SITE ASSESSMENT WORK PLAN
SIGNAL PEAK RANGER STATION, YAKIMA COUNTY, WASHINGTON

Revised-FINAL

September 16, 2014

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ACRONYMS AND ABBREVIATIONS

AEI.....Ahtna Environmental, Inc.
Ahtna.....Ahtna Engineering
amsl.....above mean sea level
AOC.....Administrative Order on Consent
AST.....aboveground storage tank
BIA.....Bureau of Indian Affairs
CAP.....Corrective Action Plan
CFR.....Code of Federal Regulations
Cherokee.....Cherokee General Corporation
CLARC.....Ecology's Cleanup Levels and Risk Calculations
CSM.....Conceptual Site Model
COC.....chain-of-custody
COI.....contaminants of interest
cy.....cubic yards
Ecology.....Washington State Department of Ecology
EPA.....US Environmental Protection Agency
ESC.....ESC Lab Sciences
ft bgs.....feet below ground surface
Geosyntec.....Geosyntec Consultants
HASP.....Health and Safety Plan
IDW.....investigation derived waste
mg/kg.....milligrams per kilogram
MTCA.....Washington Model Toxics Control Act
NWTPH.....Northwest Total Petroleum Hydrocarbons; Dx, Diesel; Gx, Gasoline
OSHA.....Occupational Safety and Health Administration
PAH.....polycyclic aromatic hydrocarbons
PCS.....petroleum-contaminated soil
PID.....photoionization detector
QA.....quality assurance
QAPP.....Quality Assurance Project Plan
SAP.....Sampling and Analysis Plan
site.....Signal Peak Ranger Station
SQVs.....sediment quality values
TEE.....terrestrial ecological evaluation
TPH.....total petroleum hydrocarbons
TOX.....total organic halides
µg/L.....micrograms per liter
UST.....underground storage tank
VOCs.....volatile organic compounds

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1.0 INTRODUCTION

It is our understanding that the Bureau of Indian Affairs (BIA) entered into an Administrative Order on Consent (AOC) with the US Environmental Protection Agency (EPA) in June 2014 at the Signal Peak Ranger Station, Yakima County, Washington. The negotiated AOC listed a number of activities that must be completed in accordance with a prescribed timeline, including the BIA and EPA agreeing that the BIA would: 1) develop and submit to the EPA a Site Assessment Plan to determine the nature and extent of the release from underground storage tanks (USTs) of petroleum constituents at or from the site; 2) develop and submit to EPA a Site Assessment Report that describes the results of the Site Assessment; 3) develop and submit to the EPA a Corrective Action Plan (CAP) to identify and evaluate alternatives and select the preferred alternative for corrective action necessary to prevent or mitigate any migration or releases of petroleum constituents at or from the site, including a schedule for implementing the Corrective Action Plan; and 4) implement the CAP at the site as approved or modified by EPA.

This Work Plan presents the scope and schedule for the completion of a Site Assessment at the Signal Peak Ranger Station (site) located southwest of Toppenish, Washington. The purpose of this Site Assessment is to:

- Decommission and assess the remaining UST present near Building 407;
- Further assess soil and groundwater conditions by collecting soil and groundwater samples and assessing site hydrogeology;
- Assess seasonal variations in groundwater conditions by conducting a quarterly groundwater monitoring program;
- Dispose of all investigation derived waste (IDW) generated during the Site Assessment; and
- As specified in the administrative order on consent, determination if further action is necessary including any recommendations for additional investigation and/or cleanup necessary to close the site shall be included in the site investigation report or corrective action report as applicable.

1.1 Work Plan Organization

This Work Plan describes the rationale and scope of services to accomplish the goals of the site Assessment. The Sampling and Analysis Plan (SAP) is provided as Appendix A and describes the sampling and analysis procedures for this Site Assessment, and the Quality Assurance Project Plan (QAPP) is provided as Appendix B. Field sampling and laboratory analytical testing will be completed in accordance with the Washington State Department of Ecology (Ecology) "*Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies*" dated July 2004.

A project-specific Health and Safety Plan (HASP) is provided as Appendix C, which was prepared in accordance to the Occupational Safety and Health Administration (OSHA) regulations and Title 29 of the Code of Federal Regulations (CFR) 1910.120 and 1926.

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2.0 SITE DESCRIPTION AND BACKGROUND

2.1 Site Description

The site is located in Township 9 North, Range 13 East, Section 25 in Yakima County, Washington (Figure 1). The site is located on the Yakama Indian Reservation approximately 24 miles north-northeast of Glenwood, Washington, and is accessed by Signal Peak Road (Road BIA 140). The site is located at the base of the north flank of Signal Peak, a remnant volcanic peak, approximately 17 miles east of Mt. Adams. The elevation of the site is approximately 4,000 feet above mean sea level (amsl).

The site was originally built by the Civil Conservation Corps in the 1930s, with additional buildings and structures constructed by 1962. The site is comprised of less than a dozen buildings of various ages; three structures (Buildings 407, 415, and 427) are referred to herein as the "main compound" area (Figure 2). The remaining portions of the site consist of gravel access roads, parking, and storage areas. The site is bounded by forest land and wilderness areas and Signal Peak to the south. Surveyors Creek, a tributary to the Klickitat River, flows from east to west through the site. There is a small pond located to the east of the main compound that was used to fill water trucks during fire season. Former residences are located to the south, north, and east. The local area is undeveloped wilderness.

2.2 Background

The following section provides a brief summary of the environmental conditions at the site, based on our review of the AOC and previous reports. Previous sample locations are shown in Figure 3.

- The presence of two federally regulated USTs was documented at the site during environmental site assessments conducted in 2003, 2006, and 2008.
    - UST-1 was a concrete and wood-lined sump measuring approximately 4 feet by 4 feet by 50 inches. UST-1 was located adjacent to Building 415 and was used to dispose of waste oil from generator maintenance. UST-1 was removed during field activities in September 2008.
    - UST-2 is a tank measuring approximately 4 feet in diameter and 9 feet long. UST-2 was discovered at the southwest corner of Building 407 during the 2008 field activities. It was filled approximately three feet deep with liquid. Testing in 2008 revealed no Contaminants of Potential Concern in UST-2 at that time. The age and intended use of UST-2 is not known. UST-2 has not been permanently closed and remains in the ground. It is our understanding that the liquid in UST-2 may be comprised primarily of water.
- In July 2003, the BIA performed a Site Investigation at the site and noted visual evidence of petroleum-contaminated soil (PCS) near UST-1.
- In October 2006, A BIA contractor, Cherokee General Corporation (Cherokee), conducted an initial site characterization at the site and identified at least eight areas of recognized environmental concern. Two areas of concern were the areas surrounding the two USTs

(UST-1 and UST-2). At the time of the 2003 site characterization, it was assumed that UST-2 had been removed in the 1970s.

- During the 2006 site characterization, the contents of UST-1 were pumped out and five borings were drilled in the vicinity. Soil analytical results indicated concentrations of total petroleum hydrocarbons (TPH) above Washington Model Toxics Control Act (MTCA) cleanup levels (Figure 4). EPA uses MTCA cleanup levels as a guide for determining appropriate cleanup levels for petroleum releases on Tribal Lands in Washington State. MTCA cleanup levels for TPH in soil are as follows: TPH in the diesel-range, 2,000 milligrams per kilogram (mg/kg); TPH in the gasoline-range, 100 mg/kg; and TPH in the heavy-oil range, 2,000 mg/kg. The highest concentrations of TPH detected in soil collected from these soil borings were diesel-range hydrocarbons at 8,560 mg/kg and oil-range hydrocarbons at 29,800 mg/kg.
- During the 2006 site characterization, six soil borings were drilled near UST-2. Analytical data indicated the presence of TPH above MTCA cleanup levels (Figure 4). The highest concentrations of TPH detected in soil collected from these soil borings were diesel-range hydrocarbons at 3,800 mg/kg; gasoline-range hydrocarbons at 841 mg/kg; and oil-range hydrocarbons at 14,500 mg/kg.
- In September 2008, Cherokee performed additional site characterization and cleanup actions. Building 415 was razed, and approximately 590 cy (cubic yards) of PCS were excavated near UST-1. PCS excavation was halted to avoid compromising the structural integrity of Building 407; however, sampling results indicated that further contamination extended beneath Building 407. The highest concentrations of TPH were detected in soil collected from the excavation side walls, with diesel-range hydrocarbons at 22,200 mg/kg; gasoline-range hydrocarbons at 922 mg/kg; and oil range hydrocarbons at 8,060 mg/kg.
- During the 2008 field work, UST-2 was discovered during removal of conveyance piping associated with an aboveground storage tank (AST) located near Building 427. Four test pits were excavated near UST-2 to determine the presence of petroleum contamination in the area. The highest concentrations of TPH were detected in soil collected from the test pits, with diesel-range hydrocarbons at 7,670 mg/kg; gasoline-range hydrocarbons at 848 mg/kg; and oil-range hydrocarbons at 4,630 mg/kg.

2.3 Site Visit

On July 23, 2014, a site visit was conducted by Bob Blaesing and Steve Wangemann of the BIA, Tracy Smith of Ahtna Engineering (Ahtna), and Joey Hickey of Geosyntec Consultants (Geosyntec). The site visit was conducted to allow for Ahtna and Geosyntec to survey the site for access and field conditions in advance of preparation of this Work Plan. In addition, the fluid contained in UST-2 was sampled during the site visit and submitted to ESC Lab Sciences (ESC) of Mt. Juliet, Tennessee for chemical analysis. The purpose for sampling was to characterize the fluid for disposal profiling. The fluid in UST-2 was analyzed for total organic halides (TOX) by EPA Method 9020, total metals by EPA Method 6010B, volatile organic compounds (VOCs) by EPA Method 8260B, diesel-range organics by Northwest Total Petroleum Hydrocarbons Diesel (NWTPH-Dx) method, and gasoline-range organics by NWTPH-Gx method. Analytical results for the fluid sample were all below the method detection limits for the constituents texted, except for barium, which was detected at 8.4 micrograms per liter (µg/L). This concentration of barium is below applicable limits for water disposal.

3.0 CONCEPTUAL SITE MODEL

As part of the development of this Work Plan, the BIA developed a Conceptual Site Model (CSM) for the site. The current CSM evaluated potentially exposed populations (receptors) and exposure pathways. The CSM will be refined as necessary (including consideration of exposure pathways that are currently incomplete based on existing information) once more data are obtained during the supplemental work. This refinement will include the presentation of the CSM graphically as well as in text.

It is also recognized that certain remedial action components may eventually be necessary to ensure that incomplete exposure pathways remain incomplete (for example, construction and/or maintenance of a temporary fence, use of best management practices and worker safety programs for construction workers, and institutional controls that prevent future residential land use, maintain exposure barriers and prevent future development of drinking water wells).

3.1 Overview of Exposure Pathways and Receptors

An exposure pathway describes the mechanisms by which human or ecological exposure to site contaminants can occur under current (baseline) conditions, assuming no remedial action or protective control is in place. To be considered complete, an exposure pathway has:

- An identified source of contaminant(s);
- A mechanism for contaminant release and transport from the source;
- An exposure route where contact with the contaminant can occur; and
- A receptor that can be exposed to the contaminant.

An exposure pathway is considered complete if a human or ecological receptor can be exposed to a contaminant via that pathway. This subsection describes exposure pathways for contaminants in soil, groundwater, and air (soil gas) at the site.

3.1.1 Soil Exposure Pathway

Based on previous site investigation findings, the potential receptors and exposure pathways for identified soil contamination at the site include:

- Direct contact (dermal, incidental ingestion, and/or inhalation) with contaminated soil by visitors, workers, future residents, and/or other property users;
- Direct contact (dermal, incidental ingestion, and/or inhalation) with contaminated soil and/or food-web exposures by terrestrial wildlife;
- Direct contact with contaminated soil by terrestrial plants and soil biota; and
- Soil leaching to groundwater and groundwater transport to surface water. Contact with contaminated surface water by aquatic organisms, and potential contact by humans through consumption of aquatic organisms (surface water exposure pathway, described below).

In addition to these pathways, contaminants in soil can leach to groundwater and be released to air through vapor intrusion of volatile contaminants. Therefore, the soil-to-groundwater and soil-

to-groundwater-to-air exposure pathways are also considered in the site assessment. The soil-to-groundwater pathway considers the most stringent groundwater screening levels protective of the exposure pathways described above.

In addition, soil screening levels for terrestrial ecological protection will also be considered in the forthcoming work.

3.1.2 Groundwater Exposure Pathway

Considering a range of potential future land uses, current and future potentially complete exposure pathways for groundwater include:

- Ingestion of shallow groundwater as a drinking water;
- Inhalation of indoor air by residents, industrial/commercial workers, and visitors in buildings via the vapor intrusion pathway from volatilization of contaminants from shallow groundwater;
- Direct contact or dermal exposure and inhalation of vapors in outdoor air by construction workers contacting contaminated shallow groundwater during excavation or other construction-related activities, if no worker protection controls are in place; and
- Groundwater migration to surface water and/or sediment (surface water exposure pathway, described below).

3.1.3 Soil Gas Exposure Pathway

According to the Department of Ecology Draft Guidance for Evaluating Vapor Intrusion (Ecology, 2009), remedial investigations and feasibility studies should include “an evaluation to determine if vapor intrusion is unacceptably impacting indoor air quality whenever volatile hazardous substances are present in the subsurface at a site.” The Draft Guidance recommends a tiered evaluation approach, beginning with a preliminary assessment and progressing through Tier 1, 2, and 3 assessments depending on the results of each analysis.

Assuming the range of potential future land uses, current and future potentially complete exposure pathways for air (soil gas) include:

- Residents, industrial/commercial workers, and visitors in buildings inhaling indoor air contaminated, via vapor intrusion, by volatile contaminants originating from soil or groundwater;
- Residents, industrial/commercial workers, and visitors inhaling contaminated vapors in outdoor air in the future, if no controls are in place to restrict use of the property; and
- Construction workers breathing outdoor air contaminated by dust or vapors during excavation or other construction-related activities, if no worker protection controls are in place.

3.1.4 Surface Water Exposure Pathway

Potential exposure pathways and receptors for surface water in the tributary to Surveyors Creek could include:

- Ingestion and contact by aquatic receptors to surface water impacted by contaminants migrating from groundwater or soil and groundwater; and
- Ingestion by site visitors of aquatic organisms affected by surface water impacted by contaminants.

3.1.5 Sediment Exposure Pathway

Potential exposure pathways and receptors for contaminants in sediment in the tributary to Surveyor Creek could include:

- Exposure of benthic organisms to contaminants in the biologically active zone of sediment;
- Ingestion by aquatic organisms of benthic organisms impacted by contaminants in sediment; and
- Ingestion by site visitors of organisms impacted by contaminants in sediment.

3.2 Screening Levels by Media

The following subsections present the basis for establishing numerical screening levels and points of compliance for groundwater and soil to be applied in this site assessment. In general, screening levels were developed for constituents that were previously analyzed in soil and groundwater and that have regulatory criteria (or toxicity data that can be used to calculate protective criteria) listed in Ecology's Cleanup Levels and Risk Calculations (CLARC) data tables (Ecology, 2014).

3.2.1 Soil

Regulatory criteria for soil include MTCA Method A, as well as Method B soil cleanup levels (standard formula values for carcinogens and non-carcinogens) protective of human health for unrestricted land use (WAC 173-340-740[3]) obtained from Ecology's CLARC data tables. It is anticipated that site soil cleanup levels will be used to delineate which portions of the site do not require further action and which portions will require a formal cleanup remedy (for example, an institutional control remedy at a minimum).

In addition, a site-specific terrestrial ecological evaluation (TEE) is required for the site per WAC 173-340-7491. Consistent with WAC 173-340-7493(3), the MTCA Ecological Indicator Soil Concentrations for protection of terrestrial plants and animals (WAC 173-340-900, Tables 749-1, -2 and -3) will be used in developing screening levels. Since the future use of the site has not been determined and may include unrestricted use by terrestrial plants and animals, the lowest of the indicator soil concentrations for protection of plants, soil biota, and wildlife will be selected as the TEE criterion for use in deriving soil screening levels.

3.2.2 Groundwater

MTCA Method A and B groundwater cleanup levels (which are not necessarily the same as the lookup values in MTCA Table 720-1) will be calculated in accordance with WAC 173-340-720(3) and -730(2) for use as groundwater screening levels. These screening levels will assist in the evaluation of potential exposure pathways (for example, soil to groundwater, groundwater as

drinking water, vapor intrusion, and groundwater to surface water) in the Site Assessment Report.

3.2.3 Surface Water

MTCA Method B freshwater surface water cleanup levels protective of aquatic organisms and human health (WAC 173-340-730[3]), include:

- Water quality criteria published in the Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A-200);
- Water quality criteria based on the protection of aquatic organisms (acute and chronic criteria) and human health published under Section 304 of the Federal Clean Water Act;
- Concentrations established under the National Toxics Rule (Code of Federal Regulations [CFR] Title 40, Part 131); and
- MTCA standard formula values (for carcinogens and non-carcinogens) protective of human health (consumption of aquatic organisms), obtained from Ecology's CLARC data tables.

3.2.4 Sediment

Sediment sample results will be evaluated using Ecology Sediment Management Standards (SMS) (Ecology, 2013; WAC-173-204) and freshwater sediment quality values (SQVs); Ecology, 2011) as applicable.

4.0 SITE ASSESSMENT ACTIVITIES

The Site Assessment activities are organized into six general tasks consisting of: 1) pre-field activities; 2) UST decommissioning; 3) subsurface soil and groundwater assessment; 4) laboratory analysis; 5) terrestrial ecological evaluation; and 6) reporting.

4.1 Pre-Field Activities

Several actions are necessary to prepare for the field activities. The proposed pre-field activities are described below:

- Obtain necessary Yakama Nation Tribal permits for the completion of field activities;
- Coordinate and schedule field activities with the UST decommissioning Subcontractor (Ahtna) and the vacuum truck service (Certified Cleaning Services, Inc.);
- Call in public utility locates through the One Call service;
- Procure a private locator to conduct a utility locate survey at the site prior to any drilling;
- Procure a drilling subcontractor to advance explorations, install wells and assist in groundwater sampling from these explorations; and
- Coordinate with ESC Laboratory Sciences for analytical services.

4.2 Decommissioning Activities

To fully assess site contamination, UST-2 (~1,000 gallons in size) will be decommissioned by removal. The UST and associated piping will be decommissioned by a licensed UST service provider. Ahtna will have a field representative onsite during field activities to oversee and document procedures. Team member, Geosyntec will be responsible for the collection of soil samples following removal of the UST, assisting in determining which soils are contaminated, and providing general oversight of decommissioning and backfill activities. At this time, the removal of Building 407 has not been considered. If possible, the BIA would like to maintain Building 407 as structure that could be used in the future. During the development of the CAP, the BIA will reevaluate if the removal of Building 407 is necessary for remediation cleanup purposes.

4.2.1 UST Decommissioning

The UST will be uncovered and removed to assess current subsurface conditions. During excavation activities, Ahtna will: 1) document UST decommissioning activities including overall condition of the UST; 2) maintain a daily log, site sketch, and take daily photographs of site activities; and 3) document subsurface conditions, including depth to water observations (if encountered) and presence/absence of PCS. The following tasks will be performed by the UST subcontractor.

1. Remove any cement and/or concrete over the UST. Concrete that is uncontaminated (based on visual evidence) will be stockpiled onsite for future offsite disposal or re-use onsite.

2. Excavate soil overlying the UST. Soil excavated to access the UST will be field-screened by Geosyntec; soil with field evidence of contamination will be stockpiled on and covered with 6-millimeter thick plastic pending disposal.
3. Inert and remove the UST. Remove all residual media from the UST, triple rinse, and transport UST offsite for recycling/disposal. Rinsate will be contained and disposed offsite.
4. The UST contractor will be responsible for submitting notifications to Ecology and/or EPA regarding the proposed UST removal work, and upon completion, preparing UST removal documentation for inclusion in the Site Assessment Report.

During the removal of the UST, if areas of PCS are observed, they will be excavated and stockpiled onsite. Due to the location of the UST near Building 407, we anticipate the removal of PCS will be limited so as to not undermine the building.

4.2.2 Management of PCS

Excavated soil that exhibits field evidence of petroleum contamination will be segregated and managed in a manner that minimizes potential spills or accidental releases. PCS will be stockpiled in a lined, bermed area, and kept covered. We anticipate that PCS will be transported offsite for disposal after the completion of the Site Assessment activities.

4.2.3 Management of Clean Soils

The UST subcontractor will excavate apparently clean overburden, as directed by Ahtna. At Ahtna's direction, the UST subcontractor will segregate and stockpile apparently clean soil that does not exhibit field evidence of petroleum contamination. Excavated soil that does not exhibit evidence of petroleum contamination will be segregated and re-used as backfill for the excavation.

4.2.4 Groundwater Management

Based on a review of the previous excavations at the site, we do not expect that groundwater will be encountered during the removal of the UST. However, if groundwater is encountered, the UST subcontractor will dewater the excavation for UST removal purposes only. We anticipate that the UST subcontractor will either use a vacuum truck or pumps to dewater excavations. Removed water will be collected and disposed of in a manner that meets local and state requirements. If groundwater is encountered, then dewatering shall continue to the extent allowing for a confirmation soil sample to be collected from the floor of excavation beneath the UST.

4.2.5 UST Disposal

The UST contractor will be responsible for the disposal of the UST. The UST contractor will select an appropriate permitted landfill, recycling facility, or other appropriate method for disposal of the UST and associated piping.

4.2.6 Collection of Confirmation Soil Samples

Following the removal of the UST and prior to backfilling, soil samples will be collected in accordance with Ecology's guidance for Site Checks and Site Assessments for USTs, revised April 2003. Soil samples from the UST excavation will include a minimum of three samples. At least one sample will be collected beneath the UST and two samples will be collected from excavation side walls. As discussed in Section 4.2.4, dewatering will be completed in order to collect necessary soil samples. For IDW disposal purposes, three soil samples will be collected from the soil stockpile. Table 1 provides a summary of the proposed analytical program.

4.2.7 Backfill and Compaction

The UST subcontractor will backfill the excavation in the following order, from bottom to top:

1. Clean fill material provided by the subcontractor and soil that did not exhibit field evidence of contamination that was removed to access the UST will be used. Clean fill must be obtained from a commercial source, have less than 10 percent by weight passing US Standard No. 200 Sieve, and have a particle size not exceeding 6 inches in diameter.
2. The subcontractor shall place 6 inches of compacted crushed rock on top of the native or imported fill to serve as the surface grade for the project. The final surface shall be relatively level and match surrounding grades.
3. The subcontractor shall place backfill in lifts of no more than 16 inches loose and compact the backfill to a dense, non-yielding state using a hoepack, compactor, jumping jack, excavator bucket, or other suitable compaction device. No formal compaction testing will be completed. The excavation areas will be backfilled such that water does not pond on the restored surface and offsite surface water flow is maintained. No asphalt or concrete patching is anticipated.

4.3 Subsurface Soil and Groundwater Assessment

Ahtna will procure a drilling subcontractor to advance approximately 20 direct-push borings to depths up to 20 feet below ground surface (ft bgs) for collection of soil and groundwater samples. Eight of the borings will be completed as 2-inch pre-pack monitoring wells. Samples will be collected as described in the SAP (Appendix A). Proposed direct-push borings and groundwater monitoring well locations are shown on Figure 5.

4.3.1 Soil Assessment

Soil samples will be collected from the 20 borings to assess the presence of contaminants of interests (COIs). Table 1 summarizes the soil sampling program, including proposed sample depths and analytical testing. Table 2 summarizes the sample container and holding time requirements. The proposed scope of services includes:

- Oversee the completion of up to 20 borings to depths up to 20 feet bgs, depending on the depth at which refusal is encountered (Figure 5);
- Measure the position of each boring location relative to existing site features using a tape wheel, fiberglass tape or other suitable measuring devise;

- Prepare field logs for each boring in accordance with ASTM International Standard Practices D 2488-00 and document sample collection depths;
- Field screen soil samples for evidence of petroleum hydrocarbon contamination using visual observations, a water sheen test, and a photoionization detector (PID); all reasonable efforts will be made to minimize loss of volatiles during field screening and sample collection;
- Attempt to collect soil samples continuously from each boring to the total depth explored for soil characterization and field screening, and to collect select samples for potential chemical analysis;
- Submit soil samples from each boring for chemical analysis based on visual observations, field screening results, risk assessment needs, and spatial coverage across the site; and
- Abandon borings not completed as monitoring wells in accordance with Ecology regulations.

All soil samples submitted for chemical analysis will be analyzed for gasoline- and diesel-range hydrocarbons along with total lead and up to 12 soil samples will be subsequently analyzed for VOCs and polycyclic aromatic hydrocarbons (PAHs). The 12 samples will be selected based on either field observations or the gasoline- and diesel-range analytical results.

4.3.2 Groundwater Investigation

Groundwater quality will be assessed at approximately 20 direct-push boring locations to assess whether site contaminants are present in groundwater, and if so, the nature and extent of contamination. The proposed groundwater analytical testing program is summarized in Table 1. The groundwater assessment will consist of the following tasks:

- Collect grab-groundwater samples from 12 borings using a temporary well screen and either a peristaltic pump or disposable tubing equipped with a check valve;
- Install 2-inch diameter monitoring wells in eight of the borings (MW-1 through MW-8; Figure 5) using pre-packed well screens. The wells will be installed to a depth of approximately 20 feet bgs, with 15 feet of 0.010-inch well screen. The screened intervals of the monitoring wells will extend from the base of the borings to approximately 5 feet bgs. The monitoring wells will be finished with flush-mount, traffic rated monuments and will be installed in accordance with Ecology regulations;
- Develop each monitoring well by pumping, surging, bailing, or a combination of these methods. Record the initial and final depth to water, initial and final well depth, and volume of removed water;
- Survey the elevation of each well using an engineer’s level accurate to 0.01 foot relative to a common datum; and
- Collect representative groundwater samples from each newly installed monitoring well using low flow sampling techniques as described in the SAP (Appendix A).

All grab groundwater samples submitted for chemical analysis will be analyzed for gasoline- and diesel-range hydrocarbons along with dissolved lead. Up to six grab groundwater samples will be subsequently analyzed for VOCs and PAHs. The six samples will be selected based on the gasoline- and diesel-range analytical results. For the eight monitoring well samples, each sample will be analyzed for gasoline- and diesel-range hydrocarbons, VOCs, PAHs and dissolved lead.

