SAMPLING AND ANALYSIS PLAN FOR
SAUNDERS SUPPLY COMPANY SUPERFUND SITE
5969 GODWIN BOULEVARD
SUFFOLK, VIRGINIA

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Prepared For:

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

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ENVIRONMENTAL ALLIANCE

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1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) is for the Saunders Supply Company (Saunders) Superfund Site located at 5969 Godwin Boulevard, Suffolk, Virginia (the site). Environmental Alliance, Inc. (Alliance) has prepared this SAP under contract with the Virginia Department of Environmental Quality (VADEQ), who is responsible for site operations including operation and maintenance of the groundwater extraction and treatment system. This SAP outlines the methodologies that will be used for all measurement, sample collection, sample handling, and sample shipment during operation, maintenance, and monitoring of the groundwater extraction and treatment system and groundwater monitoring at the site. This SAP is organized as follows: Section 2.0 describes the sampling program, rationale, and locations. Section 3.0 details field activity methods and procedures. The Quality Assurance Project Plan (QAPP) is distributed in Sections 4.0 through 7.0. Section 4.0 describes project management, and Section 5.0 details data generation and acquisition. In Section 6.0, assessment and oversight are discussed. Finally, Section 7.0 outlines data validation and usability.

1.1 Project Objectives

The overall objectives of the sampling to be conducted at the site are to monitor the groundwater plume and to evaluate the effectiveness of the groundwater treatment system in removing pentachlorophenol (PCP), arsenic, and chromium from recovered groundwater. Specifically, the objectives of the sampling include:

- Conducting monthly collection of samples from the groundwater treatment system
- Conducting semi-annual groundwater level measurements and groundwater monitoring of site monitoring wells and recovery wells

1.2 Site Background

The Saunders Supply Company Superfund Site is located in the unincorporated community of

Chuckatuck, Virginia, within the City of Suffolk. The site encompasses 7.3 acres and is comprised of the Saunders Supply Company and Kelly Nursery properties. The property slopes towards a drainage ditch immediately north of the site and an intermittent unnamed stream west of the site. These surface water streams discharge to Godwin's Millpond, located approximately 600 feet north of the property. The site previously hosted a wood preserving facility that used two processes in its wood treating operations. These operations included the use of PCP and copper, chromium, and arsenic (CCA).

The Saunders Supply Company property was purchased by the current owners in 1946 and operated as a lumber and hardware retail store. On-site chemical wood treatment began in 1964. PCP was used for wood treatment until Saunders Supply began phasing it out from 1974-1984. When in use, the PCP treatment solutions were periodically drained into a series of oil/water separators. The final oil/water separator in the series was an unlined pond, located southeast of the existing wastewater pond on the Saunders property. A crust-like residue that formed on the surface of the former pond was occasionally burned as a training exercise for the local fire departments. The pond has since been filled in and covered over by the Saunders Supply Company.

Sludge removed during annual maintenance of the PCP treatment process was used on the roads and/or around the lumber storage areas to control dust and weeds from approximately 1966-1981. After 1981, PCP sludge was disposed off-site.

Prior to 1984, treated wood was placed on pallets located directly on the ground in the southern portion of the property near the wood treating process to dry. From 1984-1991, the wood was air-dried on a concrete drip pad that collected the excess chemicals. By 1984, CCA replaced PCP in the wood treating operations at the site. The facility ceased all wood treating operations in 1991.

The site was proposed for the National Priorities List (NPL) in January 1987. A Remedial Investigation / Feasibility Study (RI/FS) was performed from September 1988 until May 1991. Godwin's Millpond is part of the City of Suffolk's public water supply. During routine

monitoring conducted at the site for the remedial design, the U.S. Environmental Protection Agency (EPA) detected the presence of PCP and traces of metals such as arsenic and chromium in the groundwater downgradient from the Saunders Supply Company property. Since the groundwater feeds to Godwin's Millpond, EPA used its emergency removal authority during the remedial design to design and construct a system to prevent the impacted groundwater from reaching the pond. The groundwater collection and treatment system began operating in April 1998 with four recovery wells that deliver groundwater to a treatment building for processing. The major treatment process equipment includes a reaction tank, a blower, a holding tank, a filter system, activated carbon units, and an effluent tank. The system has been in operation since 1998 with EPA responsible for system operation and site monitoring through July 15, 2009. On July 15, 2009, site responsibility was officially transferred to the VADEQ.

The site is currently used as a wholesale lumber yard. A year-round nursery that grows and retails various annual and perennial flowers and potted plants is located north of Saunders Supply and is where the monitoring and recovery wells are located.

2.0 SAMPLING PROGRAM, RATIONALE, AND LOCATIONS

The SAP for the Saunders site has been developed to provide rationale and procedures that will be followed during the performance of long-term monitoring of the groundwater treatment system and groundwater from recovery and monitoring wells. The frequency of sampling events, locations of samples, and number of samples that will be collected have been determined based on historical sampling events and work scope/contract negotiation with the VADEQ.

2.1 Monthly Treatment System Sampling

As part of the long-term monitoring activities at the site, samples will be collected from the groundwater treatment system once per month. The following subsections describe the rationale, number of samples, and locations for the treatment system sampling.

2.1.1 Treatment System Sampling Rationale

Samples will be collected from the system influent and after the first activated carbon unit (C1) on a monthly basis. The data will be used to monitor the activated carbon performance, present removal efficiencies, and evaluate overall system performance.

2.1.2 Treatment System Sample Number and Location

A total of three samples will be collected from the treatment system during each monthly sampling event. This total number of samples includes one quality control (QC) sample: a blind duplicate sample. Additionally, one sample will be designated as a matrix spike/matrix spike duplicate. All treatment system samples will be analyzed for pentachlorophenol (PCP), dissolved and total arsenic, and dissolved and total chromium. A temperature blank will be included in each cooler shipment.

2.2 Semi-Annual Groundwater Monitoring

As part of the long-term monitoring of the site, groundwater samples will be collected from site monitoring and recovery wells on a semi-annual basis in April and October. The following subsections describe the rationale, number of samples, and locations for semi-annual groundwater sampling events.

2.2.1 Groundwater Sampling Rationale

Groundwater samples will be collected from 11 site monitoring wells and four recovery wells during each semi-annual sampling event. Data collected will be presented and evaluated in an annual report and will be used to determine if the treatment system is effectively reducing the extent and magnitude of the groundwater plumes.

2.2.2 Groundwater Sampling Number and Location

Table 2-1 presents a list of all the recovery and monitoring wells that are included in the semi-annual sampling program. QA/QC samples including duplicates, rinsate blanks, and matrix spikes/matrix spike duplicates will be collected at a frequency of one per 20 samples. All groundwater samples will be analyzed for PCP, total and dissolved arsenic, and total and dissolved chromium. During each semi-annual groundwater sampling event, one groundwater sample from the monitoring or recovery well with the highest PCP concentration will be analyzed for: benzo(b) fluoranthene, benzo(k) fluoranthene, benzo(a) pyrene, indeno(1,2,3 cd) pyrene, dibenzo(ah) anthracene, and benzo(ghi) perylene. Additionally during each semi-annual sampling event, one groundwater sample from the monitoring or recovery well with the highest arsenic or chromium concentration will be analyzed for cyanide, antimony, barium, cobalt, copper, lead, manganese, nickel, selenium, and zinc. A temperature blank will be included in each cooler.

Groundwater elevation will also be determined during each semi-annual event. Synoptic water

level measurements will be collected prior to the initiation of each sampling event from all site monitoring and recovery wells.

3.0 FIELD ACTIVITY METHODS AND PROCEDURES

3.1 Treatment System Sampling

Treatment system samples will be collected on a monthly basis from the influent and after the first activated carbon unit (C1). The procedures to be followed for sampling from the treatment system are as follows:

1. Determine appropriate level of PPE required according to the approved Health and Safety Plan (HASP).
2. Obtain laboratory-prepared sample containers prior to sampling. Any required preservatives will be added to the sampling containers by the receiving laboratory prior to sampling.
3. Collect treatment system samples as described below. Collect unfiltered treatment system samples within laboratory supplied bottleware directly from sample ports. For filtered treatment system samples, attach 45-micron sample filters to sample ports with small section of polyethylene tubing, wait for water to discharge from filters, then collect samples. Obtain duplicate samples at the frequency outlined in this SAP.
4. Label the sample containers using stick-on labels and waterproof ink with project information detailed in the SAP.
5. Check that the bottleware caps are tight and place samples within an iced cooler at a temperature of 4°C.
6. Field data will be entered onto a sampling field data sheet. Field data includes but is not limited to: sampling location, sampling method, time, sampler(s) name(s), etc.
7. Store the collected samples together under refrigeration (or on ice) in an area known to be free of contamination.
8. Transport or ship the sample set to the laboratory, maintaining chain-of-custody as described in this SAP.

Sampling ports for the recovery wells are located inside the treatment building along the north

wall. The control boxes for each recovery well are located along the west wall. The recovery wells are scheduled to pump in turn, but there is a manual override to turn on each pump. When a recovery well is set to manual mode for sampling, the water level gauge located at the control box will be monitored to make sure it is operating within the appropriate range, as indicated on the control box. If water levels drop too low, the pump control will be manually returned to auto mode, allowing the well to recover, after which time sampling can be resumed.

Sampling ports for treatment system influent, C1, C2, and effluent are labeled inside the treatment building. The influent port will be sampled first by opening the valve. Before collecting the remaining samples, the intake pump must be turned on and readings on the pressure gauge must stabilize. Samples will then be collected from the C1, C2, and effluent ports, respectively. While the pump is operating, the intake tank will be monitored to insure that the water level does not drop below the intake level. Should the water level drop too low, the pump will be shut off, allowing the water level to recover, after which time sampling can be resumed.

3.2 Water Level Measurements

Synoptic water level measurements will be collected from all site monitoring wells prior to each quarterly groundwater sampling event. The procedures to be followed for collecting water level measurements are as follows:

1. Determine appropriate level of PPE required according to the approved HASP.
2. Obtain a depth to water measurement using a decontaminated electric water level meter. The static water level will be measured to the nearest 0.01 feet. Water level measurements should proceed from the least impacted well to the most impacted well, if this information is known.
3. Field data will be entered onto a sampling field data sheet or field log book. Field data includes but is not limited to: well location, depth to water, gauging method, time, sampler(s) name(s), etc.

