



# **REMOVAL ACTION AND SITE INVESTIGATION WORK PLAN**

**Cooperative Agreement No: NALEMP-FY13-04  
Native Village of Northeast Cape**

**Saint Lawrence Island, Alaska**

**Revision 2**

**May 2014**

**Prepared for:**

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**ACRONYMS AND ABBREVIATIONS**

|                   |   |
|-------------------|---|
| '                 | minutes   |
| "                 | seconds   |
| °                 | degrees   |
| µg/kg             | micrograms per kilogram                                       |
| µg/L              | micrograms per liter  |
| µg/m <sup>3</sup> | micrograms per cubic meter                                    |
| AAC               | Alaska Administrative Code                                    |
| ACM               | asbestos-containing material                                  |
| ADEC              | Alaska Department of Environmental Conservation               |
| AIHA              | American Industrial Hygiene Association                       |
| ATVs              | all-terrain vehicles  |
| Bristol           | Bristol Environmental Remediation Services, LLC               |
| CA                | Cooperative Agreement   |
| CESQG             | conditionally exempt small quantity generator                 |
| CFR               | Code of Federal Regulations                                   |
| CoC               | chain-of-custody  |
| CON/HTRW          | Containerized Hazardous, Toxic, and Radioactive Waste         |
| DoD               | U.S. Department of Defense                                    |
| DOT               | U.S. Department of Transportation                             |
| DRO               | diesel range organics   |
| ELAP              | Environmental Laboratory Accreditation Program                |
| EPA               | U.S. Environmental Protection Agency                          |
| FUDS              | formerly used defense site                                    |
| GPS               | Global Positioning System                                     |
| GRO               | gasoline-range organics                                       |
| HWAP              | hazardous waste accumulation point                            |
| ID                | identifications   |
| L/min             | liters per minute   |
| LBP               | lead-based paint  |
| LCS/LCSD          | Laboratory control sample/laboratory control sample duplicate |
| MS/MSD            | matrix spike/matrix spike duplicate                           |
| MSDSs             | Material Safety Data Sheets                                   |

**ACRONYMS AND ABBREVIATIONS (continued)**

|         |  |
|---------|--|
| NALEMP  | Native American Lands Environment Mitigation Program |
| NE Cape | Northeast Cape                                       |
| NIOSH   | National Institute of Occupational Safety and Health |
| NVG     | Native Village of Gambell                            |
| NVLAP   | National Voluntary Laboratory Accreditation Program  |
| NVNC    | Native Village of Northeast Cape                     |
| NVS     | Native Village of Savoonga                           |
| OSHA    | Occupational Safety and Health Administration        |
| PAHs    | polynuclear aromatic hydrocarbons                    |
| PCBs    | polychlorinated biphenyls                            |
| PEL     | permissible exposure limit                           |
| PID     | photoionization detector                             |
| QA      | quality assurance                                    |
| QC      | quality control                                      |
| RA      | removal action                                       |
| RCRA    | Resource Conservation Recovery Act                   |
| RRO     | residual range organics                              |
| Satori  | Satori Group, Inc.                                   |
| SG      | silica gel   |
| SI      | site investigation                                   |
| SIMS    | selective ion monitoring system                      |
| SOPs    | standard operating procedures                        |
| SPIP    | Strategic Project Implementation Plan                |
| SVOCs   | semi-volatile organic compounds                      |
| SW      | Solid Waste  |
| TAH     | total aromatic hydrocarbons                          |
| TAqH    | total aqueous hydrocarbons                           |
| TCLP    | Toxicity Characteristic Leaching Procedure           |
| TDC     | Transportation and Disposal Coordinator              |
| TOC     | total organic carbon                                 |
| TSDF    | treatment, storage, and disposal facility            |
| UN      | United Nations                                       |

### **ACRONYMS AND ABBREVIATIONS (continued)**

|       |                            |
|-------|----------------------------|
| USACE | US Army Corps of Engineers |
| VOA   | volatile organic analysis  |
| VOCs  | volatile organic compounds |
| WMI   | Waste Management, Inc.     |
| WP    | Work Plan                  |

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### APPROVALS

This report was prepared under the supervision and direction of the undersigned individuals.

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## **1.0 INTRODUCTION**

This Work Plan (WP) has been developed for the Native Village of Savoonga (NVS) for approval by the US Army Corps of Engineers®, Alaska District (USACE), as a control mechanism for work to be performed at the Native Village of Northeast Cape (NVNC). The NVNC is also referred to as the “Northeast Cape Fish Camp.” Alaska Department of Environmental Conservation (ADEC) and USACE comments on the WP, Bristol responses to comments, and a copy of the ADEC WP approval letter will be included in Appendix A.

The purpose of this WP is to establish field procedures for conducting Removal Action (RA) and Site Investigation (SI) activities at the NVNC, located near the Northeast Cape (NE Cape) of Saint Lawrence Island, Alaska (Figures 1 and 2). The purpose of the work proposed under the Native American Lands Environment Mitigation Program (NALEMP) FY13 Cooperative Agreement (CA) is to containerize and remove identified physical and environmental hazards and to perform SI activities on Native-owned lands in and around the NVNC that have been impacted from military materials.

A number of sites have been identified as sites of concern by the NVS and have been fully described and prioritized in the NVNC Strategic Project Implementation Plan (SPIP) (Bristol, 2010), in the NVNC SI Report under the NALEMP FY09 CA (Bristol, 2009), in the NVNC RA Report under the NALEMP FY11 CA (Bristol, 2012), and in the NVNC RA/SI Report under the NALEMP FY12 CA (Bristol, 2013).

### **1.1 ORGANIZATION OF THE WORK PLAN**

This WP includes the following sections in order:

- Introduction,
- Site Description and History,
- Objectives and Scope,
- RA/SI Field Activities,

- Field Sampling Procedures,
- Quality Assurance and Sample Handling,
- RA/SI Draft and Final Reporting, and
- References.

## **2.0 SITE DESCRIPTION**

### **2.1 LOCATION AND DESCRIPTION**

Saint Lawrence Island is located in the Bering Sea, near the territorial waters of Russia, approximately 135 air miles southwest of Nome, Alaska (Figure 1). The NVNC site, located near the Northeast Cape of Saint Lawrence Island (NE Cape), falls between Kitnagak Bay to the northeast, Kangighsak Point to the northwest, and the Kinipaghulghat Mountains to the south (Figure 2). The site is located at 63 degrees (°) 19°minutes (') 38.9 seconds (") north latitude, 168° 55' 59.3" west longitude (NAD 83). The legal description of the site is Sections 14 and 15, Township 25 South, Range 54 West. Both sections are in the Kateel River Meridian.

The NVNC was once a year-round village site used by the Saint Lawrence Island Yupik Eskimos of Savoonga, Alaska. The NVNC has also been termed "Northeast Cape Fish Camp" and "Fish Camp" by various government agencies and past environmental contractors, although it is important to the people of Saint Lawrence Island to refer to it as the NVNC.

The NVNC is mainly used by the residents of the NVS as traditional fishing, hunting, and food-gathering camps. The sites are also used throughout the year as a rest stop to wait out storms and bad weather, and as a source of drinking water that is hauled to other locations in the area.

The NVNC site and surrounding areas are owned in common by Kukulget, Inc. and Sivuqaq, Inc., consisting of tribal members of the NVS and the Native Village of Gambell (NVG), respectively.

### **2.2 SITE BACKGROUND AND HISTORY**

Located near the NVNC is a formerly used defense site (FUDS) that contained a U.S. Air Force base and White Alice radio relay site that were operated by the military during the

1950s through the early 1970s. During and after the operation of the military base at NE Cape, various building materials were donated and salvaged for use at the NVNC. Residents of NVNC recall that military personnel gave away building materials, including lumber, paint, wiring, and insulation when the U.S. Department of Defense (DoD) abandoned the base. At the time of donation and use of the building materials, local residents were unaware of the potential danger posed by the materials. Some of the materials provided by the military have been identified as asbestos-containing material (ACM) and have been painted with lead-based paint (LBP) that is potentially harmful to current and future residents. Contamination from polychlorinated biphenyls (PCBs) has also been identified and documented at areas around the nearby NE Cape FUDS (F10AK0969) facility, raising concerns about the potential presence of PCBs, dioxins, and furans at the NVNC.

Demolition of the buildings and all other structures at the FUDS adjacent to the NVNC was completed under multiple USACE contracts (FUDS program) between 1999 and 2005. The runway, gravel roads, and concrete foundations of some of the structures remain intact.

Investigations have been performed at the Northeast Cape Site since the early 1990s. Phase I of the remedial investigation was conducted during the summer of 1994. Additional sampling was performed as part of Phase II during 1996 and 1998. Additional investigations were conducted during the 2001 and 2002 field seasons as part of Phase III. A final round of remedial investigation, Phase IV, was completed in 2004.

Contaminants that have been identified at the nearby NE Cape FUDS site include: petroleum-based fuels, volatile organic compounds (VOCs), heavy metals, PCBs, solvent-associated contaminants (e.g., tetrachlorethylene, trichloroethylene) and polynuclear aromatic hydrocarbons (PAHs).

The past and current presence of environmental contamination at many of the FUDS-related sites in the NE Cape area is a cause of concern to Saint Lawrence Island residents. Local residents fear that the NVNC may have environmental impacts present that have been caused by the proximity of the NVNC to the NE Cape FUDS.

### **2.3 OVERVIEW OF ENVIRONMENTAL RESTORATION WORK ACCOMPLISHED TO DATE**

This is the fourth CA between the NVS and the DoD. The first CA developed a SPIP which covered documentation of site background and history, environmental impacts, and hazard mitigation objectives. Activities performed under the first CA, with the support of Bristol Environmental Remediation Services, LLC (Bristol) at the request of the Tribe, were: (1) preparation of the SPIP and a fieldwork planning document; (2) performance of a site investigation and an asbestos and lead-based paint Hazardous Building Materials Survey; and (3) preparation of a site investigation report.

The SPIP is the long-term planning document of the NVS for mitigation of impacts from the FUDS site located at NE Cape. Representatives from the NVS have overseen the preparation of the SPIP and will oversee any investigation and remediation activities to be conducted.

The NVS's primary objectives for the cleanup and closure of not only the NVNC site, but all NE Cape DoD impacted sites are:

- To protect and provide for the health and safety of all current and future St. Lawrence island residents and visitors, including residents of the NVNC, NVS, NVG, remote camps, and other travelers, visitors, and workers;
- To protect and enhance the environment and preserve Native culture in the NE Cape area;
- To provide the opportunity for the Native people to use the land without the fear of environmental contamination; and
- To eliminate adverse impacts and exposure risks to human health and the environment.