4.4 Surface Water and Sediment Sampling

The site is located in close proximity to a small tributary to Surveyors Creek. To evaluate the groundwater to surface water and/or groundwater to sediment pathway, Geosyntec will collect three surface water samples and three sediment samples from the tributary for analysis of gasoline- and diesel-range hydrocarbons, VOCs, PAHs and dissolved lead.

Co-located sediment and surface water samples will be collected at up to three locations using hand-auguring techniques. Proposed co-located sample locations are shown on Figure 5.

4.5 Management of Investigation Derived Waste

IDW anticipated to be generated includes potentially contaminated soil and water, and solid waste (e.g. used disposable sampling equipment). The drilling-related IDW and UST IDW (contaminated soil and water) will be stored onsite pending review of the results of laboratory analytical testing and identification of management options (e.g., offsite disposal). Ahtna will coordinate disposal of IDW after characterization results are received. IDW management is described in more detail in the SAP (Appendix A). Solid waste will be disposed of in trash receptacles.

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5.0 ANALYTICAL PROGRAM

The proposed laboratory analytical plan has been designed to fulfill the following data collection needs for groundwater:

- Evaluate the presence and concentration of contaminants;
- Assess the nature and extent of contamination;
- Support risk-based decision making; and
- Manage IDW.

Ahtna will utilize ESC Lab Sciences of Mt. Juliet, Tennessee to complete the groundwater and soil analyses for this project. Table 1 presents the proposed analytical plan, and Table 2 provides a summary of sample container requirements and holding times.

5.1 Soil and Groundwater

The following analyses will be performed on the samples:

- TPH using the NWTPH for gasoline-range, and oil- and diesel-range hydrocarbons;
- VOCs in soil and water using EPA Method 8260B;
- PAHs using EPA Method 8270C SIM; and
- Dissolved and total lead by EPA 6000 series methods.

5.2 Data Management

Upon receipt of the final analytical laboratory data, a data quality review will be completed for the data collected, and the data with qualifiers will be entered into a database in Microsoft Excel or Microsoft Access. The data set will be organized in a manner that will provide for risk screening and allow it to be exported to other data platforms requested by the BIA or EPA.

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6.0 REPORTING

Ahtna will prepare the Site Assessment Report following completion of the field activities and receipt of the laboratory analytical data. The report will include: 1) a summary of the field activities; 2) analytical results; 3) risk screening results (if impacted soil and/or groundwater was encountered); and 4) recommendations for future work.

The report will be approximately 20 pages, excluding attachments, tables and figures. The report will initially be prepared in draft form allowing revisions by the BIA and EPA, if necessary. Upon receipt of comments on the draft report, we will issue the report in its final form. The report outline includes:

- Introduction and Background
- Purpose, Objectives, and Scope of Work
- Summary of Previous Environmental Investigations
- Field Observations
    - UST Decommissioning
    - Direct Push Exploration Activities
    - Monitoring Well Activities
- Sampling Results
    - Methods
    - Analytical Data
- Risk Screening and Exposure Pathway Assessment
- Summary, Conclusions, and Recommendations

The report will also include appendices that document the following activities:

- Field Procedures, Boring Logs, and Monitoring Well Construction Logs
- Laboratory Analytical Reports and Quality Assurance (QA) Summary
- Photos from Field Activities
- UST Decommissioning Documentation

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7.0 QUARTERLY GROUNDWATER MONITORING

The eight monitoring wells installed, developed, and initially sampled during the first field event will subsequently be sampled on a quarterly basis. If monitoring wells are sampled and installed by September 2014 (3rd quarter 2014), quarterly sampling thereafter is anticipated to begin the 4th quarter of 2014 (December 2014), and continue to the 1st and 2nd quarters of 2015, for a total of three events after the initial well installation and sampling (four events total). The monitoring wells will be sampled using low-flow techniques as described in SAP (Appendix A) and in accordance with the QAPP (Appendix B).

In general the groundwater assessment will consist of the following tasks:

- Measure depth to water and check for the presence of free product in the monitoring wells using an interface probe;
- Collect groundwater samples from wells MW-1 through MW-8 using low flow sampling techniques for analysis of contaminants of concern;
- Submit groundwater samples to ESC for chemical analysis. Analysis of TPH, dissolved lead, VOCs, and PAHs is included the proposed chemical analytical plan for the quarterly groundwater samples; and
- Purge water will be stored onsite in Washington Department of Transportation (DOT) approved 55-gallon drums pending future offsite disposal.

Upon completion of the quarterly groundwater sampling, Ahtna will prepare a quarterly groundwater monitoring report that includes a description of groundwater sampling activities, handling and chain-of-custody (COC) procedures, analytical data, summary tables, water elevation and free product measurements from each monitoring well, a groundwater contour map, and an evaluation of the data describing trends or other pertinent information.

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8.0 SCHEDULE

The schedule of events and anticipated completion dates under this Task Order are summarized below.

SCHEDULE

DESCRIPTION	DATE(S)
1. BIA submits draft Work Plan to EPA.	August 15, 2014
2. EPA provides comments on draft Work Plan.	September 1, 2014
3. BIA submits final Work Plan to EPA.	September 5, 2014
4. Implementation of Work Plan.	Early October 2014
5. BIA submits draft Site Assessment Report to EPA.	Within 60 days of completion of field activities.
6. BIA submits final Site Assessment Report.	Within 30 days after receipt of EPA comments to draft.
7. BIA submits draft Corrective Action Plan.	Within 90 days of approval of final report.

Key:
BIA Bureau of Indian Affairs
EPA US Environmental Protection Agency

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9.0 REFERENCES

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Washington Department of Ecology 2007. *Model Toxics Control Act Statue and Regulation, Publication No 94-06*. November.

Washington Department of Ecology, 1994, *Natural Background Soil Metals Concentrations in Washington State, Ecology Publication No. 94-115*, October.

Washington Department of Ecology, 2009, *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action, Review Draft, Ecology Publication No. 09-09-047*. October.

Washington Department of Ecology, 2011, *Guidance for Remediation of Petroleum Contaminated Sites, Publication No 10-09-057*, September.

Washington Department of Ecology, 2004, "*Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies*", July.

United States Environmental Protection Agency, 2014. *Administrative Order on Consent: EPA Docket No. RCRA-10-2014-0052 Leaking Underground Storage Tank at the Former Signal Peak Ranger Station EPA UST Facility ID No. 4260128 – Yakama Indian Reservation*. June 2.

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TABLES

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TABLE 1
PROPOSED ANALYTICAL PLAN
BIA SIGNAL PEAK
SITE ASSESSMENT

Sample Location	Media	Rationale	Depth of Sample	Number of Samples	Parameters	Method
Site Investigation						
UST Excavation	Soil	Assess the nature and extent of contamination	Varies	3	TPH-Dx	NWTPH-Dx
				3	TPH-Gx	NWTPH-Gx
				3	VOCs	EPA Method 8260B
				3	PAHs	EPA Method 8270C-SIM
				3	Lead	EPA Method 6010B
Soil Borings	Soil	Assess the nature and extent of contamination	Surface (0-3 feet) and and Subsurface (below 3 feet)	25	TPH-Dx	NWTPH-Dx
				25	TPH-Gx	NWTPH-Gx
				12	VOCs	EPA Method 8260B
				12	PAHs	EPA Method 8270C-SIM
				25	Lead	EPA Method 6010B
	Groundwater (grab samples from soil borings)	Assess the nature and extent of contamination	Varies	12	TPH-Dx	NWTPH-Dx
				12	TPH-Gx	NWTPH-Gx
				6	VOCs	EPA Method 8260B
				6	PAHs	EPA Method 8270C-SIM
				12	Dissolved Lead	EPA Method 6010B
Monitoring Wells	Groundwater (initial monitoring well sampling)	Assess the nature and extent of contamination	Varies	8	TPH-Dx	NWTPH-Dx
				8	TPH-Gx	NWTPH-Gx
				8	VOCs	EPA Method 8260B
				8	PAHs	EPA Method 8270C-SIM
				8	Dissolved Lead	EPA Method 6020B
Sediment	Sediment	Assess the nature and extent of contamination	0-3 inch	3	TPH-Dx	NWTPH-Dx
				3	TPH-Gx	NWTPH-Gx
				3	VOCs	EPA Method 8260B
				3	PAHs	EPA Method 8270C-SIM
				3	Lead	EPA Method 6010B
Surface Water	Surface Water	Assess the nature and extent of contamination	NA	3	TPH-Dx	NWTPH-Dx
				3	TPH-Gx	NWTPH-Gx
				3	VOCs	EPA Method 8260B
				3	PAHs	EPA Method 8270C-SIM
				3	Lead	EPA Method 6010B
Rinsate Blanks	Soil	Assess decontamination effectiveness	NA	1	TPH-Dx	NWTPH-Dx
				1	TPH-Gx	NWTPH-Gx
				1	VOCs	EPA Method 8260B
				1	PAHs	EPA Method 8270C-SIM
				1	Lead	EPA Method 6010B
	Groundwater	Assess decontamination effectiveness	NA	1	TPH-Dx	NWTPH-Dx
				1	TPH-Gx	NWTPH-Gx
				1	VOCs	EPA Method 8260B
				1	PAHs	EPA Method 8270C-SIM
				1	Dissolved Lead	EPA Method 6010B
Trip Blank	QA/QC	1 per cooler	NA	2	VOCs	EPA Method 8260B
Duplicate Samples	Soil	Assess Field Precision	Varies	5% of total-assume 2	TPH-Dx	NWTPH-Dx
				5% of total-assume 2	TPH-Gx	NWTPH-Gx
				5% of total-assume 1	VOCs	EPA Method 8260B
				5% of total-assume 1	PAHs	EPA Method 8270C-SIM
	Groundwater	Assess Field Precision	Varies	5% of total-assume 1	TPH-Dx	NWTPH-Dx
				5% of total-assume 1	TPH-Gx	NWTPH-Gx
				5% of total-assume 1	VOCs	EPA Method 8260B
				5% of total-assume 1	PAHs	EPA Method 8270C-SIM
Quarterly Groundwater Monitoring[1]						
Monitoring Wells	Groundwater	Assess the nature and extent of contamination	Varies	8	TPH-Dx	NWTPH-Dx
				8	TPH-Gx	NWTPH-Gx
				8	VOCs	EPA Method 8260B
				8	PAHs	EPA Method 8270C-SIM
				8	Dissolved Lead	EPA Method 6020B

TABLE 1
PROPOSED ANALYTICAL PLAN
BIA SIGNAL PEAK
SITE ASSESSMENT

Sample Location	Media	Rationale	Depth of Sample	Number of Samples	Parameters	Method
Trip Blank	QA/QC	1 per cooler	NA	2	VOCs	EPA Method 8260B
Duplicate Samples	Groundwater	Assess Field Precision	Varies	5% of total-assume 1	TPH-Dx	NWTPH-Dx
				5% of total-assume 1	TPH-Gx	NWTPH-Gx
				5% of total-assume 1	VOCs	EPA Method 8260B
				5% of total-assume 1	PAHs	EPA Method 8270C-SIM
				5% of total-assume 1	Dissolved Lead	EPA Method 6020B

Notes

1 - Proposed analytical for quarterly groundwater monitoring will be completed during three sampling events (4th quarter of 2014 and 1st and 2nd quarter of 2015).

TABLE 2
SAMPLE CONTAINER AND HOLDING TIME REQUIREMENTS
BIA SIGNAL PEAK
SITE ASSESSMENT

Analyte	Media	Method	Required Sample Volume	Sample Container Size	Preservative	Holding Time
Volatile Organic Compounds	Water	EPA 8260B	(3) 40 ml	40 ml VOA	HCl pH<2	14 days
	Soil/Sediment	EPA 5035/EPA 8260B	5 g	4 oz cwm and TeraCore kit	Cool <6° C but above freezing. 2 - VOAs with sodium bisulfate, one with methanol	14 days
SVOCs/Polynuclear Aromatic Hydrocarbons	Water	EPA 8270C SIM	(3) 40 ml amber	40 ml amber VOA	Cool <6° C but above freezing	7 days extraction 40 days analysis
	Soil/Sediment	EPA 8270C SIM	30 g	8 oz cwm	Cool <6° C but above freezing	7 days extraction 40 days analysis
Lead	Water (Filtered)	EPA 6000 Series	(1) 500 ml	500 ml HDPE	HNO_3 pH<2	6 months
	Soil/Sediment	EPA 6000 Series	10 g	4 oz cwm	Cool <6° C but above freezing	6 months
Gasoline Range Organics	Water	NWTPH-Gx	(3) 40 ml	40 ml VOA	HCl pH<2	7 days
	Soil/Sediment	NWTPH-Gx	10 g	4 oz cwm	Cool <6° C but above freezing	14 days
Diesel Range Organics	Water	NWTPH-Dx	(2) 40 mL amber	40 mL amber VOA	HCl pH<2	7 days extraction 40 days analysis
	Soil/Sediment	NWTPH-Dx	50 g	8 oz cwm	Cool <6° C but above freezing	14 days extraction 40 days analysis

EPA = Environmental Protection Agency; cwm = clear wide mouth; ; ml = mililiter;
oz = ounce; HCl = Hydrochloric acid; g = gram; °C = Degrees Celsius
gw= groundwater *contingent on soil and groundwater results

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FIGURES

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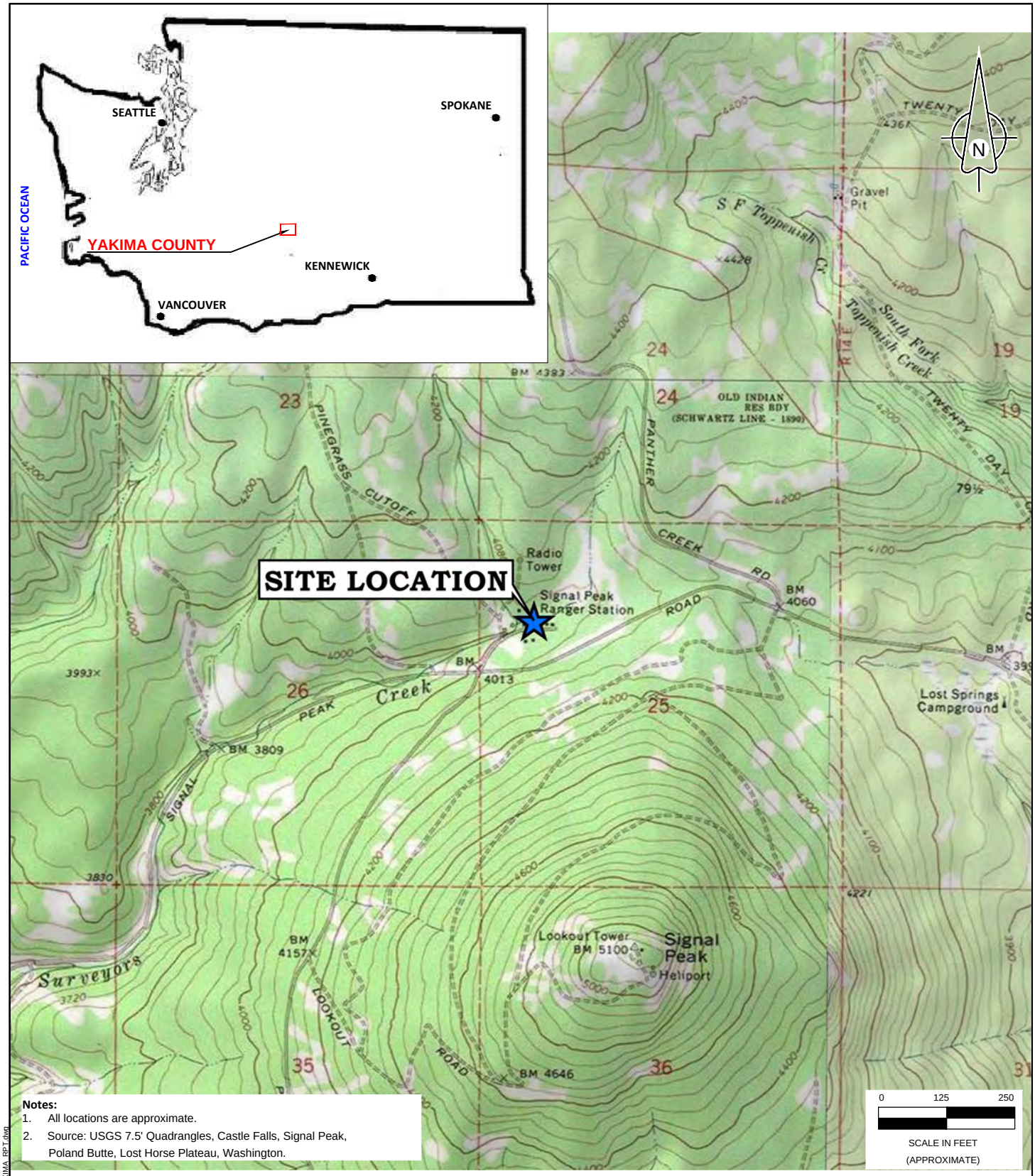

Notes:

1. All locations are approximate.
2. Source: USGS 7.5' Quadrangles, Castle Falls, Signal Peak, Poland Butte, Lost Horse Plateau, Washington.

BIA SIGNAL RANGER STATION WORK PLAN
YAKIMA COUNTY, WASHINGTON

Ahtna Environmental Inc.

STATE AND VICINITY MAP

Project Number: 05051	Figure Number: 1
Date: 8/12/14	
Drafted By: GRebne	

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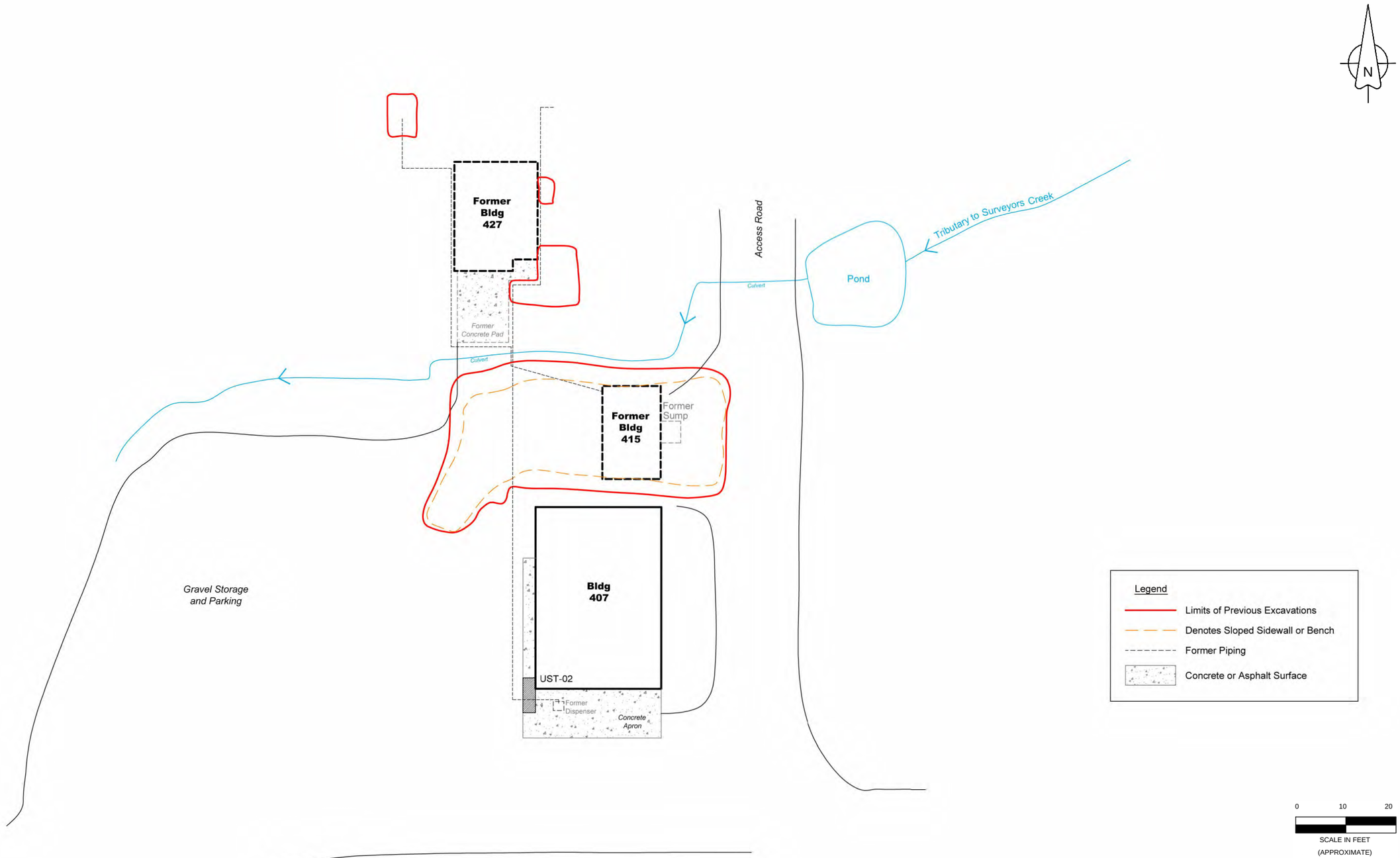

Notes:

1. All locations are approximate.
2. Figure derived from Geosyntec's 2014 Figure 2, Site Plan.

BIA SIGNAL RANGER STATION WORK PLAN
YAKIMA COUNTY, WASHINGTON

SITE PLAN

Ahtna Environmental Inc.

Project Number: 05051	Figure Number: 2
Date: 8/12/14	
Drafted By: GRebne	

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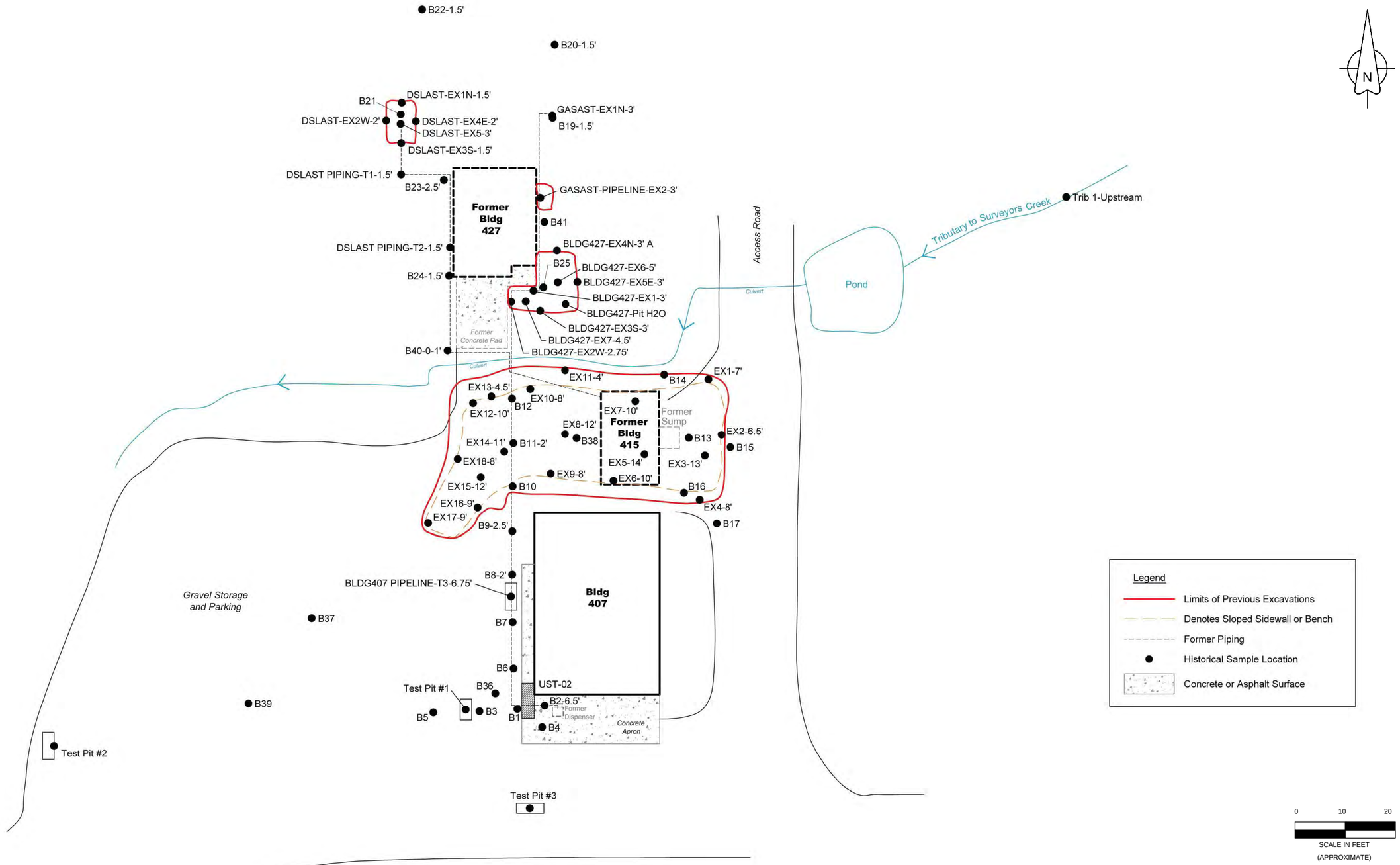

Notes:

1. All locations are approximate.
2. Figure derived from Geosyntec's 2014 Figure 3, Site Plan with Historical Sample Locations.

BIA SIGNAL RANGER STATION WORK PLAN
YAKIMA COUNTY, WASHINGTON

SITE PLAN WITH HISTORICAL SAMPLE LOCATIONS

Ahtna Environmental Inc.

