen.
- Collecting soil confirmational samples (approximately 60) from the bottom and sidewalls of excavation pits during soil remediation via excavator bucket delivery to sampling station.
- Transporting all samples to the laboratory for analysis, as necessary.
- Collecting GPS data points of samples collected, and of excavation boundary.

ESN Northwest. (subcontractor to SAIC)

(will be on site)

- Analysis of all confirmational soil samples collected.
- Mobile Laboratory services for approximately 1 week.
- Delivery of chemical analysis report.

Site Contaminants

Soil Maximum Concentrations:

Gasoline-range hydrocarbons – 52,000 mg/kg
Heavy oil-range hydrocarbons – 20,000 mg/kg
Benzene – 290 mg/kg
Toluene – 1700 mg/kg
Ethylbenzene – 600 mg/kg
M,p – Xylene – 2600 mg/kg
O – Xylene – 910 mg/kg

Groundwater Maximum Concentrations:

Gasoline-range hydrocarbons – 28,000 µg/L
Diesel-range hydrocarbons – 750 µg/L
Benzene – 22,000 µg/L
Toluene – 18,000 µg/L
Ethylbenzene – 2,400 µg/L
m,p – Xylene – 10,000 µg/L
o – Xylene – 3,500 µg/L
Methyl tert-Butyl Ether – 3,900 µg/L
Naphthalene – 400 µg/L
2-Methylnaphthalene – 100 µg/L

Approval signatures:
Signature below indicates review and approval of the plan and agreement that the anticipated hazards are correct and that planned hazard controls are sufficient.

Project Manager (PM) name and phone number:
Glen Vedera (PM) = 425 482-3329(ofc.) 206-271-4691(cell), Alisa Wells (FM) = 425 318-9496(cell)

Signature and date:
4/13/2011

FSO HS Manager name and phone number:
Mike Crenshaw / 865-481-4767 (ofc), 865-406-2659 (cell)

Signature and date: April 13, 2011

Commitment to implement:
Signature indicates commitment to implement this plan and ensure that project field work is conducted safely.

Field Manager name and phone number:
Alisa Wells (FM) = 425 318-9496(cell)

Signature and date:
4/13/11

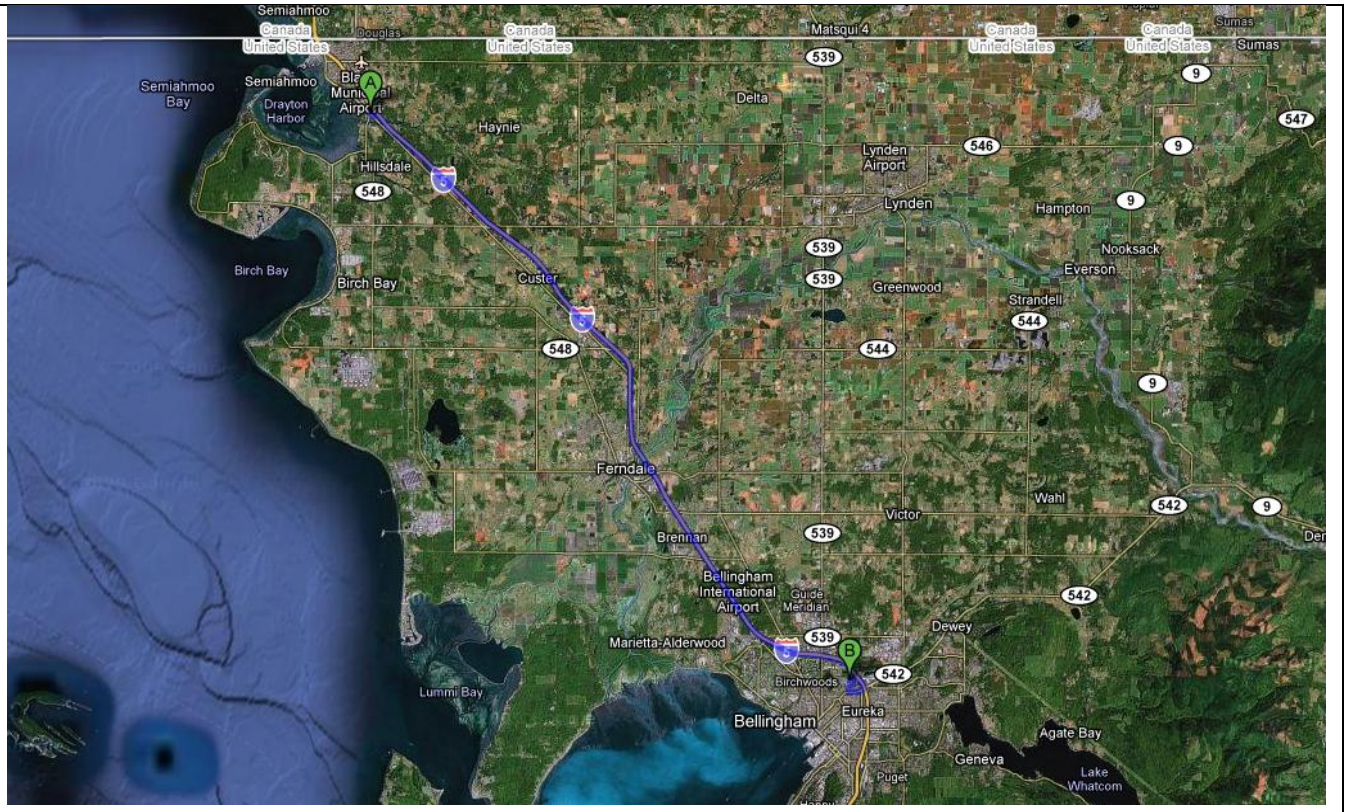
Site Safety and Health Officer name and phone number:
Alisa Wells (FM) = 425 318-9496(cell)

Signature and date:
4/13/11

Commitment to comply:
Signature below indicates that the individual has reviewed this plan, has received site-specific training (briefing), and agrees to comply with the requirements of this plan.

Name	Signature	Date

Potential Hazards and Emergency Information
Potential hazards
Non-SAIC personnel proximity to excavation/heavy equipment (Ecology contractor service personnel or subcontractors)
Traffic accidents associated with travel to and from the site.
Exposure to onsite contaminants (Gas, Heavy oil, BTEX).
Exposure to chemicals used on site. Methanol used for soil sample preservative.
Noise generated from: truck and trailers, excavators, front end loaders, pumps, generators, pressure washers, backhoe, and site machinery operation.
Exposure to hypothermia conditions.
Physical hazards slips/trips/falls, vehicle mobilization, falling objects from machinery
Exposure to hazardous energy. Pressure washer, hydraulic lines, etc.
Struck by mobile/moving equipment (truck and trailers, excavator (swinging bucket), onsite equipment, Ecology's contractor subcontractor's service truck)
Falls from elevated surfaces ($\geq$ 4 feet at facilities, $\geq$ 6 feet on construction sites)
Engulfment/entrapment due to excavation collapse
Fire
Emergency phone numbers
Medical: 911
Police/security: 911
Fire: 911
Emergency Medical Facility
Name and telephone number of nearest hospital or emergency medical service:
Saint Joseph's Hospital 2901 Squalicum Parkway Bellingham, WA 360-734-5400
Directions to medical facility:
Start at 2530 Peace Portal Drive, Blaine, WA 1. Head southeast on Peace Portal Drive; 2. Turn left to merge onto I-5 South; 3. Take exit 255 for Sunset Drive toward WA-542 E/Mt. Baker; 4. Turn right at Sunset Drive; 5. Take the 1st right onto Ellis Street; 6. Take the 2nd right onto Squalicum Parkway; and 7. Turn left. End at 2901 Squalicum Parkway, Bellingham, WA 98225