The second CA included the performance of RA activities at the NVNC site. RA activities performed at the NVNC during the 2011 field season included the following:

(1) identification, packaging, and removal of asbestos-containing material; (2) collection, packaging, and removal of wood painted with lead-based paint and other painted wood debris; (3) collection and on-site burning of non-painted wood debris; (4) staging of suspect containerized hazardous, toxic, and radioactive waste for sampling, characterization, containerization; and (5) staging of metallic and non-burnable debris for removal at a later date.

The third CA included the performance of additional RA/SI activities at the NVNC during the 2012 field season including the following: (1) collection and temporary staging of remaining hazardous and non-hazardous debris; (2) characterization, containerization, transportation, and disposal of remaining hazardous and non-hazardous debris; (3) excavation, containerization, and staging of stained soil suspected of being petroleum-contaminated and (4) performance of a SI sampling event, including the collection of soil, sediment, and surface water samples from suspect areas throughout the NVNC (Bristol, 2013). In addition, approximately three cubic yards of stained soil was removed from soil sample location 12NVNCSL56, which is approximately 100 feet northeast of sample location 12NVNCSL66 during the 2012 field activities (Figure 3). Soil sample 12NVNCSL66 was collected after the stained soil was removed and the soil sample did not exceed cleanup criteria. Figure 3 shows all 2012 SI sample locations; Figure 4 shows the 2012 soil sample locations and analytes exceeding cleanup criteria; Figure 5 shows the 2012 sediment/surface water sample locations and analytes exceeding cleanup criteria; and Figure 6 shows exceedances of cleanup criteria for sampling conducted in 1994, 1998, 2001, and 2012. Appendix B provides the 2012 sample location GPS coordinates.

No RA activities were conducted under NALEMP during the 2013 field season pending award of the CA and 2012 waste streams were stored in a Conex at the Northeast Cape

site. Waste streams generated during the 2012 field season RA activities were sampled, characterized, and transported for disposal in 2013, including three drums and four 1-cubic yard Super Sack® bags of CON/HTRW (Bristol, 2014a)

## **2.4 SITE REGULATORY STATUS**

The NVNC site is a confirmed contaminated site on ADEC's database, and is currently active and regulated under 18 Alaska Administrative Code (AAC) 75. No changes to this work plan will be made without first notifying and receiving approval from ADEC. The NVNC does not currently generate hazardous waste and would currently be considered conditionally exempt small quantity generators (CESQG's) under Resource Conservation Recovery Act (RCRA) regulations. Planned field activities are expected to generate small volumes of waste materials. If non-exempt hazardous waste materials are generated in volumes at either site that exceed the CESQG limit of 100 kilograms (220 pounds) during any one calendar month, then the respective site will become either a small- or large-quantity generator based on the volume of hazardous waste generated.

If the CESQG limit of hazardous waste generated is exceeded at either of the two sites covered by this WP, then unique U.S. Environmental Protection Agency (EPA) RCRA Subtitle C site identification numbers will be required for each respective site prior to off-site shipment of any hazardous waste. As a precaution, the NVS has applied for and attained EPA RCRA Subtitle C site identification number for the site. The NVNC has been issued identification number AKR000203687.

## **2.5 OWNERSHIP OF REMAINING STRUCTURES**

The locations of the three remaining livable structures (#1, #3, and #11) at the NVNC are shown on Figures 3 through 7. Structures #1, #3, and #11 are owned by Mr. Raymond Toolie, Mr. Eugene Toolie, and Mr. Wilson Okoomealingok, Sr., of the NVS, respectively.



It will be the responsibility of the NVS NALEMP Project Manager to obtain rights of entry from each cabin owner prior to the start of any ACM abatement and LBP Renovation, Repair, and Painting activities.

## **2.6 HUMAN HEALTH CONCEPTUAL SITE MODEL**

A Human Health Conceptual Site Model (CSM) has been developed for the NVNC site. The CSM has been copied into this WP from the NVNC RA/SI Report under the NALEMP FY12 CA (Bristol, 2013). The purpose of the CSM is to identify all:

- Present and future ways people or animals may be exposed (exposure pathways)
- Routes the contaminants may take as they move through soil, air, groundwater, and/or surface water (migration routes)
- Potential receptors (i.e., different human activities which could result in exposure) at each site

Copies of completed ADEC Human Health CSM Scoping and Graphic Forms for the NVNC site are included in Appendix C.

The CSM illustrates the exposed media, transport mechanisms, and exposure pathways, as well as current and future receptors. The following subsections describe each aspect of the CSM.

### **2.6.1 Source and Release Mechanism**

The source and release mechanisms for the NVNC site appear to be varied. Spills and leaks from CON/HTRW drums and hazardous materials may be one source of contamination. The NVNC's proximity to the former NE Cape FUDS Cargo Beach Pump House and re-fueling pipeline may be an additional source of petroleum hydrocarbon contamination. During the November 2012 Restoration Advisory Board meeting that took place in Savoonga, several Savoonga residents mentioned that at one time a break in the pipe had occurred along Cargo Beach Road just up gradient from the NVNC. The USACE investigated this claim under the FUDS program during the 2013 field season. Four soil

borings were advanced and sampled for fuel constituents. None of the samples contained contaminant concentrations exceeding regulatory cleanup levels (Bristol, 2014).

In addition, the NVNC is located adjacent to and down gradient from the NE Cape FUDS site. The NE Cape FUDS Main Operations Complex and Site 13 are located approximately 1.2 aerially miles from the NVNC and Site 31 is 1.5 aerial miles from the NVNC.

### **2.6.2 Impacted Media and Transport Mechanisms**

The 2012 SI analytical results indicate that soil, sediment, and surface water are impacted media at the site. Transport mechanisms for contamination present in surface soil are migration to subsurface soil and to groundwater. Additional potential contaminant transport mechanisms include volatilization, runoff or erosion to surface water, and flow of groundwater to surface water bodies and sediment. Potential exposure media include soil, groundwater, air, surface water, and sediment. PCBs, which bioaccumulate, are present in two locations but all other remaining contaminants located at the site do not bioaccumulate. COCs, which are contaminants exceeding the ADEC clean-up level, for soil include DRO, residual range organics (RRO), arsenic, chromium, cadmium, lead, nickel, PCBs, and benzo(a)pyrene. COCs for sediment include RRO, cadmium, and lead. COCs for surface water include PCBs.

### **2.6.3 Exposure Media, Exposure Pathways, and Receptors**

Potential exposure media include soil, groundwater, air, surface water, and sediment. Potential receptors at the NVNC site include current and future residents, site visitors, construction workers, and subsistence harvesters and consumers. Exposure media are further discussed below.

#### **2.6.3.1 Soil**

Incidental soil ingestion is considered an exposure pathway at the site because the impacted soil is buried below and within two feet of the ground surface. Although

somewhat unlikely, there is a potential for site users and visitors to accidentally and unknowingly ingest impacted soil.

Dermal absorption of contaminants and inhalation of fugitive dust from soil may occur currently, and in the future, by industrial or construction workers if activities involve digging into the subsurface soils. Diesel range organics (DRO) meet the ADEC definition of a volatile compound of concern which may permeate the skin. COCs detected above the clean-up levels during the 2012 SI in surface soil include DRO, RRO, arsenic, chromium, cadmium, lead, nickel, PCBs, and benzo(a)pyrene (Figure 4). The samples associated with each COC are provided in the bullets below:

- DRO was detected in soil samples exceeding the clean-up level in the following samples: 12NVNCSL08, 12NVNCSL09, 12NVNCSL44, 12NVNCSL54, and 12NVNCSL66.
- RRO was detected in soil samples exceeding the clean-up level in the following samples: 12NVNCSL08, 12NVNCSL09, 12NVNCSL13, and 12NVNCSL14.
- Arsenic was detected in soil samples exceeding the clean-up level in the following samples: 12NVNCSL02, 12NVNCSL04, 12NVNCSL22, 12NVNCSL23, and 12NVNCSL44.
- Chromium was detected in soil samples exceeding the clean-up level in the following samples: 12NVNCSL02, 12NVNCSL04, 12NVNCSL27, 12NVNCSL40, 12NVNCSL43, 12NVNCSL44, 12NVNCSL49, 12NVNCSL54, 12NVNCSL56, 12NVNCSL59, and 12NVNCSL64 (duplicate sample of 12NVNCSL40).
- Cadmium was detected in soil samples exceeding the clean-up level in the following samples: 12NVNCSL06, 12NVNCSL51, and 12NVNCSL54.
- Lead was detected in soil samples exceeding the clean-up level in the following samples: 12NVNCSL30 and 12NVNCSL43.
- Nickel was detected in soil sample 12NVNCSL54 exceeding the clean-up level.
- PCBs were detected in soil samples exceeding the clean-up level in the following samples: 12NVNCSL28 and 12NVNCSL64 (duplicate of 12NVNCSL40).
- Benzo(a)pyrene was detected in soil sample 12NVNCSL24 exceeding the clean-up level.

**2.6.3.2 Groundwater**

Natural conditions found at the NVNC cause the groundwater to be potentially unsuitable for use as a drinking water source. The NVNC is located in a tidal zone on the coast of the Bering Sea, so the ingestion of groundwater does not appear to be a current or future exposure pathway.

Due to the climate and nature of the site, dermal exposure of contaminants in groundwater and the inhalation of volatile compounds in tap water do not appear to be current or future exposure pathways. There are no current wells located at the site and any future sources of drinking water at the site would most likely be located further up gradient.

**2.6.3.3 Air**

Although unlikely, the inhalation of outdoor air is considered a potential exposure pathway because DRO was present in surface soil above the established clean up level. Persistent winds present at the site make the inhalation of contaminants in outdoor air unlikely.

Inhalation of indoor air is considered a potential exposure pathway at the site because DRO, which is considered a volatile compound, was detected at concentrations greater than the clean-up level in surface soil during the 2012 Site Investigation at soil sample location 12NVNCSL66 within 30-feet of one of the current site structures (Mr. Eugene Toolies' Cabin, Figure 4).

**2.6.3.4 Surface Water**

Although site surface water bodies are not currently being used as drinking water sources, the ingestion of surface water is a complete exposure pathway. In the future water collected from the creek drainage and from shallow surface ponds could be utilized by site users.

Due to the climate and nature of the site, dermal exposure of contaminants in surface water does not appear to be an exposure pathway of concern. Current residents collect and transport their drinking water to the site from other island drinking water source areas. COCs detected at concentrations greater than the clean-up levels during the 2012 SI in surface water includes PCBs. PCBs were detected in surface water at concentrations exceeding the cleanup level at sample locations 12NVNCSW05, 12NVNCSW07, 12NVNCSW10, and 12NVNCSW11 (duplicate sample of 12NVNCSW05) (Figure 5).