Project Number: 05051	Figure Number: 3
Date: 8/12/14	
Drafted By: GRebne	

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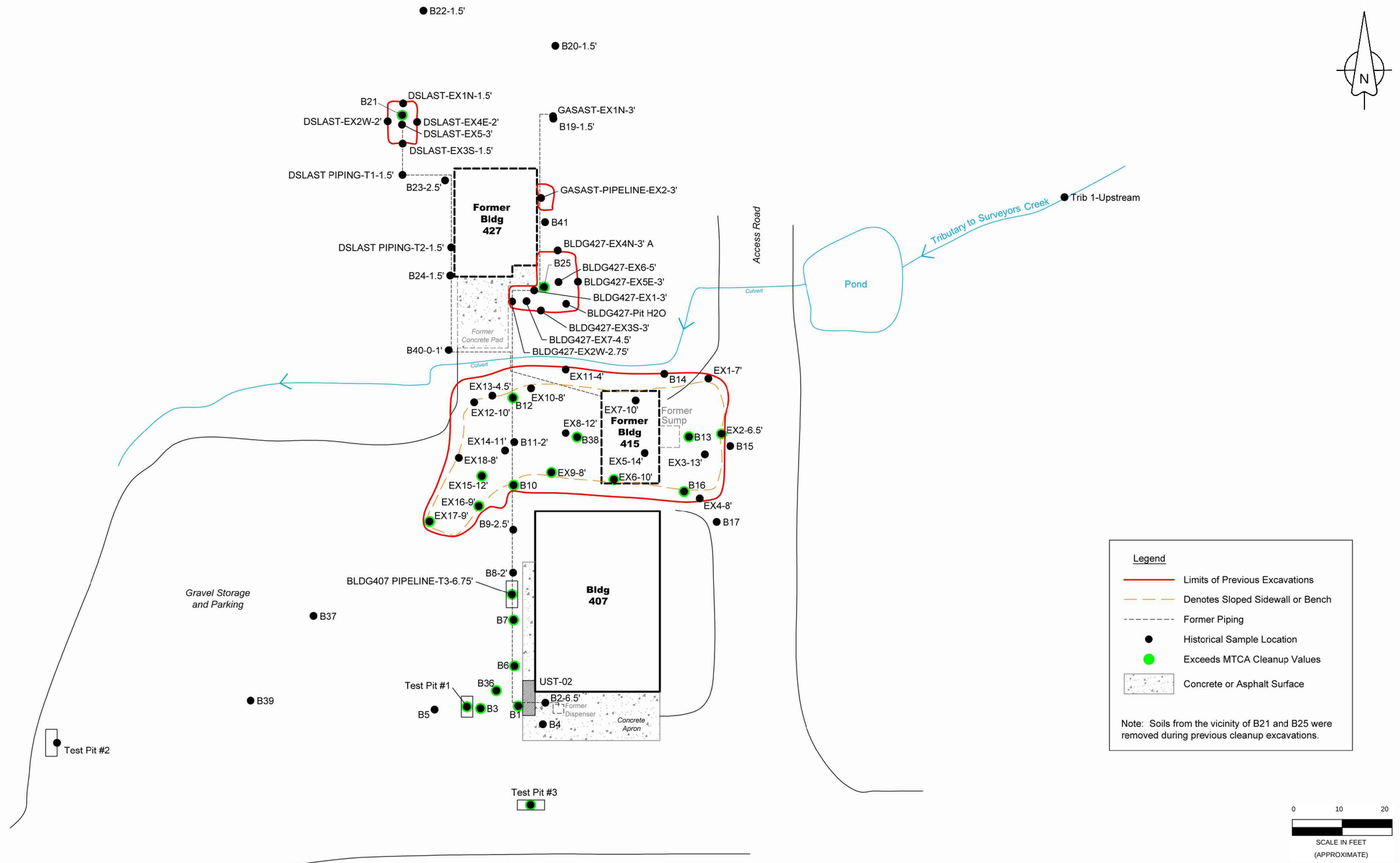

Notes:

1. All locations are approximate.
2. Figure derived from Geosyntec's 2014 Figure 4, Locations Where Historical Soil Analytical Results Exceed MTCA Cleanup Levels.

BIA SIGNAL RANGER STATION WORK PLAN
YAKIMA COUNTY, WASHINGTON

LOCATIONS WHERE HISTORICAL SOIL ANALYTICAL RESULTS EXCEED MTCA CLEANUP LEVELS

Ahtna Environmental Inc.

Project Number: 05051	Figure Number: 4
Date: 8/12/14	
Drafted By: GRebne	

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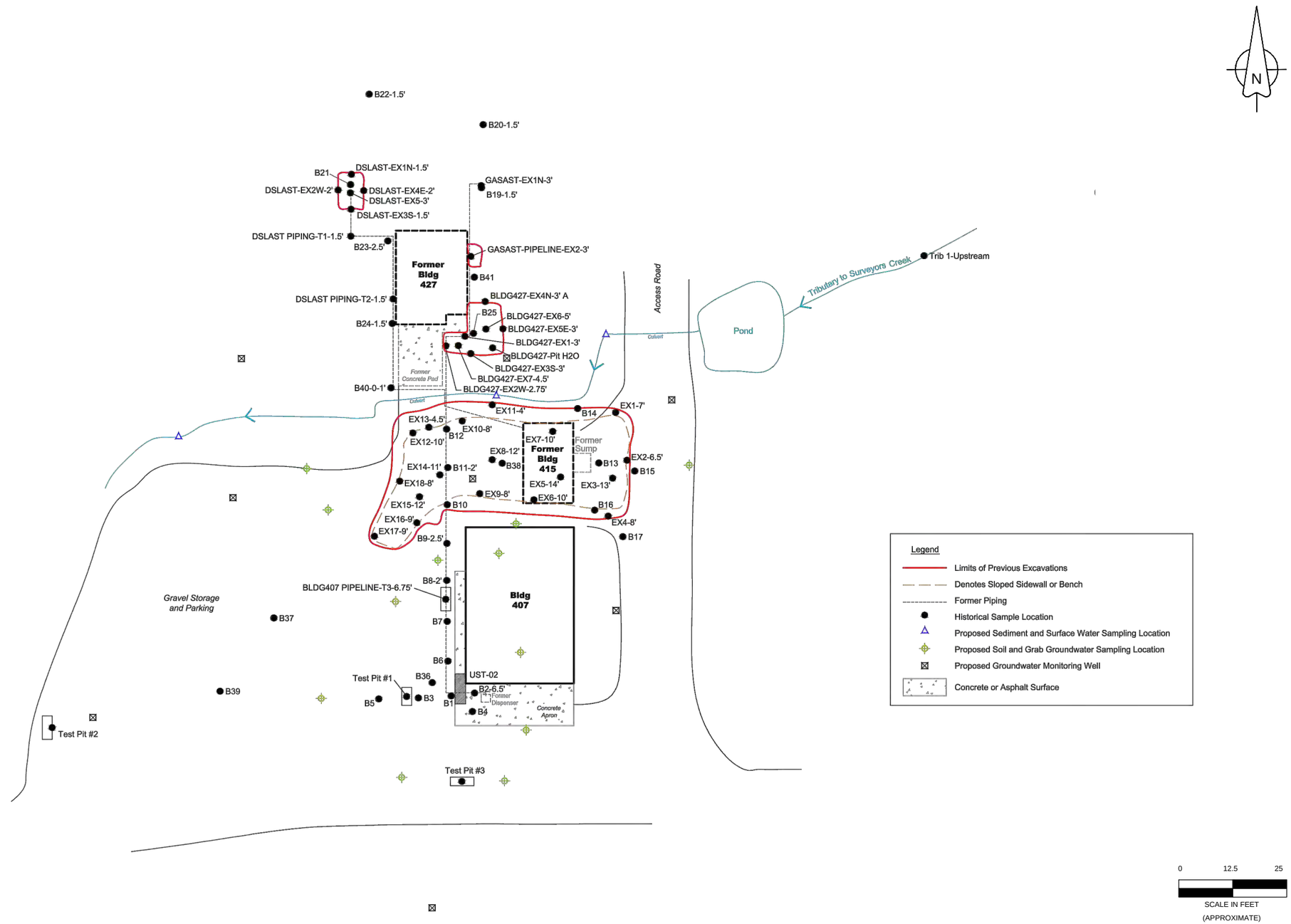

Notes:

1. All locations are approximate.
2. Figure derived from Geosyntec's 2014 Figure 5, Proposed Sampling Locations.

BIA SIGNAL RANGER STATION WORK PLAN
YAKIMA COUNTY, WASHINGTON

PROPOSED SAMPLING LOCATIONS

Ahtna Environmental Inc.

Project Number: 05051	Figure Number: 5
Date: 8/26/14	
Drafted By: GRebne	

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APPENDIX A

SAMPLING AND ANALYSIS PLAN

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APPENDIX A - SAMPLING AND ANALYSIS PLAN

This Sampling and Analysis Plan (SAP) has been prepared to accompany the Site Assessment Work Plan (Work Plan) for the Signal Peak Ranger Station (Site) located southwest of Toppenish, Washington. This SAP describes the field procedures, field Quality Assurance/Quality Control (QA/QC) protocol, and the chemical testing program to be implemented during the site assessment activities described in the Work Plan. The planned field activities include the following:

- Collection of soil samples from direct push borings;
- Collection of soil samples from an excavation;
- Field screening of soils;
- Collection of groundwater samples from direct push borings;
- Construction of groundwater monitoring wells;
- Collection of water levels and groundwater samples from monitoring wells;
- Collection of sediment samples;
- Collection of surface water samples;
- Investigation derived waste (IDW) management; and
- Equipment decontamination.

1.0 COLLECTION OF SOIL SAMPLES FROM DIRECT PUSH EXPLORATIONS

Direct-push borings will be advanced using equipment operated by a drilling subcontractor. Soil samples will be obtained continuously from each direct-push exploration using a 4- or 5-foot long, 2-inch diameter sampler lined with acrylic sleeves. The sealed sampler allows for the collection of soil samples from discrete-depth intervals without interference from overlying soil. Drilling rods will be decontaminated between each boring.

Soil samples collected from the borings will be field-screened for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID), and samples that exhibit field evidence of petroleum hydrocarbons will be field screened using a sheen test (field screening is described in more detail in Section 4, below). Soil samples that exhibit the highest PID reading will be submitted for analytical testing. If field screening does not indicate the presence of VOCs or petroleum hydrocarbons, at least one soil sample from each boring will be submitted for analytical testing from a depth just above the groundwater table or at a similar depth to where contamination was observed in other borings.

The analytical plan presented in the Work Plan includes collection of soil samples for risk characterization. The estimated soil sample depths and analytical testing are summarized in Table 1 of the Work Plan.

2.0 COLLECTING SOIL SAMPLES FROM AN EXCAVATION

Following removal of a UST and prior to backfilling the excavation, soil samples will be collected from the base of the excavation if it is a dry excavation, beneath either end of the UST as it sat in the excavation (one base sample) and from a minimum of two sidewalls. If groundwater is encountered, then dewatering shall continue to the extent allowing for a confirmation sample to be collected from the floor of the excavation beneath the UST.

Field personnel will direct the backhoe operator on where to dig for the collection of soil samples. Once the bucket has been brought back up to the surface, the field personnel will quickly remove the surface soils and then collect the soil sample from the backhoe bucket and place the sample into the appropriate containers. Samples will not be collected from soils that have touched the sides of the excavator bucket. Field personnel are not to enter into an excavation to collect soil samples.

3.0 SOIL SAMPLE COLLECTION, HANDLING, AND TRANSPORT

Soil samples to be analyzed for volatile compounds, gasoline-range petroleum hydrocarbons and VOCs, will be obtained using a Terra Core™ soil sampling devise and kit designed for direct sampling into the vial with the proper chemical preservatives. Three 5-gram size cores are added to vials (two with sodium bisulfate, one with methanol). The use of the Terra Core™ soil kit allows for a 14-day holding time. The VOC samples will be obtained prior to samples for other analytical tests to minimize the potential for volatilization. Samples obtained for non-volatile analyses will be obtained from the same general intervals as the volatile samples.

Soil samples selected for analytical testing will be placed in laboratory-supplied containers, labeled, logged on a chain-of-custody, placed into a plastic bag if needed to protect the label (i.e. if wet ice is used), and the sample containers placed into an ice chest containing ice prior to delivery to the laboratory. Chain-of-custody procedures will be observed during transport of the samples to the laboratory.

4.0 FIELD SCREENING OF SOIL SAMPLES

Soil samples from the borings and excavation will be field screened for VOCs using a PID and for non-volatile petroleum hydrocarbons using a sheen test (a visual test to assess if a sheen is produced on water by the soil), visual (i.e. staining), or olfactory indications (i.e., odor).

Field screening results are site and sample specific. The results may vary with temperature, soil moisture content, soil type, and type of contaminant. Notes on the time, location, visual appearance, odor, PID, and sheen testing will be kept in the field boring log or project field notebook. Field screening results will be noted on the boring or excavation logs.

4.1 PID

Headspace vapor screening will be conducted on samples using a MiniRae® (or equivalent model/brand) PID. The PID does not detect specific compounds, rather provides a qualitative value for the presence of VOCs. To conduct the PID screening, a small portion of soil will be

placed in a sealable plastic bag or jar. PID measurements will be taken within 15 minutes of sample collection by pushing or inserting the PID probe into the sealed bag or jar. PID are measured in parts per million (ppm) and will be recorded on the boring or exaction log and/or field notebook.

The PID is designed to quantify VOC vapor concentrations in the range between 1 ppm and 2,000 ppm with an accuracy of 10 percent of the reading and between 2,000 ppm and 10,000 ppm with an accuracy of 20 percent of the reading. The PID calibration will be checked daily.

4.2 Sheen and Visual Testing

Sheen tests will be conducted on soil samples to assess if petroleum hydrocarbons are present. A small portion of the soil sample was placed in a wide-mouth glass jar, or mining pan partially filled with water. The presence of petroleum hydrocarbons will be indicated if a moderate to heavy sheen is produced on the water surface. Results of the sheen test will be noted on the field logs and notebook.

5.0 COLLECTION OF GROUNDWATER SAMPLES FROM DIRECT PUSH EXPLORATIONS

Groundwater samples will be collected from the direct-push explorations using a temporary well screen and new temporary points will be used at each direct push location. The stainless-steel screen is nested inside the drilling rods, and retracting the drilling rods once the desired sampling depth has been reached exposes the screen. The temporary well screen will be decontaminated between each boring. The depth to groundwater will be measured in the exploration prior to before purging and sampling.

Groundwater samples will be collected using polyethylene tubing inserted inside the temporary well screen and a peristaltic pump, and/or polyethylene tubing equipped with a check valve. Used polyethylene tubing will be discarded after each sampling attempt. At a minimum, one casing volume of groundwater will be purged prior to collection of a sample.

Groundwater samples will be transferred to laboratory-prepared containers, labeled, logged on a chain-of-custody, and placed into a cooler with frozen blue ice or wet ice pending delivery to the laboratory. Chain-of-custody procedures will be followed during transport of the samples to the analytical laboratory.

6.0 INSTALLATION AND SAMPLING OF GROUNDWATER WELLS

Groundwater wells will be installed upon completion of a boring to its target depth. For this project, pre-packed well screen monitoring wells will be used. Pre-packed screens consist of a machine-slotted schedule 40 polyvinyl chloride (PVC) well screen pipe surrounded by a stainless steel or PVC mesh. Filter pack sand is packed between the slotted PVC and the stainless steel mesh to create the sand filter pack. For this project, the wells will be installed to a depth of approximately 20 feet below ground surface (bgs), with 15 feet of 0.010-inch well screen. The screened intervals of the monitoring wells will extend from the base of the borings to

approximately 5 feet bgs. The monitoring wells will be finished completed with flush grade monuments.

A bentonite seal will be placed above the sand pack and brought to within two feet of the surface. The top of the PVC pipe will be cut to the appropriate height for the monument and covered with a locking cap and padlock. A flush mount monument will be placed at the surface over the PVC and set in cement.

Well construction details will be recorded by the field geologist on the well construction log, and will include the start card and the well identification numbers. The depth of the well screen, sand pack, and bentonite seal, as well as the quantity of materials used to complete the well, will also be recorded. At least 24 hours following construction, monitoring wells will be developed using a combination of well pumping, surging, and bailing. Wells will be allowed to stabilize at least 24 hours after development and prior to sampling.

All monitoring wells will be constructed in accordance with Washington Administrative Code (WAC) 173-160, Minimum Standards for Construction and Maintenance of Wells. Per 173-160, direct push resource protection wells (monitoring wells) the filter pack must extend no less than one foot but no greater than 3-feet above the screen interval. The filter pack for the proposed well will extent one-foot above the screen (from 4 to 5 feet bgs). WAC 173-160 does not specify a specific thickness of the bentonite seal. Bentonite will be placed from 4 to 1 foot below ground surface and the upper 1-foot will be completed using a concrete seal.

6.1 Groundwater Level Measurement

The depth to water and presence of free product will be measured at each well, using an interface probe that will sound once it reaches the top of the water table or free product. Groundwater level measurements will be collected in each of the monitoring wells as quickly as possible before sampling occurs. This will provide a snapshot image of the potentiometric surface.

This depth will be measured relative to the top of the PVC casing inside the surface monument, either from a marked point that has been previously surveyed and/or the north side of the casing. This measurement will be recorded in a groundwater sampling data sheet. If water is observed inside the monument, it will be removed until it is at a level below the top of casing before the well cap is removed. Prior to using the interface probe, it must be decontaminated, using an Alconox wash and rinse.

6.2 Groundwater Sampling Using Low Flow Sampling Methods

Low flow groundwater sampling methods will be used for the collection of groundwater samples. The samples will be collected in accordance with EPA 540/S-95/504, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures.

A groundwater sample will be collected following measurement of the depth to groundwater. The following setup and procedures are used to collect a groundwater sample using low flow methods:

1. Setup new disposable tubing and pump at the well, with the intake placed within the screened portion of the well. Groundwater sampling can be performed using a peristaltic pump or a bladder or dual valve pump inserted into the well.
2. A depth to water meter is also placed in the well to monitor the water level during low-flow purging and sampling.
3. The monitoring well will be purged prior to sampling. Purge water will be discharged through a flow through cell that is setup with a water quality probe to measure temperature, pH, conductivity, oxidation reduction potential (ORP), dissolved oxygen, and turbidity during purging of the well. Discharge water from the cell will be directed into a 5-gallon bucket.
4. The rate of the pump should be set between 100 and 500 milliliters per minute (ml/min.) The rate is determined by the rate of recovery in the well. Ideally the pumping rate should match the rate the water is flowing through the well limiting drawdown in the well. The water level should not drop more than 0.3 feet once it has reached a stable state.
5. Record water level and water quality parameters on the field data sheet every 3 to 5 minutes, as well as the quantity of water purged. Purging is considered complete when parameters have stabilized for three consecutive readings, as follows:

   Temperature +/- 10%

   Specific Conductivity +/- 3%

   pH +/- 0.1 pH units

   Dissolved Oxygen +/- 10%

   ORP +/- 10 millivolts

   Turbidity +/- 10%

6. Prior to collecting the groundwater sample, the flow through cell must be disconnected from the discharge line. Groundwater samples will be collected directly from the discharge line into the appropriate laboratory-supplied containers.
7. Sample containers will be immediately labeled, logged on a chain-of-custody, and placed into a cooler with ice and shipped to the analytical laboratory under -of-custody protocol.
8. Purge water will be placed in 55-gallon drums along with decontamination water and staged pending off-site disposal.
9. Non-disposable equipment (e.g. depth to water meter, sampling pump) will be decontaminated prior to sampling the next monitoring well.

6.3 Surface Water Sampling

Surface water sampling will proceed from down-stream to up-stream locations. The water samples will be collected by direct immersion of unpreserved sample containers below the surface of the stream. If preserved containers are needed, a glass jar will be used to carefully transfer the surface water sample into the preserved container. Sample containers will be sealed,

labeled, logged on a chain of custody, placed into an iced cooler, and delivered to the analytical laboratory under chain-of-custody procedures. The laboratory will filter the water samples as necessary for analytical testing.

6.4 Sediment Sampling

Sediment samples will be collected after water samples to minimize turbidity in the water samples. Sediment samples will be collected in the upper 6 inches of sediment using new disposable non-talc nitrile gloves and a core sampler (if needed). Sediment samples were collected in sediment with average clast sizes generally less than ¼ inch in diameter.

At each location, sampling personnel will face upstream during collection of sediment samples. Samples will be collected by reaching from the stream bank or by wading into the stream. Sediment sample containers will be sealed, labeled, logged on a chain of custody, placed into an iced cooler, and delivered to the analytical laboratory under chain-of-custody procedures.

7.0 DECONTAMINATION PROCEDURES

7.1 Personnel Decontamination

Personnel decontamination procedures depend on the level of protection specified for a given activity. The site-specific Health and Safety Plan (Appendix C) documents the appropriate level of protection for the type of work and conditions involved in this project.

7.2 Equipment Decontamination

New, disposable sampling equipment (e.g., disposable bailers and nitrile gloves) will be used once and discarded as solid waste after use to prevent cross contamination between sampling locations and events. Cleaning of non-disposable items (if used) will consist of washing in a detergent (Alconox®) solution, a tap water rinse, followed with a deionized water rinse.

7.3 Handling of Investigation-Derived Waste

IDW will consist mainly of drill cuttings, purge and decontamination water, and solid waste. Water will be placed in U.S Department of Transportation (DOT)-approved 55-gallon drums, labeled with the project name, exploration number, general contents, and date. The drummed IDW will be stored on-site pending analysis and off-site disposal.

Disposable items, such as sample tubing, direct-push sampler acrylic sleeves, gloves and protective overalls, paper towels, etc., will be placed in plastic bags after use and deposited in trash receptacles for disposal.

8.0 LABORATORY ANALYTICAL PLAN

Laboratory analyses will be conducted in accordance with applicable Ecology rules. The goals for the method reporting limits will be based on the lowest applicable Model Toxics Control Act (MTCA) cleanup values. The proposed analytical methods are detailed in the Work Plan.

9.0 FIELD QUALITY ASSURANCE PROCEDURES

9.1 Sample Containers, Storage, and Sample Custody

Samples obtained for chemical analysis will be transferred in the field to laboratory-prepared sample containers and kept cool during transport to the analytical laboratory. The sample containers will be filled completely to eliminate headspace in the container. Chain-of-custody procedures will be followed for samples throughout the collection, handling, and analysis process. A chain-of-custody form will accompany each cooler of samples to the analytical laboratories. Each person who has custody of the samples will sign the chain-of-custody form and ensure that the samples are not left unattended unless properly secured.

9.2 Sample Shipment

Samples will be delivered or shipped to the contract laboratory using the following procedures:

- Each cooler containing soil and/or groundwater samples for chemical analysis will be packed to prevent breakage and to maintain 4° Celsius. Coolers will be sealed using packing tape and labeled for shipment via FedEx (labels supplied by ESC Lab Sciences). If possible, coolers will be delivered to FedEx on the same day as sample collection, or no later than one day following sample collection;
- Wet ice will be placed in the shipping containers within durable sealable plastic bags to limit leakage;
- Glass jars will be separated in the shipping container by bubble wrap to prevent breakage;
- A chain-of-custody form will be enclosed in a plastic bag and taped to the inside lid of the cooler or placed on top of the bubble wrap; and
- A signed and dated custody seal will be placed on each cooler prior to shipping.

9.3 Field Duplicates

Field duplicates will be collected at a daily frequency of 5 percent (not less than 1 duplicate per 20 samples), with a minimum of one duplicate within each media per sampling event. Field duplicates will consist of two samples collected sequentially from one sample location to assess data variability. The field duplicates will be analyzed by the same analytical methods used for primary samples. Relative percent differences for field duplicates will be calculated to assess the data precision, accuracy, and potential variability caused by sample handling.

9.4 Trip Blanks

Trip blanks will be submitted for samples that will be tested for VOCs. Trip blanks will be pre-prepared by the analyzing laboratory using distilled, de-ionized water, shipped with the sample bottles to the field, and then returned to the analyzing laboratory with the field samples for analysis. Trip blanks are not separated from other samples, but will be packaged with the samples collected during the sampling event. Trip blanks will only be analyzed for VOCs.

9.5 Field Rinsate Blanks

Rinsate blanks will be collected when non-disposable equipment is used (e.g. stainless augers or down-hole pumps). Rinsate blanks are collected after reusable equipment has been decontaminated by pouring de-ionized water over the equipment and capturing the rinsate into the sample bottle. Each rinsate blank will consist of two VOC vials. Rinsate blanks are used to assess potential cross-contamination of samples resulting from improperly decontaminated sampling equipment.

10.0 LABORATORY QUALITY CONTROL

Routine laboratory quality control activities are documented in the analyzing laboratory's Quality Manual (however named). Laboratory quality manuals must adhere to consensus standards adopted by the National Environmental Laboratory Accreditation Program, which include at a minimum the following elements:

1. Daily instrument calibration or calibration verification prior to analysis of any samples.
2. Method blank analysis daily or at a frequency of 1/20 samples, whichever is greater.
3. Analysis of an independent reference standard daily to assess the accuracy of the calibration. This reference standard check should cover low, mid-level, and high ranges when appropriate.
4. Analysis of a matrix spike at a frequency of 1/20 samples, or as the matrix changes, to assess accuracy and identify possible matrix interferences.
5. Analysis of laboratory sample duplicates or matrix spike/matrix spike duplicates on a frequency of 1/20 samples to assess the precision of the analysis.
6. Determination of the minimum reporting limit based on detection limit studies and the concentration of the lowest calibration standards.

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APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

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APPENDIX B – QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan (QAPP) has been prepared to accompany the Site Assessment Work Plan (Work Plan) for the Signal Peak Ranger Station (Site) located southwest of Toppenish, Washington. This QAPP identifies key personnel involved in project management, outlines data generation and acquisition procedures, provides assessment and oversight protocols and establishes data usability objectives. As stated in Ecology's Guidelines for Preparation of Quality Assurance Project Plans for Environmental Studies (Ecology Publication No. 04-03-030, July 2004), specific goals of this QAPP is to:

- Focus project manager and project team to factors affecting data quality during the planning stage of the project;
- Facilitate communication among field, laboratory, and management staff as the project progresses;
- Document the planning, implementation, and assessment procedures for Quality Assurance/Quality Control (QA/QC) activities for the investigation;
- Ensure that the data quality objectives (DQOs) are achieved; and
- Provide a record of the project to facilitate final report preparation.

DQOs dictate sampling and analysis designs and sample collection procedures are presented in the Work Plan and the sampling and analysis plan (SAP). The DQOs for the project include both qualitative and quantitative objectives, which define the appropriate type of data, and specify the tolerable levels of potential decision errors that will be used as a basis for establishing the quality and quantity of data needed to support the environmental assessment. To ensure that the DQOs are achieved, this QAPP details aspects of data collection including analytical methods, QA/QC procedures, and data quality reviews.