Emergency Equipment Required On Site
Cellular phone
First aid kit (10-unit unitized kit or larger)
Fire extinguisher(s) rated at least 2A and 5B– Serviced annually and inspected monthly
Eyewash bottle

Emergency Reporting

The FM will immediately report injuries or illnesses, vehicle accidents, releases (hazardous material, hazardous waste or uncharacterized waste), inspections by regulatory agencies, and any incident that could reasonably have caused a significant injury or property damage (fire, catastrophic equipment failure, capsized heavy equipment, etc.). The FM will contact emergency response organizations (if needed) and the PM. The PM will notify the client (as appropriate), Division Manager, Program Manager, and EHS Manager. If the PM is not available, the FM will make the other notifications. See EH&S Procedures 4.1, Accident Reporting and 24, Regulatory Agency Inspections and Incident Reporting for details.

General Hazard Controls Applicable to all Work in this Program

This plan represents a good-faith effort to identify, evaluate, and prescribe controls for the hazards that will be posed by this work. Revisions to this plan will be documented. The Project Manager and CIH, CSP, or designee who originally approved the plan must approve revisions to the plan that result in decreasing or eliminating a hazard control.

This work is subject to the requirements of the SAIC Environmental, Health and Safety (EH&S) program. The FM will ensure that applicable provisions of EH&S procedures are followed and that personnel have access to these procedures. Specifically applicable procedures include, but are not limited to; Procedure 4.1, Accident Reporting; Procedure 8, Hazard Communication and Hazardous Chemical Control; Procedure 12.1, Medical Surveillance; Procedure 13, Personal Protective Equipment; Procedure 20, Hazardous Waste Operations; Procedure 24, Regulatory Agency Inspections and Incident Reporting; EH&S Procedure 110, Vehicle Operation and EH&S 180, Behavior Based Safety, 15, Hearing Conservation and Noise Control; Procedure 25, Management of Investigation Derived Waste; Procedure 28, Hazardous Material Transportation; EH&S Procedure 150, Manual Lifting; and EH&S Procedure 170, EC&HS Procedure 160, Excavation Safety; and EH&S Procedure 16, Injury and Illness Plan.

A general site map showing a central rally point is attached at the end of this HASP.

The FM will perform and document daily safety inspections to verify that the work is performed safely, that the requirements of this plan are met, that the public is not endangered by this work, and that no environmental releases or violations occur as a result of this work. All onsite personnel and subcontractors will be responsible to report unsafe, or potentially unsafe, conditions to the FM immediately. The FM will take action to correct any work that he/she judges to be unsafe or non-compliant with this plan. See EH&S Procedure 20 for details.

The FM will establish local assembly points for each work zone so that in the event of an evacuation personnel can be accounted for at a pre-identified location. This should include a general assembly point a safe distance along the route of travel when traveling between remote work zones.

SAIC subcontractors will be informed of the requirements of this plan and will be provided with copies or unrestricted access to this plan and must comply with the requirements of this plan. This plan does not relieve subcontractors of the regulatory requirement to provide a safe workplace for their employees. SAIC subcontractors are required to provide trained, experienced personnel and to operate equipment as required by the manufacturer's procedures, or the subcontractor's standard operating procedures; and are required to supplement the requirements of this plan as necessary to ensure that their employees perform their specific tasks safely.

Project training will include at least the following. The FM will have current hazardous waste safety training (40-hour, 3-day OJT, 8-hour refresher within past 12 months), hazardous waste supervisor training, and sufficient experience to understand the potential hazards. All other field personnel will have current hazardous waste safety training including 40-hour, 3-day OJT and current refresher. The FM will present a project kick-off safety briefing to cover this plan, physical hazards, hazardous contaminants and chemicals, required hazard controls, and emergency contacts. Additional safety briefings will be conducted as needed (at least once per week). At least one person on site will have current first aid, cardiopulmonary resuscitation, and bloodborne pathogen training, unless emergency medical care is available within 5 minutes. The FM will maintain documentation of completed training on site. See EH&S Procedures 8 and 20 for details. Additional training may include, but not be limited to, Respiratory Protection as required in ECHS 9 and Hearing Conservation as required in ECHS 15.

Field personnel must be enrolled in a medical surveillance program and have current hazardous waste medical clearance. See EH&S Procedures 12.1 and 20 for details.

Field personnel will utilize personal protective equipment (PPE) as directed in this plan and by EH&S Procedures 9, 13 and 15. PPE for field work will include at least safety glasses with side shields, appropriate shoes (up to safety toe shoes with metatarsal guards), work clothing including long pants and shirts with sleeves, hard hats if overhead hazards are present, hearing protection in noisy environments, chemical resistant gloves (nitrile, PVC, or similar) if handling hazardous chemicals, and heavy duty work gloves for material handling. The FM will evaluate PPE during routine inspections and will ensure that PPE is appropriate to the task. If site conditions appear to require the implementation of respiratory protection the FM will suspend the impacted task and contact the PM and the health and safety reviewer for guidance.

Prior to any ground penetration (excavation), the location must be verified free of subsurface assets (tanks) or utilities. See EH&S Procedure 130 and 170 for details.

Portable electrical tools will be connected through a Ground Fault Circuit Interrupter (GFCI). No energized electrical components will be exposed to potential personnel contact. Conductive materials (drill rigs, back hoes, ladders, etc.) will be kept at least 10 feet from overhead power lines. ECHS Procedure 11 Lock out/tag out procedures will be employed when servicing any energized systems.

All vehicle operators must have valid driver's licenses and operate in compliance with applicable laws and regulations. Prohibited actions include driving while distracted and driving while using a cell phone. See EH&S Procedure 110 for details.

Flammable and combustible liquids (gasoline, kerosene, fuel oil) will be transported and stored in metal containers approved by Factory Mutual, Underwriters Labs, or equivalent or in containers provided by the vendors (example; isopropanol). Containers of hazardous chemicals must be labeled to indicate contents and hazard. MSDSs for hazardous chemicals must be available on site. Shipment and transportation of hazardous materials must be performed per DOT or IATA requirements. See QA FTP 651 and EHS 28 for guidance.

An exclusion zone (at least barricade tape) will be established around any work that poses a risk of exposure to; hazardous contaminants, hazardous chemicals, or physical hazards, in order to exclude unauthorized personnel. No food or drink will be allowed in exclusion zones. Personnel will wash their hands prior to eating or drinking. The FM will determine if additional controls such as sawhorse barricades, traffic cones or additional personal decontamination is needed.