#### **2.6.3.5 Sediment**

The nature and climate of the NVNC site and a review of sediment sampling results indicate that direct contact with sediment is an unlikely exposure pathway. Climate limits the amount of activities that can occur around sediment. COCs detected at concentrations greater than the clean-up levels during the 2012 SI in sediment includes RRO, cadmium, and lead.

While direct contact with sediment is not considered a likely exposure pathway RRO (using the values from the silica gel (SG) clean up samples), cadmium, and lead were detected in sediment sample 12NVNCSD06 exceeding the clean-up level (Figure 5).

#### **2.6.3.6 Biota**

The NVNC site is located in a remote area where people rely on wild plants and animals as their primary source of food. One contaminant detected during the 2012 SI, PCB, has the potential to bioaccumulate.

### **2.7 ECOLOGICAL CONCEPTUAL SITE MODEL**

An Ecological CSM has also been prepared to document how plants and/or animals may be exposed to contaminants found to be present at the NVNC.

During the preparation of the Ecological CSM the following factors were evaluated:

- Direct visual impacts or signs of acute toxicity;
- Terrestrial and aquatic exposure routes;
- Quality and availability of habitat;
- Quantity of contaminated media; and
- Toxicity benchmark levels.

### **2.7.1 Direct Visual Impacts and Acute Toxicity**

Site reconnaissance activities and field observations did not indicate the presence of direct visual impacts or acute toxicity. Visibly stressed vegetation was not encountered.

### **2.7.2 Terrestrial and Aquatic Exposure Routes**

Potentially complete terrestrial exposure pathways include particulates deposited on plants directly or from rain splash and the potential ingestion and/or exposure while animals grub for food, burrow, or groom.

Aquatic exposure routes may include direct exposure to contaminated sediments through foraging or burrowing. Aquatic plants rooted in contaminated sediments may also be an exposure route.

### **2.7.3 Habitat**

The NVNC area can be characterized as low-lying with ponds, bogs, and poorly drained soils. There are no known threatened or endangered species within the vicinity of the NVNC; however, the area is regularly used by the native population for subsistence activities. The area could adversely be impacted by the presence of contamination.

### **2.7.4 Contaminant Quantity**

The total contaminated surface area of the NVNC is unknown at this time. Future RA/SI activities will be required to further investigate the extent of contamination present. At this point, the total area of contaminated soil does not appear to exceed one-half acre.

Based on assumptions made during the 2012 RA/SI and during the development of this work plan, it is estimated that 32 cubic yards of contaminated soil will be removed during the 2014 field work and an approximate surface area of 400 square feet.

Initial sampling results have indicated that the aquatic environment may be affected and that petroleum and non-petroleum contaminants are present. Aquatic environment refers to the surface water located on the site and surface water samples 12NVNCSW05, 12NVNCSW07, 12NVNCSW10, and 12NVNCSW11 (duplicate sample of 12NVNCSW05) detected PCBs at concentrations greater than the clean-up levels. In addition, sediment sample 12NVNCSD06 detected RRO, cadmium, and lead at concentrations greater than the clean-up levels. Approximately one cubic yard of sediment from 12NVNCSD06 sample location and approximate surface area of 25 square feet will be removed.

#### **2.7.5 Toxicity Determination**

Most contaminants documented to be present at the NVNC above established clean up levels are not known to pose a bioaccumulation risk; however, two documented locations contained PCBs, which is a bioaccumulative contaminant, above the established cleanup level of 1 mg/kg. Additional RA/SI activities are planned for the site. RA/SI activities include the excavation and removal of contaminated soil and sediment along with follow-up confirmation sampling.

### **3.0 OBJECTIVES AND SCOPE OF WORK**

The primary focus of the scope of work, proposed under the current FY13 CA, is to remove remaining environmental and health hazards present at the NVNC. This WP discusses all of the proposed tasks that the NVS would like to see performed during the 2014 field season. A determination of NALEMP eligibility has been granted by the USACE and the Office of the Secretary of Defense's NALEMP Program for the ACM abatement and LBP renovation, repair, and painting tasks proposed to be performed at the NVNC. All proposed tasks are listed and discussed in this WP in hopes that they will be performed during the 2014 field season.

The first primary task is to abate and remove any remaining ACM found to be present in and around the remaining structures located at the NVNC. ACM items are not expected; however, an AHERA-certified subcontractor will be utilized to visually inspect the interior and exteriors of the six remaining structures and to properly abate, remove, and containerize items suspected of containing ACM.

In addition, renovation, repair, and painting (encapsulation) of LBP-containing building materials will be performed on and inside the remaining three livable structures located at the NVNC. Examples of LBP-containing items are roof fascia and window trim containing flaking LBP. Following the renovation and repair of building materials containing LBP found to be in poor condition, NVS laborers will be tasked to encapsulate (paint) all interior wood surfaces of the livable cabins. The abatement subcontractor will perform air monitoring for LBP, as required.

The third task will be to further investigate former structure and debris pile locations that may have contained lead acid batteries that were removed during the 2011 field season. During the 2011 field season four broken lead acid batteries were removed from the former structure and debris pile areas. During the 2012 field season soil samples were collected from many of the former structure and debris piles and analyzed for total RCRA



8 metals plus nickel, vanadium, and zinc; however, 15 of the debris pile areas did not receive laboratory analysis for total RCRA 8 metals plus nickel, vanadium, and zinc analysis. Field staff will revisit each of these 15 locations and collect and submit a surface soil sample for metal analysis. Based on sampling results, additional soil may be excavated and removed from these sites. These 15 locations are identified on Figure 7 and in Appendix B.

A fourth task is to excavate, containerize, transport, and dispose of soil and sediment for which analytical results indicate that concentrations of contaminants exceed the established ADEC cleanup levels for the NVNC site. Soil and sediment will be excavated and removed from areas where 2012 (and potentially 2014 SI) sampling results indicate the presence of contaminants at concentrations above established clean up levels. Following excavation of soil and sediment, the excavations will be field-screened/confirmation sampled for DRO and/or RRO/RRO-SG, as appropriate, using the Northeast Cape FUDS project's on-site field laboratory, which will be accredited for DRO, RRO, and RRO-SG by the ADEC and DoD Environmental Laboratory Accreditation Program (ELAP). If DRO/RRO sample results are greater than the established clean up levels, then the samples will be considered field screening samples. If the DRO/RRO sample results are less than the established clean up levels, then the samples will be considered confirmation samples.

Field screening and confirmation samples collected from soil and sediment excavations and analyzed for PCBs, PAHs, Total Organic Carbons (TOCs), and/or metals, as appropriate, will be sent to Test America Laboratories, Inc. (Test America) in Tacoma, Washington for analysis on a rush turn-around-time. Confirmation sample analytical results will be confirmed prior to backfilling with clean backfill.

Surface water samples will be collected from ponds where concentrations of PCBs were detected in 2012 above established clean up levels. Surface water samples will be sent to Test America in Tacoma for analysis.

Environmental samples will be collected by Bristol field personnel who possess the minimum ADEC-required qualifications and experience with the support of NVS field staff. Environmental samples will be analyzed for petroleum hydrocarbons, including DRO, RRO, and RRO-SG; TOCs VOCs, semi-volatile organic compounds, RCRA 8 Metals plus nickel, vanadium, and zinc, and PCBs.

Personnel and equipment required for removal of the physical and environmental hazards will be mobilized to and from the site. This WP, along with the attached ACM and LBP Hazard Abatement Plans (Appendix D), will be approved before field work begins.

### **3.1 SCOPE OF WORK**

The scope of work for the RA/SI is as follows:

- Mobilization and demobilization of personnel and equipment to and from the NE Cape of Saint Lawrence Island;
- Document and map field activities and conditions at the NVNC site using detailed notes, photographs, and a Global Positioning System (GPS);
- Abatement and removal of ACM-containing items from around the NVNC site;
- Renovation, repair, and encapsulation of building materials containing LBP from the three remaining livable structures located at the NVNC;
- Collection of surface soil samples from 15 former structure/debris pile locations that did not receive analysis for total RCRA metals plus nickel, vanadium, and zinc in 2012.
- Excavation, containerization, transportation, and disposal of environmentally impacted soil/sediment located at the NVNC site, including the collection of confirmation samples, the backfilling of excavations with clean fill, and the collection of confirmation surface water samples. Nearly a quarter and a third of 2012 SI soil samples collected exhibited concentrations of arsenic and chromium above their respective site-specific clean up levels (Bristol, 2013). In addition, nickel was detected in soil sample NVNCSL54 at a concentration greater than the

cleanup level but is considered de minimis. Soil sample locations exceeding established clean up levels for the contaminants arsenic and chromium in 2012 will not be further investigated in 2014 since elevated levels of naturally occurring concentrations of arsenic and chromium have been documented in the area. Additional soil may or may not need to be excavated and removed from the 15 former structure/debris pile areas that will receive total RCRA metal plus nickel, vanadium, and zinc analysis during the 2014 SI field effort and as discussed in the bullet above.

A summary of the primary activities that will be performed during the RA/SI will include:

- **Mobilization and Demobilization** – Includes transportation of all materials, personnel, and equipment to and from the site.
- **Work Plans** – Draft and final WPs will be prepared for this project.
- **Removal Action** – An RA will be performed to abate and remove physical and environmental hazards associated with building debris and CON/HTRW.
- **Site Investigation** – An SI will be performed with environmental samples to be collected from areas of contaminated soil and sediment removal and from areas of documented surface water contamination.
- **RA/SI Draft and Final Reporting** – Documents field activities and results of the RA/SI and presents the information in a detailed report.

### 3.2 PROJECT ORGANIZATION AND RESPONSIBILITIES

The fieldwork will be coordinated and conducted by Bristol, in cooperation with personnel from the NVS. Key personnel are described below.

#### 3.2.1 Bristol Personnel

##### *Project Manager*

The Project Manager, Tyler Ellingboe, will be responsible for implementation of the project, and will have authority to commit the resources necessary to meet project objectives and requirements. The primary function of the Project Manager is to ensure that all technical, financial, and scheduling objectives of the project are achieved successfully. The Project Manager will be the primary point of contact for technical project-related matters.