This QAPP describes both quantitative and qualitative measures of data to ensure that the DQOs are achieved. DQOs dictate data collection rationale, sampling and analysis designs that are presented in the Work Plan, and sample collection procedures that are presented in the SAP which is Appendix A to this Work Plan.

Many of the items specified in the QAPP guidance document have been included in the body of this work plan or Appendix A. Remaining items have been addressed in this QAPP.

Throughout the project, environmental measurements will be conducted to produce data that are scientifically valid, of known and acceptable quality, and meet established objectives. QA/QC procedures will be implemented so that precision, accuracy, representativeness, completeness, and comparability of data generated meet the specified data quality objectives.

1.0 PROJECT ORGANIZATION, ROLES, AND RESPONSIBILITIES

The project consultant team involved with data generation includes representatives from Ahtna Environmental, Geosyntec Consultants, Bureau of Indian Affairs (BIA), and ESC Lab Sciences. Descriptions of the responsibilities, lines of authority and communication for the key positions relating to quality assurance and quality control are provided below. This organization facilitates

the efficient production of project work, allows for an independent quality review and permits resolution of any QA issues before submittal of the final report.

The Bureau of Indian Affairs is the primary stakeholder for the project. Mr. Bob Blaesing will serve as the technical contact for all parties for this phase of work.

1.1 Project Implementation Team

Ahtna will implement the proposed actions on behalf of the BIA. Roles of key team personnel are described below.

PROJECT MANAGER: Nino Muniz, P.G.

The Project Manager is ultimately responsible for technical quality, schedule, budget and staff resources for the project. This person is responsible to the BIA for fulfilling contractual and administrative control of the project, providing technical oversight, and providing overall review of project deliverables. He will have the responsibility for project deliverables

SENIOR SCIENTIST: Joey Hickey

The Geosyntec Senior Scientist will maintain primary responsibility for the operations and management of the project. He will manage the project, communicate with team members, coordinate daily operations, and maintain control over the schedule, budget, and technical aspects of the project. He will have responsibility to manage subcontractor procurement activities.

HEALTH AND SAFETY OFFICER: Jess Black

The Health and Safety Officer (HSO) will be responsible for ensuring: 1) project personnel maintain appropriate levels of training, as specified by Occupational Health and Safety Administration (OSHA); 2) health and safety plans (HASPs) are prepared and maintained in accordance with OSHA protocols and 3) field operations are conducted using health and safety protocols that are appropriate and protective. The HSO will ensure that subcontractors have HASPs relative to their respective contracts.

QUALITY ASSURANCE OFFICER: Joey Hickey or Geosyntec QA/QC Officer(s)

The Quality Assurance Officer (QAO) responsibilities will include monitoring project quality assurance procedures to ensure compliance with this QAPP. The QAO will be responsible for providing final review of all project deliverables and will serve as a technical resource throughout the project. The QAO Leader is responsible for coordinating QA/QC activities as they relate to the acquisition of field data. The QAO Leader has the following responsibilities:

- Serves as the official contact for laboratory data QA concerns;
- Responds to laboratory data QA needs, resolves issues, and answers requests for guidance and assistance;

- Reviews the implementation of the QAPP and the adequacy of the data generated from a quality perspective;
- Maintains the authority to implement corrective actions as necessary;
- Reviews and approves the laboratory QA Plan;
- Evaluates the laboratory's final QA report for any condition that adversely impacts the data;
- Ensures that appropriate sampling, testing, and analysis procedures are followed and that correct quality control checks are implemented; and
- Monitors subcontractor compliance with data quality requirements.

FIELD OVERSIGHT MANAGER: Tracy Smith (Ahtna) and Barbara Lary (Geosyntec)

The field oversight manager will be responsible for implementing the work plan, including preparation for the field events, implementation of all field activities, and maintaining chain-of-custody for samples until they are transported to the analytical laboratory. Ahtna and Geosyntec staff geologists, engineers, or environmental scientists will assist with implementation of the field activities. Specific responsibilities include the following:

- Coordinates data collection activities to be consistent with information requirements;
- Supervises the compilation of field data and laboratory analytical results;
- Assures that data are correctly and completely reported;
- Implements and oversees field sampling in accordance with project plans;
- Coordinates work with on-site subcontractors;
- Schedules sample shipment with the analytical laboratory;
- Monitors that appropriate sampling, testing, and measurement procedures are followed;
- Coordinates the transfer of field data, sample tracking forms, and log books to the Project Manager for data reduction and validation; and
- Participates in QA corrective actions as required.

The field oversight manager will have 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training, and will be up-to-date on annual 8-hour refresher courses.

LABORATORY MANAGEMENT: ESC Lab Sciences

The subcontracted laboratory conducting sample analyses for this project is required to obtain approval from the QA Leader before the initiation of sample analysis to assure that the laboratory QA plan complies with the project QA objectives. The Laboratory's QA Coordinator administers the Laboratory QA Plan and is responsible for quality control (QC). Specific responsibilities of this position include:

- Ensure implementation of the QA Plan;
- Serve as the laboratory point of contact;
- Activate corrective action for out-of-control events;
- Issue the final QA/QC report;
- Administer QA sample analysis;

- Comply with the specifications established in the project plans as related to laboratory services; and
- Participate in QA audits and compliance inspections.

Field Staff:

All field staff will also be trained in applicable OSHA guidelines pertaining to site work. Health and safety protocol will be followed during field activities as outlined in the attached HASP (Appendix C).

2.0 QUALITY OBJECTIVES AND CRITERIA

The general data quality objective of this QAPP is to provide environmental data for soil samples that are of known and dependable quality. Dependable data are necessary to ensure that interpretations and recommendations are based on sound data.

Specific project tasks that do not generate data are described in this section using a qualitative measure of success unique to each task. The measurements of success for each task are described in the following sections.

2.1 Project Quality Objectives

Task-related DQOs will vary according to the nature of the task. Data quality parameters for tasks requiring measurements will be evaluated on precision, accuracy, representativeness, completeness, comparability and range. Data quality for field sampling methods will be based on measurement quality criteria listed below, and may be checked using analytical results of field duplicate samples. For chemical analyses, established precision and accuracy protocols, combined with those outlined in this QAPP, should suffice for analytical data quality. The laboratory's QA manager is responsible for maintaining the method-defined and QAPP- defined QA/QC criteria.

2.2 Sampling and Analytical Methods and Data Quality Objectives

Field sampling methods are described in detail in Appendix A. All samples will be submitted to a Washington State accredited laboratory. Table 1of the Work Plan summarizes the chemical analyses for soil and groundwater samples.

2.2.1 Preventative Maintenance – Field Equipment

Ahtna performs routine inspections and preventative maintenances (parts replacement and cleaning) for all pieces of field equipment in our office warehouse. These activities are conducted before and after each fieldwork event. Maintenance activities are conducted by our field technicians who are specifically trained in the use, operation, and maintenance of the equipment. All field equipment used during this project will be cleaned and decontaminated prior to use.

Each piece of equipment will be inspected and tested to ensure proper working function and facilitate replacement or repair of broken or non-operational components. Key spare parts will be included in the equipment cases to facilitate troubleshooting and repair under field conditions.

2.2.2 Calibration and Corrective Action – Field Equipment

Field instrument calibration and calibration checks facilitate accurate and reliable field measurements. The calibration of the instruments will be checked and adjusted as necessary in general accordance with manufacturers' recommendations. Methods and frequency of calibration checks and instrument maintenance will be based on the type of instrument, stability characteristics, required accuracy, intended use, and environmental conditions. The basic calibration check frequencies are described below.

If a photoionization detector (PID) is used for headspace vapor screening, its calibration will be checked at the start of each day it is used. If necessary (based on the calibration check results), the instrument will be calibrated in general accordance with the manufacturer's specifications. Calibration check and calibration results will be recorded in the field report.

The calibration of the water quality meter (e.g., Horiba U-22) will be checked, and if necessary, the instrument will be calibrated, prior to each water sampling event. The instrument will be calibrated in general accordance with the manufacturer's specifications. Calibration check and calibration results will be recorded in the field report.

2.2.3 Preventative Maintenance – Laboratory Equipment

Contract laboratories perform routine testing, inspection, and preventative maintenance (parts replacement and cleaning) of all instruments and equipment, and provide a clean, climate controlled environment for instrument/equipment operation.

Major instruments such as gas chromatographs, atomic absorption spectrophotometers, analytical balances and GC/MS systems are maintained under commercial service contracts or by qualified in house service technicians. All instrument maintenance is recorded in the associated instrument logbook for future reference and validation of scheduled maintenance. Logbook entries include the date, analysts name, detailed description of the problem, detailed explanation of the solution and a verification that the instrument is functioning properly.

2.2.4 Calibration and Corrective Action – Laboratory Equipment

The analytical laboratory will maintain standard procedures for calibration and a system of corrective action to ensure continuous acceptable quality levels for laboratory services. In order to meet this goal, the laboratory will be provided the standard calibration procedures communicated in the QAPP and will be required to state their ability to comply with the procedures. For corrective action, the QAPP contains the systems established to assure that conditions adverse to quality are promptly identified and corrected. This corrective action system functions at both the bench level through recognition and response to isolated events and at the management level through trend analysis.

2.2.5 Calibration of Laboratory Instruments/Equipment

In general, laboratory calibration procedures are divided into fixed or within-batch calibration. Fixed calibration utilizes a calibration curve over a number of analytical batches. In within-batch calibration, a calibration curve or factor is determined for each batch of analyzed samples.

Each instrument is normally calibrated for the specific analytical method for which it is allocated. Once the operating parameters have been established according to that method, the analyst prepares standard solutions containing all of the analytes of interest, any internal standards and any surrogate standards appropriate to the method. To establish the calibration curve for the particular analyte, these standard solutions are prepared at graduated dilution. One of the concentrations must be above the detection limit while the others are used to define the working range of the instrument.

Standards for instrument calibration are obtained from a variety of sources. Elemental standards are purchased from commercial suppliers, dated upon receipt and replaced as needed according to the methodology. A standard log is kept containing the analyte name, date of receipt, supplier lot number, concentration, any analyte dilutions and a unique code number.

Analysts document the use of standards by entering the code number in their notebooks. Specific guidelines for standards handling, preparation, and traceability for the selected analytical laboratory will be reviewed for conformance with this QAPP.

2.2.5.1 Laboratory Instrument Calibration Frequencies

Instrument calibration is performed on an as-needed basis in accordance with the specific method requirements. Recalibrations are performed when fundamental changes to the instrument characteristics occur (i.e., change of analytical column, etc.) or when results of QC check standards or samples indicate an out-of-control condition

2.3 Sample Handling and Custody Requirements

2.3.1 Sample Containers

All samples obtained for chemical analysis will be transferred in the field to sample containers and kept cool during transport to the testing laboratory. Chain-of-custody procedures will be observed during transport of the samples to the testing laboratory.

2.3.2 Sample Handling and Custody

Sample handling and custody will be completed by the Ahtna field manager and laboratory sample control personnel. Sample handling in the field will typically consist of placement of soil samples into individual sealed plastic bags for field screening and placement of select samples into containers provided by the analytical laboratory. Holding times will be observed during sample storage.

2.3.3 Sample Identification

Each container will be labeled by the field technician to avoid the possibility of misidentification. Each sample label will contain the field sample identification, sample description, sample date, and sample time.

Upon receipt at the analytical laboratory, each sample will be logged into a bound notebook with numbered pages. Each sample will be assigned a unique laboratory identification number used by the laboratory for analysis assignment, sample tracking and data reporting.

Sample labels will be completed in permanent ink. Sample labels and/or chain-of-custody record will include the following information:

- Ahtna's job number;
- Sample designation (structure name, boring number, and sample depth, e.g. 5303 P1 (0-6));
- Date of sample collection (month/day/year); and
- Time of sample collection (hours: minutes).

2.3.4 Chain-of-Custody

Field sample management will follow specific procedures to ensure sample integrity. Sample possession will be tracked from collection to analysis. Each time the samples are transferred between parties, both the sender and receiver will sign and date the chain-of-custody form and specify which samples have been transferred. When a sample shipment is sent to the laboratory, the container will be sealed with custody tape and the original form will be placed with the samples and transported to the laboratory. A copy of the form will be retained in the project files. A chain- of-custody record will be completed for each batch of samples hand-delivered or shipped to the laboratory. The laboratory will assume sample custody upon receipt and retain the samples in a secure area.

In addition to the labels, seals and chain-of-custody form, other components of sample tracking will include the field log book, sample shipment receipt and/or laboratory log book.

Information that will be included on the COC form is:

- Project name and number;
- Sample identification number;
- Date and time of sampling;
- Sample matrix (soil) and number of containers from each sampling point, including preservatives used, if any;
- Depth of sample, if appropriate;
- Analyses to be performed; and
- Names of sampling personnel and transfer of custody acknowledgment spaces.

2.3.5 Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. For many methods, holding times may be extended by sample preservation techniques in the field. If a sample exceeds a holding time, then the results may be biased low.

For example, if the extraction holding time for volatile analysis of samples is exceeded, then the possibility exists that some of the organic constituents have volatilized from the sample or degraded. Results for that analysis will be qualified as estimated to indicate that the reported results may be lower than actual site conditions.

2.4 Analytical Precision and Accuracy

The overall project quality assurance objective will be to develop and implement procedures to provide data that are accurate, reliable, reproducible, and representative of the site. Data quality will be assessed by representativeness, comparability, accuracy, precision and completeness. Definitions of these terms, as they apply to quality control, are described below.

2.4.1 Detection Limits

Analytical methods have quantitative limitations at a given statistical level of confidence that are often expressed as the method detection limit (MDL). Individual instruments often can detect but not accurately quantify compounds at concentrations lower than the MDL, referred to as the instrument detection limit (IDL). Although results reported near the MDL or IDL provide insight to site conditions, quality assurance dictates that analytical methods achieve a consistently reliable level of detection known as the practical quantitation limit (PQL). The contract laboratory will provide numerical results for all analytes and report them as detected above the PQL or undetected at the PQL.

2.4.2 Representativeness

Representativeness is a measure of how closely the measured results reflect the actual concentration or distribution of chemical compounds in the media sampled. Sampling plan design, sampling techniques and sample handling protocols will be developed to ensure that samples collected are representative of site conditions within the limitations of the collection technologies. The proposed documentation will establish protocols for assurance of sample identification and integrity. Field duplicate samples will be used to assess matrix homogeneity, and laboratory accuracy and precision.

2.4.3 Comparability

Data comparability will be ensured by monitored control of sample collection, analytical methods and data recording. Comparability of laboratory and field data will be maintained by using EPA-defined procedures where available. Data comparability will be maintained by use of

consistent methods and units. Actual detection limits will depend on the sample matrix and will be reported as defined for the specific samples.

2.4.4 Accuracy

Accuracy is a measure of bias in the analytical process. The closer the measurement value is to the true value, the greater the accuracy. This measure is defined as the difference between the reported value versus the actual value and is often measured with the addition of a known compound to a sample. The amount of known compound reported in the sample, or percent recovery, assists in determining the performance of the analytical system in correctly quantifying the compounds of interest. Since most environmental data collected represent one point spatially and temporally rather than an average of values, accuracy plays a greater role than precision in assessing the results. In general, if the percent recovery is low, non-detect results may indicate that compounds of interest are not present when in fact these compounds are present. Detected compounds may be biased low or reported at a value less than actual environmental conditions. The reverse is true when recoveries are high. Non-detect values are considered accurate while detected results may be higher than the true value.

Accuracy will be expressed as the percent recovery of a surrogate compound (also known as "system monitoring compound"), a matrix spike result, or from a standard reference material and may be calculated using the equation(s) below.

2.4.5 Precision

Precision is the measure of mutual agreement among replicate or duplicate measurements of an analyte from the same sample and applies to field duplicate or split samples, replicate analyses, and duplicate spiked environmental samples (matrix spike duplicates). The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as the relative percent difference (RPD) for spike sample comparisons of various matrices and field duplicate comparisons for samples.

The calculation applies to split samples, replicate analyses, duplicate spiked environmental samples (matrix spike duplicates), and laboratory control duplicates. The RPD will be calculated for samples and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Persons performing the evaluation must review one or more pertinent documents (USEPA February 1994; USEPA 1986; or USEPA 1983) that address criteria exceedences and courses of action. Relative percent difference goals for this effort is 30 percent for all analyses.

2.4.6 Completeness

Completeness is a measure of the amount of valid data obtained from the analytical system. The completeness of the data will be assessed during quality control reviews. The completeness goal will be 90 percent. Audits, internal control checks and preventative maintenance will be implemented to help maintain the above quality assurance objectives.

2.5 Field and Laboratory Quality Control Requirements

2.5.1 Field Quality Control Requirements

Field quality control measures will include collection of duplicate samples as well as documentation of field measurements and observations, and field instrument calibration.

2.5.2 Collection of Quality Control Samples

2.5.2.1 Field Duplicate Samples

Field duplicate samples will be collected for each matrix at a minimum frequency of 1 for every 20 samples (5 percent) of total with a minimum of one duplicate within each media per sampling event. Duplicate samples will be collected to assess matrix homogeneity, sampling procedures and laboratory analytical consistency. The field duplicates will be analyzed by the same analytical methods used for primary samples. Relative percent differences (RPDs) for field duplicates will be calculated to assess the data precision and accuracy and potential variability caused by sample handling.

In addition to replicate analyses performed in the laboratory, field duplicates also serve as measures for precision. Under ideal field conditions, field duplicates (referred to as “splits”), are created when a volume of the sample matrix is thoroughly mixed, placed in separate containers, and identified as different samples. This tests both the precision and consistency of laboratory analytical procedures and methods, and the consistency of the sampling techniques used by field personnel.

2.5.3 Documentation of Field Activities

Daily field activities, including observations, measurement data, and variations in field procedures will be recorded on appropriate field forms. The original field forms will be maintained in Ahtna's office files. Copies of the completed forms will be maintained in a binder and sequentially numbered field file for reference during field activities. Indelible ink will be used unless prohibited by weather. Photographic documentation of field activities will be performed as appropriate. The daily record of field activities will include the following information:

- Date;
- Time of arrival and departure;
- Weather condition description;
- Field team description;
- List of daily activities and times conducted;
- Observation descriptions;
- List of samples collected with sample designations and locations specified;
- Photograph log;
- Field monitoring data, including health and safety monitoring;
- List of equipment used and calibration records, if appropriate;

- Site visitors;
- List of additional data sheets and maps completed; and
- Signature of person completing field record.

Site conditions may make it necessary to modify the procedures described in this QAPP. Variations or modifications implemented during activities and the reason for the modification will be documented in field records. Sufficient information will be recorded in the log book so that all field activities can be reconstructed without reliance on personnel memory.

2.6 2.6 Laboratory Quality Control Requirements

The project laboratory is required to adhere to a strict internal quality control program. Method blanks, duplicate samples, matrix spike and spike duplicate, and laboratory control standards are used at frequent intervals for internal quality control. A careful field sampling program, strict chain-of-custody procedures, and collection of adequate sample volumes for duplicate and spike samples will provide the internal quality control needed for this program. Laboratory quality control measures, including information on calibration procedures, are described below.

2.6.1 Method Blanks

Method blanks, consisting of carbon-free water and carried through the analytical scheme, serve to measure potential contamination associated with laboratory storage, preparation, or instrumentation. For most analyses, method blanks are analyzed on a daily basis and at a frequency of one per 20 samples if more than 20 samples are analyzed in a given batch.

2.6.2 Calibration Blanks

Calibration blanks are prepared with standards to create an instrument calibration curve. They differ from other standards only by the absence of an analyte and provide the zero-point for the curve.

2.6.3 Sample Blanks

Sample blanks are used when characteristics such as color or turbidity interfere with a determination. In a spectrophotometric method, for example, the natural absorbency of the sample is measured and subtracted from the absorbency of the developed sample. Sample blanks are run only as necessary.

2.6.4 Internal Standards

Internal standards are measured amounts of certain compounds added after sample preparation or extraction. They are used in an internal standard calibration method to correct for sample results which are compromised by capillary column injection losses, purging losses, or viscosity effects. Internal standard calibration is currently used for volatile organic compounds VOCs and semivolatiles and by Gas Chromatograph/Mass Spectrometer (GC/MS) and inductively coupled plasma (ICP) analytical methods.

2.6.5 Surrogates

Surrogates are measured amounts of certain compounds added before sample preparation or extraction. Analysts measure the surrogate recovery to determine systematic extractions problems. Surrogates are added to all samples analyzed for GC/MS extractables and volatiles and GC volatiles.

2.6.6 Spikes

Spikes are aliquots of samples to which known amounts of an analyte have been added and are extracted and analyzed. The stock solutions used for spiking are purchased or prepared independently of calibrations standards. The spike recovery measures the effects of matrix interferences and reflects the accuracy of the determination.

Spikes are prepared and analyzed on a daily basis and at a frequency of at least one per 20 samples or one per batch, whichever is more frequent.

2.6.7 Duplicates and Duplicate Spikes

Duplicates are additional aliquots of samples subjected to the same preparation and analytical scheme as the original sample suite. In cases where the analyte concentration is consistently below the method detection limit, duplicate spikes are substituted for duplicate samples. The RPD between duplicates or duplicate spikes measures the precision of a given analysis.

Duplicate and spike duplicates are prepared and analyzed on a daily basis, and at a frequency of at least 1 per 20 samples or 1 per batch, whichever is more frequent.

2.6.8 Laboratory Control Standards

Laboratory control standards (LCS) or quality control check standards (QCCS) are aliquots of carbon-free or deionized water to which known amounts of an analyte have been added. They are subjected to the sample preparation or extraction procedure and are analyzed as samples. Stock solutions used for LCSs are purchased or prepared independently of the calibration standards. The LCS recovery evaluates the functioning analytical method process and equipment function.

LCSs are prepared and analyzed on a daily basis and at a frequency of 1 per 10 samples if more than 10 samples are run on a given day. For every 10 samples logged in for a particular determination, the laboratory computer generates a call for an LCS to be analyzed. The true values and recovered concentrations are archived and retrievable for statistical analysis. Laboratory control limits are calculated when 20 data points become available.

2.6.9 Laboratory Data Validation and Usability

Procedures at the laboratory for verifying data accuracy and completeness include at least three levels of review for both data accuracy and completeness before release. Data accuracy review is initiated at the bench level with a peer review system. At this level, all calculations and entries

into data logbooks are checked for error by a second analyst. The second level of review is performed by an area supervisor. Upon completion of a batch sample data set and prior to release, the laboratory project manager conducts a third level of data accuracy review.

Review of data completeness is initiated in the sample login area to insure that internal worksheets match the request on the chain-of-custody forms. The laboratory project manager performs a second level of review before datasheets are given to the analytical areas. Once the results are complete, the laboratory project manager performs a third level of review to ensure that all analyses initially requested were performed.

2.6.10 Verification and Validation Methods

Data are verified and validated through several processes before release of the final data package. The process is initiated at the analytical bench through documentation of all testing parameters in the analyst's notebook. All measurements and calculations for the sample as well as quality control measures are documented in the notebook. Once the analyst is satisfied that the analytical batch meets all quality control requirements and has quantified the sample results, they are transferred to a set of laboratory worksheets as stated on the chain-of-custody report.

When completed, the data on the worksheets are entered into an electronic database. The laboratory project manager reviews the results from the database and checks that the analyses performed are appropriate to the client's requests. Related analyses from the same sample are compared for coherence, and the data are compared with previous results (if available) from the same source to observe any deviations from established trends. Any corrections that are necessary are made at this time and a final report is generated. After the final report is generated it is again reviewed by the project manager to ensure accurate transfer of information from the laboratory worksheets to the final report. After the final review, the laboratory project manager signs the final report. The laboratory manager reviews approximately 15 percent of all the approved PM reports.

Hardcopies of final reports, including the original laboratory worksheets and chain-of-custody are kept in a secure filing area for as minimum of 5 years.

Data reporting parameters typically included in the laboratory reports include the following:

- Chain-of-Custody Forms;
- Date of Sample Receipt and Condition;
- Dates of Sample Analysis, extraction, digestion, or distillation;
- Analytical tuning for GC/MS;
- Initial calibrations for organics with the date each initial standard was run, the concentration and response factor of the compounds in each initial standard, and the average response factor and standard deviation for each compound in the initial standards;
- Continuing calibrations for organics with the date that each daily or continuing standard was run, the concentration and response factor of the compounds in each

daily or continuing standard, and the percent difference between the daily or continuing standard and the average initial calibration standard;

- Initial calibration verification and continuing calibration verifications for inorganics with the true value, detected value and percent recovery for each parameter;
- Mass spectra for compounds found in each sample and the corresponding standard;
- Laboratory blank results including method blanks, calibration blanks, and continuing calibration blanks, and a list of associated samples;
- Percent surrogate recoveries for samples blanks, duplicates, and matrix spikes with the names and concentrations of each surrogate compound;
- Laboratory duplicate analysis with the relative percent difference between the duplicates;
- Matrix spike/matrix spike duplicate analysis with the name and concentrations of each spiking compound, the percent recovery and the relative percent difference of the matrix spike and matrix spike duplicate recoveries;
- Laboratory control sample analysis with percent recoveries and control limits for each parameter;
- Inductively coupled plasma (ICP) interference check sample with percent recoveries of parameters;
- ICP linear range for each parameter determined by ICP;
- Reporting and quantitation limits for all parameters; and
- Raw data to support calculation of the above summaries are kept at the project laboratory.

2.7 Data Reporting Management

Laboratories will report data in formatted hardcopy and digital form. Analytical laboratory measurements will be recorded in standard formats that display, at a minimum, the field sample identification, the laboratory identification, reporting units, qualifiers, analytical method, analyte tested, analytical result, extraction and analysis dates, and detection limit (PQL only). Each sample delivery group will be accompanied by sample receipt forms and a case narrative identifying data quality issues. Laboratory electronic data deliverables (EDD) will be established by Ahtna/Geosyntec, with the contract laboratory.

Upon receipt of the analytical data, the EDD will be reduced into summary tables. Upon completion of the summary tables, the accuracy of the data reduction will be verified using the hard copy of the data received from the laboratory. Any exceptions will be noted and corrections will be made.

2.7.1 Data Reduction

Data reduction involves the conversion or transcription of field and analytical data to a useable format. The laboratory personnel will reduce the analytical data for review by the Quality Assurance Leader and Project Manager.

2.8 Field Measurement Evaluation

Field data will be reviewed at the end of each day by the field lead following the quality control checks outlined below and procedures in the QAPP. Field data documentation will be checked against the applicable criteria as follows:

- Sample collection information;
- Field instrumentation and calibration;
- Sample collection protocol;
- Sample containers, preservation and volume;
- Field QC samples collected at the frequency specified;
- Sample documentation and COC protocols; and
- Sample shipment.