Regulated (and potentially regulated) project waste will be managed per the intent of EH&S Procedure 25. SAIC personnel will not sign disposal documents without written approval from the corporate EH&S office. The written plan for disposition of potentially regulated project waste must be in place prior to generating the waste. The plan may be specified in proposal language (preferred method), incorporated into the HASP, or be a separate document. The plan must specify; anticipated type, characteristics, and quantity of wastes; requirements for storage; process for characterization by client or at least approval of characterization by client; and process for documented transfer to client or disposal company. The plan must be approved by the client, or at least submitted (documented submittal) to the client. Containers of potentially regulated wastes must be labeled or indelibly marked to indicate at least; contents (including physical state), date placed in container, source, and client's name.

The FM will ensure that equipment and supplies are available to control and remove potential spills of chemicals or contaminants. The required equipment and supplies will vary by project, type and quantity of contaminants/chemicals, and may include sorbent pads, granular sorbent, sorbent boom, open-top drums, shovels, etc.

Information for all site contaminants present in hazardous concentrations in environmental media that workers are anticipated to encounter is included as NIOSH safety cards (or equivalent) after the site map.

Each employee is empowered and expected to stop his or her own work or the work of co-workers if any person's safety or the environment are at risk. The FM is expected to support and reinforce this expectation. Stopped work will not resume until the hazard has been controlled and a review has been performed.

Each major task must have an AHA and the work must be performed as required by the AHA.

Activity Hazard Analysis

Work Activity: Site Observation of Excavation or Construction

Personal Protective Equipment (PPE)	Selected	Comments
Safety Shoes	X	
Hard Hat	X	If overhead hazards are present
Safety Glasses With Side Shields	X	
Fire Resistant Clothing		
Face Shields		
Goggles		
Lifeline/Body Harness		
Hearing Protection	X	As necessary
Air Purifying Respirator		
Welding Hood		
Welding/Pipe Clothing		
Welding Mask/Goggles		
Personal Floatation Device		
Gloves	X	Nitrile, PVC or similar for potentially contaminated material. Heavy duty work gloves for material handling.
Other	X	10.0 eV PID (calibration checked daily) monitoring if free product is encountered or anticipated. Stop work for SAIC employee if breathing zone readings exceed 5 ppm for more than 1 minute, move to an upgradient location.
Safety Cones/Barricades		
Safety Vest	X	
Knee Pads		
Caution Tape		

Job Steps	Potential Hazard	Critical Actions
Mobilize to work site	Traffic accident	Compliance with EC&HS Procedure 110, Vehicle Operation (valid driver's license, seat belt use, routine vehicle inspections, no cell phone use while driving).
Operations in construction, excavation, trenching, and heavy equipment areas	General hazards	Stay clear of construction area unless verifying installation.
	Slip/Trip	Inspect area for debris/equipment/uneven/slippery surfaces before entry and plan path if hazards cannot be removed.
	Falling equipment	No workers under suspended loads.
	Struck by moving/mobile equipment	Workers will maintain a safe distance equivalent to the full, extended reach of all moving/mobile equipment. Approach mobile/moving equipment only after getting permission of the operator. Maintain visual contact with equipment operators at all times.
	Noise	Hearing protection when within 25 feet of operating generators or heavy equipment unless equipment-specific monitoring indicates that noise levels are less than 85 decibels.
	Temperature stress	If temperature is above 80°F or below 40°F, administrative controls will be implemented (cooled or warmed drinks, routine breaks in heated or shaded area, provisions for emergency heating or cooling).
	Lifting (muskuloskeletal injuries)	Compliance with EC&HS Procedure 150, Manual Lifting. If equipment is to be moved, an evaluation of potential pinch points and/or weight strain will be conducted. Clear area of all unnecessary equipment and slip/trip hazards. Additional help will be obtained by workers or mechanical assistance used on site if equipment to be moved is unwieldy, has a weight >50 lbs or has to be moved by maneuvering through awkward positioning.
	Pinch hazards	Keep hands clear of all articulated or moving parts. Guards shall be maintained for all machinery representing a pinch hazard. Maintenance on equipment with articulating or moving parts shall be performed only after control keys have been put under control by competent mechanics/operators only.
	Fire	Identify location of fire extinguishers on site and posted emergency response numbers
	Chemical exposure	Medical clearance for hazardous waste work. Wash hands before eating or drinking. Hazard communication labels on all chemical containers. MSDSs on site for all chemicals in use. Site-specific training must address chemicals, hazards, and proper handling. 40-hour HAZWOPER and current refresher for workers. 8-hour additional supervisor for FM, SSHO, and all other onsite supervisors. Nitrile gloves for chemical/contaminant contact.
	Falls	Stay at least 6 ft from excavation edge.

Job Steps	Potential Hazard	Critical Actions
	Excavation collapse	Compliance with ECHS 160, Excavation Safety. No SAIC personnel will enter any excavation or trenches deeper than 4 feet from ground surface. All equipment shall be kept away from the edge of the excavation to prevent cave-in. All personnel will remain a minimum of 6 feet from the edge of any excavation.

Activity Hazard Analysis		
Work Activity: Sampling At Excavation/Trenching Locations		
Personal Protective Equipment (PPE)	Selected	Comments
Safety Shoes	X	
Hard Hat	X	
Safety Glasses	X	
Fire Resistant Clothing		
Face Shields		
Goggles		
Lifeline/Body Harness		
Hearing Protection		
Air Purifying Respirator	X	If necessary
Supplied Air Respirator – SCBA		
Welding Hood		
Welding/Pipe Clothing		
Welding Mask/Goggles		
Personal Floatation Device		
Gloves	X	Nitrile or similar for potentially contaminated material. Heavy duty work gloves for material handling.
Other		
Safety Cones/Barricades		
Safety Vest	X	
Knee Pads		
Caution Tape		