***Field Manager***

The Field Manager, an ADEC qualified field sampler, will be responsible for managing the logistical elements of equipment and personnel mobilization, execution of field RA/SI activities, and demobilization. The Field Manager will provide oversight of project activities and will be responsible for health and safety of personnel while on site (Appendix E contains the Site Safety and Health Plan for this project). The Field Manager will conduct a daily safety meeting and be responsible for communication of project hazards to project personnel before work begins each day. The Field Manager will also be responsible for mapping and documentation of all field and sampling activities, and the Field Manager's notes will be utilized as a formal record of field activities. Once the project is underway, personnel from the NVS will lead the field effort with support from Bristol.

***Equipment Operator***

Bristol will provide an equipment operator that will support field activities on an as-needed basis. It is expected that the equipment operator will aid with the excavation of contaminated soil and will perform the loading of debris into intermodal shipping containers for off-site shipment.

***Regulatory Compliance Manager/Transportation and Disposal Coordinator***

The Regulatory Compliance Manager/Transportation and Disposal Coordinator (TDC), Tyler Ellingboe, will oversee all activities related to the collecting, manifesting, transporting, and disposing of all hazardous materials/wastes generated at the site. He will work closely with the Field Manager and waste management personnel to ensure that wastes are properly identified, packaged, transported, and disposed of.

Resumes of key Bristol personnel have been provided in Appendix F.

### **3.2.2 NVS Personnel**

#### ***Project Manager***

The Project Manager, Robert Annogiyuk, is responsible for ensuring that all tasks for the scope of work are achieved successfully. The Project Manager will coordinate the effort, and provide the necessary NVS resources to meet the project objectives and requirements.

#### ***NVS Field Representative(s)***

The NVS field representative(s) will contribute his/their knowledge of the history of the DoD facility at NE Cape and will perform encapsulation, debris collection, and removal activities under the RA. NVS Field Representatives will also support the SI effort to be performed. One NVS Field Representative will be elected and trained as the Site Safety and Health Officer and field lead for when the Bristol Field Manager is not on site.

### **3.2.3 Subcontractors**

Subcontractors will be utilized as required, and will perform all work in accordance with this WP. Test America, will be subcontracted to perform laboratory analysis on all environmental samples collected during RA/SI events.

Satori Group, Inc. (Satori) is a State of Alaska, Licensed Asbestos Abatement Contractor and will provide properly trained/certified/licensed abatement workers to properly identify, package, and label ACM items that are suspected or identified for off-site transportation and disposal. Satori will also conduct renovation and repair of LBP found to be in poor condition from remaining site structures. Satori will also conduct air monitoring and sampling for lead exposure during the performance of painting (encapsulation) activities, as required.

Depending on the outcome of RA activities, it is foreseen that additional subcontractors will include transportation and waste recycling and/or disposal companies. Selection of subcontractors will be based on the types of waste materials that are found and shipped off

site. Transportation companies may include air, marine, road, and/or rail carriers.

Recycling and disposal companies may include recyclers, landfills, incinerators, and/or other waste treatment facilities. All subcontractors will be in good standing with the EPA and the U.S. Department of Transportation (DOT) prior to being subcontracted by Bristol.

### **3.3 SCHEDULE**

The work proposed under this WP will be conducted during the 2014 summer field season. The work is estimated to take approximately four and one half weeks. The actual days of work will be selected based upon the schedule of operation for Northeast Cape FUDS field activities and weather predictions by the National Weather Service in hopes of selecting a time period during which mobilization and demobilization delays will not occur due to weather.

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## **4.0 FIELD ACTIVITIES**

The following subsections detail the field activities that will be performed and procedures that will be followed in support of this project.

### **4.1 MOBILIZATION AND DEMOBILIZATION**

Bristol and subcontractor personnel (if required), equipment and materials will be mobilized to and from Anchorage, Alaska, and Nome by commercial airlines.

Mobilization of NVS, Bristol, and subcontractor personnel from Savoonga and Nome, to the NE Cape site will be provided by a charter air service. Mobilization and demobilization of required heavy equipment and shipping containers will be performed by Northland Services, Inc., using the NE Cape FUDS barge.

### **4.2 DOCUMENTATION**

Field activity will be carefully documented for all tasks. All field activities will be recorded in a Rite in the Rain® all-weather field notebook. Dates, times, sample locations and identifications, field personnel, any pertinent field observations, and any pertinent information to help identify field activities, will be recorded in a field notebook. Field sketches showing sample locations and identifications will be drawn in the field notebook. Photographs will be taken and logged in the field notebook. A Trimble GeoExplorer 2008 GeoXH Series handheld GPS will be used for marking sample locations, locations of debris, or other areas of interest, to sub-meter accuracy after post-processing. The GPS points will also be recorded in the field notebook as well as location sketches including sample identification numbers.

### **4.3 REMOVAL ACTION FIELD ACTIVITIES**

RA field activities will be performed to properly manage and remove previously identified hazardous and potentially hazardous waste streams from the NVNC site. In addition, items of value to NVS or NVG residents found around the sites during removal activities



will be turned over to on-site NVS representatives. Contractors and subcontractors will not remove native artifacts or items of value without the consent of NVS and/or NVG personnel. The following subsections detail field activities and how generated waste streams will be managed during the RA. RA activities will be documented in the RA/SI Report that will be prepared and submitted following the conclusion of the field season.

#### **4.3.1 ACM Removal Activities**

Building materials containing ACM were identified, packaged, and removed during the 2011 and 2012 field efforts; however, the potential exists that additional ACM may be located at the NVNC. If encountered, ACM will be identified, removed, and packaged for off-site transportation and disposal by subcontractor personnel. NVS personnel will not participate in ACM abatement and removal activities.

Satori personnel will travel to the NVNC to conduct identification, packaging, and labeling of ACM and potential ACM for proper transportation and disposal. All abatement work will be performed by Satori, a licensed asbestos abatement contractor, in accordance with the most recent version of the USACE Engineers Manual EM 385-1-1. ACM items that are suspected to contain greater than one percent ACM, will be appropriately wetted, removed, packaged, and properly labeled for off-site shipment to an EPA-approved landfill. ACM items will be double bagged, marked and labeled, and hand placed into an intermodal shipping container (Conex) for shipment. There will be no visible emissions from abatement activities. Appendix D contains the Asbestos Hazard Abatement Plan that will be implemented and followed for the project.

Since this is a multi-employer work site, Satori will be responsible for conducting all ACM abatement activities and will inform all other on-site employers of the nature of the ACM work, the location of regulated areas, and requirements pertaining to those areas, and the measures that have been taken to ensure that employees of other employers are not exposed to ACM.

#### **4.3.2 Renovation and Repair of Building Materials Containing LBP**

Inspection and sampling conducted during the Hazardous Building Materials Survey performed during the 2009 field season and included in the NVNC SI Report (Bristol, 2009), indicated positive concentrations of LBP greater than one milligram per square centimeter.

LBP-containing building materials present on and within the three remaining livable structures located at the NVNC will be renovated, repaired, and painted (encapsulated) in order to remove potential health hazards related to the presence of LBP.

Federal law requires that individuals receive certain information before renovating six square feet or more of painted surfaces in a room for interior projects or more than 20 square feet of painted surfaces for exterior projects in homes built before 1978. The renovation and repair subcontractor (Satori) will provide copies of EPA's The Lead-Safe Certified Guide to Renovate Right pamphlet to each remaining structure owner prior to the start of renovation, repair, and painting activities. Copies of the pamphlet will be sent to each respective structure owner via certified mail at least seven days prior to the start of renovation activities.

A copy of Satori's LBP Abatement Plan is included in Appendix D. The LBP Abatement Plan includes the following sections:

- Description of Activities
- Engineering Controls
- Initial Determination
- Personnel Protective Equipment
- Administrative Controls
- Medical Surveillance
- Competent Person and Employee Training
- Waste Generation

### **4.3.3 Debris Collection, Containerization, and Removal**

Although not expected, if NVS field personnel identify suspected ACM or CON/HTRW items during debris removal activities, they will immediately contact Bristol personnel who will safely and properly remove the item(s) from the work area to reduce the potential NVS field personnel exposure.

Hand tools, including chop saws, chain saws, and saws-all type saws, may be used to make debris easier to manage. Saws will not be used to remove debris that contains painted surfaces. Debris with painted surfaces will be removed intact or with pry bars in order to reduce the potential hazard of causing LBP-containing chips to become airborne and ingested.

The following sections further discuss removal of painted wood debris and non-painted wood/metallic/non-burnable debris

#### **4.3.3.1 LBP and Painted Wood Debris**

Inspection and sampling conducted during the Hazardous Building Materials Survey performed during the 2009 field season and documented in the NVNC SI Report (Bristol, 2009), indicated positive concentrations of LBP greater than one milligram per square centimeter. LBP and painted wood debris was removed from the NVNC during the 2011 and 2012 field seasons.

Prior to the handling of any LBP-containing or painted wood debris, air monitoring will be conducted to ensure that workers will not be subjected to lead concentrations over the OSHA action level of 30 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) of air or above the permissible exposure limit (PEL) of 50  $\mu\text{g}/\text{m}^3$  of air, averaged over an 8-hour shift. A negative initial determination for LBP will be attained by collecting two air samples per day over a two-day period. As per Title 29 Code of Federal Regulations, Part 1926.62(d)(7) [29 CFR 1926.62(d)(7)], additional air samples will be collected if site conditions change. If

air monitoring samples indicate concentrations of LBP below the action level, then removal of LBP debris will commence at a Level D personal protective equipment level without respiratory protection. Appendix D includes the Lead-Based Paint Hazard Abatement Plan that will be implemented and followed for the project.

If airborne concentrations of LBP are above the action level, then additional requirements will be triggered including engineering controls, proper housekeeping, washing facilities for hand and face washing, additional worker training, respiratory protection, medical monitoring, and additional air sampling. If action levels are exceeded, then LBP handling work will stop until a Work Plan Addendum can be issued and approved that addresses the additional requirements.

#### **4.3.3.2 Collection, Staging, and Removal of Non-Hazardous/Metallic Debris**

The majority of non-painted wood debris located at the NVNC was burned on-site during the 2011 and 2012 field efforts. In addition, non-burnable/metallic debris located at the NVNC was collected and removed during the 2012 field season. Although not anticipated, any remaining non-painted wood, non-burnable, and/or metallic debris will be collected, containerized, and prepared for off-site shipment.

Waste streams that are expected to be generated and managed during debris collection and removal from the NVNC are summarized in Table 4-1.