Cooler receipt forms and sample condition forms provided by the laboratory will be reviewed for out-of-control incidents. The final report will contain what effects, if any, an incident has on data quality. Sample collection information will be reviewed for correctness before inclusion in a final report.

2.9 Field Quality Control Evaluation

A field quality control evaluation will be conducted by the project manager reviewing field log books and daily reports, discussing field activities with staff, and reviewing field QC samples (field duplicates and laboratory results).

2.9.1 Laboratory Data Quality Control Evaluation

The laboratory data assessment will consist of a formal review of the following quality control parameters by the project manager:

- Holding times;
- Method blanks;
- Matrix spike/spike duplicates;
- Surrogate spikes; and
- Replicates.

In addition to these quality control mechanisms, other documentation such as cooler receipt forms and case narratives will be reviewed to fully evaluate laboratory QA/QC

3.0 ASSESSMENT AND OVERSIGHT

3.1 Assessments and Response Actions

Assessments used during implementation of the project will include daily communication and updates during fieldwork and data quality review by the PM and QAO. Response actions to assessed issues will be coordinated between the PM, QAO and involved subcontractors.

3.2 Routine Communications

Subsequent to approval of the project work plan, Ahtna will communicate project status to the BIA Project Manager through periodic conference calls or emails. These calls will include discussion of project status and schedule, any quality assurance problems and recommended solutions, and data quality assessments.

4.0 SITE-SPECIFIC HEALTH AND SAFETY PLANS

A HASP will be prepared for the site in accordance with OSHA requirements in 29 CFR Part 1910 Subpart Z. The HASP will include general site information including access procedures, site/waste characteristics, hazard evaluation, on-site control, personal protection, and emergency information and procedures.

APPENDIX C

HEALTH AND SAFETY PLAN

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Bureau of Indian Affairs
Northwest Regional Office
Division of Environmental, Safety and
Cultural Resources Management
911 NE 11th Avenue
Portland, Oregon 97232

HEALTH AND SAFETY PLAN

BIA Signal Peak Ranger Station
Yakima Indian Reservation
State of Washington

Prepared by

Ahtna Environmental, Inc.
19540 International Blvd., Suite 201
Seatac, WA 98188

Geosyntec consultants
engineers | scientists | innovators

Geosyntec Consultants, Inc.
621 SW Morrison St, Suite 600
Portland, Oregon 97205

Project Number: PNG0633

6 August 2014

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1. SIGNATURES

1.1 Preparers and Reviewers

This HASP, which must be maintained on site when field work is being performed, addresses the health and safety hazards of each phase of site operation, including the procedures and equipment required for worker protection. Only the Site Health and Safety Officer (SHSO) can change or amend this document, in agreement with the Environmental Health and Safety Coordinator (EHSC), and Project Manager. The SHSO must initial any change made to the HASP at the relevant section. Major amendments (e.g., changes in personal protective equipment, addition of tasks, etc.) must be documented in Section 3 and in Appendix A. This HASP must be reviewed and amended on an annual basis for projects lasting more than one year.

Prepared by:	Joey Hickey & Jess Black	
	SHSO	Date
Reviewed by:	Jess Black	
	EHSC	Date
Approved by:	Joey Hickey	
	Senior Scientist	Date
Approved by:	Nino Muniz, P.G.	
(as needed)	Project Manager	Date

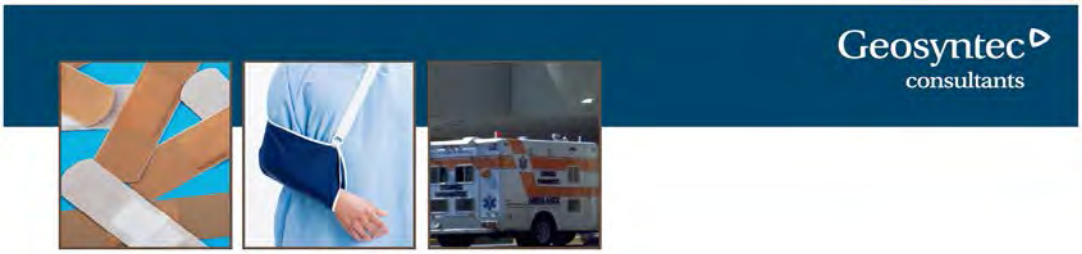
Copy Cover Sheet to: EHSC

This HASP has been given to the following subcontractor(s) in accordance with the Occupational Safety and Health Administration (OSHA) HAZWOPER Standard, per Chapter 29 of Code of Federal Regulations (CFR), Subsection 1910.120.

Subcontractor: _____ Representative: _____ Date: _____

Subcontractor: _____ Representative: _____ Date: _____

Subcontractor: _____ Representative: _____ Date: _____



Instructions for Injury Response

IF LIFE THREATENING: CALL 911

If not life threatening but requiring emergency care:

Seek immediate medical attention at the hospital/facility that provides emergency care shown on **FIGURE 1A**.

- **Once the emergency situation has stabilized, follow the "Instructions for Incident Reporting" included in this HASP.**

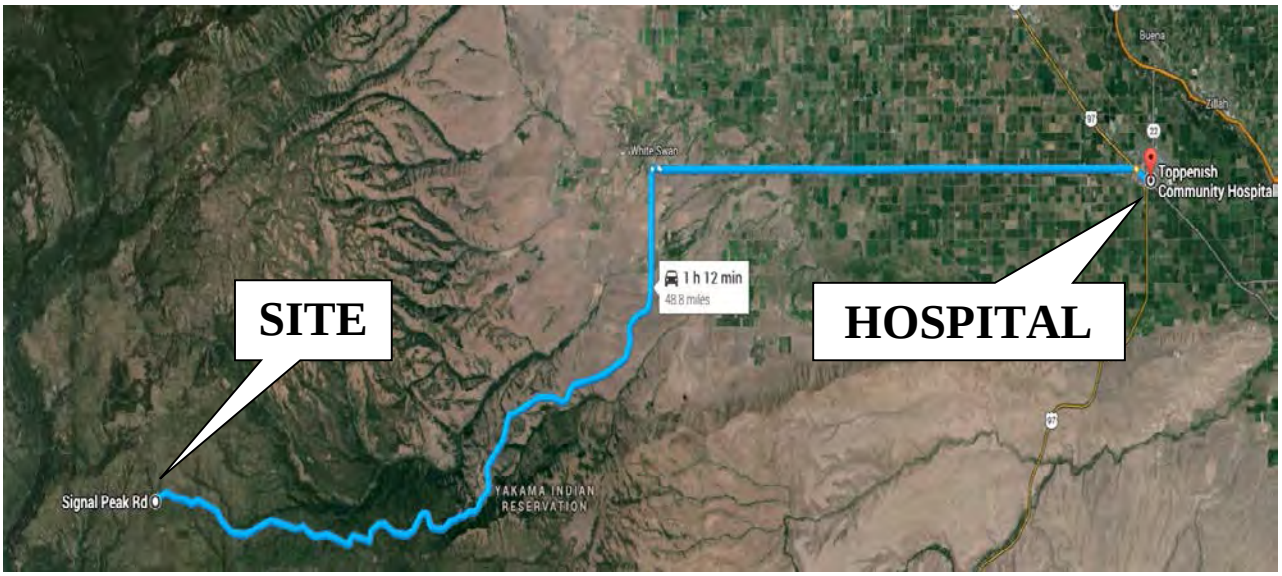
If Not Requiring Emergency Care:

Manager/Supervisor calls the EHS Department at **(804) 349-8067 (Dale Prokopchak)** or **(404) 435-4722 (Ersin Yalcin)** to discuss appropriate medical attention (even if he/she thinks medical attention is not required). If professional care is needed, contact **WorkCare** at **(888) 449-7787** to get assistance.

- **Present the medical care provider with the TEAR-OUT FORMS *("Instructions to Medical Provider"* and *"Physical Status for Return to Work")* included in this HASP.**
- **Follow the *"Instructions for Incident Reporting"* included in this HASP within one hour.**

FIGURE 1A

ROUTE TO HOSPITAL



Toppenish Community Hospital
(509) 865-3105***
502 W 4th Ave
Toppenish, WA 98948

***There is likely no cell service at the Site. However, BIA representative will have radio communication if help is needed. Additionally, if needed, drive to a high (or higher) point – 911 service is available in remote parts of Yakima County, assuming cell phone coverage.

Written Directions to Hospital (Toppenish Community Hospital) from Site:

Drive 48.8 miles, 1 h 12 min

Signal Peak Rd

WA

1. Head northeast on BIA Rd 140/Signal Peak Rd toward BIA Rd 219

   Continue to follow Signal Peak Rd

   28.8 mi

2. Turn right onto Fort Rd Exn

   0.2 mi

3. Turn right onto Curtis St

   351 ft

4. Continue onto Fort Rd

   18.9 mi

5. Turn right onto US-97 S

   0.5 mi

6. Turn left onto WA-22 W

   410 ft

7. Turn right onto W 4th Ave

   Destination will be on the right

   0.2 mi

Toppenish Community Hospital: Iovino Ivana MD

502 W 4th Ave, Toppenish, WA 98948

FIGURE 1B

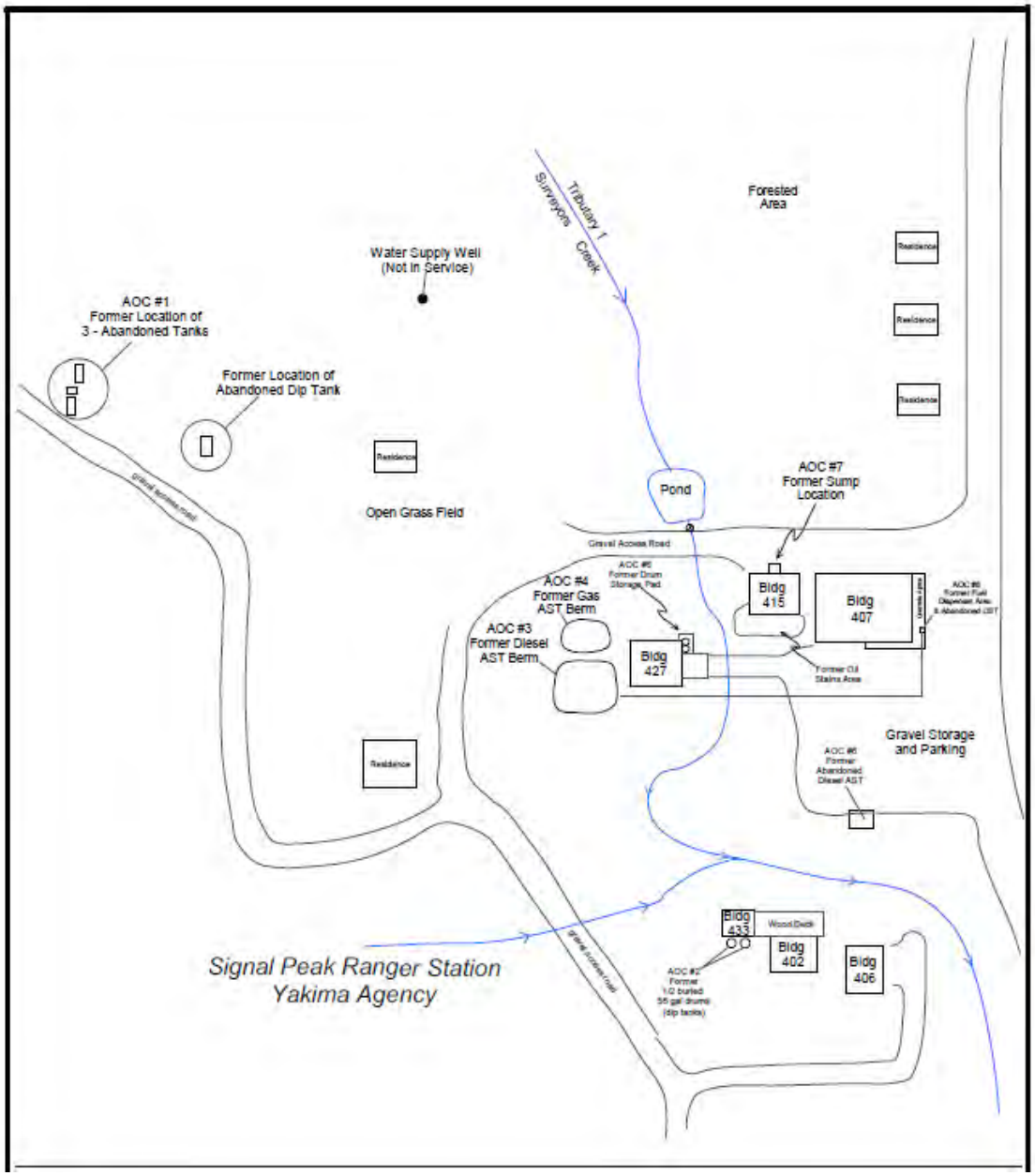
ROUTE TO URGENT CARE FACILITY

There are no urgent care facilities within reasonable proximity to the site. Go to Toppenish Community Hospital emergency room for urgent care needs.

FIGURE 2

SITE MAP

(from 2008 Cherokee General Corp and Grant Associates, Inc Findings Report)



EMERGENCY RESPONSE PROCEDURES

- The Site Health and Safety Officer (SHSO), or designated alternate, should be immediately notified via the on-site communication system. The SHSO assumes control of the emergency response.

- If applicable, the SHSO must immediately notify off-site emergency responders (i.e., fire department, hospital, police department, etc.) and must inform the response team of the nature and location of the emergency on site.

- If applicable, the SHSO calls for evacuation of the site. Site workers should move to their respective refuge stations using the evacuation routes provided on the Site Map (Figure 2).

- For small fires, flames should be extinguished using the fire extinguisher. Large fires should be handled by the local fire department.

- If a worker is injured, the procedures presented in "Instructions for Injury Response", located in the front of this HASP, must be implemented immediately.

- After an incident has stabilized, the procedures presented in "Instructions for Incident Reporting", located in the front of this HASP, must be followed.

EMERGENCY RESPONSE CONTACT INFORMATION

Contact	***Telephone Numbers***		***Date of Pre-Emergency Notification (if required)***
	Office	***Cell***	
Fire Department	911		
Police Department	911		
Hospital - Toppenish Community Hospital	(509) 869-3105	NA	
Ahtna Project Manager – Nino Muniz	(907) 646-2969	(907) 306-2040	
Geosyntec Director of Environment, Health & Safety – *Dale Prokopchak*	(804) 332-6376	(804) 349-8067	
Geosyntec Sr. Scientist - Joey Hickey	(971) 271-5897	(503)730-6608	
Geosyntec Environmental, Health & Safety Coordinator – Jess Black	(971) 271-5899	(503) 805-3112	
Geosyntec Principal- or Associate-in-Charge – Sean Ragain	(971)271-5907	(503)702-0205	
Geosyntec Office Manager - Lisa Curtis	(971) 271-2903	(503)764-7440	
Utility Emergencies	811		
BIA- Bureau of Indian Affairs – Bob Blaesing	(503) 231-6753	(971) 313-4245	

Dear Medical Provider:

On behalf of Geosyntec Consultants/MMI Engineering, you are authorized to evaluate and treat the above Geosyntec/MMI employee today for an alleged work-related injury or illness.

Employee Name: _____
Alleged Injury: _____
Date of Alleged Injury: _____
Date of Medical Evaluation: _____

Geosyntec/MMI strives to reduce OSHA recordables; therefore, ***please do not prescribe or dispense prescription medications if OTC medications or non-prescription strength can be used*.** It is our primary interest to ensure this employee returns to work full duty. If a full duty release is not possible, Geosyntec/MMI may be able to find light duty for the **employee**; ***unless it is unavoidable, please do not prescribe lost time.*** We would appreciate it if you would complete the attached form "Physical Status for Return to Work", or a similar form, to assist us in evaluating this employee's work capabilities.

- Please fax a copy of all medical paperwork and "Physical Status for Return to Work Form" to Dale Prokopchak at (804) 332-6732.
- Invoices and supporting medical records should be mailed to:

  Human Resources Department
  Geosyntec Consultants
  900 Broken Sound Parkway, NW, Suite 200
  Boca Raton, FL 33487
  Phone: 561.922.1002
  Fax: 561.922.1101

Thank you for your assistance.

Very truly yours,

Dale Prokopchak, CIH, CSP
Director of Environmental Health and Safety

PHYSICAL STATUS FOR RETURN TO WORK
PLEASE FAX COMPLETED FORM TO DALE PROKOPCHAK AT (804) 332-6732

Employee Name _____ Date of Injury/Illness _____

TO BE COMPLETED BY TREATING PHYSICIAN

Diagnosis _____

I saw and treated this patient on (date) _____ and:

__ Release the patient to full duty with no limitations on (date) _____

__ Patient may return to work with the following limitation on (date) _____ and may work an 8 hr. shift unless specified otherwise.

LIFTING CAPACITY

__ Occasional lifting (10 lbs. max.) and lifting and carrying occasionally. Walking and standing occasionally.

__ Occasional lifting (20 lbs. max.). Significant walking, standing; or sitting with pushing and pulling with arms or legs.

__ Occasional lifting (50 lbs. max.) with frequent lifting and/or carrying up to 25 pounds.

OTHER ACTIVITIES

		SINGLE DURATION					IN AN 8 HOUR DAY PATIENT MAY DO				
LIMITATION	NO LIMITATION	< 1/2 hr	1/2-1 hr	1-2 hr	2-4 hr	4-6 hr	1/2-1 hr	1-2 hr	2-4 hr	4-6 hr	6-8 hr
SIT											
STAND											
WALK											
USE RIGHT HAND											
USE LEFT HAND											

	NO LIMITATION	FREQUENTLY (31%-60%)	OCCASIONALLY (1%.-30%)	NEVER
BEND				
SQUAT				
CLIMB				
REACH OVERHEAD		WEIGHT LIMIT	WEIGHT LIMIT	
REACH SHOULDER		WEIGHT LIMIT	WEIGHT LIMIT	
PUSHING/PULLING		WEIGHT LIMIT	WEIGHT LIMIT	

Other instructions or limitations:

_____

_____

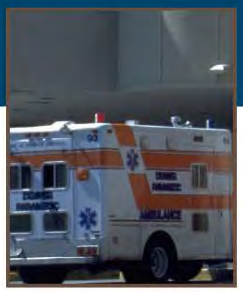
Estimated length of time of modified duty: _____

__ These restrictions are in effect until (date) _____ or until patient is reevaluated on (date) _____

__ Patient is totally incapacitated at this time. Patient will be reevaluated on (date) _____

Physician Signature _____ Date _____

ADDITIONAL NOTES:



Instructions for Incident Reporting

Once an emergency situation has been stabilized, or within one hour of a non-emergency incident:

Manager/Supervisor calls the EHS Department at **(804) 349-8067** or **(404) 435-4722**—to discuss appropriate medical attention. If unable to contact the EHS Department within one (1) hour, a detailed voicemail with information about the incident must be provided and if non-emergency professional care is needed, contact **WorkCare** at **(888) 449-7787** to get assistance.

- Within 24 hours, the Manager/Supervisor completes a draft of the "Manager's Report of Incident", located in this HASP and on the EHS website, and sends to HR at (561) 922-1101.
- Manager/Supervisor forwards the finalized paperwork within 48 hours to both EHS (dprokopchak@geosyntec.com); fax (804) 332-6732 and HR; fax (561) 922-1101 for review, documentation, and implementation into our case management program.
- Contractors are responsible for compliance with their internal safety procedures regarding Incident Reporting. Geosyntec will document the Contractor's incident in their Project Logbook.
- In the event of a vehicle accident that does not involve injuries, please follow the procedures outlined in EHS 105—Driver Safety.

Contact Information

Dale Prokopchak: office: 804.332.6376 | cell: 804.349.8067 | fax: 804.332.6732 | dprokopchak@geosyntec.com
Ersin Yalcin: office: 678.202.9552 | cell: 404.435.4722 | fax: 678.202.9501 | eyalcin@geosyntec.com

DRIVER'S REPORT OF ACCIDENT – PAGE 1

Driver's Report of Accident

Do not argue at the scene of the accident. Be courteous and show your license willingly.

Your Vehicle

Name of Driver _____

Odometer Reading _____

Vehicle I.D. No. _____

License Plate No. _____ State _____

Place of Accident _____

_____

City/State _____

Direction of Travel _____

Speed _____

Other Vehicle

Name of Driver _____

Address _____

_____

Phone No. _____

Driver's License No. _____

License Plate No. _____ State _____

Vehicle I.D. Number _____

Year/Model _____

Owner of Vehicle _____

Address of Owner _____

_____

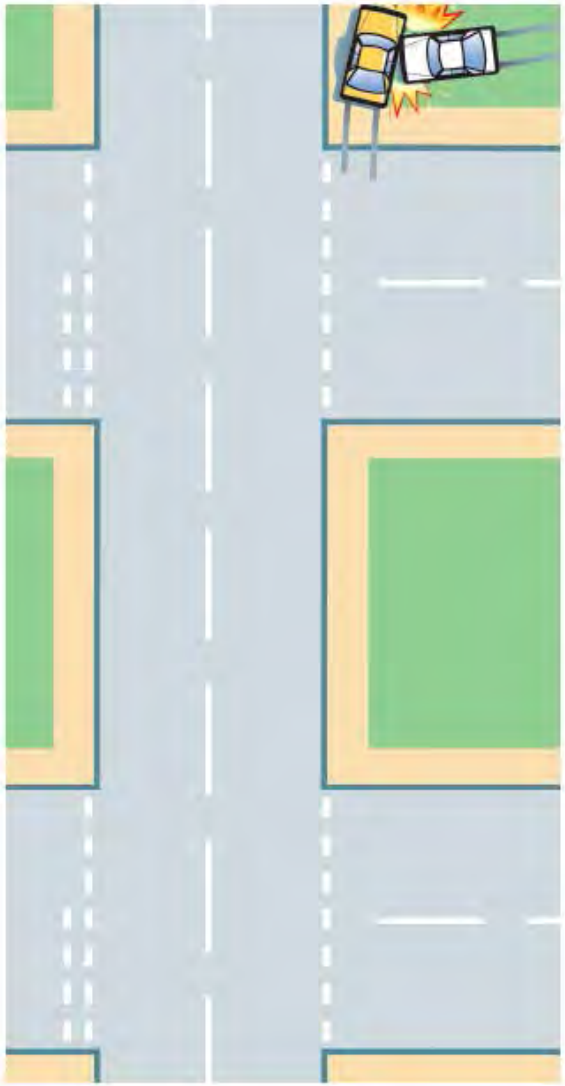
Insured by _____

Direction of Travel _____

Approximate Speed _____

Diagram of Accident

Using the diagram below, show exact relationship of roadways and vehicles at the time of the accident. (Indicate North) Show measurements if possible (identify your vehicle as #1, other vehicles as #2, #3, etc.)



What to do in Case of a **Vehicle Accident**

Geosyntec consultants

Here is What to do

1. Take precautions necessary to protect the scene of the accident from further accidents.
2. Call police immediately, if someone is injured, request medical assistance. In case of fire, request fire department.
3. If there are any injuries, follow the requirements of the injury, illness, near miss procedure
4. Be courteous. Answer police questions. Give identifying information to the other party involved, but make no comments about assuming responsibility. Check the glove box for insurance information on your rental car.
5. Complete this ACCIDENT REPORT FORM. You will need this information later for state and insurance reports.
6. Report the accident to your immediate supervisor as soon as possible. The supervisor will send the completed form to Emil Uglesic in the Oakland Office: phone (510) 285-2718; fax (510) 836 -3037. Emil will contact Marsh (the insurance carrier). If the vehicle accident results in an injury to a Geosyntec employee that requires medical attention, the supervisor will notify appropriate personnel within their department and EHS.
7. Take photographs of the damage if it is safe to do so.
8. Do not leave the scene of the accident, until police have arrived or you're being transported by rescue.

Description of Accident

Date _____ Time _____ ○am ○pm

Road Condition _____

Time of Day
(check one) ○ Daylight ○ Dawn/Dusk ○ Night

Weather Condition
(check one) ○ Foggy ○ Cloudy ○ Clear

Road Surface
(check one) ○ Wet ○ Damp ○ Dry

Description _____

Driver's Signature _____

Employer
(check one) ○ Geosyntec Consultants ○ MMI

Branch Location _____

Branch Phone Number _____

Witnesses

1. Name _____

Address _____

Phone _____

2. Name _____

Address _____

Phone _____

Police Investigation

Name of Officer _____

Report Number _____

Name of Police Agency _____

Was Summons Issued ○ Yes ○ No

Injured Persons

1. Name _____ **DOB:** _____

Address _____

Nature of Injury _____

2. Name _____ **DOB:** _____

Address _____

Nature of Injury _____

Damage to Property

1. Owner _____

Address _____

Damaged _____

Property _____

Extent of Damage _____

2. Owner _____

Address _____

Damaged _____

Property _____

Extent of Damage _____

MANAGER'S REPORT OF INCIDENT

1. Seek immediate medical attention if the injury/illness is serious and/or life threatening.
2. Employee must report all incidents and near misses to their supervisor **immediately**
3. Supervisor must immediately notify the EHS Department at (804) 349-8067 or (404) 435-4722 with details of the incident, and discuss appropriate medical care for non-life threatening injury/illness. If unable to contact EHS, employee must call WorkCare at (888) 449-7787 to get assistance with non-life threatening injury/illness care.