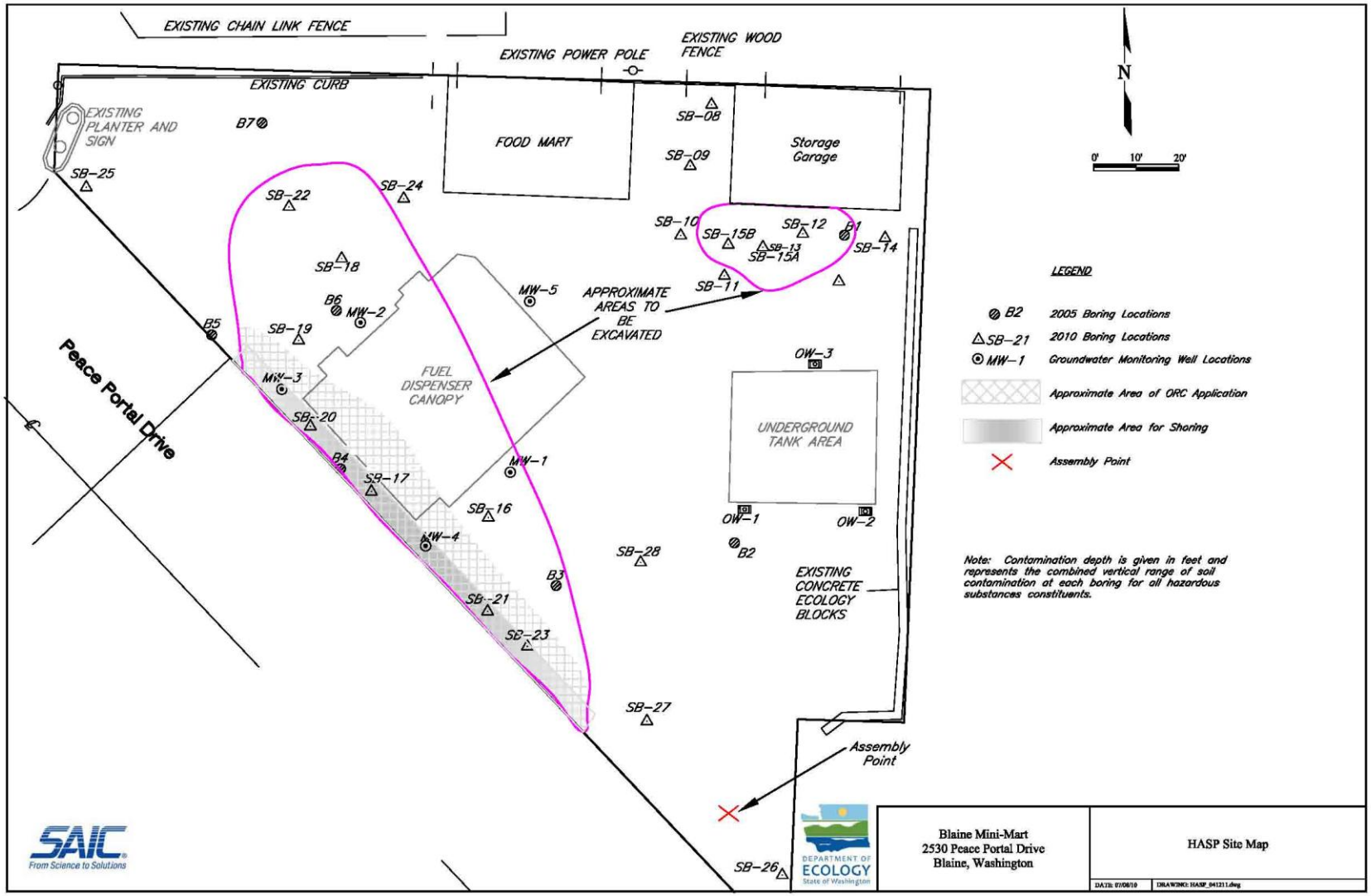
Job Steps	Potential Hazard	Critical Actions
Mobilize to work site	Traffic accident	Compliance with EC&HS Procedure 110, Vehicle Operation (valid driver's license, seat belt use, routine vehicle inspections, no cell phone use while driving).
Operations in excavation, trenching and heavy equipment areas	Falling equipment	No workers under suspended loads.
	Struck by moving/mobile equipment	Workers will maintain a safe distance equivalent to the full, extended reach of all moving/mobile equipment. Approach mobile/moving equipment only after getting permission of the operator. Maintain visual contact with equipment operators at all times.
	Slip/Trip	Inspect area for debris/equipment/uneven/slippery surfaces before entry and plan path if hazards cannot be removed.
	Noise	Hearing protection when within 25 feet of operating generators or heavy equipment unless equipment-specific monitoring indicates that noise levels are less than 85 decibels.
	Temperature Extremes	If temperature is above 80°F or below 40°F, administrative controls will be implemented (cooled or warmed drinks, routine breaks in heated or shaded area, provisions for emergency heating or cooling).
	Lifting (musculoskeletal injuries) hazards	Compliance with EC&HS Procedure 150, Manual Lifting. If equipment is to be moved, an evaluation of potential pinch points and/or weight strain will be conducted. Clear area of all unnecessary equipment and slip/trip hazards. Additional help will be obtained by workers or mechanical assistance used on site if equipment to be moved is unwieldy, has a weight >50 lbs or has to be moved by maneuvering through awkward positioning.
	Pinch hazards	Keep hands clear of all articulated or moving parts. Guards shall be maintained for all machinery representing a pinch hazard. Maintenance on equipment with articulating or moving parts shall be performed only after control keys have been put under control by competent mechanics/operators only.
	Fire	Fire extinguisher rated 2A and 5B (serviced annually and inspected monthly) in all fuel use areas.
	Chemical exposure	Breathing zone monitoring with 10.6 eV PID if free product anticipated; action level of 5 ppm sustained for over 1 minute. Medical clearance for hazardous waste work. Wash hands before eating or drinking. Hazard communication labels on all chemical containers. MSDSs on site for all chemicals in use. Site-specific training must address chemicals, hazards, and proper handling. 40hr HAZWOPER and current refresher for workers. 8hr additional supervisor for FM, SSHO, and all other onsite supervisors. Nitrile gloves for chemical/contaminant contact.
	Falls	Stay at least 6 ft from excavation edge.

Job Steps	Potential Hazard	Critical Actions
	Excavation collapse	Compliance with ECHS 160, Excavation Safety. No SAIC personnel will enter any excavation or trenches deeper than 4 feet from ground surface. All equipment shall be kept away from the edge of the excavation to prevent cave-in. All personnel will remain a minimum of 6 feet from the edge of any excavation.
Sample collection	Struck by moving/mobile equipment	Workers will maintain a safe distance equivalent to the full, extended reach of all moving/mobile equipment. Approach mobile/moving equipment only after getting permission of the operator. Maintain visual contact with equipment operators at all times. Samples may be taken from an excavator bucket after the bucket has been grounded at a safe location and the operator has given permission for the sampler to approach.
	Slip/Trip	Inspect area for debris/equipment/uneven/slippery surfaces before entry and plan path if hazards cannot be removed.
	Noise	Hearing protection when within 25 feet of operating generators or heavy equipment unless equipment-specific monitoring indicates that noise levels are less than 85 decibels.
	Excavation collapse	Excavation collapse controls as in step 2 with the modification of no approach closer than 6 feet of unsupported trenches unless slopes are $\geq$ 2/1.
	Lifting (musculoskeletal injuries) hazards	Compliance with EC&HS Procedure 150, Manual Lifting. If equipment is to be moved, an evaluation of potential pinch points and/or weight strain will be conducted. Clear area of all unnecessary equipment and slip/trip hazards. Additional help will be obtained by workers or mechanical assistance used on site if equipment to be moved is unwieldy, has a weight >50 lbs or has to be moved by maneuvering through awkward positioning.
	Fire hazards	Fire extinguisher rated 2A and 5B (serviced annually and inspected monthly) in all fuel use areas.
	Pinch hazards	Keep hands clear of all articulated or moving parts. Guards shall be maintained for all machinery representing a pinch hazard. Maintenance on equipment with articulating or moving parts shall be performed only after control keys have been put under control by competent mechanics/operators only.
	Chemical exposure	Breathing zone monitoring with 10.6 eV PID; action level of 5 ppm sustained for over 1 minute. Nitrile gloves for chemical/contaminant contact. Wash hands before eating or drinking. Hazard communication labels on all chemical containers. MSDSs on site for all chemicals in use. Site-specific training must address chemicals, hazards, and proper handling. 40-hour HAZWOPER and current refresher for workers. 8-hour additional supervisor for FM, SSHO, and all other onsite supervisors. Nitrile gloves for chemical/contaminant contact.