3.3 Monitoring Well Sampling

The 11 monitoring wells will be sampled during each semi-annual event. A stainless steel, variable speed (e.g., Grundfos Rediflo™) submersible pump is used for well purging and sample collection. The submersible pump used for purging will be used to collect the sample(s) for the well, and the discharge rate during sampling will be reduced to prevent turbulence and volatilization and fast enough to fill the tubing to prevent in-line VOC stripping. All pumps, tubing, and rope will be decontaminated prior to each use as specified in Section 3.0 or dedicated (new and disposable) equipment will be used. Prior to the collection of groundwater samples, monitoring wells will be purged with a submersible pump in general accordance with EPA's Region I *Low Stress (Low Flow) Standard Operating Procedure for the Collection of Ground Water Samples from Monitoring Wells* (SOP# GW 0001, July 1996). The procedures to be followed for groundwater sampling from a monitoring well are as follows:

1. Determine appropriate level of PPE required according to the approved HASP.
2. Obtain laboratory-prepared sample containers prior to sampling. Any required preservatives will be added to the sampling containers by the receiving laboratory prior to sampling.
3. Prior to purging, obtain a depth to water measurement and total depth measurement for all wells specified for the sampling event. A decontaminated electric water level meter will be used for this activity. The static water level will be measured to the nearest 0.01 feet. Water level measurements should proceed from the least impacted well to the most impacted well, if this information is known.
4. Groundwater sampling should proceed from the least impacted well to the most impacted well, if this information is known.
5. Lower pump, safety cable, tubing and electrical lines slowly (to minimize disturbance) into the well such that the pump intake is two feet above the bottom of the well.
6. Before starting pump, measure water level. If recording pressure transducer is used, initialize starting condition.
7. Purge well.
    a. Start the pump at its lowest speed setting and slowly increase the speed until

discharge occurs.

b. Check water level.

c. Adjust pump speed until there is little or no water level drawdown (less than 0.3 feet). If the minimal drawdown that can be achieved exceeds 0.3 feet but remains stable, continue purging until indicator field parameters stabilize.

d. Monitor and record water level and pumping rate every three to five minutes (or as appropriate) during purging. Record any pumping rate adjustments (both time and flow rate). Pumping rates should, as needed, be reduced to the minimum capabilities of the pump (e.g., 0.1 to 0.4 L/min) to ensure stabilization of indicator parameters. Adjustments are best made in the first 15 minutes of pumping in order to help minimize purging time. During pump start-up, drawdown may exceed the 0.3 feet target and then "recover" as pump flow adjustments are made. Purge volume calculations should utilize stabilized drawdown value, not the initial drawdown. Do not allow the water level to fall to the intake level (if the static water level is above the well screen, avoid lowing the water level into the screen). The final purge volume must be greater than the stabilized drawdown volume plus the extraction tubing volume.

e. Wells with low recharge rates may require the use of special pumps capable of attaining very low pumping rates (e.g., bladder, peristaltic) and/or the use of dedicated equipment. If the recharge rate of the well is lower than the extraction rate capabilities of currently manufactured pumps and the well is essentially dewatered during purging, then the well should be sampled as soon as the water level has recovered sufficiently to collect the appropriate volume needed for all anticipated samples (ideally, the intake should not be moved during this recovery period). Samples may then be collected even though the indicator field parameters have not stabilized.

f. During subsequent low stress sampling events, information from previous sampling event(s) may be used to set and duplicate, to the extent practical, the purging conditions achieved during the previous events. After the synoptic water level measurement round, check intake depth and drawdown information from previous sampling event(s) for each well. Duplicate, to the extent practical, the

intake depth and extraction rate (use final pump dial setting information) from previous event(s). Perform purging operations as above.

g. Groundwater generated during the well purging process will be handled as presented in Section 3.8 of this SAP.

8. During well purging, monitor indicator field parameters (turbidity, temperature, specific conductance, pH, eH, dissolved oxygen [DO]) every three to five minutes (or less frequently, if appropriate). During the early phase of purging, emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments. Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings, taken at three to five minute intervals, are within the following limits:

Turbidity:	10% for values greater than 1 NTU
DO:	10%
Specific conductance:	3%
Temperature:	3%
pH:	+/- 0.1 unit
ORP/eH:	+/- 10 millivolts

All measurements, except turbidity, must be obtained using a flow-through cell. Transparent flow-through cells are preferred because they allow field personnel to watch for particulate buildup within the cell. This buildup may affect indicator field parameter values measured within the cell and may also cause an underestimation of turbidity values measured after the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities.

The flow-through cell must be designed in a way that prevents air bubble entrapment in the cell. When the pump is turned off or cycling on/off (when using a bladder pump), water in the cell must not drain out. Monitoring probes must be submerged in water at all

times. If two flow-through cells are used in series, the one containing the DO probe should come first (this parameter is most susceptible to error if air leaks into the system).

9. After purging the wells, don fresh disposable sampling gloves prior to collecting a groundwater sample.

10. Collect groundwater samples within laboratory-supplied bottleware.

    h. Samples for laboratory analyses must be collected before water has passed through the flow-through cell (use a bypass assembly or disconnect cell to obtain sample).

    i. Collect unfiltered groundwater samples within laboratory supplied bottleware directly from discharge tubing. For filtered groundwater samples, attach 45-micron sample filters to discharge tubing, wait for water to discharge from filters, then collect samples.

    j. Obtain duplicate samples at the frequency outlined in this SAP.

    k. Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

    l. During purging and sampling, the tubing should remain filled with water so as to minimize possible changes in water chemistry upon contact with the atmosphere.

11. Label the sample containers using stick-on labels and waterproof ink with project information detailed in this SAP.

12. Check that the bottleware caps are tight and place samples within an iced cooler at a temperature of 4°C.

13. Field data will be entered onto a sampling field data sheet. Field data includes but is not limited to: well location, depth to water, well depth, purge volume, sampling method, drawdown, field indicator parameters, time, sampler(s) name(s), etc.

14. Store the collected samples together with any blank samples collected for that sampling event. The sample set and blanks must be stored together under refrigeration (or on ice) in an area known to be free of contamination.

15. Transport the sample set to the laboratory, maintaining chain-of-custody as described in this SAP.

3.4 Recovery Well Sampling

The four recovery wells will be sampled during each semi-annual event. Recovery well samples will be collected directly from the treatment system manifold sampling ports. The procedures to be followed for sampling the recovery wells are as follows:

1. Determine appropriate level of PPE required according to the approved HASP.
2. Obtain laboratory-prepared sample containers prior to sampling. Any required preservatives will be added to the sampling containers by the receiving laboratory prior to sampling.
3. Collect recovery well samples as described below. Collect unfiltered treatment system samples within laboratory supplied bottleware directly from sample ports. For filtered recovery well samples, attach 45-micron sample filters to sample ports with small section of polyethylene tubing, wait for water to discharge from filters, and then collect samples. Obtain duplicate samples at the frequency outlined in this SAP.
4. Label the sample containers using stick-on labels and waterproof ink with project information detailed in the SAP.
5. Check that the bottleware caps are tight and place samples within an iced cooler at a temperature of 4°C.
6. Field data will be entered onto a sampling field data sheet. Field data includes but is not limited to: sampling location, sampling method, time, sampler(s) name(s), etc.
7. Store the collected samples together under refrigeration (or on ice) in an area known to be free of contamination.
8. Transport or ship the sample set to the laboratory, maintaining chain-of-custody as described in this SAP.

Sampling ports for the recovery wells are located inside the treatment building along the north wall. The control boxes for each recovery well are located along the west wall. The recovery wells are scheduled to pump in turn, but there is a manual override to turn on each pump. When a recovery well is set to manual mode for sampling, the water level gauge located at the control box will be monitored to make sure it is operating within the appropriate range, as indicated on

the control box. If water levels drop too low, the pump control will be manually returned to auto mode, allowing the well to recover, after which time sampling can be resumed.

3.5 Field Logbook Documentation

All field activities will be documented in a field logbook. Recorded notes will include but not be limited to: field personnel name(s), time of arrival to site, time leaving site, purpose of site activities, procedures and methods used, any field conditions that required deviations from the SAP, etc.

3.6 Packaging and Shipping of Environmental Samples

All samples collected will be analyzed by a Virginia certified and accredited analytical laboratory. All coolers will be relinquished to an overnight courier or be transported by the approved laboratory under proper chain-of-custody.

3.7 Equipment Decontamination

This section presents the protocol for decontaminating sampling equipment. Efforts will be made to minimize the amount of equipment requiring decontamination by utilizing disposable sampling equipment whenever possible. However, some equipment such as water level indicators, sampling pumps, and field parameter meters must be reused. Non-dedicated sampling equipment that will require decontamination consists of polyethylene tubing, submersible pump, and electric water level meter. The sediment filters used to collect filtered water samples for dissolved metals analysis are disposable and cannot be re-used.

3.7.1 Groundwater Sampling Equipment Decontamination

Decontamination of the submersible pump and tubing will be conducted prior to each monitoring

well sampling. New tubing may be used *in lieu* of tubing decontamination. The following procedure will be employed for groundwater purging and sampling equipment decontamination:

1. In the predetermined decontamination area, a piece of clean plastic will be placed on the ground.
2. Fill two five-gallon buckets, one with a low phosphate detergent and tap water wash, the other with a tap water rinse. Each bucket will have a dedicated stiff scrub brush and bristle test tube brush. Place buckets on plastic cover.
3. Scrub all well purging/sampling equipment first in the soap wash and then in the tap water rinse using the dedicated brushes. Upon completion of exterior scrubbing on submersible pumps and tubing, the pump and tubing will be operated to decontaminate the interior of pump and tubing. The pump will be operated to purge approximately one gallon of water from each bucket, starting with the soap bucket. If stainless steel or reusable Teflon™ bailers are used, the interior of bailers will be scrubbed with a test tube brush. If disposable, dedicated, single-sample bailers or tubing is used, decontamination of the bailers and tubing is not necessary.
4. Rinse all above equipment twice with distilled water.
5. Water draining from decontamination procedures will be collected and containerized for appropriate disposal.
6. Allow equipment to air dry.
7. All trash generated during well installation and development activities will be collected in plastic garbage bags. Garbage bags will be placed in a designated storage area for disposal.

3.8 Management of Sampling Waste

Groundwater generated during well purging and sampling will be temporarily stored in U.S. Department of Transportation (DOT)-approved 55-gallon steel drums until sampling activities are completed. Generated groundwater will subsequently be pumped through the site groundwater treatment system for treatment and discharge.

4.0 PROJECT MANAGEMENT

As stated in Section 1, Sections 4.0 through 7.0 of this SAP constitute the Quality Assurance Project Plan (QAPP).

4.1 Distribution List

Copies of the approved QAPP and any subsequent revisions will kept on file at Environmental Alliance, Inc.'s Ashland, Virginia office and will be sent to VADEQ and the EPA.

4.2 Project/Task Organization

This Quality Assurance Project Plan (QAPP) focuses on policies and objectives that are designed to achieve data quality objectives for the tasks that may be required as part of the Operation, Monitoring, and Maintenance (O&M) of the groundwater extraction and treatment system at the Saunders Supply Company Superfund Site. The QAPP is a structured plan that describes the policies and procedures for ensuring that work processes, products, or services satisfy stated expectations or specifications and is organized in accordance with U.S. Environmental Protection Agency (EPA) guidance (EPA QA/R-5). The QAPP integrates all technical and quality aspects of a project, including planning, implementation, and assessment. Elements of the QAPP are drawn from the previous QAPP included in the *Final Sampling and Analysis Plan for Long-Term Remedial Action* (CDM, June 2003). This QAPP provides sufficient detail to demonstrate that:

- The project technical and quality objects are identified and agreed upon;
- The intended measurements, data generation, or data acquisition methods are appropriate for achieving project objectives;
- Assessment procedures are sufficient for confirming that data of the type and quality needed and expected are obtained; and

- Any limitations on the use of the data can be identified and documented.

4.3 Project Management / Roles

This section addresses the basic area of project management, including objectives, roles and responsibilities of the participants.

Mr. Thomas Modena of VADEQ, is the Client Project Manager. He will oversee all aspects of the project.