EMPLOYEE INFORMATION

Name: _____ Position: _____

Department #: _____ Employee #: _____ Phone #:_____

Supervisor Name: _____

FACTS OF INCIDENT

□ Injury □ Illness □ General Liability □ Near Miss Date and Time of Incident: _____

Date and Time Accident Reported: _____ To Whom: _____

Where did the incident occur (location name and street address)? _____

City: _____ State/Province_____ Zip/Postal Code: _____

County _____ Country: _____

What was the employee doing when the incident occurred? Name the tools, equipment or material the employee was handling and what he was doing with them. _____

_____

_____

Explain how the incident occurred. List events leading up to incident, what happened, how it happened and name objects and how they were involved (use a separate sheet if necessary). _____

_____

_____

NATURE OF INCIDENT

Describe incident and indicate body part affected if injury (e.g. cut on middle left finger). _____

_____

_____

Name object or substance that injured the employee._____

_____

Has any prior, related injury to affected area of body occurred while employed at Geosyntec/MMI? □ Yes □ No

MEDICAL ATTENTION GIVEN (check all that apply)

□ First Aid given by _____ Date/Time _____ Phone _____

□ Doctor's Name _____ Date/Time _____ Phone _____

Address _____

□ Hospital Name _____ Date/Time _____ Phone _____

Address _____

□ Released □ Admitted Length of Stay: _____

Did the employee go to an Emergency Room? □ Yes □ No

EMPLOYEE'S DESCRIPTION OF THE INCIDENT (IN OWN WORDS)

Describe incident and indicate body part affected (e.g. cut on middle left finger) and what you were doing when the incident occurred (be specific) _____

_____

_____

_____

Explain how the incident occurred. List events leading up to incident, what happened, how it happened and name objects and how they were involved (use a separate sheet if necessary). _____

_____

_____

_____

Employee's Signature _____ **Date**_____

ADDITIONAL INFORMATION (TO BE COMPLETED BY THE MANAGER)

Witnesses

Name: _____ Phone: _____

Name: _____ Phone: _____

What do you believe could be done to help prevent incidents of this type (be specific)? _____

_____

_____

_____

Any additional Comments _____

_____

_____

_____

Manager's Signature _____ **Date**_____ **Phone #:** _____

HR/EHS

OSHA Recordable?: □ Yes □ No □ Pending WC? □ Yes □ No

Days away from work: _____ Days of restricted work activity: _____ Date returned to work _____

HR Manager's Signature _____ **Date**_____

Comments: _____

EHS Manager's Signature _____ **Date**_____

Comments: _____

Manager must complete this form within 24 Hours of the incident and fax a copy of this report to Human Resources at (561) 922-1101 and EHS at (804) 332-6732

1.2 Site Workers

A pre-entry briefing conducted by the SHSO must be held prior to initiating the field work of this project. All sections of this HASP must be reviewed during this briefing. Any worker not in attendance at the initial meeting must be trained by the SHSO on the information covered in the pre-entry briefing. Tailgate meetings must be held at the beginning of each day by the SHSO to discuss important health and safety issues concerning tasks to be performed during that shift. Topics discussed in the tailgate meetings must be documented in a daily field log. Weekly site health and safety audits must be performed and documented by the SHSO for projects lasting more than one week. After reading the HASP and attending a pre-entry briefing, Geosyntec employees must sign the following acknowledgment statement.

"I have read, understand, and agree with the information set forth in this HASP. I have also attended a pre-entry briefing. I agree to perform my work in accordance with this HASP."

Signature	Printed Name	Date

2. DISCLAIMER

This HASP was prepared in accordance with Geosyntec Consultants' Health and Safety Procedures for use by Geosyntec project staff. This plan complies with Geosyntec internal review procedures. Geosyntec does not endorse the use of this HASP by others. This document and its contents should not be used by firms other than Geosyntec or by persons other than Geosyntec employees without a thorough peer review by their health and safety managers. Should the work outlined in this HASP be executed by contractors other than Geosyntec, the HASP should be modified and reviewed to comply with such company's corporate health and safety procedures. In the event that a contractor other than Geosyntec executes this work, the contractor should complete independent analyses of hazards and mitigation measures, and should update all HASP tables, text, figures, and appendices prior to commencing work. Geosyntec assumes no responsibility for the accuracy, content, or health and safety of non-Geosyntec personnel during the implementation of the work in this HASP by other parties.

3. HASP AMENDMENTS

Over the course of this project, it is possible that the project-specific details and working conditions will change. This HASP shall be reviewed and amended as necessary to effectively describe the changing working conditions and to mitigate the potential health and safety issues that may arise during the project. Amendments to the HASP should be briefly described in the following spaces provided. The full text of the amendments should be provided in Appendix A.

AMENDMENT 1:

Date: _____ Project Manager: _____ EHSC: _____
Brief description of amendment:
_____
_____

AMENDMENT 2:

Date: _____ Project Manager: _____ EHSC: _____
Brief description of amendment:
_____
_____

4. SITE/TASK DESCRIPTION

The following is a brief description of the site, including information as to the location, approximate size, previous usage, and current usage. A description of the tasks to be performed is also presented.

- Site Location: The Site is situated in Township 9 North, Range 13 East, Section 25 in Yakima County, Washington (Figure 1). The Site is located on the Yakama Indian Reservation approximately 24 miles north-northeast of Glenwood, Washington and is accessed by Signal Peak Road (road BIA 140). The Site is located at the base of the north flank of Signal Peak, a remnant volcanic peak, and approximately 17 miles east of Mt. Adams.
- Previous Site Usage: Undeveloped
- Current Site Usage: Not in use currently, but former ranger station.
- Description of Surrounding Property/Population:

North	Undeveloped	East	Undeveloped
South	Undeveloped	West	Undeveloped

Summary of previous site investigations (if available/applicable):

- The presence of two federally regulated USTs was documented at the Site during environmental site assessments conducted in 2003, 2006, and 2008.
- UST-1 was a concrete and wood-lined sump measuring approximately 4 feet by 4 feet by 50 inches. UST-1 was located adjacent to Building 415 and was used to dispose of waste oil from generator maintenance. UST-1 was removed during field activities in September 2008.
- UST-2 is a tank measuring approximately 4 feet in diameter and 9 feet long. UST-2 was discovered at the southwest corner of Building 407 during the 2008 field activities. It contained approximately three feet of liquid. Testing in 2008 revealed no Contaminants of Potential Concern in UST-2 at that time. The age and intended use of UST-2 is not known. UST-2 has not been permanently closed and remains in the ground. It is our understanding that the liquid in

UST-2 may be comprised primarily of water.

- In July 2003, the BIA performed a Site Investigation at the Site and noted visual evidence of petroleum-contaminated soil (PCS) near UST-1.
- In October 2006, A BIA contractor, Cherokee General Corporation (Cherokee), conducted an initial site characterization at the Site and identified at least eight areas of recognized environmental concern. Two areas of concern were the areas surrounding the two USTs. At the time of the site characterization, it was assumed that UST-2 had been removed in the 1970s.
- During the 2006 site characterization, the contents of UST-1 were pumped out and five borings were drilled in the vicinity. Analytical data revealed the presence of total petroleum hydrocarbons (TPH) above Washington Model Toxics Control Act (MTCA) cleanup levels. EPA uses MTCA cleanup levels as a guide for determining appropriate cleanup levels for petroleum releases in Indian Country in Washington State. MTCA cleanup levels for TPH in soil are as follows: TPH in the diesel range (TPH-D), 2,000 milligrams per kilogram (mg/kg); TPH in the gasoline range (TPH-G), 100 mg/kg; and TPH in the heavy oil range (TPH-O), 2,000 mg/kg. The highest concentrations of TPH detected in soil collected from these soil borings were TPH-D at 8,560 mg/kg and TPH-O at 29,800 mg/kg.
- During the 2006 site characterization, six soil borings were drilled near UST-2. Analytical data indicated the presence of TPH above MTCA cleanup levels. The highest concentrations of TPH detected in soil collected from these soil borings were diesel-range hydrocarbons at 3,800 mg/kg; gasoline-range hydrocarbons at 841 mg/kg; and oil-range hydrocarbons at 14,500 mg/kg.
- In September 2008, Cherokee performed additional site characterization and cleanup actions. Building 415 was razed, and approximately 590 cubic yards of PCS was excavated near UST-1. PCS excavation was halted to avoid compromising the structural integrity of Building 407; however, sampling results indicated that further contamination extended beneath Building 407. The highest concentrations of TPH detected in soil collected from the excavation side walls were diesel-range hydrocarbons at 22,200 mg/kg; gasoline-range hydrocarbons at 922 mg/kg; and oil-range hydrocarbons at 8,060 mg/kg.
- During the 2008 field work, UST-2 was discovered while removing conveyance piping associated with an aboveground storage tank (AST). Four test pits were excavated near UST-2 to determine the presence of petroleum contamination in the area. The highest concentrations of TPH detected in soil collected from the test pits were diesel-range hydrocarbons at 7,670 mg/kg; gasoline-range hydrocarbons at 848 mg/kg; and oil-range hydrocarbons at 4,630 mg/kg.

Task Descriptions:

Task 1: UST Decomissioning and Removal
Oversee activities of subcontractor removal of tank. No confined space entry is expected. Includes soil sampling of excavation, obtained via bucket of excavator. A private locate will be performed prior to excavation. The excavation will be marked with yellow caution tape and cones/stantions if needed during the work, or in the event the excavation is unattended. Hard hat, safety glasses, safety vest, gloves, and steel toed boots are required. A first aid kit should also be available. Field personnel should inspect themselves for evidence of ticks after work day. Petroleum hydrocarbons are the expected soil and groundwater contaminants. Alconox may be used for decontamination of equipment.

Task 2: Temporary soil borings and installation of groundwater monitoring wells
Up to 19 borings to depths up to 20 feet bgs will be advanced by the subcontractor. A private locate will be performed prior to drilling. Groundwater and soil samples will be collected for potential chemical analysis. Approximately seven borings will be completed as 2" groundwater monitoring wells. Borings not completed as monitoring wells will be abandoned in accordance with Ecology regulations. Hard hat, safety glasses, safety vest, gloves, and steel-toed boots are required. Hearing protection if needed during operation of drill rig. Field personnel should inspect themselves for evidence of ticks after work day. Petroleum hydrocarbons are the expected soil and groundwater contaminants. Alconox may be used for decontamination of equipment. IDW soil and groundwater will be generated and placed in drums for subsequent disposal.

Task 3: Surface Water and Sediment Sampling
A small creek and wetland area (Tributary to Surveyors Creek) approximately one foot deep will be sampled for both surface water and sediment in three locations. Surface water samples will be collected by hand, and sediment samples will be collected using a hand auger. Waterproof boots or waders, safety vest, gloves, and safety glasses required. No working alone is permitted. Field personnel should inspect themselves for evidence of ticks after work day. Petroleum hydrocarbons are the expected soil and groundwater contaminants. Alconox may be used for decontamination of equipment.

Task 4: Subsequent groundwater monitoring activities

Because of the remote location, no working alone is permitted. Samples will be collected using a battery-powered low flow pump from monitoring wells on a periodic basis. Safety glasses, safety vest, gloves, and steel toed boots are required. A first aid kit should also be available. Field personnel should inspect themselves for evidence of ticks after work day. Petroleum hydrocarbons are the expected soil and groundwater contaminants. Alconox may be used for decontamination of equipment. IDW soil and groundwater will be generated and placed in drums for subsequent disposal.

5. KEY PERSONNEL AND HEALTH AND SAFETY RESPONSIBILITIES

Table 1 lists project personnel and their responsibilities in regard to health and safety concerns on this project.

6. WORKER TRAINING

Table 2 presents the training and medical monitoring that project personnel have received in accordance with the company Environmental, Health, and Safety (EH&S) Training Program. Pre-entry briefings and daily tailgate meetings shall also be conducted to facilitate site-specific training.

7. MAPS AND SITE CONTROL

7.1 Routes to Hospital

A hospital near the site has been identified. Figure 1A presents the route to the hospital, for emergency care. There is no Figure 1B for this plan because an urgent care facility could not be found within a reasonable distance. Both figures also include the facility name, phone number, and written directions from the site. The figures are included at the front of this HASP.

7.2 Site Map

A site map is presented on Figure 2, located inside the cover of this HASP. The site map is intended to show the location of the work zone(s), to provide on-site orientation, and to delineate evacuation routes. Changes may be made to the site map by the SHSO based on changing site conditions. The site map should be accessible in the work area.

7.3 Buddy System

The buddy system is required for all tasks. The buddy system includes maintaining regular contact with onsite Geosyntec personnel, clients, and/or contractors to periodically check on the condition of site workers. In situations when only one employee is performing field work, on-site personnel must have appropriate communication devices on his/her persons at all times and shall maintain contact with off-site personnel. The field worker must communicate with off-site personnel, at a minimum, of three times daily: (1) upon arriving at the site; (2) midway through the work day; and (3) upon departing from site.

7.4 Controlled Work Zones

APPLIES TO TASK: ☐① ☐② ☐③ ☐④ ☐⑤ ☐⑥ ☐⑦ ☐⑧ ☒ Not Applicable

Three controlled work zones, including an Exclusion Zone, a Contaminant Reduction Zone (CRZ), and a Support Zone, are required for the task(s) indicated above. The Exclusion Zone is defined as the area on site where contamination is suspected and tasks are to be performed. The CRZ is defined as the area where equipment and workers are to be decontaminated as they leave the Exclusion Zone. The Support Zone is defined as the command area and may serve as a staging and storage area for supplies. The location and extent of the work zones may be modified as necessary as site investigation information becomes available. For sites that do not require the three controlled work zones, the area(s) where work is to be performed shall be called the Work Zone.

The boundaries of the Exclusion Zone, CRZ, and Support Zone or the Work Zone shall be marked using the following methods:

- ☐ Warning tape
- ☐ Traffic cones
- ☐ Signs
- ☐ Fence
- ☐ Other: _____

7.5 Site Access

Access to the site must be controlled using the following method:

- ☐ Sign in/Sign out log
- ☐ Guard
- ☐ Identification badges
- ☐ Check in with SHSO
- ☒ Other: No access control needed – remote site.

7.6 Visitors

Visitors to the site may need to be continually escorted for safety purposes. Geosyntec employees must not be allowed into the CRZ or Exclusion Zone or the Work Zone until they have received the proper personal protective equipment (PPE) and they have read, understand, and meet the requirements outlined in this HASP. Other visitors under Geosyntec's direction (subcontractors, etc.) may review this HASP for site familiarity, but they are ultimately responsible for their own health and safety (see disclaimer in Section 1).

7.7 Safe Work Practices

General Safe Work Practices that must be implemented during work activities at this site are listed in Table 3.

7.8 Inspections

For projects with field components lasting longer than one week, the SHSO must conduct periodic health and safety inspections. The inspections must be documented using the Health & Safety Inspection Checklist, presented in Appendix B. The Health & Safety Inspection Checklist records should be kept on file at the project site.

The requirement for periodic inspections is:

☒ Not Applicable
☐ Applicable, and the frequency shall be:
- ☐ Weekly
- ☐ Bi-Weekly
- ☐ Monthly

8. HAZARD ANALYSIS AND MITIGATORS

Site specific hazards have been identified through a hazard analysis. Hazard analysis included a review of chemical, physical, and biological hazards. The analysis also identified health and safety hazard mitigators needed to protect workers, which are presented in Appendix C.

8.1 Chemical Hazards

Potential exposure pathways to chemical health hazard agents include inhalation, dermal exposure, and/or ingestion. To effectively manage risk to exposure, constituents of concern (COCs) have been identified. Potential exposure to these COCs will be mitigated through engineering, administrative, and/or PPE controls. The COCs are

documented and/or suspected materials present based on previous operations/activities. The identified COCs for this project are listed in Appendix D with appropriate hazard information, including signs of exposure. Hazard Mitigators, which include control measures and methods to minimize exposure, are presented in Appendix C. Also, airborne levels of COCs may be estimated or measured to evaluate levels of PPE that will be required for individual tasks. The type(s) of air monitoring to be performed are discussed in Section 9.

8.2 Physical Hazards

Physical hazards due to the tasks to be performed (e.g., electrocution due to drilling, etc.) and due to the site setting and condition (e.g., slips, trips, or falls due to rocky terrain, etc.) were analyzed. Hazard mitigators for each physical hazard identified are presented in Appendix C. These hazard mitigators must be implemented for each task in which they are applicable, as summarized in the table in Appendix C.

8.3 Biological Hazards

Biological hazards (e.g., allergic reactions to poisonous plants or insects indigenous to the area, etc.) associated with tasks to be performed were analyzed. Hazard mitigators for each biological hazard identified are presented in Appendix C. These hazard mitigators must be implemented for each task in which they are applicable, as summarized in the table in Appendix C.

9. AIR MONITORING

APPLIES TO TASK: ☐① ☐② ☐③ ☐④ ☐⑤ ☐⑥ ☐⑦ ☐⑧ ☒ Not Applicable

Air monitoring will be performed to evaluate airborne exposure levels associated with the COCs on site within the breathing zone of site workers. Hazardous conditions may include concentrations that may cause acute or chronic illness, potential oxygen deficient environments, or potential explosive environments. Air monitoring may also be performed to evaluate the adequacy of engineering, administrative, and/or PPE controls. Air monitoring may be “real-time” (e.g., the instrument provides immediate results at the project), using multi-gas meters, photoionization detectors (PIDs), or colorimetric tubes. “Non-real-time” monitoring may also be performed by collecting samples and forwarding to a laboratory for analysis and quantification.

The type(s) of air monitoring equipment required to evaluate COCs is outlined in Appendix E. Monitoring equipment must be calibrated based on the manufacturer’s requirements. Calibration results and air monitoring measurements must be

documented. Based on the results noted and site activities or scope of work changes, the frequency of air monitoring may be adjusted on site by the SHSO with the consent of the Project Manager and communication with the EHSC.

10. PERSONAL PROTECTIVE EQUIPMENT

The levels of PPE required for each task are presented in Appendix F. Required equipment and types of protective clothing materials, as well as an indication of the initial level of protection to be utilized, are listed. The level of protection may be upgraded or downgraded by the SHSO according to mitigation measures required in Appendix C or according to action guidelines provided in Appendix E. The PPE levels that are implemented must be documented in a daily field log.

If respirators are worn, workers must abide by the company's Respiratory Protection Program in accordance with 29 CFR §1910.134. Table 2 provides a record of the last fit test for each site worker that may be required to wear a respirator. Fit tests are valid for a period of one year. Persons with facial hair that may interfere with the respirator seal may not wear respirators.

11. DECONTAMINATION

The SHSO and Project Manager will determine the type and level of decontamination procedures for both personnel and equipment based on evaluation of specific work activities in the controlled work zones. In an emergency, the primary concern is to prevent the loss of life or serious injury to personnel. Medical treatment will take precedence over decontamination in the event of a life threatening and/or serious injury/illness. Personnel will perform decontamination in designated and identified areas upon leaving "hot zones" where the potential exists for exposure to hazardous chemical, biological, or environmental conditions.

Decontamination of personnel in Level D (modified) will consist of closure and disposal of coveralls, disposable boots, and gloves, (if applicable).

Decontamination of personnel in Level C, if applicable, will consist, at a minimum, of:

- Removal and cleaning/disposal of boot covers, coveralls, and outer gloves;
- Removal, cleaning, and storage of respiratory protection;
- Washing of boots or other non-disposable PPE (e.g., hard hat, safety glasses/goggles, etc.) suspected of being contaminated using a soap solution followed by a water rinse; and

- Removal and disposal of inner gloves.

Wash solutions and PPE may require disposal at a licensed waste facility. Hand tools and sampling equipment shall be decontaminated as needed by washing in decontamination basins with appropriate solutions, or, if possible, by dry decontamination.

12. EMERGENCY PREPAREDNESS AND RESPONSE

A table presenting a list of contacts and telephone numbers for the applicable local off-site emergency responders is provided inside the front cover of this HASP (after figures). If the nature of the site work and COCs requires that off-site responders be notified before work begins on this project, the date that the pre-notification was made is presented in the table.

The following emergency response equipment is required for this project:

☒ First Aid Kit
☐ Fire Extinguisher (Type ABC)
☐ Eyewash bottle
☐ Other: _____

In the event of an injury to an employee, the Instructions for Injury Response, located in the front of this HASP, must be implemented immediately. 'Tear-out' forms are located after the Instructions for Injury Response. If professional medical attention is required, these forms must be provided to the medical provider at the time the medical attention is administered. Injury reporting is required per the procedures presented on the Instructions for Incident Reporting, also located in the front of this HASP.

In the event that an emergency develops, the procedures delineated in the Emergency Response Procedures, located in the front of this HASP, are to be followed immediately. (Note that an emergency does not necessarily include an injury.) After the emergency is resolved, post-incident reporting is required per the procedures presented on the Instructions for Incident Reporting, also located in the front of this HASP.

13. CONFINED SPACE ENTRY

☐ APPLICABLE ☒ NOT APPLICABLE

The task(s) for this project involve confined-space entry. Workers must abide by the company's Confined Space Entry Program [29 CFR §1910.120(j)].

14. SPILL CONTAINMENT

☐ APPLICABLE ☐ NOT APPLICABLE

The task(s) for this project involve handling of drums and/or containers that contain stored chemicals and/or wastes associated with sampling, excavation, transportation, etc. Workers must implement the hazard mitigating procedures for drum/container handling presented in Appendix C.

15. CHEMICAL HAZARD COMMUNICATION LABELING

☐ APPLICABLE ☐ NOT APPLICABLE

The following procedures must be followed for chemicals brought onto the site by Geosyntec personnel (i.e., decontamination solution, sampling preservatives, KB-1 solution, sodium permanganate, etc.) while performing the tasks of this project:

- Labels on primary chemical containers must not be defaced.
- Chemical containers must be stored in appropriate storage containers.
- Secondary containers and storage cabinets must be correctly and clearly labeled using the Hazardous Materials Identification System (HMIS).
- Chemicals incompatible with each other must not be stored together.
- Workers must receive training on the chemical hazards.
- Material Safety Data Sheets (MSDSs) for the chemical must be added to Appendix G.

When chemicals are used on site, workers must abide by Geosyntec's Hazard Communication Program.

Table 1

Key Personnel and Health & Safety Responsibilities

Principal-in-Charge or Associate-in-Charge Sean Ragain	***Project Manager (PM)*** Joey Hickey	***Site Health & Safety Officer (SHSO)*** Joey Hickey	***Project Personnel*** Refer to Table 2	***Environmental, Health & Safety Coordinator (EHSC)*** Jess Black
• Approve this HASP and amendments, if any. • Verify that elements of this HASP are implemented.	• Approve this HASP and amendments, if any. • Monitor the field logbooks for health and safety work practices employed. • Coordinate with SHSO so that emergency response procedures are implemented. • Verify that corrective actions are implemented. • Verify and document that personnel receive this plan and are aware of its provisions and potential hazards associated with site operations, and that they are instructed in safe work practices and familiar with emergency response procedures. • Provide for appropriate monitoring, personal protective equipment, and decontamination materials.	• Prepare and implement project HASP and amendments, if any, and report to the Project Manager for action if any deviations from the anticipated conditions exist and authorize the cessation of work if necessary. • Verify that site personnel meet the training and medical requirements. • Conduct pre-entry briefing and daily tailgate safety meetings. • Verify that all monitoring equipment and personal protective equipment is operating correctly according to manufacturer's instructions and such equipment is utilized by on-site personnel. Calibrate or verify calibration of all monitoring equipment and record results. • Verify that decontamination procedures are being implemented. • Implement site emergency response and follow-up procedures. • Notify the EHSC in the event an emergency occurs. • Perform weekly inspections.	• Provide verification of required health and safety training and medical surveillance prior to arriving at the site. • Notify the SHSO of any special medical conditions (e.g., allergies). • Attend pre-entry briefings and daily tailgate safety meetings. • Immediately report any accidents and/or unsafe conditions to the SHSO. • Be familiar with and abide by the HASP. • Be ultimately responsible for his or her own safety.	• Review and audit HASP and amendments. • Maintain a copy of the cover sheet of each completed HASP. • Notify Director of Environment, Health & Safety in the event an emergency occurs. • Assist with the implementation of the corporate health and safety program. • Consult on health and safety issues.

Table 2: Personnel Training

Last name	First Name	Initial 40 Hr	Annual 8 Hr refresher	CPR	First Aid	AED	Medical Surveillance
Black	Jess	4/24/2003	10/17/2013	5/6/2011	5/6/2011	5/6/2011	5/4/2012
Hickey	Joey	4/28/1995	10/17/2013	2/9/2012	2/9/2012	2/9/2012	8/14/2012
Jarosz	Adrianna	9/13/2013	due in 2014	NA	NA	NA	9/6/2013
Lary	Barbara	6/16/1995	10/17/2013	NA	NA	NA	
Ragain	Sean	2/24/1989	10/17/2013	11/27/2010	NA	11/27/2010	NA
Smith	Luke	5/9/2013	due in 2014	NA	NA	NA	10/4/2013

Table 3

General Safe Work Practices

- Minimize contact with impacted materials. Do not place equipment on the ground. Do not sit or kneel on potentially contaminated surfaces.
- Smoking, eating, or drinking after entering the work zone and before decontamination is not allowed. Employees who are suspected of being under the influence of illegal drugs or alcohol will be removed from the site. Workers taking prescribed medication that may cause drowsiness shall not operate heavy equipment and are prohibited from performing tasks where Level C or B personal protective equipment is required.
- Practice good housekeeping. Keep everything orderly and out of potentially harmful situations.
- Use of contact lenses may not be allowed under certain hazardous working conditions.
- The following conditions must be observed when operating a motor vehicle.
  - Wearing of seat belts is mandatory
  - The use of headlights is mandatory during periods of rain, fog, or other adverse weather conditions
  - A backup warning system or use of vehicle horn is mandatory when the vehicle is engaged in a backward motion
  - All posted traffic signs and directions from flagmen must be observed
  - Equipment and/or samples transported in vehicles must be secured from movement
  - The use of vehicles acquired by Geosyntec by non-Geosyntec personnel is prohibited
- In an unknown situation, always assume the worst reasonable conditions
- Be observant of your immediate surroundings and the surroundings of others. It is a team effort to notice and warn of dangerous situations. Withdrawal from a hazardous situation to reassess procedures is the preferred course of action.
- Conflicting situations may arise concerning safety requirements and working conditions. These must be addressed and resolved rapidly by the SHSO and PM to relieve any motivations or pressures to circumvent established safety policies.
- Unauthorized breaches of specified safety protocol must not be allowed. Workers unwilling or unable to comply with the established procedures must be discharged.

Appendix A

HASP Amendments

Discuss details of amendments to this HASP here. Include amendment number, date, and details of amendments.