Activity Hazard Analysis		
Work Activity: Equipment decontamination		
Personal Protective Equipment (PPE)	Selected	Comments
Safety Shoes	X	
Hard Hat		
Safety Glasses With Side Shields	X	
Fire Resistant Clothing		
Face Shields	X	When pressure washing
Goggles	X	For splash protection
Lifeline/Body Harness		
Hearing Protection	X	Near pressure washer or generator
Air Purifying Respirator		
Welding Hood		
Welding/Pipe Clothing		
Welding Mask/Goggles		
Personal Floatation Device		
Gloves	X	Nitrile or similar for potentially contaminated material. Heavy duty work gloves for material handling.
Other		
Safety Cones/Barricades	X	As necessary, to control/alert traffic and exclude unauthorized personnel. Site will be fenced.
Safety Vest	X	
Knee Pads		
Caution Tape	X	As needed, to exclude unauthorized personnel

Job Steps	Potential Hazard	Critical Actions
Mobilize to work site	Traffic accident.	Compliance with EH&S Procedure 110, Vehicle Operation (valid driver's license, seat belt use, routine vehicle inspections, no cell phone use while driving).
Equipment decontamination by washing and water rinse	Being struck by vehicles.	Site will be fenced. Decontamination station and work station for confirmational samplers will be determined during daily tailgate meetings and will be located out of the "line-of-fire."
	Slip/Trip	Inspect area for debris/equipment/uneven/slippery surfaces before entry and plan path if hazards can not be removed.
	Lifting (musculoskeletal injury)	Compliance with EH&S Procedure 150, Manual Lifting. If equipment is to be moved, an evaluation of potential pinch points and/or weight strain will be conducted. Clear area of all unnecessary equipment and slip/trip hazards. Additional help will be obtained by workers or mechanical assistance used on site if equipment to be moved is unwieldy, has a weight >50 lbs or has to be moved by maneuvering through awkward positioning.
	Temperature stress.	If temperature is above 80°F or below 40°F, administrative controls will be implemented (cooled or warmed drinks, routine breaks in heated or shaded area, provisions for emergency heating or cooling).
	Fire	Fire extinguisher rated 2A and 5B (serviced annually and inspected monthly) in all fuel/flammable liquid use areas.
	Chemical exposure	40-hour HAZWOPER and current refresher for workers. 8-hour additional supervisor for FM and SSHO. Medical clearance for hazardous waste work. Nitrile gloves for chemical/contaminant contact. Wash hands before eating or drinking. Chemical containers labeled with identity and hazard. MSDSs on site for all chemicals in use. Site-specific training must address chemicals, hazards, and proper handling.

SITE MAP


EXISTING CHAIN LINK FENCE
EXISTING POWER POLE
EXISTING WOOD FENCE
EXISTING CURB
EXISTING PLANTER AND SIGN
FOOD MART
Storage Garage
FUEL DISPENSER CANOPY
UNDERGROUND TANK AREA
APPROXIMATE AREAS TO BE EXCAVATED
Peace Portal Drive
EXISTING CONCRETE ECOLOGY BLOCKS
Assembly Point
N
0' 10' 20'
LEGEND
B2 2005 Boring Locations
SB-21 2010 Boring Locations
MW-1 Groundwater Monitoring Well Locations
Approximate Area of ORC Application
Approximate Area for Shoring
Assembly Point
Note: Contamination depth is given in feet and represents the combined vertical range of soil contamination at each boring for all hazardous substances constituents.
SAIC From Science to Solutions
DEPARTMENT OF ECOLOGY State of Washington
Blaine Mini-Mart
2530 Peace Portal Drive
Blaine, Washington
HASP Site Map

SAIC INCIDENT NOTIFICATION CONTACT LIST

NAME	POSITION	OFFICE PHONE	CELL PHONE	E-Mail/PAGER
Doug Pearman	Program Manager	425-482-3307	206-200-7637	pearmand@saic.com
Steve Davis All Safety Related Incidents	Corporate H&S Manager	865-481-4755	865-414-9035	Stephen.L.Davis@saic.com
Mike Crenshaw	H&S Manager	865-481-4767	865-406-2659	CrenshawJ@saic.com
Glen Vedera	Project Manager	425-482-3329	206-271-4691	vederag@saic.com
Alisa Wells	Field Manager/ SHSO (SAIC)	425-482-3316	425-318-9496	wellsaj@saic.com
Michael Pagel	Field Support (SAIC)	425-398-2115	206-200-5061	pagelm@saic.com
Amber Kennedy	Field Support (SAIC)	425-482-3318	757-270-1607	kennedya@saic.com

Workers performing tasks under this project may come in contact with environmental media that have concentrations of site contaminants that may pose a risk of overexposure. The following data sheets are for chemicals of concern detected in soil remediation at the site:

NIOSH Pocket Guide to Chemical Hazards

Gasoline	CAS 8006-61-9
	RTECS LX3300000
Synonyms & Trade Names Motor fuel, Motor spirits, Natural gasoline, Petrol [Note: A complex mixture of volatile hydrocarbons (paraffins, cycloparaffins & aromatics).]	DOT ID & Guide 1203 128
Exposure Limits	NIOSH REL: Ca See Appendix A
	OSHA PEL†: none
IDLH Ca [N.D.] See: IDLH INDEX	Conversion 1 ppm 2.95 mg/m^3 (approx)

Physical Description
Clear liquid with a characteristic odor.

MW: 72 (approx)	BP: 102°F	FRZ: ?	Sol: Insoluble
VP: 38-300 mmHg	IP: ?		Sp.Gr(60°F): 0.72-0.76
Fl.P: -45°F	UEL: 7.6%	LEL: 1.4%	

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities Strong oxidizers such as peroxides, nitric acid & perchlorates

Measurement Methods OSHA PV2028 See: NMAM or OSHA Methods

Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Important additional information about respirator selection
Respirator Recommendations NIOSH
At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid); possible liver, kidney damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

Cancer Site [in animals: liver & kidney cancer]

NIOSH Pocket Guide to Chemical Hazards

Benzene			CAS 71-43-2
C_6H_6			RTECS CY1400000
Synonyms & Trade Names Benzol, Phenyl hydride			DOT ID & Guide 1114 130
Exposure Limits	NIOSH REL: Ca TWA 0.1 ppm ST 1 ppm See Appendix A		
	OSHA PEL: [1910.1028] TWA 1 ppm ST 5 ppm See Appendix F		
IDLH Ca [500 ppm] See: 71432		Conversion 1 ppm = 3.19 mg/m^3	
Physical Description Colorless to light-yellow liquid with an aromatic odor. [Note: A solid below 42°F.]			
MW: 78.1	BP: 176°F	FRZ: 42°F	Sol: 0.07%
VP: 75 mmHg	IP: 9.24 eV		Sp.Gr: 0.88
Fl.P: 12°F	UEL: 7.8%	LEL: 1.2%	
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.			
Incompatibilities & Reactivities Strong oxidizers, many fluorides & perchlorates, nitric acid			
Measurement Methods NIOSH 1500, 1501, 3700, 3800; OSHA 12, 1005 See: NMAM or OSHA Methods			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Important additional information about respirator selection Respirator Recommendations NIOSH At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus **Escape**: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]			
Target Organs Eyes, skin, respiratory system, blood, central nervous system, bone marrow Cancer Site [leukemia]			

NIOSH Pocket Guide to Chemical Hazards

Toluene	CAS 108-88-3
$C_6H_5CH_3$	RTECS XS5250000
Synonyms & Trade Names Methyl benzene, Methyl benzol, Phenyl methane, Toluol	DOT ID & Guide 1294 130
Exposure Limits	NIOSH REL: TWA 100 ppm (375 mg/m^3) ST 150 ppm (560 mg/m^3)
	OSHA PEL†: TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak)
IDLH 500 ppm See: 108883	Conversion 1 ppm = 3.77 mg/m^3

Physical Description
Colorless liquid with a sweet, pungent, benzene-like odor.