Environmental Alliance, Inc. (Alliance) will oversee all technical aspects for this project. Mr. Jason Early, P.G., is the contract Project Manager, responsible for bringing forth the technical resources necessary to perform the scope of work. Mr. James Bernard is the Client Liaison, who will be consulted on regulatory issues that may arise during the course of the project. Mr. Joseph Zay is the Project Technical Support, responsible for providing technical assistance on system operation and maintenance to the Lead O&M Technician. Mr. Matthew Richardson will serve as the Lead O&M Technician, responsible for performing the routine weekly and monthly O&M tasks and groundwater sampling and analysis. Ms. Julie Ann Turner is the designated Quality Assurance Officer for this project, and will manage the flow of data generated during the course of the project.

REIC Laboratories (Beaver, West Virginia) will analyze all treatment system and groundwater samples generated during O&M of this site.

4.4 Problem Definition/Background

VADEQ is in the process of operating and maintaining the remedial system at and monitoring of the Saunders Supply Superfund Site.

4.5 Project/Task Description

The QAPP addresses the field work that will be performed during the remedial action monitoring at the site. Water from the treatment system extraction wells, system influent and after the first activated carbon unit (C1), and groundwater from site monitoring wells, will be sampled. Sampling activities and all associated procedures are described in detail in this QAPP and the SAP. All samples will be analyzed for PCP, total and dissolved arsenic, and total and dissolved chromium. During each semi-annual groundwater sampling event, one groundwater sample from the monitoring or recovery well with the highest PCP concentration will be analyzed for: benzo(b) fluoranthene, benzo(k) fluoranthene, benzo(a) pyrene, indeno(1,2,3 cd) pyrene, dibenzo(ah) anthracene, and benzo(ghi) perylene. Additionally during each semi-annual sampling event, one groundwater sample from the monitoring or recovery well with the highest arsenic or chromium concentration will be analyzed for cyanide, antimony, barium, cobalt, copper, lead, manganese, nickel, selenium, and zinc.

4.6 Quality Objectives and Criteria

The Data Quality Objectives (DQOs) are to obtain representative samples from the site groundwater treatment system, site recovery wells, and site monitoring wells to evaluate the treatment system performance and the overall remediation of groundwater at the site. Separate data quality requirements have been designed for field sampling and laboratory analysis to assist the reviewer in identifying the sources of any discrepancies found within the data. The data quality requirements are also designed to provide an indication of the variability inherent in the overall system. Quality control samples, duplicates, specific field sampling protocol, and standard operating procedures are steps taken to address the possible sources of variability in analytical results relating to the project.

4.6.1 Overall Quality Assurance Project Objectives

The overall quality assurance objective is that data generated during this investigation, in conjunction with data from the previous investigations conducted, is appropriately obtained. The objectives were achieved by using the following DQO process (EPA QA/G-4, Guidance for the Data Quality Objectives Process):

1. State the problem
2. Identify the decision
3. Identify the inputs to the decision
4. Define the study boundaries
5. Develop a decision rule
6. Specify limits on decision errors
7. Optimize the design for obtaining data

The DQO can be evolved from data quality indicators (DQI). DQI are qualitative and quantitative descriptors used in interpreting the degree of acceptability or utility of data. The principal DQIs are precision, accuracy, representativeness, comparability, and completeness (PARCC). Establishing acceptance criteria for the DQI sets quantitative goals for the quality of data generated in the analytical measurement process.

Precision is a measure of agreement among replicate measurements of the same property, under prescribed similar conditions. Precision will be determined through the use of field duplicates, matrix spike/matrix spike duplicates and duplicate quality control samples. The Relative Percent Difference (RPD) between the two results will be calculated and used as an indication of the precision of the analyses performed.

The following formula should be used to calculate precision:

$$RPD = \frac{(C_1 - C_2)}{(C_1 + C_2)/2} x100$$

Where: RPD = relative percent difference

C_1 = larger of the two observed values

C_2 = smaller of the two observed values

Accuracy is a measure of the closeness of an individual measurement or the average of a number of measurements to the true value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that result from sampling and analytical operations. Accuracy is determined by analyzing a constituent of known concentration or by reanalyzing a sample to which a constituent of known concentration has been added. The analytical accuracy will be expressed as the percent recovery (%R) of a surrogate analyte. The surrogate analyte is added to the environmental sample at a known concentration before analysis and the percent recovery calculated according to the following equation.

$$\%R = 100x\frac{S - U}{C_{sa}}$$

Where: %R = percent recovery

S = measured concentration in spiked aliquot

U = measured concentration in unspiked aliquot

C_{sa} = actual concentration of spike added

Representativeness is a measure of the degree to which data accurately and precisely represent a characteristic of a population parameter at a sampling point or for a process condition or environmental condition. Representativeness is a qualitative term that should be evaluated to determine whether *in-situ* and other measurements are made and physical samples collected in

such a manner that the resulting data appropriately reflect the media and phenomenon measured or studied.

Comparability is the qualitative term that expresses the confidence that two data sets can contribute to a common analysis and interpolation. Comparability must be carefully evaluated to establish whether two data sets can be considered equivalent in regard to the measurement of a specific variable or groups of variables. In laboratory analysis, the term comparability focuses on method type comparison, holding times, stability issues, and aspects of overall analytical quantification.

Completeness is a measure of the amount of valid data obtained from a measurement system, expressed as a percentage of the number of valid measurements that should have been collected (i.e., measurements that were planned to be collected). Lack of completeness is a vital concern with stratified sampling. The intensity of effect due to incompleteness of data is sometimes best expressed as a qualitative measure and not just as a quantitative percentage. Data completeness will be expressed as the percentage of valid data obtained from the measurement system. For data to be considered valid, it must meet all the acceptable criteria including accuracy and precision, as well as any other criteria required by the prescribed analytical method.

The following formula should be used to calculate completeness:

%C = 100 times {V over n}

Where:	%C	= percent completeness
	V	= number of measurements judged valid
	n	= total number of samples

Secondary DQIs include sensitivity, recovery, memory effects, limits of quantitation, repeatability, and reproducibility.

Sensitivity is the capability of a method or instrument to discriminate between measurement

responses representing different levels of a variable of interest. Sensitivity is determined from the value of the standard deviation at the concentration level of interest. It represents the minimum difference in concentration that can be distinguished between two samples with a high degree of confidence.

Recovery is an indicator of bias in a measurement. In this case, spikes and/or surrogates may be added to the sample matrix. The recovery is often stated as the percentage measured with respect to what was added.

A memory effect occurs when a relatively high-concentration sample influences the measurement of a lower concentration sample of the same analyte when the higher concentration sample precedes the lower concentration sample in the same analytical instrument.

The limit of quantitation is the minimum concentration of an analyte in a specific matrix that can be identified and quantified above the method detection limit and within the specified limits of precision and bias during routine analytical operating conditions.

Repeatability is the degree of agreement between independent test results produced by the same analyst using the same test method and equipment on random aliquots of the same sample within a short time period.

Reproducibility is the precision that measures the variability among the results of measurements of the same sample at different laboratories. It is usually expressed as a variance and low values of variance indicate a high degree of reproducibility.

4.6.2 Laboratory Data Quality Objectives

The laboratories used for this project will demonstrate analytical precision and accuracy by the analysis of laboratory duplicates and matrix spikes. Laboratory accuracy will be demonstrated by the addition of surrogate and matrix spike compounds to characterize the behavior of similar

analytes contained in the particular sample matrix. Accuracy will be presented as percent recovery. Precision will be reported as relative percent difference (RPD).

Laboratory blanks will also demonstrate accuracy with respect to the analyses. The frequency of laboratory duplicates, matrix spikes, and blanks and standard calibration checks will be performed according to the laboratory's Standard Operating Procedures.

The laboratory used for this project will be expected to perform all analyses to provide the best possible representation of the sampling point. The project laboratory will also be expected to document any analytical problems encountered during the course of analysis and report these discrepancies in the narrative section of the deliverables package. The “CLP like” deliverable packages will contain documentation that will assure that analytical methods, parameters, and reporting units are comparable with other existing data.

4.7 Special Training/Certification

All project personnel including subcontractors will be 40-hour OSHA safety trained and current in their annual 8-hour refresher. The laboratory will be licensed in Virginia and certified to perform the required project analyses

4.8 Documents and Records

The quality assurance guidelines for the compilation of data begin by the proper organization of data to be evaluated. The initial organization process begins with following the quality assurance procedures regarding sampling and logging, labeling and documentation of samples collected in the field. This process continues with maintaining chain-of-custody from sample collection through sample analysis at the laboratory selected for this project: R.E.I. Consultants (REIC) Laboratories (Beaver, West Virginia). This preliminary organization process concludes with the reporting process by the laboratories for this project that will provide documentation in a “Contract Laboratory Procedure (CLP) like” data deliverable package. The data deliverable

package will include the submission of the complete raw data and be available along with electronic data to the VADEQ and EPA upon request.

Presentation of the data gathered will involve the manipulation of data in tables and graphic displays to make evaluation of data easier and facilitate the decision making process. All of the data collected should be inserted into data summary tables to create an accessible pool of information. From this point, the data can be grouped together to illustrate various observations, such as concentrations of variable constituents detected above applicable guidelines.
Base maps of the site should be made illustrating site conditions and sampling locations.

All project related files (both hard copy and electronic copies) will be maintained at Alliance. The electronic files use typical operating system security and are backed up regularly to tape and taken off-site. Hard copy files are kept locked in the Ashland, Virginia office. Electronic copies of laboratory-related files (i.e., EQuIS database files) will be made available to VADEQ and EPA, if requested.

5.0 DATA GENERATION AND ACQUISITION

This section addresses all aspects of data generation and acquisition to ensure that appropriate methods for sampling, measurement and data analysis, data collection or generation, data handling, and quality control activities are employed and documented.

5.1 Sampling Process Design (Experimental Design)

Alliance has developed a Sampling and Analysis Plan (SAP) for the Saunders Supply Superfund Site in order to evaluate the effectiveness of the groundwater extraction and treatment system and to evaluate the overall remediation of groundwater at the site.

Sampling locations have been identified in the SAP. The SAP identified the specific locations where samples that will be collected.

5.2 Sampling Methods

Sampling methods and procedures were identified in the SAP.

5.3 Sample Handling and Custody

The primary objectives of sample custody procedures are to create accurate written records that can be used to trace the possession and handling of all samples from the moment of their collection through analysis, until their final disposition. Custody documentation for samples collected during this project must be maintained by all members of the field and management staff. The field personnel are responsible for documenting each sample transfer and maintaining custody of all samples until they are shipped to the laboratory.

The project laboratory will ship all necessary sample bottles. The chain-of-custody will begin with the laboratory relinquishing sampling bottles. Sample bottles will be relinquished by the identified field staff after a thorough check of the integrity of the bottles and inspecting the bottles for correct application to the sampling task to be conducted.

Immediately after soil or aqueous sample collection, samples will be placed in an insulated cooler (containing ice for preservation) for shipment to the laboratory. Field chain-of-custody records completed at the time of sample collection will accompany the sample cooler for shipment to the project laboratory. The samples will be relinquished on the field chain-of-custody record by the sampling team. Each cooler will contain sufficient ice to maintain determined preservation temperatures and stored in a manner which prevents damage to sample containers. The sampler will initial and place a custody seal on each sample cooler. All coolers will be relinquished to an overnight courier or be transported by the approved laboratory under proper chain-of-custody.