Appendix B

Health & Safety Inspection Checklist

Project: _____ Date: _____

Inspected by: _____

Category	*Observations/Corrective Actions (N/A, if Not Applicable)*
Pre-entry briefing records are current	
Tailgate meeting records are current	
Training/medical surveillance/respiratory protection records are current	
Site map is posted	
Buddy system is implemented	
Work zones are identified	
Site access is controlled	
Visitors are being escorted	
On-site/off-site communications are in working order	
Safe work practices are being implemented	
Any additional hazards incurred?	
Air monitoring equipment is in working condition	
Air monitoring records are being recorded in field logbook	
Air monitoring calibration records are being recorded in field logbook	
PPE storage area is neat and organized	
Standard operating procedures are being implemented	
Housekeeping at decontamination zone is appropriate	
Decontamination procedures are being implemented	
Emergency response equipment is in working condition	
Route to hospital is posted	
Confined space entry program is being implemented	
Spill containment equipment is available	
Chemical inventory is up to date	
Material safety data sheets are available	
Primary and secondary containers are properly labeled	
Housekeeping at the chemical storage area is appropriate	

Appendix C

Hazard Analysis and Hazard Mitigators

TASKS	
① UST Decomissioning and Removal	⑤
②Soil borings and groundwater well installation	⑥
③Surface water and sediment sampling	⑦
④Periodic groundwater monitoring	⑧

TASK #	①	②	③	④	⑤	⑥	⑦	⑧
I. Chemical Hazards								
Fire	**X**	**X**	**X**	**X**				
Permanganate Handling								
Reactivity								
Skin absorption	**X**	**X**	**X**	**X**				
II. Physical Hazards								
Bioaugmentation Culture Handling								
Boating								
Chainsaw								
Cold Stress								
Compressed Gas Cylinder								
Downhole Logging								
Drilling (including Indoor)		X	X					
Drum and Container Handling	X	X	X	X				
Electrocution								
Excavation/Trenching	X	X						
Eye Injury	X	X	X	X				
Fall Protection								
Flash Flood								
Hand/Foot Injury	X	X	X	X				
Heat Stress	X	X	X	X				
Heavy Equipment	X	X						
Helicopter								

TASK #	①	②	③	④	⑤	⑥	⑦	⑧
Knives / Blades	**X**	**X**	**X**	**X**				
Lifting Heavy Loads	**X**	**X**	**X**	**X**				
Lockout/Tagout								
Loud Noise	**X**	**X**						
Nuclear Gauge Radiation Exposure								
Portable Power/Hand Tool								
Slips, Trips, and Falls	X	X	X	X				
Thoroughfares								
Truck Crane								
Urban Environments								
Utility Protection	X	X	X					
Welding and Cutting								
Other:								
III. Biological Hazards								
Allergic Reaction to Poisonous Plants	X	X	X	X				
Alligators								
Dogs								
Stinging Insects / Vermin / Snakes	X	X	X	X				
Medical Waste								
Mountain Lions	X	X	X	X				
Other:								

An X in a box indicates that the listed hazard is applicable to the respective task. The appropriate Hazard Mitigators are presented in this Appendix.

FIRE

- Know fire prevention procedures, fire-fighting techniques and essential precautions to prevent injury.
- Do not stop to get anything out of a building or area if evacuation is required. JUST GET OUT - and assemble in the predetermined evacuation assembly points.
- There are 3 elements to starting a fire: a fuel source, an oxygen source and a point of ignition.
- Know how and when to use different types of fire extinguishers.
- Keep all fire extinguishers in workable condition and accessible at all times. Access to or visibility of extinguishers shall not be obstructed.
- Control static electricity (e.g., ground equipment)
- Remove only the minimum required supply of paints, solvents, or other flammables from storage. At no time shall the quantity removed exceed one day's working supply.
- Do not allow combustible products of rubbish, waste or other residues to accumulate. Oil soaked rags and material subject to spontaneous combustion shall only be stored in non-combustible containers with self-closing lids.
- Do not store gasoline, flammable solvents, and liquids inside a building unless the structure has been approved for flammable storage containers. Only OSHA-approved storage cabinets shall be used for all flammable liquids, paints or solvents.
- Flammable liquids shall be stored in locations that will not interfere with evacuation of the area in case of a fire.
- Do not permit smoking, striking of matches, or other sources of ignition outside of designated "SMOKING" areas.
- Discard cigarette butts, matches or other similar materials in non-combustible containers.

SKIN ABSORPTION

- Be aware of chemicals of concern that can directly injure (corrode, burn, dehydrate) the skin or that can be absorbed into the bloodstream and subsequently transported to other organs from dust, liquid or vapor sources.
- Know that skin absorption is enhanced by abrasions, cuts, heat, and moisture.
- Do not wear contact lenses in contaminated atmospheres (since they may trap chemicals against the eye surface). The eye is particularly vulnerable because airborne chemicals can dissolve in its moist surface and be carried to the rest of the body through the bloodstream (capillaries are very close to the surface of the eye).
- Keep hands away from face.
- Minimize contact with liquid and solid chemicals.
- Wear protective clothing (e.g., suits and gloves) as specified by the Site Specific Health and Safety Plan.

DRILLING (Including Indoor)

- All members of the drilling crews shall be trained in the standard operating safety features and procedures to be utilized during operation, inspection, and maintenance of the equipment.
- Wear hard hats, steel toed boots, hearing protection and safety glasses at all times when performing drilling operations.
- Conduct a survey, prior to bringing drilling equipment to the job site, to identify overhead electrical hazards, potential subsurface hazards, and terrain hazard. Once on site, before drilling equipment is moved, the travel route shall again be visually surveyed for overhead and terrain hazards. Document possible hazards and communicate them to the drilling crew.
- Use only drilling equipment equipped with two easily-accessible emergency shutdown devices, one for the operator and one for the helper. Shutdown devices should be tested at the beginning of each day.
- Do not transport drilling equipment with the mast in the upward position.
- Extend outriggers per the manufacturer's specifications.
- Monitor weather conditions. Operations shall cease during electrical storms or when electrical storms are imminent.
- Wearing of loose clothing (e.g., open shirts, hooded sweatshirts, etc) is not permitted.
- When appropriate use auger guides on hard surfaces.

- Verbally alert employees and visually ensure employees are clear from dangerous parts of equipment prior to starting or engaging equipment.
- Channel the discharge of drilling fluids away from the work area to prevent the ponding of water.
- Use hoists only for their designed intent. Hoists shall not be loaded beyond their rated capacity. Steps shall be taken to prevent two-blocking of hoists (the condition when the lower load block or hook assembly comes in contact with the upper load block, or when the load block comes in contact with the boom tip). Follow the equipment manufacturer's procedures if ropes become caught in, or objects are pulled into a cathead.
- Do not run or rotate drill rods through rod slipping devices. No more than 5 feet of drill rod column shall be hoisted above the top of the drill mast. Drill rod tool joints shall not be made up, tightened, or loosened while the rod column is supported by a rod slipping device.
- Control dust using dust suppression techniques.
- Clean augers, drill casing, or drill rod only when the rotating mechanism is in neutral and the pipe is stationary is stopped.
- Cap and flag open boreholes; open excavations shall be barricaded.
- Keep all hand tools used during drilling operations clean and in good working condition.
- Check fire extinguishers and notify all onsite personnel to their whereabouts.
- Check cables for frays and hydraulic hoses for leaks daily.
- In situations where ambient water level may be above top of well screen, during well construction, ensure that well casing is vented to prevent air pressure build-up in blank casing above screen.

Indoor Drilling

- Conduct a survey, prior to bringing drilling equipment to the job site, to identify ceiling height, overhead hazards, potential subsurface hazards, terrain hazard, and building stability particularly during drilling activities. Identify sources of ventilation (including open doorways for cross ventilation and fans to assist in air flow). Once on site, before drilling equipment is moved, the travel route shall again be visually surveyed for overhead and terrain hazards and avenues of ventilation will be opened or turned on.
- Notify and/or evacuate all building occupants prior to start of drilling activities.
- All drilling rig exhaust will be redirected outdoors by tubing. The perimeter of the outdoor exhaust area shall be roped off a suitable distance to allow proper ventilation of exhaust.
- Monitor ambient oxygen percentage and carbon monoxide concentrations in the work zone, as well as entire indoor area, to prevent low oxygen or high carbon monoxide

environments. Operations shall cease and the building will be evacuated if levels become dangerous.

DRUM AND CONTAINER HANDLING

- Only trained personnel should open drums containing unknown materials.
- Bulging drums or containers are an indication of pressure build-up. Open all drums or bungs extremely slowly to determine the presence of vapors or pressure inside the drum. If the possibility of fire or explosion exists, a protective shield should be used and/or remote opening devices. Employees not directly involved with opening a container shall be kept a safe distance away.
- Use only drums and containers that meet the appropriate DOT, OSHA, and EPA regulations.
- Utilize drum/container handling equipment whenever possible. The equipment should have a sufficiently rated load capacity and should be able to operate smoothly on the available surface.
- Label and identify drums and containers when moved to the staging areas to safely identify and classify their contents. Segregate incompatible drums.
- Inspect the integrity of the drum container before moving. Any drum or container lacking integrity shall be placed within an over pack container.
- Staging areas require adequate escape routes. Staging area should provide secondary containment for all moved drums.
- Employees must be warned of the potential hazards associated with the contents of containers or drums prior to moving said containers or drums.
- Organize site operation to minimize the amount of drum or container movement. Have a clear view of the available pathway when moving drums. If needed, an additional person should be available to provide guidance.
- Never stand on drums or containers.
- Use non-sparking tools and appropriate grounding and bonding equipment.
- Appropriate fire extinguishing equipment must be onsite at all times during drum handling.
- Spill control equipment shall be onsite in areas where spills ruptures or leaks may occur.

EXCAVATION/TRENCHING

Prior to Excavation

- Confirm that an OSHA competent person is available. An OSHA competent person is someone with enough training to identify soil types and other excavation hazards and authority to take prompt corrective actions.
- Check for the presence of underground and aboveground utilities before conducting any intrusive work. Support, protect or remove utility lines as appropriate.
- Implement the Geosyntec Confined Space Entry Program if employees are to enter excavations or trenches of 4 feet deep or deeper (regardless of width).
- Remove or brace trees, boulders, etc., adjacent to the work area that could fall into the work area before intrusive begins.
- Underpin all nearby existing structures to ensure their stability before excavating below the level of the base of the footing of any foundation or retaining wall.

During Excavation

- Wear hard hats, safety boots and reflective vests.
- Use flagmen or warning devices for all mobile equipment using reverse and forward motion
- Adequately slope or shore all sides of excavations/trenches 5 feet or more in depth (depending on local regulations) before allowing anyone to enter them (see below).
- Store and retain all equipment/material and excavated soil/rock/waste (spoil(s)) at least 2 feet or more from the edge of the excavation/trench.
- Use diversion ditches or dikes to prevent water from entering an excavation, and to provide adequate drainage of the area adjacent to the excavation. Prevent water from accumulating in an excavation.
- Install substantial stop logs or barricades when mobile equipment is used or allowed adjacent to excavations.
- Provide a walkway or bridge with standard guardrails where employees or equipment are required or permitted to cross over excavations.
- Ladders used for ingress/egress should extend a minimum of 3’ above ground surface, be secured, and be located so as to require no more than 25 feet of lateral travel for workers in the trench or excavation.
- Avoid standing on top of trench/excavation while personnel are below, in the trench.
- Examine all excavation work areas and faces for unsafe conditions at least at the beginning of each shift and especially after blasting, a rain, a freeze or a thaw. If unsafe conditions are found, all work in that immediate area shall cease until the necessary
- If it is necessary to place or operate trucks, materials or other heavy objects on a level above and near an excavation, pile, shore, and/or brace sides of excavations to resist the extra pressure due to such superimposed loads.

Shoring an Excavation

- Place cross braces or trench jacks in a true horizontal position, space vertically and secure to prevent sliding, falling or kick-outs.
- Use portable trench boxes or sliding trench shields, if needed, in place of a shoring system or sloping.
- Support systems shall be planned and designed by a qualified professional engineer when the excavation is in excess of 20 feet in depth, adjacent to structures or improvement, or subject to vibration or ground water.
- Removal and backfilling of trench supports must slowly progress together from the bottom of the trench. Jacks or braces shall be released slowly and in unstable soil, ropes shall be used to pull out the jacks or braces from above after employees have cleared the trench.
- Stability of an excavation left open for a long period of time(i.e. more than a few days) should be evaluated by a professional engineer to assess if slopes, bracing measures, etc. need to be modified.
- Start backfilling trench before removing braces in case of Type C soils.
- Put up barricades – flagging tape, fencing to prevent falls into the excavation.
- Cover or secure trench/excavation if left open overnight.

Sloping an excavation

- Excavate to at least the OSHA minimum required angle ratio according to soil classification identified except for areas where solid rock allows for line drilling or pre-splitting.
- Flatten the angle of repose when an excavation has water conditions, silty materials, loose boulders, and areas where erosion, deep frost action and slide planes appear.

Soil Classification	Soil Classification Description	OSHA Minimum Requirements For Side Slopes
Soil Type A	Most stable: clay, silty clay and hardpan (resists penetration)	.75:1 (for one foot vertical rise, the trench wall must be cut back ¾’)
Soil Type B	Medium stability: silt, sandy loam, medium clay and unstable dry rock	1:1 (each step has an equal horizontal and vertical rise; only cohesive Type B soils may be benched)
Soil Type C	Least stable: gravel, loamy sand, soft clay, submerged soil or dense, heavy unstable rock	1.5:1 (trench wall must be cut back 1-1/2’ for 1’ vertical rise; type C soil is not benched)

EYE INJURY

- Wear appropriate eye protection according to the task at hand.

HAZARD	TYPE OF PROTECTION
Impact	Safety glasses with side shield or vented safety goggles
Heat (Sparks)	Vented safety goggles or safety glasses with a face shield
Chemical	Hooded vented safety goggles or full-face respirator (if mild chemicals then safety glasses with side shield is acceptable)
Light Radiation	Tinted/reflective safety glasses or tinted/reflective face shield
Dust	Hooded vented safety goggles

- Apply anti-fog product to lens not previously treated.

- Minimize the amount of vapor or particulate matter generated, if possible.
- Avoid touching the face and eyes.
- Flush eyes with water for at least 15 minutes if chemicals do get into the eyes. If condition persists, seek medical attention.
- If dust or foreign objects are in your eyes, do not rub your eyes.
- If an object becomes embedded in the eye, do not attempt to remove. Lightly bandage your eyes, or both eyes, if possible and immediately seek medical attention.
- Do not wear contact lenses if chemical or dust hazard is present (e.g. decontamination or preservation chemicals used during sampling).
- Provide on-site training to workers before tasks at hand.
- If visitors enter area, stop work until they are properly protected.

HAND/FOOT INJURY

- Wear protective gloves as required in the Health and Safety Plan. Gloves should be chosen to suit the work being performed (e.g., chemical resistant gloves will be worn when handling chemicals or sampling for suspected chemicals).
- Steel-toed/steel-shanked safety boots must be worn whenever working around heavy objects (or as required by the HASP). Insulated and/or waterproof boots may also be warranted depending on weather conditions. Boots should be inspected periodically for signs of wear (e.g., cracks in rubber or along soles) and replaced as required.
- Durable footwear which provides adequate ankle support should be worn when working in rugged terrain.
- Use proper lifting techniques to avoid dropping heavy loads on hands and feet (refer to lifting heavy loads hazard mitigator)
- Be aware of moving machinery and heavy equipment in the work area and tuck away any loose clothing.

HEAT STRESS

Prevention:

- Drink plenty of hydrating fluids, such as Gatorade® or water. In high heat, a minimum of one gallon per day should be consumed. Fluid should be consumed frequently. Don't wait until thirsty.

- Provide cooling devices, when necessary, to aid natural body heat exchange during prolonged work or severe heat exposure. Devices include field showers, hose-down areas, shade umbrellas/tents, wide-brim hats, and cooling jackets, vests, or suits.
- If amenable to work conditions, wear light-colored, loose fitting, "breathable" clothing.
- Avoid prolonged periods of exposure. Take breaks as necessary. Higher heat exposure requires more frequent breaks.
- Be able to recognize the signs, symptoms and how to treat for heat stress. Signs, symptoms and treatment are listed below.

Signs and Symptoms:

- Mild heat stress - Decreased energy, slight loss of appetite, nausea, lightheadedness.
- Moderate heat stress - heavy sweating, thirst, faintness, headache, confusion.
- Severe heat stress (heat stroke) - Throbbing headache, confusion, irritability, rapid heartbeat, difficulty breathing, dry skin (no sweating), vomiting, diarrhea.

Treatment:

- Mild and Moderate heat stress - Take to cool place, drink cool (not cold) fluids, remove excess clothing, rest.
- Severe heat stress - Call 911 for an ambulance and get to a cool place, remove excess clothing and rest.
- Adjust work and rest schedules as needed. Establish a work regimen that will provide adequate rest periods for cooling down. This may require additional shifts of workers.
- Provide shelter or shaded areas (77ºF is best) to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels to ensure that the cardiovascular system functions adequately. Daily fluid intake must equal the approximate amount of water lost in sweat. Workers are encouraged to drink more than the amount required to satisfy thirst (recommend water and sport drinks, not coffee or soda), because thirst is not an adequate indicator of adequate salt and fluid replacement.
- Remove impermeable protective garments during rest periods.
- Do not assign other tasks to personnel during rest periods.

HEAVY EQUIPMENT

Working around Heavy Equipment

- Yield to heavy equipment.
- Listen for warning signals on heavy equipment.
- Perform a visual inspection and walk around parked heavy equipment before moving to assure that equipment is in good condition and that there are no personnel on the ground that could be injured or objects that could be damaged by vehicle movement.

- Wear hearing protection if required.
- Wear traffic vests for increased visibility.
- Maintain eye contact with the heavy equipment operator when working near equipment.
- Be aware of changes in sound of equipment which may indicate a change in direction.

Heavy Equipment Operators

- Use hand rails and footholds when mounting and dismounting equipment,
- Brakes, steering, clutches and controls shall be tested.
- Pay attention to workers on the ground who may be in the path and provide warning prior to moving the equipment.
- Permit no one to ride on, or in, heavy equipment. This includes any portion of a backhoe, bulldozer, forklift or the back of a pickup truck, except in locations specifically designed for passenger use and approved by the SHSO.
- Keep haulage vehicles under positive control at all times while operating. Vehicles shall be kept in gear when descending grades.
- Do not use heavy equipment on slopes with steepness exceeding 3H:1V unless operations are consistent with manufacturer's recommendations (if the Owner's Manual is not with the equipment or does not specify slope operating procedures, see the SHSO).
- Operate equipment with booms, blades, buckets, beds, etc., lowered or in a stable position while on slopes. Safety cables tethered to appropriate anchors shall be used for equipment working on steep slopes, where appropriate.
- Suspend in slings or support by hoists or jacks heavy equipment in need of repair. The equipment must also be blocked or cribbed before working underneath.
- Shut off motors, do not allow smoking, and use proper dispensing equipment when refueling gasoline-operated equipment to prevent fire hazards.
- Lower hydraulic systems (e.g., blades, etc.) to the ground, set brakes, and shut down equipment if malfunction occurs.
- Use rollover protection and seat belts.

KNIVES / BLADES

- Always wear proper protective equipment. This should include:

  - heavy-duty leather gloves,

  - steel-toed boots with non-slip soles, and

  - hardhat and eye protection.

- Check the work area and make sure that:

  - the ground is free of obstacles such as rocks, stumps, holes, and wet or otherwise slippery conditions.

  - you can get a firm footing on the ground.

- Route cords, hoses, and cables supplying power to portable power tools to prevent tripping hazards.
- Protect tools from corrosion damage.
- Keep tools free of accumulated dirt and unnecessary oil or grease.
- Worn, damaged or dull blades should be sharpened or replaced as necessary.

LIFTING HEAVY LOADS

- Proper lifting techniques include:
  - *Feet* - Feet should be parted, with one foot alongside the object being lifted and one behind. Feet should be comfortably spread to give greater stability. The rear foot should be in position for the upward thrust of the lift.
  - *Back* - Use the sit-down position and keep the back straight, but remember that "straight" does not mean "vertical". A straight back keeps the spine, back muscles, and organs of the body in correct alignment. It minimizes the compression of the abdomen that can cause a hernia.
  - *Arms and Elbows* - The load should be drawn close to the body, and the arms and elbows should be tucked in. When the arms are held away from the body, they lose much of their strength and power. Keeping the arms tucked in also helps keep body weight centered.
  - *Palm* - The palm grip is one of the most important elements of lifting. The fingers and the hand are extended around the object to be lifted. Use the full palm; fingers alone have very little power.
  - *Chin* - Tuck in the chin so the neck and head continue the straight back line. Keep the spine straight and firm.
  - *Body Weight* - Position the body so its weight is centered over the feet. This provides a more powerful line of thrust and assures better balance. Start the lift with a thrust of the rear foot. Shift hand positions so the object can be boosted after knees are bent. Straighten knees as object is lifted or shifted to the shoulders. To change direction, lift the object to a carrying position, and turn the entire body, including the feet. Do not twist your body. In repetitive work, both the person and the material should be positioned so that the worker will not have to twist his body when moving the material. If the object is too heavy to be handled by one person, get help.

- Limit continuous lifting of weights to 50 pounds or the maximum allowed by the client whichever is less. Lifts of heavier weights are permitted on an interim basis. Help shall be obtained for lifting of loads greater than 50 pounds or the maximum allowed by the client whichever is less. Mechanical equipment should be used on heavy materials when possible. If mechanical assistance is not available, adequate manpower to maintain the 50-pound limit per employee will be required.
- Do not lift more weight than can be handled comfortably, regardless of load weight. If necessary, help should be requested to lift a load so that the lifting is comfortable.
- Use drum dollies when moving drums or barrels.
- Inspect objects for grease or slippery substances before they are lifted to ensure that the object will not slip.
- Do not carry long, bulky or heavy objects without first verifying that the way is clear and that vision is unobstructed. This ensures that other persons or objects will not be struck by the load.
- Do not carry loads that cannot be seen over or around.
- Exercise caution when lifting above the chest level.
- Make sure workers are physically suited for the job before assigning jobs requiring heavy and/or frequent lifting. A person's lifting ability is not necessarily indicated by his height or weight.
- Before lifting an object, consideration should be given to how the object will be set down without pinching or crushing hands or fingers. For example, to place an object on a bench or table, the object should be set on the edge and pushed far enough onto the support so it will not fall. The object can then be released gradually as it is set down, and pushed in place with the hands and body from in front of the object.
- When two or more people are handling the same object, one should "call the signals". All the persons on the lift should know who this person is and should warn him if anyone in the crew is about to relax his grip.

LOUD NOISE

- Wear hearing protection in areas with constant or loud noise.
- Know the effects of noise, including:
  - Workers being startled, annoyed, or distracted.
  - Physical damage to the ear, pain, and temporary and/or permanent hearing loss.
  - Communication interference that may increase potential hazards due to the inability to warn of danger and proper safety precautions to be taken.

- Implement the company Hearing Conservation Program when noise exposures equal or exceed an 8-hour, time-weighted average (TWA) sound level of 85 decibels on the A-weighed scale (dB).
- Utilize feasible administrative or engineering controls if workers are subjected to noise exceeding an 8-hour TWA sound level of 90 dB.

SLIPS, TRIPS, AND FALLS

- Wear the proper foot wear and clothing for the task at hand.
- Pay attention to the work environment and become aware of all equipment and vehicles active onsite and use caution when moving about.
- Use caution when walking on sloped areas (especially geosynthetics), particularly when moisture is present. Use caution when walking on soft or uneven surfaces; e.g., marsh areas. Watch for icy conditions in cold weather.
- Follow the established designated safe paths for travel and keep these areas free from debris. Avoid steep or slippery slopes and paths near operation vehicles and equipment.
- Follow good housekeeping procedures. Never assume that someone else will clean up a spill or put away an object.
- Remove or clearly mark objects that pose tripping hazards.
- Prevent water accumulation where practicable.
- Cables and/or wiring should be taped down, when possible. Locate cables and/or wiring out of the commonly used areas.
- Mark or repair any opening or hole in the floor.
- Carry objects in a manner that allows you to see in the area you are moving in. Do not carry objects that are too large or bulky. Do not carry more weight than you can balance and keep stable. Understand that PPE can reduce or limit your field of vision and mobility.
- Use the proper ladder for the task at hand and do not exceed the recommended height. Do not use the top two rungs of a ladder. Ensure a flat and stable footing for the placement of a ladder. Utilize the buddy system to help secure the ladder. When working over 6 ft., utilize fall prevention measures. Obey height and weight guidelines and/or rules.
- Use the handrail when using stairs. Be aware of stairway blockages.
- If conditions even slightly resemble an unsafe environment, do not make any assumptions that the integrity of a workplace is intact.
- Never jump over or into a trench or excavation.

- Walk, do not run.
- Maintain proper lighting so obstacles are clearly visible

UTILITY PROTECTION

The occurrence of above and below-ground utilities should be anticipated at every site. The traditional method of using existing "as built" plans and maps (if available) and probing in the field (i.e., "hunt and hope") is not sufficient to provide adequate assurance that utilities are not impacted during site activities. Geosyntec developed this Utility Protection Hazard Mitigator to implement prior to conducting intrusive site activities (i.e., drilling, well installation, trenching, excavation, hand auguring, etc.). The objective of the Utility Protection Hazard Mitigator is to describe the process necessary to investigate, and to the extent practical, identify utilities in work areas for the purpose of avoiding the utilities, protecting utilities and site personnel, and mitigating impacts to site operations.

Approximate location of subsurface installation means a strip of land not more than 24-inches on either side of the exterior surface of the subsurface installation.

Excavation means any operation in which earth, rock, or other material in the ground is moved, removed, or otherwise displaced by means of tools, equipment, or explosives in any of the following ways: grading, trenching, digging, ditching, drilling, auguring, tunneling, scraping, cable or pipe plowing and driving, or any other way.

High priority subsurface installation means high-pressure natural gas pipelines with normal operating pressures greater than 415 kPa gauge (60 psig) or greater than six inches nominal pipe diameter, petroleum pipelines, pressurized sewage pipelines, high-voltage electric supply lines, conductors, or cables that have a potential to ground of greater than or equal to 60 kilovolt (kV), or hazardous materials pipelines that are potentially hazardous to workers or the public if damaged.

The Mitigator process is summarized below:

- Identify the location of the planned intrusive activities.
- Mark the planned work area with white water based marking paint. If work area is not visible from the street either because of obstruction or distance, provide distance from street to work area (i.e., 150 feet north).
- Contact DigAlert or dial 811 (nationwide) to identify utilities in your work area. http://www.digalert.org/ (811) provides a link to the local state operated "Call-Before-You-Dig" service.
- Review existing utility maps with facility personnel and determine the approximate numbers and types of utilities within the project area. This is inclusive of below-ground utilities that may be encountered during intrusive operations as well as overhead utilities that may be encountered during operations (i.e., drilling mast and overhead power lines).
- Most "Call-Before-You-Dig" services will only mark below-ground utilities leading to the site utility meter. With the exception of high priority utilities (as defined above), utilities present after passing through the site meter may be left without adequate inspection. In such cases, the use of a private utility location firm may be prudent to ensure thorough identification of utilities.