MW: 92.1	BP: 232°F	FRZ: -139°F	Sol(74°F): 0.07%
VP: 21 mmHg	IP: 8.82 eV		Sp.Gr: 0.87
Fl.P: 40°F	UEL: 7.1%	LEL: 1.1%	

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities Strong oxidizers

Measurement Methods NIOSH 1500, 1501, 3800, 4000; OSHA 111 See: NMAM or OSHA Methods

Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Important additional information about respirator selection
Respirator Recommendations NIOSH
Up to 500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

NIOSH Pocket Guide to Chemical Hazards

p-Xylene	CAS 106-42-3
$C_6H_4(CH_3)_2$	RTECS ZE2625000
Synonyms & Trade Names 1,4-Dimethylbenzene; para-Xylene; p-Xylol	DOT ID & Guide 1307 130
Exposure Limits	NIOSH REL: TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3)
	OSHA PEL†: TWA 100 ppm (435 mg/m^3)
IDLH 900 ppm See: 95476	Conversion 1 ppm = 4.41 mg/m^3

Physical Description
Colorless liquid with an aromatic odor. [Note: A solid below 56°F.]

MW: 106.2	BP: 281°F	FRZ: 56°F	Sol: 0.02%
VP: 9 mmHg	IP: 8.44 eV		Sp.Gr: 0.86
Fl.P: 81°F	UEL: 7.0%	LEL: 1.1%	

Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.

Incompatibilities & Reactivities Strong oxidizers, strong acids

Measurement Methods NIOSH 1501, 3800; OSHA 1002 See: NMAM or OSHA Methods

Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Important additional information about respirator selection
Respirator Recommendations NIOSH/OSHA
Up to 900 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys

International Chemical Safety Cards

METHYL TERT-BUTYL ETHER ICSC: 1164

tert-Butyl methyl ether
MTBE
Methyl-1,1-dimethylethyl ether
2-Methoxy-2-methyl propane
$(CH_3)_3COCH_3$ / $C_5H_{12}O$
Molecular mass: 88.2

http://www.cdc.gov/niosh/images/30.gifICSC # 1164 CAS # 1634-04-4 RTECS # KN5250000 UN # 2398

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking. NO contact with oxidants.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE			
•INHALATION	Drowsiness. Dizziness. Headache. Weakness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
•SKIN	Dry skin. Redness.	High-visibility protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Safety goggles or face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. (Extra personal protection: filter respirator for organic gases and vapours).	Fireproof. Separated from strong oxidants, strong acids.	R: S: UN Hazard Class: 3 UN Packing Group: II

ICSC: 1164
Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

METHYL TERT-BUTYL ETHER ICSC: 1164

IMPORTANT DATA	PHYSICAL STATE; APPEARANCE: COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. PHYSICAL DANGERS: The vapour is heavier than air and may travel along the ground; distant ignition possible. CHEMICAL DANGERS: Reacts violently with strong oxidants causing fire hazard. The substance decomposes on contact with acids. OCCUPATIONAL EXPOSURE LIMITS: TLV: 40 ppm; 144 mg/m^3 (as TWA) A3 (ACGIH 1999). ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion. INHALATION RISK: A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C. EFFECTS OF SHORT-TERM EXPOSURE: The substance irritates the skin. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Exposure far above the OEL could cause lowering of consciousness. EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
PHYSICAL PROPERTIES	Boiling point: 55°C Melting point: -109°C Relative density (water = 1): 0.7 Solubility in water, g/100 ml at 20°C: 4.2 Vapour pressure, kPa at 20°C: 27 Relative vapour density (air = 1): 3.0 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.5 Flash point: -28°C c.c. Auto-ignition temperature: 375°C Explosive limits, vol% in air: 1.6-15.1 Octanol/water partition coefficient as log Pow: 1.06
ENVIRONMENTAL DATA	 It is strongly advised not to let the chemical enter into the environment because it persists in the environment.

N O T E S

Much less likely to form peroxides than other ethers.

Transport Emergency Card: TEC (R)-30G30

ADDITIONAL INFORMATION

ICSC: 1164 METHYL TERT-BUTYL ETHER

Material Safety Data Sheets

The following sheets include MSDSs for chemicals brought on site.

- Methanol
- Isobutylene calibration gas
- Liquinox

NIOSH Publication 2005-149 September 2005

NIOSH Pocket Guide to Chemical Hazards

NPG Home | Introduction | Synonyms & Trade Names | Chemical Names | CAS Numbers | RTECS Numbers | Appendices | Search

Methyl alcohol

CAS 67-56-1

CH_3OH

RTECS PC1400000

Synonyms & Trade Names
Carbinol, Columbian spirits, Methanol, Pyroligneous spirit, Wood alcohol, Wood naphtha, Wood spirit

DOT ID & Guide
1230 131

Exposure Limits

NIOSH REL: TWA 200 ppm (260 mg/m^3) ST 250 ppm (325 mg/m^3) [skin]

OSHA PEL †: TWA 200 ppm (260 mg/m^3)

IDLH 6000 ppm See: 67561

Conversion 1 ppm = 1.31 mg/m^3

Physical Description
Colorless liquid with a characteristic pungent odor.

MW: 32.1	BP: 147°F	FRZ: -144°F	Sol: Miscible
VP: 96 mmHg	IP: 10.84 eV		Sp.Gr: 0.79
FI.P: 52°F	UEL: 36%	LEL: 6.0%	

Class IB Flammable Liquid: FI.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities
Strong oxidizers

Measurement Methods
NIOSH 2000, 3800; OSHA 91
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA
Up to 2000 ppm:
(APF = 10) Any supplied-air respirator
Up to 5000 ppm:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
Up to 6000 ppm:
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape: Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; headache, drowsiness, dizziness, nausea, vomiting; visual disturbance, optic nerve damage (blindness); dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract

See also: INTRODUCTION See ICSC CARD: 0057 See MEDICAL TESTS: 0137

NIOSH Home | NIOSH Search | Site Index | Topic List | Contact Us

International Chemical Safety Cards

ISOBUTENE

ICSC: 1027

Isobutylene
2-Methylpropene
1,1-Dimethylethylene
C_4H_8 / $CH_2=C(CH_3)_2$
Molecular mass: 56.1
(cylinder)

ICSC # 1027
CAS # 115-11-7
RTECS # UD0890000
UN # 1055
EC # 601-012-00-4
April 13, 2000 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Extremely flammable.	NO open flames, NO sparks, and NO smoking. NO contact with oxidizing materials.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out; in other cases extinguish with water spray, powder, carbon dioxide.
EXPLOSION	Gas/air mixtures are explosive. Risk of fire and explosion on contact with oxidants, halogens (see Chemical Dangers).	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position.
EXPOSURE			
•INHALATION	Dizziness. Drowsiness. Dullness. Nausea. Unconsciousness. Vomiting.	Closed system and ventilation.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
•SKIN	ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention.
•EYES	See Skin.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	
			PACKAGING &