Each separate sample will be identified using a sample label. The sampler will complete all information, using a black waterproof pen, as follows:

- The sample ID number will be the number assigned to the particular sampling location.
- The job number will be the number assigned to the particular facility.
- The analysis required will be indicated for each sample using approved analytical methodologies.
- Date taken will be the date the sample was collected, using the format: MM/DD/YY.
- Time will be the time the sample was collected, using military time. Example: 1430 hrs.
- The sampler's name will be printed in the "Sampled By" section.
- The container will also be marked to indicate preservation technique.

This sample label contains the authoritative information for the sample. Inconsistencies with other documents will be settled in favor of the vial label unless otherwise corrected in writing from the field personnel collecting the samples.

All samples analyzed by the project laboratory are to be considered to be of an evidentiary nature. The possession of samples must be traceable from the time samples are collected in the field until the analysis is completed and the data are entered as evidence. The tracing of the samples is accomplished by chain-of-custody procedures. A chain-of-custody record will be completed for each set of samples. The sampler will sign the first "Relinquished By" line at the bottom of the chain-of-custody record and indicate the date and time of the custody transfer. Samples will not leave custody of the field investigator until relinquished to another party.

Custody is defined as:

- In the actual physical possession of field personnel.
- In the field personnel's view after being in physical possession.
- In a locked area after being in physical possession.
- In a designated, locked storage area.

Upon arrival at the project laboratory, the Sample Custodian at each laboratory is responsible for maintaining possession of the chain-of-custody samples and for maintaining all records documenting that possession. Upon receipt of samples, the sample custodian signs the shipping report accompanying each sample and records the date and the time. A copy of this record becomes part of the report file. The custodian signs the chain-of-custody "Received By" laboratory space. The samples are then secured under lock and key in refrigerated storage. After each extraction or analysis of a sample fraction, the custody record is signed by the analyst, indicating the date and time of completion, which samples were used and to which location they were returned. By signing the custody record, the individual affirms that he was completely responsible for the sample fraction during the period of time it was not in the secure storage.

5.4 Analytical Methods

5.4.1 Analytical Method Selection

The analytical methods specified cover the project target list to include those compounds deemed to pose a potential hazard to human health and the environment detected during previous investigations. All analytical methods are selected to obtain the most accurate representation of the sampling point possible. The project laboratory will utilize standard EPA methods to analyze constituents of concern.

The method detection limit selection is based on the real assessment and analytical characterization data quality objectives. The methods selected specify the frequency and acceptance criteria for all associated control samples.

The project laboratory will use the following EPA analytical methods:

- Pentachlorophenol – Method SW8270 SIMS
- Arsenic and chromium (total and dissolved) – Method E200.8
- Benzo(b) fluoranthene, benzo(k) fluoranthene, benzo(a) pyrene, indeno(1,2,3 cd) pyrene, dibenzo(ah) anthracene, and benzo(ghi) perylene – Method SW8270 SIMS
- Cyanide – Method E335.4
- Antimony, barium, cobalt, copper, lead, manganese, nickel, selenium, and zinc – Method E200.8

The contract required quantitation limits are as follows:

- Pentachlorophenol – 0.2 ug/L
- Arsenic (total and dissolved) – 1 ug/L
- Chromium (total and dissolved) – 2 ug/L
- Benzo(b) fluoranthene, benzo(k) fluoranthene, benzo(a) pyrene, indeno(1,2,3 cd) pyrene,

dibenzo(ah) anthracene, and benzo(ghi) perylene – 0.1 ug/L for each

- Cyanide – 10 ug/L
- Antimony – 2 ug/L
- Barium – 10 ug/L
- Cobalt – 1 ug/L
- Copper – 2 ug/L
- Lead – 1 ug/L
- Manganese – 1 ug/L
- Nickel – 1 ug/L
- Selenium – 5 ug/L
- Zinc – 2 ug/L

5.4.2 Laboratory Selection

REIC Laboratories (Beaver, West Virginia) has been chosen to perform all analyses by current protocols, including sample tracking, instrument capabilities, and personnel qualification.

5.5 Quality Control

The following subsections involve the implementation of checks to be conducted by the Quality Assurance Officer. These checks are to ensure that quality assurance procedures are being implemented in conducting field tasks and that these procedures are producing the desired level of confidence in data quality.

5.5.1 Field Sampling Quality Control Checks

The field sampling quality control checks monitor the data quality as it is affected by field procedures. Several types of sample blanks may be used during the implementation. A list of these various sample blanks and their collection procedures are as follows:

Equipment (or Rinsate) Blank - Reagent water poured through the sampling equipment after routine cleaning. This sample is preserved and subsequently handled like all others. This blank is used to assess the potential for carryover contamination on non-disposable sampling equipment. **One rinsate blank during each semi-annual groundwater sampling event will be collected and submitted for laboratory analysis of PCP, arsenic (total and dissolved), and chromium (total and dissolved).**

Duplicate Samples - Blind field duplicates (as opposed to duplicate containers full of sample intended as backup) are sequential grab samples collected to monitor field precision. **One blind duplicate will be taken during each monthly system sampling event and one duplicate will be taken during each semi-annual groundwater sampling event. Duplicates will be analyzed for PCP, arsenic (total and dissolved), and chromium (total and dissolved).**

Matrix Samples – Matrix Spike and Matrix Spike Samples are sequential grab samples collected to determine long-term precision and accuracy of the analytical method on the sample matrix and to demonstrate acceptable compound recovery by the laboratory. **One matrix spike and one matrix spike duplicate will be designated during each monthly system sampling event and each semi-annual groundwater sampling event. The matrix samples will be analyzed for pentachlorophenol, total and dissolved arsenic, and total and dissolved chromium.**

5.5.2 Laboratory Quality Control Checks

The internal quality control checks to be routinely implemented by the project laboratory include the following:

- Replicates - A minimum of 5% of all samples will be duplicated (unspiked) in the lab. Duplicate injections will be made for all samples and should be within 20% RPD to be acceptable.

- Matrix samples – Semi-volatile organic samples will be matrix spiked with the suggested matrix spike compound at a frequency of one per twenty samples per matrix or every fourteen days, whichever occurs most frequently. A matrix spike duplicate will be prepared simultaneously.
- Surrogate spikes - Surrogate compound spikes are placed into all samples and all matrices for organic analysis prior to sample preparation.
- Blanks - Blanks will be analyzed at a minimum of one every twelve hours or twenty organic samples, whichever is more frequent. These blanks are referred to as method blanks. The acceptability limits for method blanks is to be below the designated EPA Method detection level.
- Quality Control Standards - Quality control standards (often referred to as spiked reference materials) traceable to the U.S. EPA or generated from concentrates prepared separately from calibration standards, will be included at a rate dependent on sample matrix and lab performance with matrix spikes. The minimum is one QC standard to validate the initial calibration. For organic analyses after every 12 hours of operation, a QC or mid-range standard will be analyzed to continuously verify that the calibration is within 10% of the initial calibration. For organic analyses after every 12 hours of operation, a QC or mid-range standard will be analyzed to verify that the Calibration Check Compounds are within 25% of the initial calibration curve for volatile analysis. Additionally, for organics the system response for System Performance Check Compounds must be verified to be above the minimum levels as described in method SOP.
- GC/MS - Once every 12 hours the GC/MS tune must be verified. This tune is followed by the calibration verification, a method blank, and the internal standard response and retention time check before resuming sample analysis.
- GC/MS Internal Standard Response and Retention Times - Immediately after calibration verification the internal standard response must be verified to be within 50% to 200% of the response for the previous verification, and the internal standard retention times must be within 30 seconds of the previous verification run.
- The quantitation limits stated in section 5.4.1 will be utilized as per contract requirements.

5.6 Instrument/Equipment Testing, Inspection, and Maintenance

The following section will detail the quality assurance guidelines to be adhered to by the field personnel for calibration and maintenance of their equipment.

Field measurements of pH, dissolved oxygen, specific conductance, eH, turbidity, and temperature (as collected) will be in accordance with the field instruments' manufacturers' instructions and with Alliance's manual of Standard Operating Procedures. Each instrument will be field-calibrated as required (a minimum of once daily – before field measurements).

Field equipment is maintained through daily maintenance procedures conducted in the field will include:

- Removal of surface dirt and debris from exposed surfaces of sampling equipment and measuring systems.
- Storage of equipment away from the elements.
- Daily inspections of sampling equipment and measurement systems for possible problems (e.g., cracked or clogged lines or tubing or weak batteries).
- Calibration of instrument.
- Charging any battery packs for equipment when not in use.

To minimize down time, spare replacement parts should be stored in the field, including:

- Batteries.
- Locks.
- Extra sample containers and preservatives.
- Extra field monitoring probes, sample coolers, packing material and sample location stakes.
- Additional supply of health and safety equipment (i.e., respirator cartridges, boots,

gloves, Tyvek, etc.).

5.7 Instrument/Equipment Calibration and Frequency

During the course of this project, various field measurements will be taken during sampling. Monitoring devices (e.g., pH meter) will be used while conducting site activities. All instruments used during site activities to screen samples and to determine the level of personal protective equipment required will be calibrated daily prior to usage and/or as specified in the manufacturer's protocols. The following section details the calibration methodology for numerous types of standard field instrumentation.

In general and at a minimum, all field instruments will be calibrated as specified by the manufacturer and documented as follows:

- The calibration of each instrument/meter shall be recorded in the field log book, as well as maintenance/repair work, and usage, in a standard format including the information listed below.
- Entries to the instrument log books shall be made at least daily whenever the instrument is in use.
- All personnel performing instrument calibrations shall be trained in its operation and calibrating procedures.

5.8 Inspection/Acceptance of Supplies and Consumables

Daily inspections of supplies and consumables will be conducted and be in accordance with the field instruments manufacturer’s instructions.

5.9 Non-Direct Measurements

No non-direct measurements are being used during this project.

5.10 Data Management

The Database System that Alliance utilizes is the "Environmental Quality Information System (EQuIS)" which is based on Microsoft Office products and written for the Microsoft Windows operating system. Therefore, all existing data and new data is easily imported and exported to different products that are used for diagrams, graphs, tables, and figures. This Database System provides an integrated suite of applications and a common database management system for all organizations involved in the data collection, processing, management, and evaluation aspects of environmental project work.

Laboratory data is electronically transmitted to Alliance in common electronic data deliverable (EDD) formats. Once received, the Alliance data management department uploads the data into the EQuIS database system. Field data is manually entered into EDDs and uploaded into the EQuIS database system.

Once the data has been fully incorporated into the database, it can then be easily exported into the programs that are used to graphically represent the data (i.e., Grapher, Surfer, AutoCAD, ARCView, etc.).

6.0 ASSESSMENT AND OVERSIGHT

This section describes activities that will be conducted to ensure data quality.

6.1 Assessments and Response Actions

A review of field notes, chain of custody forms, and laboratory analytical data will be conducted throughout the course of project activities. The review will be conducted by the Project Manager or by a member of the project team designated by the Project Manager. The laboratory will be responsible for their quality control / quality assurance criteria.

If an error is suspected during the course of assessment, one or more of the following response actions may be taken:

- A new sample may be collected or the sample may be re-analyzed if sufficient sample volume remains and the sample is within the appropriate holding time for that analysis.
- Equipment calibrations will be repeated and the measurement taken again.
- The equipment will either be repaired or replaced.
- A second piece of equipment will be on hand (if possible) to replace and/or verify measurements taken with a suspect piece of equipment.