**Table 4-1 Anticipated Debris Waste Streams**

| <b>Waste Stream Item No.</b> | <b>Waste Type</b>               | <b>Suspected Location</b> |
|------------------------------|---------------------------------|---------------------------|
| 1                            | ACM                             | Inside of NVNC Structures |
| 2                            | LBP Renovation and Repair Waste | Inside of NVNC Structures |

Notes:

ACM = asbestos-containing material

NVNC = Native Village of Northeast Cape

LBP = lead-based paint

#### 4.3.4 Containerized Hazardous and Toxic Waste Removal Activities

Small volumes of CON/HTRW items may be identified at the NVNC site during RA field activities. Items may vary from ACM, LBP-containing items and waste from renovation and repair activities, and intact surface drums to small quart-sized metal containers. Only items of CON/HTRW having a military origin will be considered for removal.

The Bristol Field Manager will conduct CON/HTRW identification, sampling, characterization, packaging, marking, and labeling of CON/HTRW, as required.

CON/HTRW items eligible for removal will be containerized into new United Nations (UN)-approved shipping containers consisting of drums, buckets with lids, fiberboard boxes, or totes prior to shipment off site.

**Table 4-2 Anticipated CON/HTRW Waste Streams**

| Waste Stream Item No. | Waste Type                                   | Location |
|-----------------------|--|----------|
| 1                     | ACM Abatement Debris                         | NVNC     |
| 2                     | LBP Abatement Debris                         | NVNC     |
| 3                     | Miscellaneous Drum or Small Container Wastes | NVNC     |

Notes:

ACM = asbestos containing material

CON/HTRW = containerized hazardous, toxic, and radioactive waste

LBP = lead-based paint

NVNC = Native Village of Northeast Cape

##### 4.3.4.1 Surface and/or Partially Buried Drums

Surface and partially buried drums were removed from the NVNC during the 2011 and 2012 RAs. It is not expected that additional drums will be identified at the NVNC during the field effort. If surface and/or partially buried drums are identified they will be excavated and inspected for contents. The location of the drums will be marked by GPS, and observations and locations will be noted in the field notebook. If found to be empty, the drums will be crushed and shipped off site for either metal recycling or disposal.

depending on the condition of the drums. The contents from any drums found to be full, or partially full, will be consolidated with like materials into new UN-approved drums, or will be overpacked into salvage drums. Contents from full or consolidated drums will be sampled and properly characterized prior to shipment off site to a recycling or disposal facility. If full or partially full drums are found, Bristol and the NVS will contact the USACE NALEMP Program Manager (Andrea Elconin) to determine if additional funding may be available to sample soil from beneath the drums. If funding is not available, follow-up sampling will occur during a future SI.

#### **4.3.4.2 Incidental Stained Soil**

Areas with visible staining from petroleum products will be containerized in cubic yard Super Sacks<sup>®</sup> or drums, depending on volume, using either heavy equipment or hand shovels. Staining will be determined to be of petroleum origin if fuel odor is observed. Removal of stained soil will be limited to stained soil immediately adjacent to partially buried drums. Further RAs may be required pending the outcome of analytical results. Representative samples will be collected to properly characterize the waste streams for disposal. Soil, once containerized, will be shipped off site for disposal as either non-hazardous or hazardous waste based on sampling results. The location of any additional stained soil will be marked by GPS, and observations and locations will be noted in the field notebook. If stained soil is identified and removed, Bristol and the NVS will contact the USACE NALEMP Program Manager (Andrea Elconin) to determine if additional funding may be available to collect confirmation soil samples after the stained soil has been removed. If funding is not available, follow-up sampling will occur during a future SI.

#### **4.3.4.3 Characterization and Sampling of Waste Streams**

CON/HTRW identified during RA field activities will be properly containerized, sampled, and characterized. Potential contaminants will be properly characterized through

laboratory analysis, use of Material Safety Data Sheets (MSDSs), and/or through previous experience prior to shipment to an off-site recycling or disposal facility. Characterization and sampling of the waste streams will be based on the nature of the waste streams and acceptance criteria of the recycling/disposal facility. It is expected that sample analyses may include flashpoint, pH, oil-burn specifications, toxicity characteristic leaching procedure (TCLP) RCRA metals, VOCs, SVOCs, and PCBs. Table 4-3 lists sample analytes, test methods, and sample quantities expected to be required for the CON/HTRW RA.

**Table 4-3 CON/HTRW RA Sample Collection Summary**

| Analytes                                     | Test Method          | No. of Samples Expected |
|--|----------------------|-------------------------|
| Flashpoint, closed-cup                       | EPA SW1020A          | 0                       |
| pH   | EPA SW9040           | 0                       |
| Oil-Burn Specifications                      | EPA SW9056/8082/6020 | 0                       |
| Diesel Range Organics                        | AK 102               | 2                       |
| Residual Range Organics                      | AK 103               | 2                       |
| TCLP Metals (Ag, As, Ba, Cd, Cr, Hg, Pb, Se) | EPA SW6020/SW7471B   | 2                       |
| Volatile Organic Compounds                   | EPA SW8260B          | 2                       |
| Semi-volatile Organic Compounds              | EPA SW8270C          | 2                       |
| Polychlorinated Biphenyls                    | EPA SW8082A          | 2                       |

Notes:

AK = Alaska Test Method

RA = removal action

CON/HTRW = containerized hazardous and toxic waste

SW = EPA Solid Waste Test Method

EPA = U.S. Environmental Protection Agency

TCLP = Toxicity Characteristic Leaching Procedure

pH = potential Hydrogen (a measure of acidity)

**4.3.4.4 Waste Classification**

Upon the completion of waste characterization activities, waste streams will be classified in accordance with 40 CFR 261 and 40 CFR 761. In addition, waste streams will be profiled in accordance with recycling/disposal facility acceptance criteria. Each hazardous waste will be evaluated to identify all applicable treatment standards in 40 CFR 268, Land Disposal Restrictions.

**4.3.4.5 Hazardous Waste Accumulation Point**

A hazardous waste accumulation point (HWAP) or container storage area will be established for handling containers of hazardous material and waste generated at the NVNC site. The HWAP will most likely consist of a 20-foot Conex box staged near the barge landing area adjacent to the NVNC. The HWAP will serve as the central collection, identification, bulking, and secure storage point for any CON/HTRW encountered during



the project. Waste materials will be packaged, labeled, and manifested in accordance with DOT (49 CFR 172-178) and RCRA (40 CFR 260-268) requirements.

#### **4.3.4.6 Packaging**

Waste materials will be stored in appropriate UN-approved containers, and incompatibles will be segregated. Containers will be compatible to wastes (49 CFR 100-177), will be in good condition, and will be marked in accordance with 40 CFR 262. If used oil is collected, it will be marked in accordance with 40 CFR 279.

#### **4.3.4.7 Marking and Labeling**

Waste containers will be marked and labeled depending on waste composition and hazard class. Unknowns will be marked, "Potential Hazardous Waste Pending Analysis," with the date of sampling and suspected hazards. Labels will be added as required by the Hazardous Materials Table in 49 CFR 172.101. All containers to be shipped off site will be marked with non-hazardous, non-regulated, or hazardous waste markers, as appropriate, prior to shipment. Information to be placed on markers will include generator information, manifest number, accumulation start date, DOT proper shipping name, and EPA identification number and waste codes, if applicable.

#### **4.3.4.8 Placarding**

Hazardous materials and wastes shipped off site will be placarded in accordance with 49 CFR 172(F). All four sides of the shipping container (Conex) will be placarded appropriately. Segregation of hazard classes, if required, will be in accordance with the shipment of hazardous material by marine vessel (49 CFR 176).

#### **4.3.4.9 United States Shipping Documents**

Bristol, in accordance with the requirements of 40 CFR 262, will prepare Uniform Hazardous Waste Manifests, EPA Form 8700-22, for all hazardous wastes (as defined in 40 CFR 262). Non-hazardous and/or non-regulated wastes shipped off site will be

manifested on Non-Hazardous Waste Manifests. In addition, all shipping manifests will be referenced on a Bill of Lading prepared for the marine carrier prior to off-site shipment. Waste stream profiles and land disposal restriction forms will also be completed and attached to manifests, as necessary. Shipping documents will be prepared and signed by Bristol on behalf of the NVS IRA Council.

#### **4.3.4.10 Canadian Shipping Documents**

The Basel Convention prohibits the shipment of hazardous wastes across international borders without prior notification and approval. Hazardous wastes shipped from the NVNC to Washington State by marine vessel will pass through Canadian waters during transit. A Canadian Transit Notice will be completed and approved by Canadian authorities prior to shipment. In addition, Canadian Movement Documents will be completed and will accompany the shipment during transit. The Bristol Transportation and Disposal Coordinator will sign the Canadian Movement Documents on behalf of the generator.

#### **4.3.4.11 Transportation**

Wastes generated from RA activities at the NVNC will be shipped off site as one waste shipment at the end of the field season. Wastes will be transported by barge (marine vessel) from NE Cape to Seattle, Washington, and then by truck and/or rail to their respective recycling/disposal facilities.

#### **4.3.4.12 Treatment, Recycling, and Disposal**

CON/HTRW that is generated and shipped off-site will be placed in bulk and non-bulk containers, as necessary. Hazardous materials, hazardous wastes, and non-hazardous solid wastes removed from the NVNC site and generated during RA activities will be treated, recycled, and disposed of as listed in Table 4-4.

**Table 4-4 Waste Types and Disposition**

| <b>Waste Stream Code</b> | <b>Waste Type</b>                                       | <b>Final Treatment/ Disposal</b>     | <b>Treatment Facility/Location</b>   |
|--------------------------|---|--------------------------------------|--|
| 1                        | ACM, non-RCRA   | Disposal in Subtitle C or D Landfill | Chemical Waste Management of the Northwest - Arlington, OR or<br>Columbia Ridge Landfill – Arlington, OR or<br>U.S. Ecology Idaho, Inc. - Grand View, ID |
| 2                        | LBP Renovation and Repair Waste, RCRA                   | Disposal in Subtitle C Landfill      | Chemical Waste Management of the Northwest - Arlington, OR or<br>U.S. Ecology Idaho, Inc. - Grand View, ID   |
| 3                        | LBP Debris, RCRA (non-bulk, small amounts)              | Disposal in Subtitle C Landfill      | Chemical Waste Management of the Northwest - Arlington, OR or<br>U.S. Ecology Idaho, Inc. - Grand View, ID   |
| 4                        | LBP Debris, RCRA (bulk, large amounts)                  | Disposal in Subtitle C Landfill      | Chemical Waste Management of the Northwest - Arlington, OR   |
| 5                        | Non-Painted Wood/Non-Burnable/Metallic Debris, non-RCRA | Disposal in Subtitle C or D Landfill | Columbia Ridge Landfill – Arlington, OR or<br>U.S. Ecology Idaho, Inc. - Grand View, ID  |
| 6                        | Oily Debris/Grease/Soil in drums                        | Disposal in Subtitle C Landfill      | Chemical Waste Management of the Northwest - Arlington, OR or<br>U.S. Ecology Idaho, Inc. - Grand View, ID   |
| 7                        | POL-contaminated soil, non-RCRA                         | Disposal in Subtitle C or D Landfill | Chemical Waste Management of the Northwest - Arlington, OR or<br>Columbia Ridge Landfill – Arlington, OR or<br>U.S. Ecology Idaho, Inc. - Grand View, ID |
| 8                        | Soil Contaminated with Paint (RCRA)                     | Disposal in Subtitle C Landfill      | Chemical Waste Management of the Northwest - Arlington, OR or<br>U.S. Ecology Idaho, Inc. - Grand View, ID   |
| 9                        | Additional small CON/HTRW items                         | Varies by Waste Type                 | Varies by Waste Type   |

## Notes:

ACM = Asbestos containing material  
 CON/HTRW = Containerized hazardous, toxic, and radioactive waste  
 ID = Idaho

LBP = lead-based paint  
 OR = Oregon  
 POL = petroleum, oil, and lubricants

RCRA = Resource Conservation Recovery Act  
 UT = Utah  
 WA = Washington

All facilities used for off-site disposal have been reviewed and approved by the Defense Reutilization Marketing Service. Proposed recycling/disposal facility information is listed in Table 4-5.