SPILLAGE DISPOSAL	STORAGE	LABELLING
Evacuate danger area! Consult an expert! Ventilation. Remove all ignition sources. Do NOT wash away into sewer. NEVER direct water jet on liquid. Chemical protection suit including self-contained breathing apparatus.	Fireproof. Separated from incompatible materials (see Chemical Dangers). Cool.	Note: C F+ symbol R: 12 S: 2-9-16-33 UN Hazard Class: 2.1
SEE IMPORTANT INFORMATION ON BACK		
ICSC: 1027	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

ISOBUTENE

ICSC: 1027

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** COLOURLESS COMPRESSED LIQUEFIED GAS , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** The gas is heavier than air and may travel along the ground; distant ignition possible, and may accumulate in low ceiling spaces causing deficiency of oxygen. As a result of flow, agitation, etc., electrostatic charges can be generated. **CHEMICAL DANGERS:** Reacts violently with halogens, oxidants, strong acids causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. MAK not established.	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation. **INHALATION RISK:** On loss of containment this liquid evaporates very quickly causing supersaturation of the air with serious risk of suffocation when in confined areas. **EFFECTS OF SHORT-TERM EXPOSURE:** Rapid evaporation of the liquid may cause frostbite. The substance may cause effects on the central nervous system. Exposure at high levels may result in unconsciousness. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
PHYSICAL PROPERTIES	Boiling point: -6.9°C Melting point: -140.3°C Relative density (water = 1): 0.59 Solubility in water, g/100 ml at 20°C: 0.03 Vapour pressure, kPa at 20°C: 257 Relative vapour density (air = 1): 1.94	Flash point: -76.1°C c.c. Auto-ignition temperature: 465°C Explosive limits, vol% in air: 1.8-9.6 Octanol/water partition coefficient as log Pow: 2.35
ENVIRONMENTAL DATA		
NOTES		
Density of the liquid at boiling point: 0.605 kg/l. High concentrations in the air cause a deficiency of oxygen with the risk of unconsciousness or death. Check oxygen content before entering area. Turn leaking cylinder with the leak up to prevent		

CORNELL

Material Safety Data Sheets

Division of Facilities Services

DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only

LIQUI-NOX

Section 1 - Product and Company Identification
LIQUI-NOX

Product Identification: LIQUI-NOX
Date of MSDS: 01/02/1987 **Technical Review Date:** 04/19/1993
FSC: 7930 **NIIN:** 01-166-0819
Submitter: G AW
Status Code: C
MFN: 01
Article: N
Kit Part: N

Manufacturer's Information

Manufacturer's Name: ALCONOX, INC.
Post Office Box: N/K
Manufacturer's Address1: 215 PARK AVE SOUTH
Manufacturer's Address2: NEW YORK, NY 10003
Manufacturer's Country: US
General Information Telephone: 212-473-1300
Emergency Telephone: 212-473-1300
Emergency Telephone: 212-473-1300
MSDS Preparer's Name: N/K
Proprietary: N
Reviewed: Y
Published: Y
CAGE: NO073
Special Project Code: N

Item Description

Item Name:
Item Manager:
Specification Number: N/K
Type/Grade/Class: N/K
Unit of Issue:
Unit of Issue Quantity:
Type of Container: PLASTIC

Contractor Information

Contractor's Name: ALCONOX INC
Contractor's Address1: 9 EAST 40TH STREET, SUITE 200
Contractor's Address2: NEW YORK, NY 10016
Contractor's Telephone: 212-532-4040
Contractor's CAGE: 17534

Contractor Information

Contractor's Name: ALCONOX, INC.
Post Office Box: N/K
Contractor's Address1: UNKNOWN
Contractor's Address2: UNKNOWN, NK 00000
Contractor's Telephone: UNKNOWN
Contractor's CAGE: NO073

Section 2 - Compositon/Information on Ingredients
LIQUI-NOX

Ingredient Name: "NOT HAZARDOUS"
Ingredient CAS Number: Ingredient CAS Code: X
RTECS Number: RTECS Code: X
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:

>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: N/K
% Enviromental Weight:
Other REC Limits: NONE SPECIFIED
OSHA PEL: UNKNOWN **OSHA PEL Code:** M
OSHA STEL: OSHA STEL Code:
ACGIH TLV: UNKNOWN **ACGIH TLV Code:** M
ACGIH STEL: N/P **ACGIH STEL Code:**
EPA Reporting Quantity:
DOT Reporting Quantity:
Ozone Depleting Chemical:

Section 3 - Hazards Identification, Including Emergency Overview
LIQUI-NOX

Health Hazards Acute & Chronic: SKIN CONTACT MAY PROVE LOCALLY IRRITATING, INGESTION MAY CAUSE DISCOMFORT AND/OR DIARRHEA.

Signs & Symptoms of Overexposure:
PROLONGED SKIN CONTACT MAY CAUSE DRYING AND/OR CHAPPING.

Medical Conditions Aggravated by Exposure:
NONE.

LD50 LC50 Mixture: N/K

Route of Entry Indicators:
Inhalation: NO
Skin: YES
Ingestion: YES

Carcenogenicity Indicators
NTP: NO
IARC: NO
OSHA: NO

Carcinogenicity Explanation: N/K

Section 4 - First Aid Measures
LIQUI-NOX

First Aid:
EYES: FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. SKIN: FLUSH WITH WATER. INGESTION: DRINK LARGE QUANTITIES OF WATER. GET MEDICAL ATTENTION FOR

DISCOMFORT.

Section 5 - Fire Fighting Measures
LIQUI-NOX

Fire Fighting Procedures:
FOR FIRES INVOLVING THIS MATERIAL, DO NOT ENTER WITHOUT PROTECTIVE EQUIPMENT AND SELF CONTAINED BREATHING APPARATUS.
Unusual Fire or Explosion Hazard:
NONE.
Extinguishing Media:
WATER, DRY CHEMICAL, FOAM, CO2, SAND/EARTH.
Flash Point: Flash Point Text: NONE

Autoignition Temperature:
Autoignition Temperature Text: N/K
Lower Limit(s): N/A
Upper Limit(s): N/A

Section 6 - Accidental Release Measures
LIQUI-NOX

Spill Release Procedures:
MATERIAL FOAMS PROFUSELY, RECOVER AS MUCH AS POSSIBLE WITH ABSORBENT MATERIAL AND RINSE REMAINDER TO SEWER, MATERIAL IS COMPLETELY BIODEGRADABLE.