The appropriate response action will be determined by the Project Manager and appropriate personnel on a case-by-case basis. The Project Manager will oversee implementation of the response action.

6.2 Reports to Management

The Project Manager will oversee the preparation of update reports designed to keep project team members appraised of investigation activities. The report frequency and content will be at

the discretion of the Project Manager. The distribution of update reports will be at the discretion of the Project Manager.

7.0 DATA USABILITY

All data will be evaluated to document its usability. The activities associated with the data evaluation are data compilation and data presentation. The purpose of these practices is to manage and effectively evaluate (in terms of quality assurance and quality control) the quality of data anticipated to be generated. By implementing these practices, a confidence in the accuracy and representativeness of the data obtained can be assured. The following subsections present discussions of data compilation and data presentation.

7.1 Data Review

A Type 1 data package (CLP like for non-CLP methods) will be requested from the analytical laboratory. Upon the tabulation of all data, the overall quality of the project data can be evaluated.

The results of the field duplicates and blanks will be evaluated at this time along with comparisons using previous laboratory results and field data.

7.2 Reconciliation with User Requirements

Presentation of the data gathered will involve the manipulation of data in tables and graphic displays to make evaluation of data easier and facilitate the decision making process. All of the data collected will be inserted into data summary tables to create an accessible pool of information. From this point, the data can be grouped together to illustrate various observations, such as concentrations of variable constituents. Bar and line graphs may be used to illustrate change in constituent concentration per unit variable such as time or distance. Pie charts can be used to illustrate constituent concentration percentages identified at specific locations or overall sampling locations.

Base maps of the site will be made illustrating site conditions and sampling locations.

TABLES

Table 2-1
Recovery and Monitoring Wells to Be Sampled
Saunders Supply Company Superfund Site

ID	Type
MW-7S	Monitoring Well
MW-8D	Monitoring Well
MW-9S	Monitoring Well
MW-10D	Monitoring Well
MW-11S	Monitoring Well
MW-12D	Monitoring Well
MW-19D	Monitoring Well
MW-20S	Monitoring Well
MW-21D	Monitoring Well
MW-22S	Monitoring Well
MW-23D	Monitoring Well
RW-1	Recovery Well
RW-2	Recovery Well
RW-4	Recovery Well
RW-5	Recovery Well

APPENDIX I

HEALTH AND SAFETY PLAN

SITE HEALTH AND SAFETY PLAN

Prepared for:

Saunders Supply Superfund Site
5969 Godwin Boulevard
Suffolk, Virginia

Prepared by:

Environmental Alliance Inc.
10993 S. Richardson Road
Suite 17
Ashland, VA 23005

Jason S. Early
Project Manager

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SITE EMERGENCY FORM

Contaminants of Concern: Pentachlorophenol, Polycyclic Aromatic Hydrocarbons, Arsenic, Chromium, and other Metals
Minimum Level of Protection: Level D

Do not endanger your life. Survey the situation before taking any action.

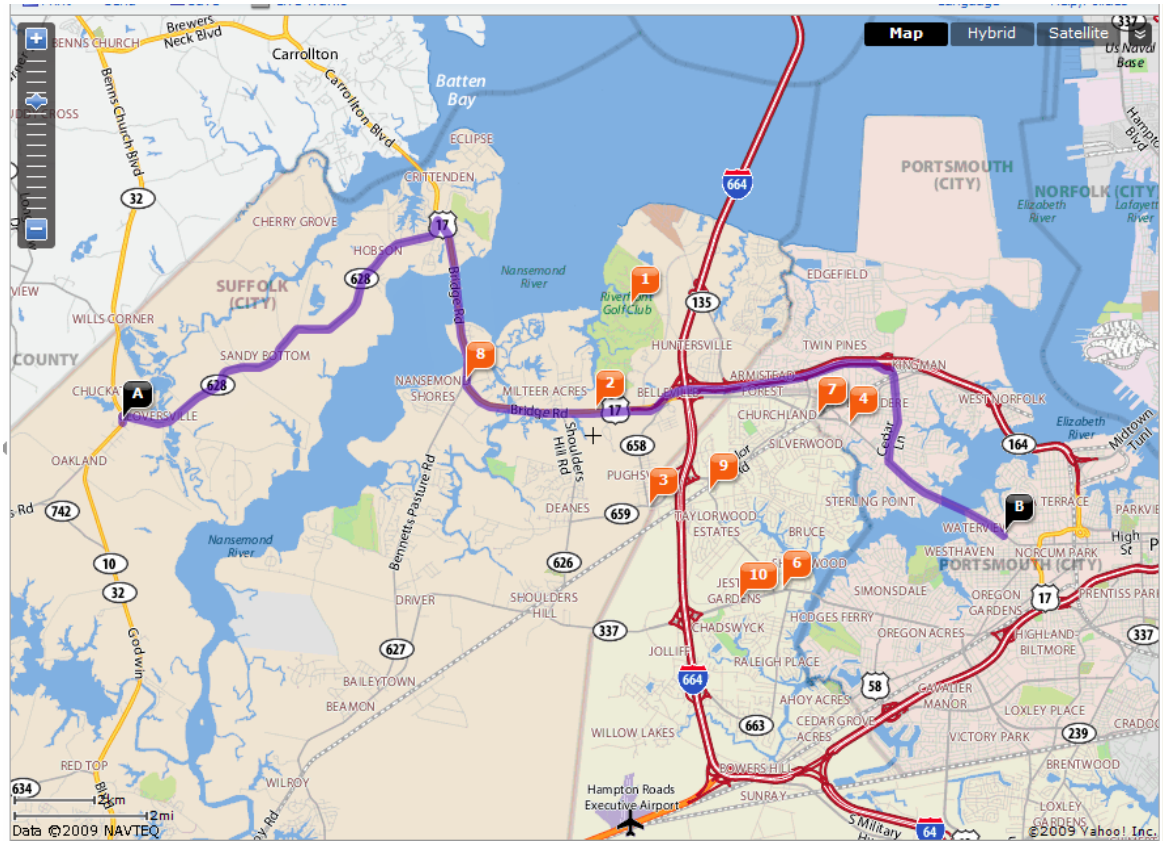
Environmental Alliance, Inc. Office Telephone:	(804) 752-3558
Environmental Alliance, Inc. Cell Telephone (Jason Early):	(540) 809-5085
Site Location Address:	5969 Godwin Boulevard Suffolk, VA
Site Contact:	Alliance field supervisor
Ambulance:	911

EMERGENCY PHONE NUMBERS:

IN THE EVENT OF ANY EMERGENCY, CONTACT PROJECT MANAGER OR HEALTH AND SAFETY REPRESENTATIVE
PROJECT MANAGER: JASON EARLY

Fire:	911
Field Operations Manager:	Matt Richardson
Health and Safety Representative:	Matt Geary
Police:	911
Client Contact:	Tom Modena, VADEQ (804) 698-4183 [office] (804) 819-9884
Poison Control:	800-222-1222 (VA)
State Agency:	Virginia Department of Environmental Quality (804) 698-4183
DEQ 24-hour emergency number:	800-592-5482
Hospital Name:	Bon Secours Maryview Medical Center 3636 High Street Portsmouth, VA 23707
Hospital Phone:	(757) 398-2200

HOSPITAL LOCATION MAP



Hospital Directions:

Start at 5969 GODWIN BLVD, SUFFOLK going toward KINGS HWY
Turn Right on KINGS HWY(VA-125) - go 0.71.1 mikm
Turn Left on CRITTENDEN RD(VA-628) - go 5.38.5 mikm
Turn Right on BRIDGE RD(US-17 S) - go 5.08.0 mikm
Take ramp onto VA-164 E toward I-664 N/NEWPORT NEWS/HAMPTON/DOWNTOWN PORTSMOUTH - go 3.75.9 mikm
Take the CEDAR LANE exit onto CEDAR LN - go 1.72.7 mikm
Bear Left on HIGH ST W(US-17) - go 2.03.2 mikm
Arrive at 3636 HIGH ST, PORTSMOUTH, on the Left

Hospital Information:

Name:
Bon Secours Maryview Medical Center
Union Hospital

Address:
3636 High Street
106 Bow Street

City, State:
Portsmouth, VA

Phone:
(757) 398-2200
(410) 398-4000

EMERGENCY FIRST AID

1. Survey the situation. Do not endanger your own life. **DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND A STANDBY PERSON IS PRESENT.**

2. Call 911 (if available) or the fire department **IMMEDIATELY**. Explain the physical injury, chemical exposure, fire, or release.

3. Decontaminate the victim without delaying life-saving procedures.

4. If the victim's condition appears to be non-critical, but seems to be more severe than minor cuts, he/she should be transported to the nearest hospital by trained Emergency Medical Services (EMS) personnel: Let the doctor assume the responsibility for determining the severity of the injury. If the condition is obviously serious, EMS must transport the victim.

5. Notify the Project Manager and the Health and Safety Manager. Complete the Preliminary Incident Report Form within 24 hours.

EMERGENCY FIRST AID PROCEDURES	
To Stop Bleeding	**Cardiopulmonary Resuscitation (CPR)**
1. Give medical statement only if qualified. 2. Assure airway, breathing, circulation. 3. Use DIRECT PRESSURE over the wound with clean dressing or your hand (use nonpermeable gloves). Direct pressure will control most bleeding. 4. Bleeding from an artery or several injury sites may require DIRECT PRESSURE on a PRESSURE POINT. Use pressure points for 30-60 seconds to help control severe bleeding. 5. Continue primary care and seek medical aid as needed.	1. Call for help. 2. Arousal: Check for consciousness. 3. Open airway with chin-lift. 4. Look, listen, and feel for breathing. 5. If breathing is absent, give 2 slow, full rescue breaths. 6. Check the pulse for 5 to 10 seconds. 7. If pulse is present, continue rescue breathing: 1 breath every 5 seconds. 8. If pulse is absent, start CPR: 15 compressions, 2 breaths (1 man).

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1.0 INTRODUCTION/SCOPE OF WORK

The Virginia Department of Environmental Quality (VADEQ) has contracted Environmental Alliance, Inc. (Alliance) to perform environmental services at the Saunders Supply Superfund Site in Suffolk (Chuckatuck), Virginia. Environmental services consist of the following site activities: remediation system operation and maintenance and groundwater sampling and analysis. The site is located at 5969 Godwin Boulevard, Suffolk, Virginia.

This Site Safety Plan is written to ensure the well being of all field personnel and the community surrounding the site. Accordingly, project staff and approved Alliance subcontractors must follow the policies and procedures established in the Site Safety Plan. All personnel assigned to this project must sign the Agreement and Acknowledgement Sheet (Appendix A-2) to confirm that they understand and agree to abide by the provisions of the plan.

All work will comply with the OSHA Standard, "Hazardous Waste Operations and Emergency Response," (29 CFR 1910.120) and other federal, state and local procedures that require the development and implementation of a Site Safety Plan.