**Table 4-5 Proposed Recycling and Waste Disposal Facilities**

|                              |  |
|------------------------------|--|
| <b>Facility Name</b>         | Chemical Waste Management of the Northwest |
| <b>Facility Address</b>      | 17629 Cedar Springs Lane                   |
| <b>City, State, Zip Code</b> | Arlington, OR 97812                        |
| <b>Phone</b>                 | 541-454-2030                               |
| <b>EPA I.D. No.</b>          | ORD089452353                               |
| <b>Facility Name</b>         | Columbia Ridge Recycling and Landfill      |
| <b>Facility Address</b>      | 18177 Cedar Springs Lane                   |
| <b>City</b>                  | Arlington, OR 97812                        |
| <b>Phone</b>                 | 541-454-2030                               |
| <b>EPA I.D. No.</b>          | ORD987173457                               |
| <b>Facility Name</b>         | Emerald Services, Inc.                     |
| <b>Facility Address</b>      | 1825 Alexander Avenue                      |
| <b>City, State, Zip Code</b> | Tacoma, WA 98421                           |
| <b>Phone</b>                 | 206-832-3100                               |
| <b>EPA I.D. No.</b>          | WAD981769110                               |
| <b>Facility Name</b>         | Emerald Recycling                          |
| <b>Facility Address</b>      | 1500 Airport Way South                     |
| <b>City, State, Zip Code</b> | Seattle, WA 98134                          |
| <b>Phone</b>                 | 206-832-3191                               |
| <b>EPA I.D. No.</b>          | WAD058367152                               |
| <b>Facility Name</b>         | U.S. Ecology, Inc.                         |
| <b>Facility Address</b>      | 20400 Lemley Road                          |
| <b>City, State, Zip Code</b> | Grand View, ID 83624                       |
| <b>Phone</b>                 | 800-274-1516                               |
| <b>EPA I.D. No.</b>          | IDD073114654                               |

**4.3.4.13 Waste Tracking Requirements**

Bristol's TDC will track all off-site shipments on a Waste Tracking Summary Spreadsheet. A copy of the final Waste Tracking Summary Spreadsheet will be included in the final RA/SI Report.

**4.3.4.14 Packaging Certifications and Exception Reporting**

A generator who creates 1,000 kilograms or more of hazardous waste in a calendar month, and sends it to a disposal facility, must contact the transporter and/or disposal facility to determine the status of the hazardous waste if the generator has not received a copy of the signed, handwritten manifest from the designated facility owner/operator within 35 days of the date the waste was accepted by the initial transporter. On the 40<sup>th</sup> day, Bristol will again verify whether the generator has received a copy of the signed manifest from the TSDF. If the signed manifest is not received by the generator within 45 days, Bristol will prepare and submit an Exception Report to the EPA Regional Administrator (EPA Region 10) in accordance with 40 CFR 262.42

**4.3.4.15 Violations and Discrepancies**

In the event that notices of noncompliance or notices of violations are issued to the NVS, Bristol and the NVS will do everything in their power to rectify the situation. All relevant documentation regarding the incident will be provided to Bristol, and any response will be coordinated through Bristol. The NVS will provide all documentation related to the issue to Bristol until the matter is resolved.

If the amount of hazardous waste designated on a manifest and the quantity of hazardous waste received at the disposal facility do not agree, a discrepancy report will be filed as required by 40 CFR 264.72. If required, Bristol will submit this report as required by the EPA.

#### **4.3.4.16 Transportation and Disposal**

To document all wastes generated and managed during this project, all transportation and disposal documentation will be tracked and provided in the final RA/SI Report.

Documentation will include a summary of all wastes generated, quantities, and final disposition of the wastes. Copies of the following documentation will be provided:

- United States Uniform Hazardous Waste Manifests
- Land Disposal Restriction Forms
- Non-Hazardous Waste Manifests
- Material Safety Data Sheets
- Laboratory Results
- Canadian Manifests and Transit Notices
- Bills of Lading
- Certificates of Weight
- Certificates of Disposal
- Exception Reports and Discrepancy Reports, if applicable
- Waste Photographs

A waste tracking log will list all wastes, container numbers, weights, manifest and profile numbers, and dates for shipping and receiving.

#### **4.4 SITE INVESTIGATION AND ENVIRONMENTAL SAMPLING**

In addition to debris and CON/HTRW removal activities, SI and environmental sampling activities will be performed at 15 former structure/debris pile locations that did not receive total RCRA 8 metals plus nickel, vanadium, and zinc analysis during the 2012 field effort and at locations within the NVNC where exceedances of soil, sediment, and surface water contaminant clean up criteria were documented during the 2012 field season. Proposed 2014 SI sampling locations are shown on Figure 7 and are listed in Appendix B.

Soil and sediment will be excavated as outlined in Table 4-7 at the locations presented in Figures 7 through 10 and containerized for transportation and disposal. Following excavation of soil and sediment, field screening and the collection and analysis of confirmation samples from the excavations will occur in accordance with the ADEC Draft Field Sampling Guidance document (ADEC, 2010a).

Excavations will remain open until confirmation soil sampling results are received. Excavations confirmed as clean or as having concentrations of contaminants below established clean up levels will be backfilled with clean fill from the NE Cape FUDS fill site that is located up Kangukhsam Mountain from the NE Cape Main Operations Complex.

Although there is a CA option to excavate additional volumes of soil/sediment from excavations that continue to exhibit concentrations of contaminants above established clean up levels following confirmation sampling, it is expected that the short field season will not allow time for the excavation and sampling of additional volumes of soil. If the remaining duration of the field season does not allow for the additional excavation and removal of contaminated soil/sediment, the excavation will be lined with a poly liner and backfilled.

All excavation and confirmation sampling locations will be photographed and marked with a GPS with sub-meter accuracy after post-processing. Excavation and confirmation sampling locations will be depicted on a new figure that will be provided in the SI Report.

Planned SI and environmental sampling tasks are more thoroughly discussed in the following sections. Field sampling procedures are detailed in Section 5.0. Details of the quality assurance (QA) program and sample handling procedures are detailed in Section 6.0.

#### **4.4.1 Permits**

It is not anticipated that federal, state, or local permits will be required. Utilities are not present at the NVNC site. If permits are required, copies of the permits will be included in the RA/SI Report at the conclusion of the project.

#### **4.4.2 Site Access**

Access restriction will be provided during the field effort to prevent any children or site visitors from entering the work areas until the hazards can be alleviated. Safety fencing may be used to restrict access.

#### **4.4.3 On-Site Laboratory**

An on-site field-screening laboratory will be set up at the NE Cape FUDS camp site and will utilize gas chromatographs to provide screening-level and confirmation sampling results for DRO, RRO, and RRO-SG analyses using Alaska Test Method AK102/103/103-SG. The field laboratory is pending ADEC-approval and adequate certification for the 2014 FUDS work. The mobile lab will be accredited by the ADEC and ELAP. DRO, RRO, and RRO-SG results from the on-site laboratory will be used to direct excavations, characterize waste, and will be used to confirm that cleanup goals have been achieved at the sites (for DRO and/or RRO/RRO-SG only).

Bristol will employ two on-site analysts from Test America to operate the laboratory equipment. Additionally, two extractionists will assist in sample preparation.

#### **4.4.4 Data Gap Investigation of Former Structure/Debris Piles**

During the 2011 field effort four broken lead acid batteries were removed from former structure/debris pile areas depicted on Figure 3 of the 2012 RA Report (Bristol, 2012). It is unknown which debris piles there were removed from. During the 2012 field season surface soil samples were collected from the majority of the former structure/debris piles



and analyzed for total RCRA 8 metals plus nickel, vanadium, and zinc with the exception of 15 of the former structure/debris pile locations.

In order to complete a data gap for the potential presence of lead contamination associated with the past removal of lead acid batteries, a surface soil sample will be collected from each of these 15 locations and submitted for total RCRA 8 metals plus nickel, vanadium, and zinc analysis. Table 4-6 depicts the 15 former structure/debris pile locations that will be further investigated and expected sample quantities. The 15 former structure/debris pile locations are shown on Figure 7 and are listed in Appendix B.