Section 7 - Handling and Storage
LIQUI-NOX

Handling and Storage Precautions:

Other Precautions:

Section 8 - Exposure Controls & Personal Protection
LIQUI-NOX

Repiratory Protection:
N/K
Ventilation:
LOCAL EXHAUST: NORMAL.
Protective Gloves:
RECOMMENDED.
Eye Protection: RECOMMENDED.
Other Protective Equipment: NOT REQUIRED.
Work Hygenic Practices: NO SPECIAL PRACTICES REQUIRED.
Supplemental Health & Safety Information: N/K

Section 9 - Physical & Chemical Properties
LIQUI-NOX

HCC:
NRC/State License Number: N/K
Net Property Weight for Ammo: N/K
Boiling Point: Boiling Point Text: 214F,101C
Melting/Freezing Point: Melting/Freezing Text: N/A
Decomposition Point: Decomposition Text: N/K
Vapor Pressure: N/A **Vapor Density:** N/A
Percent Volatile Organic Content:
Specific Gravity: 1.075
Volatile Organic Content Pounds per Gallon:
pH: N/K
Volatile Organic Content Grams per Liter:
Viscosity: N/K
Evaporation Weight and Reference: (BU AC=1) SLOWER
Solubility in Water: COMPLETELY SOLUBLE
Appearance and Odor: YELLOW LIQUID - PRECTICALLY ODORLESS.
Percent Volatiles by Volume: N/K
Corrosion Rate: N/K

Section 10 - Stability & Reactivity Data
LIQUI-NOX

Stability Indicator: YES
Materials to Avoid:
NONE.
Stability Condition to Avoid:
NONE.
Hazardous Decomposition Products:
SO2, MAY BE RELEASED ON BURNING.
Hazardous Polymerization Indicator: NO
Conditions to Avoid Polymerization:
NONE.

Section 11 - Toxicological Information
LIQUI-NOX

Toxicological Information:
N/P

Section 12 - Ecological Information
LIQUI-NOX

Ecological Information:
N/P

Section 13 - Disposal Considerations
LIQUI-NOX

Waste Disposal Methods:
SMALL QUANTITIES MAY BE DISPOSED OF IN SEWER. LARGE QUANTITES SHOULD BE SOAKED UP WITH ABSORBENT MATERIAL AND DISPOSED OF ACCORDING TO LOCAL

ORDINANCES.

Section 14 - MSDS Transport Information
LIQUI-NOX

Transport Information:
N/P

Section 15 - Regulatory Information
LIQUI-NOX

SARA Title III Information:
N/P
Federal Regulatory Information:
N/P
State Regulatory Information:
N/P

Section 16 - Other Information
LIQUI-NOX

Other Information:
N/P

HMIS Transportation Information

Product Identification: LIQUI-NOX
Transporation ID Number: 112501
Responsible Party CAGE: NO073
Date MSDS Prepared: 01/02/1987
Date MSDS Reviewed: 04/19/1993
MFN: 04/19/1993
Submitter: G AW
Status Code: C

Container Information
Unit of Issue:
Container Quantity:
Type of Container: PLASTIC
Net Unit Weight: N/K

Article without MSDS: N
Technical Entry NOS Shipping Number: N/K
Radioactivity: N/K
Form:
Net Explosive Weight: N/K
Coast Guard Ammunition Code: N/K
Magnetism: N/P
AF MMAC Code: NK
DOD Exemption Number: N/K
Limited Quantity Indicator:
Multiple Kit Number: 0
Kit Indicator: N

Kit Part Indicator: N
Review Indicator: Y
Additional Data:
N/K

Department of Transportation Information

DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
DOT PSN Code: ZZZ
Symbols: N/R
DOT PSN Modifier:
Hazard Class: N/R
UN ID Number: N/R
DOT Packaging Group: N/R
Label: N/R
Special Provision(s): N/R
Packaging Exception: N/R
Non Bulk Packaging: N/R
Bulk Packaging: N/R
Maximimum Quanity in Passenger Area: N/R
Maximimum Quanity in Cargo Area: N/R
Stow in Vessel Requirements: N/R
Requirements Water/Sp/Other: N/R

IMO Detail Information

IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
IMO PSN Code: ZZZ
IMO PSN Modifier:
IMDG Page Number: N/R
UN Number: N/R
UN Hazard Class: N/R
IMO Packaging Group: N/R
Subsidiary Risk Label: N/R
EMS Number: N/R
Medical First Aid Guide Number: N/R

IATA Detail Information

IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
IATA PSN Code: ZZZ
IATA PSN Modifier:
IATA UN Id Number: N/R
IATA UN Class: N/R
Subsidiary Risk Class: N/R
UN Packaging Group: N/R
IATA Label: N/R
Packaging Note for Passengers: N/R
Maximum Quantity for Passengers: N/R
Packaging Note for Cargo: N/R
Maximum Quantity for Cargo: N/R
Exceptions: N/R

AFI Detail Information

AFI Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
AFI Symbols:
AFI PSN Code: ZZZ

AFI PSN Modifier:
AFI UN Id Number: N/R
AFI Hazard Class: N/R
AFI Packing Group: N/R
AFI Label: N/R
Special Provisions: N/A
Back Pack Reference: N/A

HAZCOM Label Information

Product Identification: LIQUI-NOX
CAGE: NO073
Assigned Individual: Y
Company Name: ALCONOX, INC.
Company PO Box: N/K
Company Street Address1: UNKNOWN
Company Street Address2: UNKNOWN, NK 00000 NK
Health Emergency Telephone: 212-473-1300
Label Required Indicator: Y
Date Label Reviewed: 12/16/1998
Status Code: C
Manufacturer's Label Number:
Date of Label: 12/16/1998
Year Procured: N/K
Organization Code: G
Chronic Hazard Indicator: N/P
Eye Protection Indicator: N/P
Skin Protection Indicator: N/P
Respiratory Protection Indicator: N/P
Signal Word: N/P
Health Hazard:
Contact Hazard:
Fire Hazard:
Reactivity Hazard:

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Appendix B
Chain-of-Custody Forms

SAIC
From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project Number: **198662**
Project Name: Blaine Mini-Mart Confirmational Soil Sampling
Project Location: Blaine, WA
Contact Name: Marina Mitchell 425.482.3310 marina.i.mitchell@saic.com
Samples Collected by:

Sample ID	Depth	Matrix	Date	Time	# of Containers	TPH-G (NWTPH-G)	TPH-Dx (NWTPH-Dx) with silica gel cleanup	VOCs (EPA 8260C)	Total Solids (EPA 160.3)		Comments
											Analyze per SAP
											provided under separate cover.
											Do not dispose of samples
											without written authorization
											from SAIC.

Analyses / Tests

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:	Signature:	Signature:
Date/Time: / /2011 @	Date/Time:	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation:	Affiliation:	Affiliation:

Appendix C
Field Forms

PID RESULTS
Blaine Mini Mart
2530 Peace Portal Drive, Blaine, WA

Date	Sample Number	Sample Depth feet bgs	Sample Result ppm	Time Collected	Sample Location			PID Used	Odor	Sheen Test	Corresponding Analysis			GPS Coordinates (Lat. and Long)
					X	Y	Excavation No.				TPH-Gx	TPH-Dx / HO	B	

WASTE LOG
Blaine Mini Mart
2530 Peace Portal Drive, Blaine, WA

Date	Manifest Number	Waste Description	Transporter	Driver/ Truck ID	Total Yards	Total Tons	Estimated Yards

IMPORTED MATERIAL LOG
Blaine Mini Mart
2530 Peace Portal Drive, Blaine, WA

Date	Manifest Number	Waste Description	Transporter	Driver/ Truck ID	Total Yards	Total Tons	Estimated Yards