This plan addresses the safety issues associated with environmental operations typically involving the following site tasks:

- Field Survey/Walkover
- Drilling/Boring/Soil Sampling
- Remediation System Operation and Maintenance (O&M)
- Groundwater/Surface Water Sampling

All activities of this project will be carried out under Level D Personal Protective Equipment (PPE) with air monitoring and Level C capability on-site. This Site Safety Plan must be modified or amended when circumstances or conditions develop that are beyond this scope. Such conditions include:

- Troubleshooting Energized Equipment
- Level B Work
- Presence of Nonhydrocarbon Materials

Any changes in project work scope and/or site conditions as described must be amended in writing by the Health and Safety Representative (HSR) on the Site Safety Plan Amendment Sheet (Appendix A-1).

Table 1-1 presents an overview of the Environmental Alliance health and safety programs in which all field personnel are required to participate. These include the medical surveillance and comprehensive training programs in accordance with OSHA Hazardous Waste Operations and Emergency Response regulation, 29 CFR 1910.120.

TABLE 1-1 ENVIRONMENTAL ALLIANCE, INC. HEALTH AND SAFETY PROGRAMS		
Activity	**Description**	**Action**
Medical Surveillance	• The program tracks the physical condition of the Company's employees in compliance with DOT and OSHA regulations, and other customer requirements. • Specific components of the medical surveillance program are described in Environmental Alliance's Health and Safety Procedure Manual.	• Medical examinations and consultations are completed for all full-time field employees prior to assignment, annually, upon termination, and in the event of injury and/or illness resulting from exposure at the work site.
Training	• Training requirements and programs comply with the OSHA Hazardous Waste Operations and Emergency Response regulation, 29 CFR 1910.120.	• Field personnel must complete a minimum of 40 hours of hazardous waste activity instruction. • Field personnel must complete a minimum of three days supervised field instruction. • Field personnel assigned to the site will also receive eight hours of refresher training each year. • On-site managers and supervisors directly responsible for employees engaged in hazardous waste operations receive an additional eight hours of supervisory training.

2.0 HAZARD IDENTIFICATION AND CONTROL

Precautions must be taken to prevent injuries and exposures to the following potential hazards.

TABLE 2-1 POTENTIAL HAZARDS AND CONTROL	
Potential Hazard	**Control**
Exposure to Pentachlorophenol (PCP), Polycyclic Aromatic Hydrocarbons, Metals, and Soda Ash **(See Appendices B-1: MSDS Definitions and B-2: MSDSs)**	Stand up-wind of chemicals whenever possible. Minimize contact and contact time with chemicals. Avoid walking through discolored areas, puddles, leaning on drums, or contacting anything that is likely to be contaminated. Do not eat, drink, smoke and/or apply cosmetics in the hot or warm zones. Wear gloves when in contact with contaminated surfaces. Safety glasses must be worn at a minimum. Splash goggles must be worn when working with liquids. >25 ppm organic vapors in breathing zone requires upgrade to Level C. >100 ppm organic vapors in breathing zone requires upgrade from Level C to Level B. If unknown materials are encountered, call the HSR.
Vehicular Traffic	Wear traffic safety vest when vehicle hazard exists. Use cones, flags, barricades, and caution tape to define work area. Use vehicle to block work area. Engage police detail for high-traffic situations.
Excavation Hazards	Excavation is not planned at this site.
Open Excavation	Excavation is not planned at this site.
Inclement Weather	Stop outdoor work during electrical storms and other extreme weather conditions such as extreme heat or cold temperatures. Take cover indoors or in vehicle. Listen to local forecasts for warnings about specific weather hazards such as tornados, hurricanes and flash floods.
Noise	Wear hearing protection when equipment such as a drill rig, jackhammer, cut saw, air compressor, blower or other heavy equipment is operating on the Site. Wear hearing protection whenever you need to raise your voice above normal conversational speech due to a loud noise source; this much noise indicates the need for protection.
Electric Shock	Maintain appropriate distance from overhead utilities; **20-foot minimum clearance from power lines required;** **0-foot minimum clearance from shielded power lines.** Use ground-fault circuit interrupters as required. Perform lockout/tagout procedures (Appendix C-1). Use three-pronged plugs and extension cords.

TABLE 2-1 POTENTIAL HAZARDS AND CONTROL	
Potential Hazard	**Control**
	Contact your local underground utility-locating service. Follow code requirements for electrical installations in hazardous locations.
Physical Injury	Wear safety glasses when on site. Maintain visual contact with the equipment operator and wear orange safety vest when heavy equipment is used on site. Avoid loose-fitting clothing (driller and driller's helper). Prevent slips, trips and falls; keep work area uncluttered. Keep your hands away from moving parts (i.e. augers). Test the emergency shutoff switch on the drill rig daily.
Back Injury	Use a mechanical lifting device or a lifting aid where appropriate. If you must lift, plan the lift before doing it. Check your route for clearance. Bend at the knees and use leg muscles when lifting. Use the buddy system when lifting heavy or awkward objects. Do not twist your body while lifting.
Heat Stress	Increase water intake while working. Increase number of rest breaks and/or rotate workers in shorter work shifts. Watch for signs and symptoms of heat exhaustion and fatigue. Plan work for early morning or evening during hot months. Use ice vests when necessary. Rest in cool, dry areas. In the event of heat stroke, bring the victim to a cool environment and initiate first aid procedures.
Cold Stress	Take breaks in heated shelters when working in extremely cold temperatures. Remove the outer layer of clothing and loosen other layers to promote evaporation of perspiration, upon entering the shelter. Drink warm liquids to reduce the susceptibility to cold stress.
High Crime Areas	Be aware of surroundings. Use the buddy system. Request police detail when appropriate.
Insects	Tuck pants into socks. Wear long sleeves. Use insect repellent.
Poisonous Plants (such as poison ivy, oak or sumac)	Don't enter areas infested with poisonous plants. Immediately wash any areas that come into contact with poisonous plants.
Ladders	Make sure ladder rungs are sturdy and free of cracks. Use ladders with secure safety feet.

TABLE 2-1 POTENTIAL HAZARDS AND CONTROL	
Potential Hazard	**Control**
	Pitch ladders at a 4:1 ratio. Secure ladders at the top when possible. Do not use ladders for access to air stripper towers. Use non-conductive ladders near electrical wires.
Fire Control	Smoke only in designated areas. Keep flammable liquids in closed containers. Keep site clean; avoid accumulating combustible debris such as paper. Follow Hot Work Safety Procedures when welding or performing other activities requiring an open flame. Isolate flammable and combustible materials from ignition sources. Ensure fire safety integrity of equipment installations according to Hazard Classification Diagram (Appendix D).
Chemical Spill/Release	See Section 5.4 of this document.
Explosion	All excavation equipment will be outfitted with plexiglass blast shields. Brass hand tools will be utilized when applicable.
Rail-line Traffic	Provide one flag person per shift to watch the lines. Rotate counter weight on excavation equipment prior to digging to establish safe distances from the tracks. Provide warning air horns to all personnel. Conduct a pre-construction meeting and obtain traffic schedules.
Static Electricity	Do not create static discharge in flammable atmospheres. Electrically bond and ground pumps transfer vessels, tanks, drums, bailers and probes, when moving liquids. Electrically bond and ground vacuum trucks and the tanks they are emptying. Do not splash fill containers with flammable liquids.

3.0 AIR MONITORING

3.1 Air Monitoring

Air monitoring must be performed on all sites in accordance with Alliance practices. Organic vapor concentrations are monitored in the field with a flame ionization detector (FID) or photoionization detector (PID). All readings are taken in the workers' breathing zone to determine whether an action level has been met and/or exceeded. Air monitoring results must be documented on the Vapor Monitoring Form (Appendix B-3).

Air monitoring action levels (Table 3-1) have been developed by Alliance health and safety personnel to indicate the chemical concentrations in the breathing zone that require an upgrade in level of personal protective equipment (PPE). The action levels apply to all tasks performed on this site. Guidelines for frequency of air monitoring are presented in Table 3-2.

TABLE 3-1
AIR MONITORING ACTION LEVELS

Instrument*	Function	Readings	Action
Photoionization Detector (PID) **Flame Ionization Detector (FID)**	**Measures total organic vapors**		
		0-25 ppm	Level D required.
		25-100 ppm	Upgrade to Level C.
		>100 ppm	Stop work. Contact PM and HSR for guidance.
Oxygen/ Combustimeter (O2/LEL)	**Measures oxygen level (O2) and lower explosive limit (LEL)**		
		O_2 19.5-22%	Acceptable conditions. Continue normal activity.
		O_2 <19.5%	Ventilate the space. Notify PM or HSR if unable to achieve acceptable conditions.
		O_2 >22%	**Leave area immediately**; this atmosphere is extremely flammable. Notify PM or HSR.
		LEL <10%	Acceptable conditions. Continue normal activity.
		LEL >10%	**Leave area immediately**. Contact PM or HSR for guidance on venting and other safety measures.
*** Note: Instruments must be calibrated according to manufacturer's recommendations.**			

TABLE 3-2 AIR MONITORING FREQUENCY GUIDELINES
Conduct periodic monitoring when: (1) it is possible that an IDLH condition or a flammable atmosphere has developed or (2) there is an indication that exposures may have risen over permissible exposure limits or published exposure levels since the last monitoring. Look for a possible rise in exposures associated with these situations: - **Change in Site Area** - work begins on a different section of the site - **Change in Contaminants** - handling contaminants other than those first identified - **Change in On-Site Activity** - one operation ends and another begins - **Handling Leaking Drums or Containers** - **Working with Obvious Liquid Contamination** (e.g., a spill or lagoon) Conduct air monitoring when the possibility of volatilization exists (such as with a new monitoring well or a well containing known product). Conduct air monitoring on a well at a site known to have little contamination (documented by experience or laboratory data), only if an odor emanates from the well.

3.2 Confined Space Entry Procedures and Permit

Site work may require personnel to enter confined spaces. **No Alliance employee or subcontractor shall enter an area identified as a confined space without using the confined space entry procedures described in Table 3-3**. The purpose of the confined space entry procedure is to protect employees from potentially hazardous environments and to facilitate immediate rescue in an emergency situation. A Confined Space Entry Permit must be posted at the entrance to each confined space.

TABLE 3-3 CONFINED SPACES
Definition
Any space which is large enough and so configured that an employee can bodily enter and perform assigned work.
Examples
Excavation pits, trenches, storage tanks, subsurface vaults, basements, silos, manholes, and sewers.
Characteristics
• Limited or restricted access and egress • Limited natural ventilation • Not designed for continuous human occupancy
Protocol for Confined Space Entry
• Perform the appropriate air monitoring activity at various depths in the space prior to entry. Monitor for: (1) oxygen level, (2) flammable vapors, and (3) toxic vapors. • Ventilate the atmosphere in the space so that entry may be made safely without respiratory protection. If this is not feasible, appropriate respiratory protection must be worn by authorized entrants and attendants. • Wear respiratory protection when ventilation alone can not achieve acceptable atmospheric levels of oxygen or flammable or toxic vapors.

4.0 CHEMICAL HAZARD CONTROL

4.1 Chemical Handling Procedures

Personnel must practice the chemical-specific handling procedures outlined below.