- Retain the services of a private utility locating company that can identify metallic utilities and anomalies in the vicinity of the work area. Private utility location firms use a variety of location techniques. The suspected types of utilities should be discussed with the private utility location firm to ensure that proper techniques are used. Improper techniques may result in missed or improperly identified utilities.
- DigAlert must be called at least 48 hours prior to the start of work to complete a utility inspection. (For example, if you notify DigAlert on Tuesday at 9:43 a.m. no work can begin until Thursday at 9:43 a.m.)
- Record the inspection confirmation number. Confirm that the inspection was conducted prior to the start of work. The inspection confirmation number is critical in the event that an unmarked utility is encountered, or if a utility identified during the inspection request did not mark the site for the presence or absence of the utility (no-show). If a no-show occurs with it may be possible that the utility operator sent a facsimile care of the project manager (identified during utility inspection request) indicating that there are no conflicts in the planned work area. However, if there is any question, contact DigAlert immediately and request that the missing utility please call to confirm presence or absence of utility in work area or schedule a meeting time at the site.
- After below-ground utilities are identified, the utilities should be marked. The most common marking method is paint or pin flags. The following marking colors are generally widely accepted to demarcate specific types of utilities, but should be confirmed.

RED	ELECTRIC
YELLOW	GAS, OIL, STEAM
ORANGE	COMMUNICATIONS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER
GREEN	SEWER / DRAINAGE
PINK	SURVEY MARKS
WHITE	PROPOSED EXCAVATION

- Above-ground utilities should be visually identified. Warning signs may be placed in work areas to remind workers of the above-ground utilities. Other techniques such as shielding or utility relocation may be necessary to make the work safe. Proper set back and approach distances must be maintained at all times.
- Be observant of above-ground features at a site that may be indicative of an underground utility line. An example of this would be noticing two fire hydrants and noting that there is likely a buried water line between them, sings of trenching activities, asphalt or concrete patches, or linear depressions in the ground surface.

- Following the completion of the utility marking, the work area should be inspected by all members of the project team (client, engineer, and contractor) to inspect and discuss the finding. Adjustments to site operations, if necessary, should be discussed and agreed upon by the project team prior to initiation of site work. If possible, work areas should be re-located away from utilities.
- If conditions allow, consider using vacuum excavation.
- Depending on the proximity of utilities to the work area, low impact soil removal techniques (potholing) may be necessary to either confirm the presence of utilities or to provide protection of utilities before invasive activities. In such cases, hand excavation, hand auguring, vacuum excavation, water jet removal, or other low impact removal techniques may be necessary to a depth of 3 to 5 feet (or other depth as determined by project-specific conditions). In cases where a high priority utility is located within 10 feet of the work area, documentation from the utility owner must be obtained allowing potholing before any work can be conducted. If the utility is not found after potholing is conducted, contact DigAlert and the utility owner immediately to request additional information as to the location of the utility. It is necessary to conduct potholing activities before any work can be conducted in the vicinity (within 10 feet) of the high priority utility.
- If utility location markings are lost, damaged, or faded, a new utility location survey should be conducted to replace the missing or damaged markings. Please note that some municipalities require that all utility markings be removed after work is completed. Black spray paint may be used to cover up utility markings in the street but must be removed from sidewalks.
- In all cases, State, local, utility-specific requirements, facility-specific controls, permits, and operations should be considered and incorporated into the Utility Protection Hazard Mitigator.
- Utility protection should be addressed during each tailgate or job briefing in order to reinforce below-ground utility location and the avoidance of above-ground utilities.

ALLERGIC REACTION TO POISONOUS PLANTS

- Be able to recognize and identify poisonous plants indigenous to the site location (e.g., poison ivy, poison oak, poison sumac). For example, poison Ivy plants have three leaves arranged at the end of each stem. Two secondary leaves are attached opposite one another and directly to the stem at their base. The primary leaf is attached to the end of the stem. The leaves often, but NOT ALWAYS, have a shiny appearance. See photos below.

- Poison Ivy often appears as ground cover at the edge of wooded areas and along trails within fields and woods. It may also appear growing from a vine wrapped around trees.
- Avoid or remove poisonous plants where practicable. Wear appropriate protective clothing (e.g., gloves, long-sleeved shirts) as required.
- One can become sensitized (like a latex allergy) though immune for several years at the beginning.
- If you come in contact with the plant, the plant's oil will be transferred onto your skin and clothing. The best way to manage the oil is to wash skin with cool water and soap (preferably 5% tincture of green soap available at CVS). If soap and water is unavailable, thorough (2-3 minutes) rinsing with cold water may help (not warm...want to keep those pores closed!)
- The lag time between exposure and symptoms can be quite long like several days.
- If you are in the field, blot the area with an alcohol patch and follow by washing as soon as possible. Calamine lotion, Tecnu, yellow laundry soap, or Colloidal oatmeal (Aveeno®) baths provide relief from itching and rashes. More information about Tecnu can be found at http://www.teclabsinc.com/.
- If you have to pass through heavy ivy growth, be sure to carefully handle your field cloths when you return. Your shoe laces will always get you if you are not careful. The oil can last on clothing for a few weeks, so wash frequently.
- For additional information, please see http://poisonivy.aesir.com/

MOUNTAIN LIONS

- Do not hike alone. At least two field personnel should be in constant visual and verbal contact when in areas with mountain lions.
- If a mountain lion is encountered:
  - Do not approach the lion. Most mountain lions will try to avoid a confrontation.
  - Do not run from a mountain lion, stand and face it, make eye contact.
  - Do not crouch down, squat, or bend over, remain standing.
  - Try to appear larger by raising and waving arms, opening a jacket, speak firmly in a loud voice.
  - If necessary throw stones, branches, or whatever may be reachable without crouching or bending over.
- If attacked, face animal and fight back with sticks, jackets, tools or whatever may be available without turning away from the animal.
- Report any encounters or attacks to the SHSO and seek first aid immediately if necessary.

STINGING INSECTS / VERMIN / SNAKES

- Be able to recognize stinging insects/vermin/snakes indigenous to the site location and habitats. Learn the indigenous dangerous species (e.g., spiders, snakes, ticks) prior to entering the field and know the first aid treatments.
- Venomous snakes swim on top of the water, non-venomous snakes swim with only their heads above water.
- Advise the SHSO if you have allergies to any insects prior to engaging in any field activities.
- Include the following preventative measures as necessary: wear light-colored clothing, keep clothing buttoned, tuck pant legs into socks, keep shirt tails tucked in, boots, hoods, netting, gloves, masks, insect repellants or other personal protection.
- Snake bite kits are commercially available and should be carried by field personnel when working where venomous snakes exist. In the case of a snake bite, keep the patient calm, restrict activity and immobilize the bite area (do not elevate), and immediately obtain medical attention.
- Report any bites or stings to the SHSO and seek medical attention immediately.
- Be aware of potential hive/nest locations, which may include culverts, drainage pipes, junk piles, or dense shrubbery.
- Advise the SHSO if you are allergic to stinging insects prior to engaging in any field activities.
- Include the following controls:

  - Do not agitate stinging insects or disrupt their hive/nest.
  - Wear light-colored clothes.
  - Avoid wearing perfumes, hair spray, or scented lotions in the wilderness.
- If attacked:
  - Do not scream or wave arms.
  - Cover your face with your hands.
  - Run for shelter in a building or vehicle. Do not seek shelter in water.
  - Remove stingers as quickly as possible to lessen the amount of venom entering the body. Remove the stinger by raking your fingernail across it. Don't pinch or pull the stinger out. Put ice on the sting to reduce the swelling.

Report any stings to the SHSO and seek first aid or emergency medical care immediately if stung several times.

Appendix D

Constituents of Concern (COCs)

Constituent[1]	***Medium***[2]	***Maximum Concentration***[3]
Petroleum Hydrocarbons (Benzene)[4]	Soil and Groundwater	922 mg/kg TPH gasoline

Footnotes:

1 Constituents that are included on this list have either been detected at the site at concentrations that may cause potential dermal, ingestion, or inhalation hazards, or the constituent is suspected to potentially be present at elevated concentrations but no analytical data are available.

2 Type of medium (i.e. soil, water, sludge, etc.).

3 Maximum concentration previously detected for the constituent based on historic data (if available). Liquid concentrations are presented in micrograms of constituent per liter of solution (ug/L). Solids concentrations are presented in milligrams of constituent per kilogram of soil (mg/kg). Soil gas and/or vapor concentrations are reported in milligrams of constituent per cubic meter of gas/vapor (mg/m^3).

4 MSDSs for pertroelum hydrocarbons are included in Appendix G

Appendix E does not apply to this HASP

Appendix F

Personal Protective Equipment per Task

	Task ①	Task ②	Task ③	Task ④	Task ⑤	Task ⑥	Task ⑦	Task ⑧
Potential PPE Level per Task:	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C

Modified Level D*		***Level C****	
Equipment	***Material/Type***	***Equipment***	***Material/Type***
☒ Safety Vest	High vis	☐ Full-face air-purifying respirator	Cartridge Type:
☐ Outer gloves		☐ Half-mask air-purifying respirator	Cartridge Type:
☐ Outer boots		☐ Protective clothing	
☒ Hard hat**	standard	☐ Outer gloves	
☒ Safety glasses**	standard	☐ Inner gloves	
☒ Hard-toed boots**	standard	☐ Outer boots	
☒ Hearing protection**	standard	☐ Hard hat**	
☒ Other: gloves	nitrile	☐ Safety glasses**	
		☐ Hard-toed boots**	
		☐ Hearing protection**	
		☐ Other:	

* If checked, indicates initial level of PPE. Other completed columns indicate information to upgrade/downgrade.

** Optional as applicable

Appendix G

Material Safety Data Sheets

Included in HASP	*Chemical*
☐	Acetone
☒	Alconox
☐	Ammonia
☐	Bentonite
☒	Diesel Fuel Oil No. 2-D
☒	Gasoline
☐	Helium
☐	*n*-Hexane
☐	Hydrochloric Acid
☐	Hydrogen
☐	Isobutylene Calibration Gas
☐	Isopropyl Alcohol
☐	KB-1
☐	Methane Calibration Gas
☐	Nitric Acid
☐	Permanganate
☐	Portland Cement
☐	Sulfuric Acid
☐	Other: _____

MSDSs - attached.

ALCONOX MSDS

Section 1 : MANUFACTURER INFORMATION

Product name: Alconox

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2009/04/20

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722-88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE
7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

Section 2A : ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Solid

Appearance & odor: Almost odourless.
White granular powder.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): Not applicable.

Vapour density (air=1): Not applicable.

By weight: Not available.

Evaporation rate (butyl acetate = 1): Not applicable.

Boiling point (°C): Not applicable.

Freezing point (°C): Not applicable.

pH: (1% aqueous solution).
9.5

Specific gravity @ 20 °C: (water = 1).
0.85 - 1.10

Solubility in water (%): 100 - > 10% w/w

Coefficient of water\oil dist.: Not available.

VOC: None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Not available.

Sensitivity to mechanical impact: Not applicable.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: None

Section 5 : REACTIVITY DATA

Chemical stability: Stable under normal conditions.

Conditions of instability: None known.

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizers.

Hazardous decomposition products: See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of Acute Exposure

Eye contact: May cause irritation.

Skin contact: Prolonged contact may cause irritation.

Inhalation: Airborne particles may cause irritation.

Ingestion: May cause vomiting and diarrhea.
May cause abdominal pain.
May cause gastric distress.

Effects of chronic exposure: Contains an ingredient which may be corrosive.

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available for mixture, see the ingredients section.

Exposure limit of material: Not available for mixture, see the ingredients section.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.

Teratogenicity: Not available.

Mutagenicity: Not available.

Synergistic materials: Not available.

Medical conditions aggravated by exposure: Not available.

First Aid

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
Seek medical attention if symptoms persist.

Ingestion: Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak / Spill: Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

Waste disposal: In accordance with municipal, provincial and federal regulations.

Handling procedures and equipment: Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

Storage requirements: Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves / Type:

Neoprene or rubber gloves.

Respiratory / Type:

If exposure limit is exceeded, wear a NIOSH approved respirator.

Eye / Type:

Safety glasses with side-shields.

Footwear / Type: Safety shoes per local regulations.

Clothing / Type: As required to prevent skin contact.

Other / Type: Eye wash capability should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

M A T E R I A L S A F E T Y D A T A S H E E T

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Company: AccuStandard, Inc.
125 Market Street
New Haven, CT 06513

Date MSDS Printed: 1/31/2008
Preparation Date: 1/31/2008
Information Phone Number: 203-786-5290
Emergency Phone Number: 203-786-5290
Hours: Mon. to Fri. 8am-5pm EDT

Catalog Number: **FU-009-D-40X**
Product Name: Diesel Fuel
Synonyms: N/A
Formula: N/A

Molecular Weight: N/A

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

Component(s) (1)	CAS #	Appr. %	ACGIH-TLV (mg/m3) TWA	ACGIH-TLV (mg/m3) STEL skin	OSHA-PEL (mg/m3) TWA	OSHA-PEL (mg/m3) STEL skin
#2 Diesel Fuel	68334-30-5	2.0				
Dichloromethane	75-09-2	98.00	174			

SECTION 3 - HAZARDS IDENTIFICATION

Health and Environmental Hazards/Symptoms of Exposure:

Exposure can cause headache, nausea, confusion, drowsiness, dizziness and/or vomiting. Causes depression of central nervous system. Effects may be delayed. Lachrymator. Suspect cancer hazard.

HMIS® III	*	2	1	0
NFPA		2	1	0

Potential Health Effects:

May be irritating to eyes.
May cause eye damage.
Irritating to skin.
May be harmful if absorbed through the skin.
May be irritating to mucous membrane and upper respiratory system.
May be harmful if inhaled.
Harmful if swallowed.

Routes of Entry:

Inhalation, ingestion or skin contact.

Carcinogenicity:

This product is or contains a component that is classified (ACGIH, IARC, NTP, OSHA) as a possible cancer hazard.

SECTION 4 - FIRST AID MEASURES

Emergency First Aid:

Get medical assistance for all cases of overexposure.

Skin contact: Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

Eye contact: Immediately flush with plenty of water. After initial flushing, remove contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.

Ingestion: Do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

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SECTION 5 - FIRE FIGHTING MEASURES

Flammable Properties:

Flash Point: >230°F
Flammable Limits LEL (%): 12
Flammable Limits UEL (%): 23
Autoignition Temperature: 556°C

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Containers can build up pressure if exposed to heat.

Extinguishing Media:

Use alcohol foam, carbon dioxide, dry chemical, or water spray when fighting fires involving this material.

Fire Fighting Procedures:

As in any fire, wear self-contained breathing apparatus pressure demand, MSHA/NIOSH (approved or equivalent) and full protective

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spill Response:

Wear a self-contained breathing apparatus and appropriate personal protection. Stop leak if you can do so without risk. Ventilate area. Neutralize spill with soda ash or lime. Take up and containerize for proper disposal. Flush spill area with water. Keep combustibles away from spilled material. Comply with Federal, State, and local regulations.

SECTION 7 - HANDLING AND STORAGE

Store in a tightly closed container.
Store in a cool dry, well-ventilated area away from ignition sources.
Avoid breathing vapors or mists.
Use with adequate ventilation.
Do not get in eyes, on skin or clothing.
Avoid prolonged or repeated exposure.
This product should only by used by persons trained in the safe handling of hazardous chemicals.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls and Personal Protection Equipment (PPE):

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure.
Material must be handled or transferred in an approved fume hood or with equivalent ventilation.
Protective gloves must be worn to prevent skin contact.
(Polyethylene, polyvinyl chloride (PVC) or equivalent)
Safety glasses with side shields must be worn at all times.

General Hygiene Considerations:

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear liquid
Odor: Ether-like odor
pH: N/A
Vapor Pressure: 353 mmHg (20 °C)
Vapor Density (Air = 1): 2.93 g/L
Boiling Point: 40 °C
Melting Point: -97 °C
Solubility in Water (%): Slight (1.3%)

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Specific Gravity (H_2O = 1): 1.326 g/cm3
Flash Point: >230°F
Explosion Limits (%): 12 to 23
Autoignition Temperature: 556°C
Percent Volatile: 99+
Evaporation Rate (BuAc = 1): 27.5
Molecular Weight: N/A
Molecular Formula: N/A

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable

Conditions To Avoid: Contact with ignition sources
Materials To Avoid: Bases
Oxidizers
Alkali metals; Aluminum, magnesium, sodium, potassium and lithium

Hazardous Decomposition: Hydrogen chloride gas (HCl); Phosgene; Chlorine
Hazardous Polymerization: Will not occur

SECTION 11 - TOXICOLOGICAL INFORMATION

See section 3 for specific toxicological information for the ingredients of this product.

SECTION 12 - ECOLOGICAL INFORMATION

By complying with sections 6 and 7 there will be no release to the environment.

SECTION 13 - DISPOSAL CONSIDERATIONS

Recycle or incinerate at any EPA approved facility or dispose in compliance with Federal, State and local regulations. Empty containers must be triple-rinsed prior to disposal.

SECTION 14 - TRANSPORT INFORMATION

DOT UN Number: UN1593 Shipping Class: 6.1 Packing Group: III POISON

SECTION 15 - REGULATORY INFORMATION

In addition to Federal and state regulations, local regulations may apply. Check with your local regulatory authorities.

All components are listed on the TSCA Inventory. **For laboratory, research and development use only. Not for manufacturing or commercial purposes.**
WARNING: This product contains chemical(s) known to the state of California to cause cancer.

SECTION 16 - OTHER INFORMATION

This document has been designed to meet the requirements of OSHA, ANSI and CHIPs regulations.

The statements contained herein are offered for informational purposes only and are based on technical data that we believe to be accurate. It is intended for use only by persons having the necessary technical skill and at their own discretion and risk. Since conditions and manner of use are outside our control, we make

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NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE.

Legend : N/A = Not Available ND = Not Determined NR = Not Regulated

* * * End of Document * * *

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MATERIAL SAFETY DATA SHEET

Gasoline, All Grades

MSDS No. 9950

EMERGENCY OVERVIEW
DANGER!
EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD

NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs):	**CHEMTREC (800)424-9300**
COMPANY CONTACT (business hours):	Corporate Safety (732)750-6000
MSDS (Environment, Health, Safety) Internet Website	www.hess.com

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS *

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).

Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION

EYES
Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	-45 ^{o}F (-43°C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 ^{o}F (>280 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 “Low Expansion Foam - 1994 Edition.”

FIRE FIGHTING INSTRUCTIONS
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL******
******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Component (CAS No.)	Source	TWA (ppm)	STEL (ppm)	Exposure Limits Note
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	1000	--	Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	Skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	20	--	A4
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

A translucent, straw-colored or light yellow liquid

ODOR
A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

	Odor Detection	Odor Recognition
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	85 to 437 ^{o}F (39 to 200 ^{o}C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 ^{o}F (38 ^{o}C) (275-475 mm Hg @ 68 ^{o}F (20 ^{o}C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H_2O = 1):	0.70 – 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %
SOLUBILITY (H_2O):	Non-oxygenated gasoline - negligible (< 0.1% @ 77 ^{o}F). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 ^{o}F); ethanol is readily soluble in water

10. STABILITY and REACTIVITY)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS
Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute Dermal LD50 (rabbits): > 5 ml/kg
Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating
Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME:	Gasoline
DOT HAZARD CLASS and PACKING GROUP:	3, PG II
DOT IDENTIFICATION NUMBER:	UN 1203
DOT SHIPPING LABEL:	FLAMMABLE LIQUID

PLACARD:

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION WT. PERCENT
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3

n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION - Parts per million (ppm) by weight
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Benzene	2/27/1987
Ethyl benzene	6/11/2004
Toluene	1/1/1991

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	PHYSICAL:	0	Minimal
			* CHRONIC

SUPERSEDES MSDS DATED: 07/01/06

ABBREVIATIONS:

AP = Approximately	< = Less than	> = Greater than
N/A = Not Applicable	N/D = Not Determined	ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
AIHA	American Industrial Hygiene Association	DOT	U.S. Department of Transportation [General Info: (800)467-4922]
ANSI	American National Standards Institute (212)642-4900	EPA	U.S. Environmental Protection Agency
API	American Petroleum Institute (202)682-8000	HMIS	Hazardous Materials Information System

IARC	International Agency For Research On Cancer
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Workplace Hazardous Materials Information System (Canada)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

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APPENDIX D

EPA COMMENTS

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The following are comments regarding the Site Assessment Work Plan, Signal Peak Ranger Station, Yakima County, Washington (file name "AEI_BIA_SP_ SA_Work_Plan(final).pdf") which was submitted to EPA on August 14, 2014.

1) Section 1.0, last bullet: As specified in the administrative order on consent, determination if further action is necessary including any recommendations for additional investigation and/or cleanup necessary to close the site shall be included in the site investigation report or corrective action report as applicable.
2) Section 3.0: As the conceptual site model (CSM) is developed and refined, it would be helpful to present it graphically as well as in text.
3) Section 4.2.1, last sentence: The text should briefly describe the historical significance of the structure and if moving or removing all or a portion of Building 407 is an option to assist in removal of additional petroleum contaminated soil.
4) Sections 4.2.4 and 4.2.6 and Section 2.0 of Appendix A: The text describes dewatering of the excavation if groundwater is encountered. If groundwater is encountered, then dewatering shall continue to the extent allowing for a confirmation sample to be collected from the floor of excavation beneath the underground storage tank (UST).
5) Section 4.3.1 Soil Assessment:
    a. As discussed during the August 27, 2014 conference call, borings shall be completed to 20' bgs as soil conditions allow regardless of whether or not groundwater is encountered. In addition, the text will be revised to further clarify the depths (0-3' bgs, > 3' bgs) at which soil samples will be collected for chemical analysis. Furthermore, the term "assume" creates ambiguity therefore the text shall be revised accordingly (e.g. "We have assumed that all soil samples submitted for chemical analysis will be analyzed for gasoline- and diesel-range hydrocarbons along with total lead").
    b. 2nd Bullet: how will the position of each boring location relative to existing site features be measured (e.g. a compass and tape measure)?
6) Section 4.3.2, 2nd Bullet: As discussed during the August 27, 2014 conference call, the work plan will be corrected to specify 8 (not 7) groundwater monitoring wells.
7) Table 2, Sample Container and Holding Time Requirements:
    a. Preservation temperatures shall be revised from "4˚C" to "≤ 6˚C but above freezing"
    b. VOC analysis for soil samples using Method 5035: holding time is 48 hours unless samples are to be frozen within 48 hours which will extend holding time to 14 days. Text shall clarify if samples are to be frozen within 48 hours.
8) Section 3.0, Appendix A: Following Method 5035A, will the samples be frozen, methanol extracted or collected with an Encore device?
9) Section 6.0, Appendix A: As discussed during the August 27, 2014 conference call, the 15 feet screen was proposed to address potential significant seasonal variation in groundwater. To ensure there is sufficient room to complete well construction, the work plan will include the applicable Washington state citation for well construction as well as the corresponding amount of sand pack and bentonite seal required for proper well completion.
10) Section 6.2, Appendix A, first sentence: Groundwater level measurements should be collected in each of the monitoring wells as quickly as possible before sampling occurs. This will provide a "snapshot" image of the potentiometric surface.
11) Section 6.2, Appendix A: Please include any applicable citation/reference for the low-flow purge and sampling protocol described in the work plan (e.g. EPA/540/S-95/504 April 1996).
12) Section 9.5, Appendix A: Will bladder pumps be used during this investigation?
13) Appendix C, Health and Safety Plan: EPA does not intend to review or approve the Health and Safety Plan.

Nino Muniz

Subject: FW: Revised Final WP

From: **Domingo, David** <Domingo.David@epa.gov>
Date: Wed, Sep 17, 2014 at 5:24 PM
Subject: RE: Revised Final WP
To: "robert.blaesing@bia.gov" <robert.blaesing@bia.gov>
Cc: "Rau, Rob" <Rau.Rob@epa.gov>

Bob,

As mentioned in my voice message this afternoon, I've included Rob Rau on this email so that you can send the final version of the site assessment plan (SAP) to both of us. Based on the most recent version you sent me (file name: AEI_BIA_SP_ SA_Work_Plan with EPA Cmts_NM.docx), the following revisions still need to be made before EPA can approve the SAP:

1) Section 1.0 Introduction, 2nd bullet: "Further assess soil and groundwater conditions by collecting soil and groundwater samples and assessing site hydrogeology;"

2) Section 4.3 Subsurface Soil and Groundwater Assessment: "Ahtna will procure a drilling subcontractor to advance approximately 20 direct-push borings to depths up to 20 feet below ground surface (ft bgs) for collection of soil and groundwater samples. Eight of the borings will be completed as 2-inch pre-pack monitoring wells…"

3) Section 4.3.1 Soil Assessment: "All soil samples submitted for chemical analysis will be analyzed for gasoline- and diesel-range hydrocarbons along with total lead and up to 12 soil samples will be subsequently analyzed for VOCs and polycyclic aromatic hydrocarbons (PAHs)."

4) Section 5.2 Data Management: "The data set will be organized in a manner that will provide for risk screening and allow it to be exported to other data platforms requested by the BIA or EPA.

5) Section 8.0 Schedule: delete line 6 ("EPA provides comments on draft Site Assessment Report")

5. BIA submits draft Site Assessment Report to EPA.	Within 60 days of completion of field activities.
6. BIA submits final Site Assessment Report.	Within 30 days after receipt of EPA comments to draft.

The most recent version of Appendix A (sampling and analysis plan) file name: APPA_SAP with EPA Comments_NM.docx and Table 2 (Sample container and holding time requirements) file name: BIA_SPRS_WP_Tables with EPA_NM.pdf appear to address all of our comments. Therefore, EPA can provide approval via email once all these documents (and applicable revisions listed above) are incorporated into the final SAP.

I will be checking my voicemail tomorrow and Friday if you have any questions, so please don't hesitate to leave me a message.

Thanks.

David

David Domingo

U.S. EPA Region 10

Office of Compliance and Enforcement, Ground Water Unit

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