**Table 4-6 Soil Sample Locations for Former Structure/Debris Piles**

| Feature | Previous Sample Location | Matrix | Analytes                      | Analytical Method | Unit | Primary | Duplicate |
|---------|--------------------------|--------|-------------------------------|-------------------|------|---------|-----------|
| DP14    | 12NVNCSL05               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       | 2         |
| DP12    | 12NVNCSL07               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP11    | 12NVNCSL08               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP7     | 12NVNCSL11               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP6     | 12NVNCSL12               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP8     | 12NVNCSL13               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP9     | 12NVNCSL14               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP10    | 12NVNCSL15               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |

**Table 4-6 Soil Sample Locations for Former Structure/Debris Piles (continued)**

| Feature | Previous Sample Location | Matrix | Analytes                      | Analytical Method | Unit | Primary | Duplicate |
|---------|--------------------------|--------|-------------------------------|-------------------|------|---------|-----------|
| DP3     | 12NVNCSL18               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP2     | 12NVNCSL20               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP5     | 12NVNCSL21               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP18    | 12NVNCSL25               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP17    | 12NVNCSL26               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP22    | 12NVNCSL27               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |
| DP23    | 12NVNCSL28               | Soil   | RCRA 8 Metals + Ni, V, and Zn | SW 6020           | each | 1       |           |

**Notes:**

DP = debris pile

Ni = nickel

RCRA = Resource Conservation Recovery Act

SW = EPA Solid Waste Test Method

V = vanadium

Zn = zinc

**4.4.5 Excavation of Soil/Sediment Locations Exceeding Established Cleanup Criteria**

Soil and/or sediment will be excavated and removed from the areas of known concentrations of contaminants exceeding established clean up criteria based on the results of the 2012 and 2014 field season with a few exceptions (Figures 7 through 10). As mentioned in the RA/SI report (Bristol, 2013) and shown on Figure 4, nearly a quarter and a third of 2012 SI soil samples collected exhibited concentrations of arsenic and chromium above their respective site-specific clean up levels. In addition, nickel was detected in a single soil sample (12NVNCSL54) at a concentration greater than the cleanup level and is considered de minimis. Soil sample locations exceeding established clean up levels for the

contaminants arsenic, nickel, and chromium will not be further investigated since elevated levels of naturally occurring concentrations of arsenic and chromium have been documented in the area. In addition, a review of RRO silica gel clean up results and the sample chromatograms for the 2012 sediment samples collected indicated a non-fuel pattern that resembles NOM (natural organic material). Analysis following the silica gel cleanup resulted in concentrations of RRO that were reduced by an average of 50 percent. Post silica gel cleanup values are only available for four soil samples.

Each excavation will be centered at each respective 2012 (and potentially 2014) environmental sample GPS location that indicated an exceedance of established clean up criteria and the proposed 2014 excavation dimensions are based on the 2012 site characterization results. The 2012 sample locations will be located prior to excavation activities by ECOLAND surveyors, professional land surveyors registered in the State of Alaska, to a minimum of 1.5-foot accuracy. The 2012 environmental samples with exceedances of established clean up levels are provided in Appendix B.

Following the removal of the vegetation layer, soil will be excavated and removed to an expected depth of 2-feet below ground surface (bgs). Excavated soil will be placed directly into containers for proper transportation and disposal. It is expected that 1-cubic yard and 8-yard super sacks will be used to containerize the soil. Sediment sample location 12NVNCSD06 will be excavated to an estimated depth of 1-foot bgs. Due to moisture content, 55-gallon steel drums will be used to contain sediment that is excavated. In order to reduce the impact to the local tundra, it is expected that some of the excavations will be hand dug using shovels while others may be excavated using available heavy equipment. After all contamination has been removed, excavation locations will be documented utilizing a sub-meter accuracy GPS. Excavation locations, contaminants present, and expected excavation dimensions and square footage are shown in Table 4-7.

2012 soil/sediment sample locations where excavations will be centered are shown on Figures 3 through 6. The proposed excavations are shown on Figures 7 through 10.

**Table 4-7 2012 Sample Locations and Contaminants,  
Proposed 2014 Excavation Dimensions and Square Footage**

| Sample Location | Matrix | Contaminant    | Analytical Method | Contaminant Concentration (mg/kg) | Established Clean Up Level (mg/kg) | Excavation Volume (cubic yards) | Proposed 2014 Excavation Dimensions (feet) |
|-----------------|--------|----------------|-------------------|-----------------------------------|------------------------------------|---------------------------------|--|
| 12NVNCSL08      | Soil   | DRO            | AK 102            | 74,000                            | 9,200 <sup>a</sup>                 | 2                               | 5' by 5' by 2' deep                        |
|                 |        | RRO            | AK 103            | 300,000                           | 9,200 <sup>a</sup>                 |                                 |  |
| 12NVNCSL09      | Soil   | DRO            | AK 102            | 10,000                            | 9,200 <sup>a</sup>                 | 2                               | 5' by 5' by 2' deep                        |
|                 |        | RRO            | AK 103            | 37,000                            | 9,200 <sup>a</sup>                 |                                 |  |
| 12NVNCSL13      | Soil   | RRO            | AK 103            | 12,000                            | 9,200 <sup>a</sup>                 | 2                               | 5' by 5' by 2' deep                        |
| 12NVNCSL14      | Soil   | RRO            | AK 103            | 29,000                            | 9,200 <sup>a</sup>                 | 2                               | 5' by 5' by 2' deep                        |
| 12NVNCSL44      | Soil   | DRO            | AK 102            | 23,000                            | 9,200 <sup>a</sup>                 | 2                               | 5' by 5' by 2' deep                        |
| 12NVNCSL54/66   | Soil   | DRO            | AK 102            | 38,000                            | 9,200 <sup>a</sup>                 | 2                               | 5' by 5' by 2' deep                        |
|                 |        | Cadmium        | SW 6020           | 7.9                               | 5.0                                |                                 |  |
| 12NVNCSL24      | Soil   | Benzo(a)pyrene | SW 8270C SIM      | 0.9                               | 0.49                               | 2                               | 5' by 5' by 2' deep                        |
| 12NVNCSL06      | Soil   | Cadmium        | SW 6020           | 5.1                               | 5.0                                | 2                               | 5' by 5' by 2' deep                        |
| 12NVNCSL51      | Soil   | Cadmium        | SW 6020           | 24                                | 5.0                                | 2                               | 5' by 5' by 2' deep                        |
| 12NVNCSL30      | Soil   | Lead           | SW 6020           | 1,100                             | 400                                | 2                               | 5' by 5' by 2' deep                        |
| 12NVNCSL43      | Soil   | Lead           | SW 6020           | 450                               | 400                                | 2                               | 5' by 5' by 2' deep                        |

**Table 4-7 2012 Sample Locations and Contaminants,  
Proposed 2014 Excavation Dimensions and Square Footage (continued)**

| Sample Location | Matrix   | Contaminant         | Analytical Method | Contaminant Concentration (mg/kg) | Established Clean Up Level (mg/kg) | Excavation Volume (cubic yards) | Proposed 2014 Excavation Dimensions (feet) |
|-----------------|----------|---------------------|-------------------|-----------------------------------|------------------------------------|---------------------------------|--|
| 12NVNCSL28      | Soil     | PCB-1260            | SW 8082           | 29                                | 1.0                                | 8                               | 10' by 10' by 2' deep                      |
| 12NVNCSL40/64   | Soil     | PCB-1254            | SW 8082           | 2.5                               | 1.0                                | 2                               | 5' by 5' by 2' deep                        |
|                 |          | PCB-1260            | SW 8082           | 2.0                               | 1.0                                |                                 |  |
| 12NVNCSD06      | Sediment | RRO                 | AK 103            | 8,000                             | 3,500 <sup>d</sup>                 | 1                               | 5' by 5' by 1' deep                        |
|                 |          | RRO-SG <sup>c</sup> | AK 103-SG         | 4,100                             | 3,500 <sup>d</sup>                 |                                 |  |
|                 |          | TOC                 | EPA 9060A         | NA                                | NA                                 |                                 |  |
|                 |          | Cadmium             | SW 6020           | 5.7                               | 5.0                                |                                 |  |
|                 |          | Lead                | SW 6020           | 650                               | 530 <sup>c</sup>                   |                                 |  |

## Notes:

<sup>a</sup>18 AAC 75, Method 4, Risk-Based Residential Clean up Level Established Under Feasibility Study, Northeast Cape FUDS (F10AK09603\_04.09\_0500\_a), March 2007.<sup>b</sup>Washington State Administrative Code (WAC) 173-204-520, Table III, Sediment Minimum Clean up Level (WAC, 1995)<sup>c</sup>Analytical results for residual range organics using Alaska Test Method AK 103 with silica gel clean up<sup>d</sup>Protective of human health, based on future residents, incidental ingestion/dermal contact route, exposure frequency 90 days/year, and a target hazard quotient of 0.1.

AK = Alaska Test Method

DRO = diesel range organics

mg/kg = milligrams per kilogram

PCB = polychlorinated biphenyls

RRO = residual range organics

SG = silica gel

SW = EPA Solid Waste Method

TOC = Total Organic Carbon

#### **4.4.6 Soil and Sediment Sampling**

The following sections detail the field screening and confirmation sampling of soil and sediment excavations.

##### **4.4.6.1 Soil Sampling for DRO and/or RRO Contamination**

Soil excavations with suspected DRO and/or RRO contamination will be field screened in accordance with the ADEC Draft Field Sampling Guidance document (ADEC, 2010a). Soil sample locations with documented DRO and/RRO contamination above the site-specific clean up level of 9,200 mg/kg are shown in Table 4-7. Field screening will be conducted using the NE Cape FUDS mobile laboratory due to the lack of response for DRO/RRO contaminants using a photoionization detector. Based on expected excavation dimensions of 5-foot by 5-foot by 2-foot deep (25 square feet and 20 linear feet), a total of 5 field screening samples will be collected from the base of the excavation and submitted for analysis per excavation. In addition, field screening samples will be collected from excavation sidewalls at a frequency of 1 per every 10 linear feet or portion thereof (1 field screening sample per sidewall). Field screening locations will be based on olfactory and/or visual observations, if possible. Otherwise, field screening locations will be selected from areas that are most likely to be contaminated.

Field screening samples will be submitted to the NE Cape FUDS mobile laboratory for analysis. Field screening soil sample duplicates will also be submitted to the mobile laboratory at a rate of 10% of field screening project samples. If field screening results indicate concentrations of DRO and/or RRO contaminants below the established site-specific clean up level of 9,200 mg/kg, the samples will be considered confirmation samples and no further samples will be collected. Based on a 25 square foot excavation, one confirmation soil sample is required to be collected from the base of the excavation along with one soil sample collected from the sidewall with the highest field screening result. Analyzing all field screening samples for DRO/RRO using the NE Cape FUDS mobile

laboratory more than exceeds ADEC confirmation sampling requirements. Following the receipt of field screening/confirmation soil sampling results indicating that contaminants have been removed or reduced to below the established clean up level, the excavation(s) will be backfilled with clean fill from the NE Cape borrow site.

If field screening results indicate that concentrations of contaminants remain in the excavation, Bristol and the NVS will contact the USACE NALEMP Program Manager (Andrea Elconin) to determine if additional funding may be available to excavate and sample additional soil. If funding is not available or if the remaining duration of the field season does not allow for the excavation and removal of additional volumes of soil, then the excavation will be lined with a poly liner prior to backfilling with clean fill from the NE Cape borrow site.

The locations of confirmation samples and the excavation will be photographed and will be marked and mapped using a Trimble GeoExplorer 2008 GeoXH Series handheld GPS to sub-meter accuracy after post-processing.