TABLE 4-1
CHEMICAL HANDLING PROCEDURES

Chemical	Description	Procedures
Metals	Arsenic, Chromium, and other metals	• Wear gloves and eye-splash protection while using acid dispensed from a small dropper bottle during water sampling. • Have an eye wash bottle or portable eye wash station on-site.
Gasoline	Used in generators for sampling	• Wear gloves and eye-splash protection while pouring, mixing, or handling. • Have an eye wash bottle or portable eye wash station on-site. • Do not handle near open flames, sparks, or other potential ignition sources.
Soda Ash	Sodium Carbonate; nose, throat, and lung irritant	• Wear gloves and eye-splash protection while pouring, mixing, or handling. • Have an eye wash bottle or portable eye wash station on-site.
Polycyclic Aromatic Hydrocarbons (PAHs) and Pentachlorophenol (PCP)	Skin, eye, nose, and throat irritants	• Wear gloves and eye-splash protection while using acid dispensed from a small dropper bottle during water sampling. • Wear a full-face, air-purifying respirator equipped with combination cartridges (organic vapor/acid gas) as well as Tyvek coveralls and nitrile and/or NBR gloves for large volume applications. • Have an eye wash bottle or portable eye wash station on-site.

4.2 Personal Protective Equipment (PPE)

Modified Level D is the minimum acceptable level for this site. Level C is the minimum acceptable level in the exclusion zone.

TABLE 4-2 PERSONAL PROTECTIVE EQUIPMENT	
Level	**Requirements**
Modified Level D	• Work uniform • Steel-toed boots • Approved safety glasses or goggles • Hard hat (in areas of overhead hazards) • Fluorescent vest, when vehicular traffic is on or adjacent to the site • Nitrile gloves for water sampling handling • PE-coated Tyvek suit, NBR outer and nitrile inner gloves if skin contact with contaminants is possible
Level C	• NIOSH-approved full-face respirator with organic vapor/acid gas cartridges • Work uniform • Steel-toed boots • Hard hat • PE-coated Tyvek suit, NBR outer and nitrile inner gloves, if skin contact with contaminants is possible
Level B	• SCBA or supplied air breathing apparatus • Work uniform • Steel-toed boots • Hard hat • PE-coated Tyvek suit, NBR outer and nitrile inner gloves, if skin contact with contaminants is possible

4.3 Site Control: Work Zones

Work zones will be established in order to: (1) delineate high-traffic locations, (2) identify hazardous locations and (3) contain contamination within the smallest area possible. Employees entering the work zone must wear the proper personal protective equipment for that area. Work and support areas will be established based on ambient air data, necessary security measures, and site-specific conditions. The work areas that will be established for the site and the associated PPE are as follows:

- Decontamination Zone: Modified Level D
- Contaminant Reduction Zone: Modified Level D
- Exclusion Zone: Level C

4.4 Decontamination Procedures

Operations conducted at this site have the potential to contaminate field equipment and personal protective equipment. To prevent the transfer of contamination to vehicles, administrative offices and personnel, the procedures presented in Table 4-3 must be followed.

TABLE 4-3 DECONTAMINATION PROCEDURES		
Item	**Examples**	**Procedure**
Field Equipment	Bailers, interface probes, sampling pumps, hand tools, and miscellaneous sampling equipment	• Decontaminate with a solution of detergent and water; rinse with water prior to leaving the site. • Protect from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.
Disposable PPE	Tyvek suits, inner latex gloves, respirator cartridges	• Dispose of according to the requirements of the client and state and federal agencies.
Nondisposable PPE	Respirators	• Wipe out respirator with disinfecting pad prior to donning. • Decontaminate on site at the close of each day with a solution of an approved sanitizing powder and water.

5.0 CONTINGENCY PLANS

Table 5-1 (Sections 5.1 - 5.4) presents contingency plans for potential emergency situations.

TABLE 5-1 CONTINGENCY PLANS FOR SITE EMERGENCIES	
Situation	**Action**
Evacuation	Immediately notify all on-site personnel of an emergency requiring evacuation. Leave the dangerous area and report to a designated rally point. Notify Emergency Services, as appropriate. Account for all personnel. Contact the PM and the HSR as soon as possible. Maintain site security and control measures for community safety until Emergency responders arrive.
Medical Emergency	Survey the Situation: **Do not enter an area that may jeopardize your safety.** • Establish the patient's level of consciousness. • Call for help. • Contact Emergency Medical Services and inform them of patient's condition. Primary Assessment (patient unconscious) • Arousal • Airway • Breathing • Circulation **Only trained personnel should perform CPR or First Aid.** Secondary Assessment (patient conscious) • Check for bleeding: Control with direct pressure. • Do not move patient (unless location is not secure). • Monitor vital signs. • Provide First Aid to the level of your training. • Contact the PM and HSR as soon as possible. • Document the incident on Environmental Alliance's Preliminary Incident Report Form.
Fire Emergency	**Evacuate the area**. Notify the Emergency Services. Extinguish small fires with an all-purpose extinguisher. Contact the PM and HSR. Document the incident using the Preliminary Incident Report Form.
Spill/Release	Prevent problems by documenting the location of underground lines (e.g. product, sewer, telephone) before starting site work. If you drill through a line

TABLE 5-1 CONTINGENCY PLANS FOR SITE EMERGENCIES	
Situation	**Action**
	or tank or another leak occurs, document the spill/release in writing. Include dates, times, actions taken, agreements reached and names of people involved. In the event of a spill/release, follow this plan. Wear appropriate PPE; stay upwind of the spill/release. Plug the leak or collect drippings in a bucket, when possible. Place sorbent pads to collect product, if possible. Call Fire Department immediately if fire emergency develops. Advise the client of spill discharge notification requirements and determine who will complete and submit forms. Do not submit or report to agencies without the client's consent. Document each interaction with the client and regulators and note, in writing: name, title, authorizations, refusals, decisions, and commitments to actions. Utilize drum grappler on tracked excavator to remove leaking container(s) and place into 85 gallon overpack drum. The drum will be staged on a 10 by 10 foot polyethylene bermed staging area. Stage overpacks for waste classification analysis. Do not transport or approve transportation of contaminated soils or product until proper manifests have been completed and approved. Be aware that soils/product may meet criteria for hazardous waste. Do not sign manifests as generator of waste; contact the regional compliance manager to discuss waste transportation.
Notifications The Project Manager must contact the client or generator. The generator is under obligation to report to the proper government agencies. If the spill extends into waterways, the Coast Guard and the National Guard Response Center (1-800-424-8802) must be notified immediately by the client or with his permission.	

APPENDIX A-1: AMENDMENT SHEET

Project Name:	
Project Number:	
Project Manager:	
Location:	
Changes in field activities or hazards:	

Approved by:

Matt Geary
Health and Safety Representative

Date:

APPENDIX A-2: AGREEMENT AND ACKNOWLEDGEMENT SHEET

Environmental Alliance, Inc. personnel have the authority to stop field activities at this site if any activity is not performed in accordance with the requirements of the Site Safety Plan. All Environmental Alliance, Inc. project personnel, subcontractor personnel, and visitors are required to sign the Agreement and Acknowledgement Sheet prior to conducting field activities at this site.

APPENDIX A-2 AGREEMENT AND ACKNOWLEDGEMENT SHEET		
1. I have been made aware of the contents of and fully understand the SSP and my responsibilities. 2. I agree to abide by the provisions of the SSP.		
Name		Signature
Company		Date
Name		Signature
Company		Date
Name		Signature
Company		Date
Name		Signature
Company		Date
Name		Signature
Company		Date

APPENDIX A-3: VISITOR/TRAINEE GUIDELINES

Alliance is committed to providing a safe environment on all work sites for visitors, trainees, employees and/or passersby. In order to accomplish this, the following guidelines must be followed.

1. VISITORS

Any person not actively participating in the work at the site is regarded as a "visitor" and must follow Alliance's visitor/trainee guidelines. Visitors must be accompanied by a representative while on site.

Sites must be marked with signs, placards, and/or barricades to designate hazardous boundaries. Visitors will not be allowed on any site that is not adequately marked.

2. TRAINEES

Trainees are employees of Alliance who have not yet completed the required safety training program (CRF 1910.120(e)). New hires and in-house company transfers will be considered trainees until safety training requirements are met.

Trainees will be informed of restrictions by their supervisor and must abide by them before visiting active sites.

Trainees will be permitted to visit Alliance sites as observers as long as the following conditions are met:

- Trainees are supervised at all times while observing on site.
- Trainees do not perform work functions of any type while on site.
- Trainees do not handle any equipment, tools and/or supplies while on site.
- Trainees do not enter any hazardous or hot zone or confined space areas while on site.

Supervisors will be responsible for informing trainees of the above conditions and for ensuring that the conditions are met. Supervisors will also ensure that trainees will not be asked to violate the conditions listed above.

A Trainee/Observer Agreement Form must be signed by both the trainee and the supervisor and placed on file in the Human Resources department.

Infractions of the above agreement will be viewed as extremely serious and will be subject to discipline up to and including termination for either the trainee and/or supervisor.

TRAINEE/OBSERVER AGREEMENT FORM

Environmental Alliance, Inc. is committed to providing a safe working environment for all employees. In addition, Environmental Alliance, Inc. will comply with OSHA requirements for employee safety training prior to working on any hazardous site.

The following section is to be filled out by trainee.

Agreement between:

and Environmental Alliance, Inc.

Name (print/type) SS#

Because we have your safety in mind, you will be considered a trainee until all training criteria are met. This means you must complete all training requirements prior to performing work activities on site. As a requirement of the training program, you will be asked to visit Environmental Alliance, Inc. sites as an observer. You must be supervised on all of these site visits.

As an on-site observer trainee, your signature below indicates your agreement to these restrictions.

You may not:

1. Perform work functions of any type.
2. Handle any equipment/tools and/or supplies of any type.
3. Enter any hazardous or hot zone areas.

I agree to adhere to the above conditions in all instances while on site as a trainee/observer.

Signature: Date:

- -

This section is to be filled out by supervisor.

As supervisor to the above trainee, I agree to the above restrictions and agree not to request him/her to perform activities contrary to those restrictions.

Signature: Date:

APPENDIX A-4: PRELIMINARY INCIDENT REPORT FORM

ENVIRONMENTAL ALLIANCE, INC.			
Person Completing Report:			
Phone:			
Today's Date:			
Incident Date:			
Time: am / pm:			
Location:			
Dept. #:			
Type of Incident:			
~ Personal Injury/Illness	~ Fire/Explosion	~ Chemical Exposure	
~ Unsafe Condition/Action	~ Equipment Damage	~ Customer Incident	
~ Property Damage	~ Spill/Release	~ Near Miss	
~ Permit/Code Compliance	~ Newspaper/Radio/Television	~ Motor Vehicle	
~ Other			
Personal Injury ~ Yes ~ No (If no, go to next section)			
~ First Aid Only	~ Hospitalization	~ Medical Treatment	~ Possible Injury, Not Confirmed
Person Injured:			
~ GTI Employee	~ Subcontractor	~ Customer/Public/Other	
Injured Name:			
Telephone:			
Office/Address:			
Nature of Injury, Illness, or Exposure:			
Describe nature of incident, how it occurred, who was involved, witnesses and possible causal factors:			
Describe actions taken and persons notified:			
Manager Responsible for Follow-up:			
Telephone:			
Distributed To:			

INCIDENT REPORTING GUIDE			
Incident Class	**Class I**: A minor incident that is dealt with at the local level	**Class II**: A serious incident that requires notification within 24 hours	**Class III**: A highly significant incident requiring immediate notification and assistance
Examples of Incidents	. First Aid injury. . Minor damage to property (less than $200) . Non-reportable quantity spill . Near miss incident . Unsafe condition or action Note: If there is a question as to Class I or II, follow Class II notification actions.	. Personal injury (more than first aid to employee, sub-contractor or public) . Vehicle accident involving injury or damage to vehicle or property . Damage to property greater than $200 but less than $10,000 . Near miss incident that could have been very serious . Fire/Explosion . Non-emergency notification of regulatory agency is required . Served with subpoena (DO NOT ACCEPT)	. Hospitalization (of one or more persons) . Unprotected chemical exposure . Death . Damage to property greater than $10,000 . Regulatory agency response to incident site . Multiple injury of employees, sub-contractors or public . Emergency notification of regulatory agency . Site visit from regulatory agency . Contact or appearance of news or public media
Notification Actions	1. On-scene person notifies Manager immediately by phone 2. Provide PIR form to Manager within 24 hours 3. Manager investigates and follows up	1. On-scene person notifies Manager immediately by phone 2. Manager investigates 3. Manager notifies supervisor and H&S Manager with PIR form within 24 hours of the incident 4. Manager provides a detailed final investigation report within 30 days to supervisor and H&S Manager	1. On-scene person notifies Manager immediately by phone 2. Manager immediately notifies supervisor and H&S Manager by phone. PIR form is provided by fax immediately 3. Incident management team conferences by phone and formulates an action plan

APPENDIX B-1: MSDS DEFINITIONS

(TLV-TWA)
Threshold Limit Value - Time Weighted Average. The time-weighted average concentration for a normal 8-hour work day and a 40-hour work week, to which nearly all workers may be repeatedly exposed without adverse effect.

(PEL)
Time-weighted average concentrations similar to (and in many cases derived from) the Threshold Limit Values.

(REL)
Recommended Exposure Limit as defined by NIOSH similar to the Threshold Limit Values.

(IDLH)
Immediately dangerous to life or health - Any atmospheric condition that poses an immediate threat to life, or which is likely to result in acute or immediate severe health effects. Oxygen deficiency is IDLH.

(LEL)
Lower Explosive Limit - The minimum concentration of vapor in air below which propagation of a flame will not occur in the presence of an ignition source.

(UEL)
Upper Explosive Limit - The maximum concentration of vapor in air above which propagation of a flame will not occur in the presence of an ignition source.

Flash Point (F.P.)
The lowest temperature at which the vapor of a combustible liquid can be made to ignite momentarily in air.

Vapor Pressure (V.P.)
The pressure characteristic at any given temperature of a vapor in equilibrium with its liquid or solid form, often expressed in millimeters of mercury (mm Hg).

Odor Threshold
A property displayed by a particular compound. Low detection indicates a physiological sensation due to molecular contact with the olfactory nervous system (based on 50% of the population).

Ionization Potential (I.P.)
The amount of ionization characteristic a particular chemical compound displays.

CONTAMINANTS PROFILE			
Chemical	**Exposure Route**	**Symptoms of Overexposure**	**Incompatibilities**
Gasoline	Inhalation Ingestion Skin Contact	Intense burning of mucous membranes, throat, and respiratory tract, flushing of face, staggering gait, slurred speech, mental confusion Inebriation, drowsiness, blurred vision, dizziness, confusion, vomiting, cyanosis Prolonged skin contact may cause dermatitis	Oxidizing agents such as hydrogen peroxide, nitric acid
Metals (e.g., Arsenic and Chromium)	Inhalation Ingestion Skin Contact Eye Contact	Lung damage, choking, unconsciousness Irritation to gastro-intestinal or respiratory tract, burning, sneezing, coughing Itching, scaling, reddening, blistering Redness, watering and itching	Oxidizing agents, acids and moisture
Soda Ash	Inhalation Ingestion Skin Contact Eye Contact	Irritation of nose, throat, and lungs Irritation of mouth, esophagus, and stomach Skin irritation from prolonged contact Irritate or burn eyes	Contact with acids will release carbon dioxide gas. When mixed with lime dust and water, corrosive caustic soda may be produced
Pentachlorophenol (PCP and Polycyclic Aromatic Hydrocarbons	Inhalation Ingestion Skin Contact Eye Contact	Severe irritation of nose, throat and lungs Severe irritation of mouth, esophagus, and stomach Itching, scaling, reddening, or blistering Redness, watering, and itching	Various substances

APPENDIX B-2: MATERIAL SAFETY DATA SHEETS (MSDS)

The following MSDS are for hazardous materials that will be encountered at this site. Contact your Health and Safety Representative if you need additional information on these materials.

APPENDIX B-3
ENVIRONMENTAL ALLIANCE, INC.
VAPOR MONITORING FORM

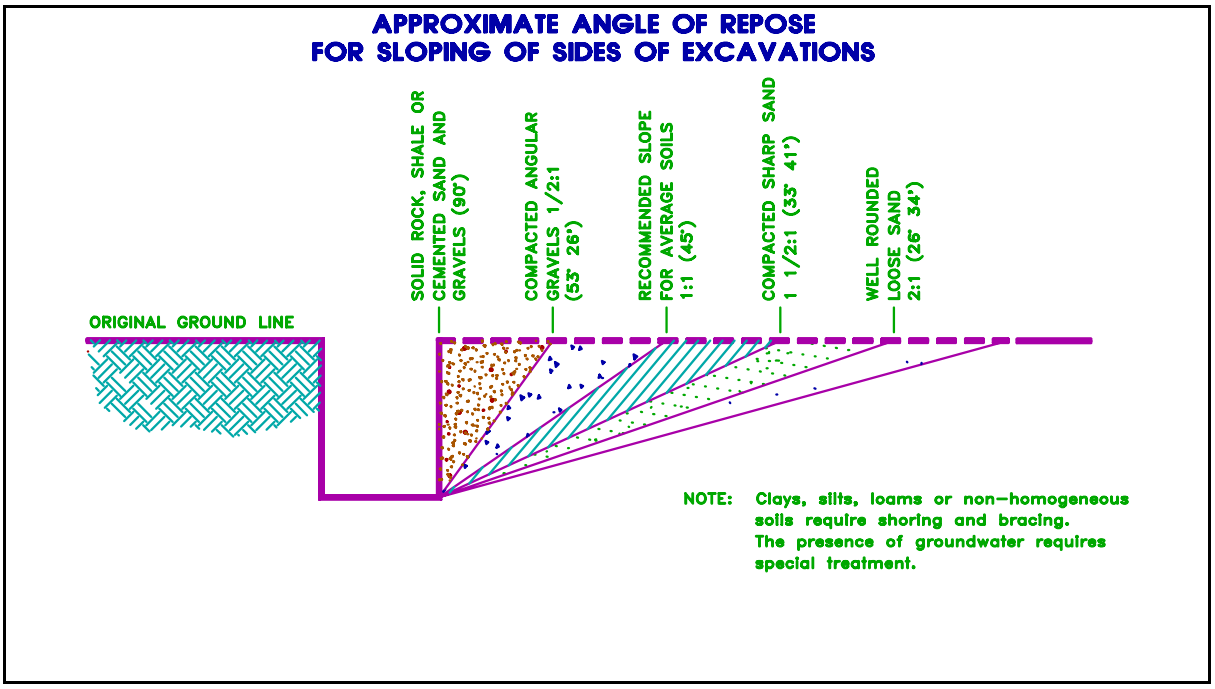
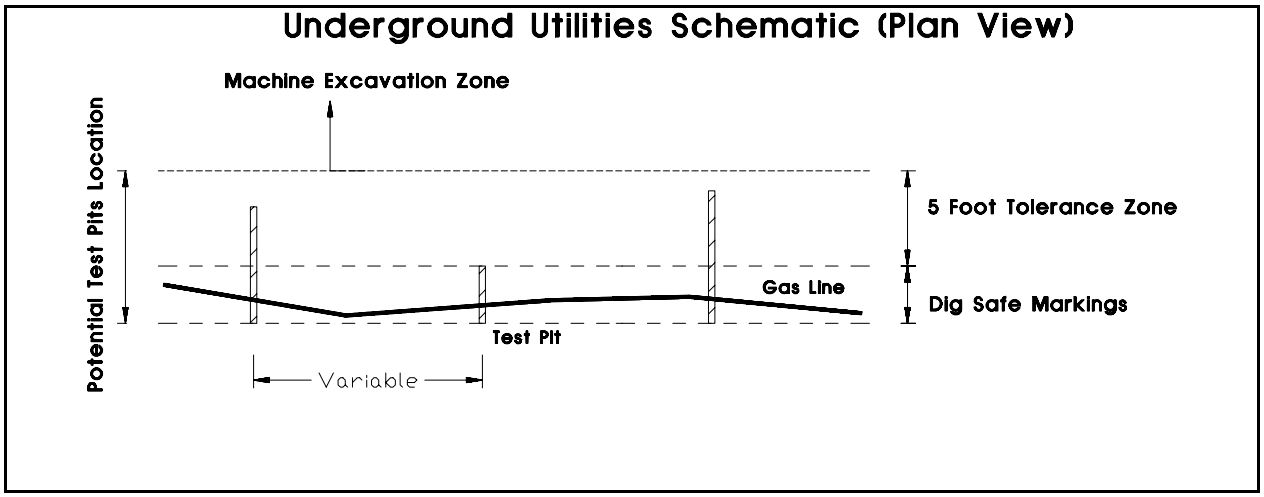
Project Name:
Project Number:
Contaminants:

Date	Time	Ionization Detector Reading		Explosimeter Reading		Radiation Monitor Reading	Location	Purpose	Initials
		FID	PID	%LEL	$\%O_2$	mR/hr			

APPENDIX C-1: SITE-SPECIFIC LOCKOUT/TAGOUT PROCEDURES

APPENDIX C-1 SITE-SPECIFIC LOCKOUT/TAGOUT PROCEDURES		
Equipment	**Operation**	**Lockout Method/Location**

APPENDIX C-2 EXCAVATION/TRENCHING SAFETY PROCEDURES
Egress: Excavation areas four feet or more deep
• Ladders must be spaced no more than 25 feet apart so that a person in the trench is always within 25 feet of a ladder for egress.
Shoring: Excavation areas five feet or more deep
• Excavations must be sloped or shored if personnel will be entering the excavation. • Soil classification may be done only by a competent person using both a visual and manual test. **WARNING**: One soil classification may not be enough. Outside disturbances during excavation may change even the best classification. ***Inspect the soil after any condition change.***
Storage: All excavations
• Spoils and heavy equipment must be stored a minimum of two feet from the edge of the excavation. • Store spoils on the downhill side.



APPENDIX C-3 EXCAVATION/TRENCHING - UNDERGROUND UTILITIES
Documentation:
• Contact the local utility service (Digsafe, Missutility...), and document Permit No. • Accompany utility representative in questionable areas, elaborate trenching projects tight/tricky areas or whenever drilling adjacent to a building or structure. • Contact the property owner and/or town building department for plans.
Physical Location:
• Use a metal detector to aid in the identification of obstructions. • Observe utility markers, vent pipes, catch basins, newly paved areas, etc.
Safety Procedures:
• Machine excavate five feet from any underground utility, tank, or utility marker. • Hand dig in utility "five-foot tolerance zone" until the service is exposed. • Utilize test pits to establish and QC markers for sensitive utility locations.
General Notes:
• Comply with local and state codes and regulations. • Utilize experienced and trained equipment operators. • Use appropriate subcontractors and applicable insurance riders. • Hand dig per customer mandate.