#### **4.4.6.2 Soil Sampling for Benzo(a)pyrene Contamination**

Soil sample location 12NVNCSL24 which exhibited a concentration of benzo(a)pyrene [900 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ )] in exceedance of the ADEC direct contact clean up level of 490  $\mu\text{g}/\text{kg}$  will be excavated similar to procedures listed in Section 4.4.5.1 above. Field screening will not be conducted; however, confirmation soil samples will be collected from the base of the excavation as well as from the four sidewalls. The confirmation samples will be sent Test America in Tacoma, Washington and analyzed for benzo(a)pyrene by EPA Method SW8270C-SIM . One confirmation soil sample will be collected from the base of the excavation and one confirmation soil sample will be collected from each excavation sidewall.



Following the receipt of confirmation soil sampling results indicating that benzo(a)pyrene contamination has been removed or reduced to below the established clean up level, the excavation will be backfilled with clean fill from the NE Cape borrow site.

If confirmation sampling results indicate that concentrations of benzo(a)pyrene remain in the excavation, Bristol and the NVS will contact the USACE NALEMP Program Manager (Ms. Andrea Elconin) to determine if additional funding may be available to excavate and sample additional soil. If funding is not available or if the remaining duration of the field season does not allow for the excavation and removal of additional volumes of soil, then the excavation will be lined with a poly liner prior to backfilling with clean fill from the NE Cape borrow site.

The locations of confirmation samples and the excavation will be photographed and will be marked and mapped using a Trimble GeoExplorer 2008 GeoXH Series handheld GPS to sub-meter accuracy after post-processing.

#### **4.4.6.3 Soil Sampling for Cadmium or Lead**

Soil samples collected during the 2012 SI which exhibited concentrations of cadmium and lead exceeding the ADEC cleanup levels of 5.0 and 400 mg/kg, respectively, will also be excavated similar to procedures listed in Section 4.4.5.1 above. Sample locations that exhibited concentrations of cadmium and/or lead above established clean up levels are listed in Table 4-7. Field screening will not be conducted; however, confirmation soil samples will be collected from the base of the excavation (1 total) as well as from each of the four sidewalls (4 total). The confirmation samples will be sent Test America in Tacoma, Washington and analyzed for cadmium and/or lead by EPA Method SW6020.

Following the receipt of confirmation soil sampling results indicating that cadmium and/or lead contamination has been removed or reduced to below the established clean up level, the excavation will be backfilled with clean fill from the NE Cape borrow site.

If confirmation sampling results indicate that concentrations of cadmium and/or lead remain in the excavation, Bristol and the NVS will contact the USACE NALEMP Program Manager (Andrea Elconin) to determine if additional funding may be available to excavate and sample additional soil. If funding is not available or if the remaining duration of the field season does not allow for the excavation and removal of additional volumes of soil, then the excavation will be lined with a poly liner prior to backfilling with clean fill from the NE Cape borrow site.

The locations of confirmation samples and the excavation will be photographed and will be marked and mapped using a Trimble GeoExplorer 2008 GeoXH Series handheld GPS to sub-meter accuracy after post-processing.

#### **4.4.6.4 Soil Sampling for PCB Contamination**

Soil sample locations 12NVNCSL28 and 12NVNCSL40/64 will be excavated down to a depth of two feet bgs. Soil sample 12NVNCSL28, which exhibited a concentration of the Arochlor-1260 PCB congener of 29 mg/kg, will be excavated to horizontal dimensions of 10-foot by 10-foot. The soil sample 12NVNCSL40/64 location with the PCB-1254 and PCB-1260 congeners detected at 2.5 and 2.0 mg/kg, respectively, will have horizontal dimensions of 5-foot by 5-foot. The excavations with suspected PCB contamination will be confirmation sampled based on guidance provided in 40 CFR Part 761 Subpart O – Sampling to Verify Completion of Self-Implementing Clean up and On-Site Disposal of Bulk PCB Remediation Waste and Porous Surfaces in Accordance with §761.61(a)(6). The confirmation samples will be sent Test America in Tacoma, Washington and analyzed for PCBs by EPA Method SW8082.

For the 10-foot by 10-foot excavation, centered at soil sample location 12NVNCSL28, a square-based grid system will be used to overlay the excavation area. The grid axes will be oriented on a magnetic north-south line centered in the excavation and an east-west axis perpendicular to the magnetic north-south axis also centered in the excavation. This will

result in the excavation having four 5-foot by 5-foot quadrants. A total of four confirmation soil samples will be collected from the excavation base and submitted to Test America in Tacoma for analysis; one soil sample collected from the center of each 25 square foot quadrant. In addition, confirmation samples will be collected from the excavation sidewalls at a rate of one soil sample per every 5 linear feet of excavation (8 total sidewall soil samples) and submitted for analysis.

For soil sample location 12NVNCSL40/64 and based on expected excavation dimensions of 5-foot by 5-foot by 2-foot deep (25 square feet and 20 linear feet), the collection of confirmation sample locations will be based on sampling guidance for small cleanup sites located in 40 CFR 761.283(c). Beginning in the southwest corner of the excavation the north-south and east-west dimensions will be measured (expected to have 5-foot axes). A total of 3 confirmation samples will be collected from the base of the excavation and submitted for analysis per excavation. A random number generator will be used to select coordinate locations for the three excavation base samples to be collected. In addition, confirmation samples will be collected from excavation sidewalls at a frequency of 1 per every 5 linear feet or portion thereof (1 confirmation sample per sidewall). Confirmation sample locations will be selected from areas that are most likely to be contaminated.

If confirmation soil sample results indicate remaining contamination above the established clean up level, Bristol and the NVS will contact the USACE NALEMP Program Manager (Andrea Elconin) to determine if additional funding may be available to excavate and sample additional soil. If funding is not available or if the remaining duration of the field season does not allow for the excavation and removal of additional volumes of soil, then the excavations will be lined with a poly liner, and will be backfilled with clean fill from the NE Cape borrow site.

The locations of confirmation samples and the excavation will be photographed and will be marked and mapped using a Trimble GeoExplorer 2008 GeoXH Series handheld GPS to sub-meter accuracy after post-processing.

#### **4.4.6.5 Clean up Levels for Soil**

The ADEC allows for site specific clean up levels under the Oil and Other Hazardous Substances Pollution Control site cleanup rules. 18 AAC 75.340(f), referred to as Method 4, specifies that an alternative clean up level may be approved by the department based upon a site specific risk assessment following the department's Risk Assessment Procedures Manual (ADEC, 2011). Soil sample field screening and confirmation sampling results will be compared to site-specific clean up levels previously provided in Table 1 of the March 2007 NE Cape FUDS Final Feasibility Study, Volume 1, March 2007 (USACE, 2007) and the 2009 Decision Document (USACE, 2009). Site specific soil cleanup levels were developed based on the Human Health and Ecological Risk Assessment performed by Montgomery Watson Harza (MWH, 2004).

Where site specific clean up levels are not established, SI soil and sediment sampling results were compared to the ADEC Method Two Soil Clean up Criteria for the Under 40-inch Precipitation Zone (Title 18 AAC, Chapter 75, Section 341 [18 AAC 75 341] [ADEC, 2012]). The cleanup level from Table B1 used was the most stringent, applicable exposure pathway-specific clean up levels based on direct contact, ingestion, outdoor inhalation, or migration to groundwater.

Table 4-8 lists the estimated quantity of soil samples to be collected along with expected analytical methods.

Table 4-8 Soil Sampling

| Sample Location | Contaminant    | Analytical Method | Unit | Field Screen Sampling  |                            | Confirmation Sampling  |                            |                 |
|-----------------|----------------|-------------------|------|------------------------|----------------------------|------------------------|----------------------------|-----------------|
|                 |                |                   |      | Excavation Base Sample | Excavation Sidewall Sample | Excavation Base Sample | Excavation Sidewall Sample | Field Duplicate |
| 12NVNCSL08      | DRO            | AK102             | each | 5                      | 4                          | 0                      | 0                          | 1               |
|                 | RRO            | AK103             | each | 5                      | 4                          | 0                      | 0                          | 1               |
| 12NVNCSL09      | DRO            | AK102             | each | 5                      | 4                          | 0                      | 0                          | 1               |
|                 | RRO            | AK103             | each | 5                      | 4                          | 0                      | 0                          | 1               |
| 12NVNCSL13      | RRO            | AK103             | each | 5                      | 4                          | 0                      | 0                          | 1               |
| 12NVNCSL14      | RRO            | AK103             | each | 5                      | 4                          | 0                      | 0                          | 1               |
| 12NVNCSL44      | DRO            | AK102             | each | 5                      | 4                          | 0                      | 0                          | 1               |
| 12NVNCSL54/66   | DRO            | AK102             | each | 5                      | 4                          | 0                      | 0                          | 1               |
|                 | Cadmium        | SW6020            | each | 0                      | 0                          | 1                      | 4                          | 3               |
| 12NVNCSL06      | Cadmium        | SW6020            | each | 0                      | 0                          | 1                      | 4                          |                 |
| 12NVNCSL51      | Cadmium        | SW6020            | each | 0                      | 0                          | 1                      | 4                          |                 |
| 12NVNCSL30      | Lead           | SW6020            | each | 0                      | 0                          | 1                      | 4                          |                 |
| 12NVNCSL43      | Lead           | SW6020            | each | 0                      | 0                          | 1                      | 4                          |                 |
| 12NVNCSL24      | Benzo(a)pyrene | SW8270C-SIM       | each | 0                      | 0                          | 1                      | 4                          | 1               |
| 12NVNCSL28      | PCB            | SW8082            | each | 0                      | 0                          | 4                      | 8                          | 2               |
| 12NVNCSL40/64   | PCB            | SW8082            | each | 0                      | 0                          | 3                      | 4                          |                 |

Notes: Confirmation samples are not indicated in this table for DRO and RRO analytical methods because if DRO/RRO sample results are greater than the established clean up levels, then the samples will be considered field screening samples. If the DRO/RRO sample results are less than the established clean up levels, then the samples will be considered confirmation samples.

AK = Alaska Test Method

DRO = diesel range organics

PCB = polychlorinated biphenyls

RRO = residual range organics

SW = EPA Solid Waste Method

#### 4.4.7 Sediment Sampling

Sediment sample 12NVNCSD06 was collected from along a small surface depression which contained standing water. The sediment sample exhibited concentrations of the contaminants cadmium and lead above established clean up levels. RRO, Cadmium, and lead were detected in sediment sample 12NVNCSD06 at concentrations of 4,100; 5.7; and 650 mg/kg, which were above the established clean up levels of 3,500; 5.0; and 530 mg/kg, respectively. The sample location will be more thoroughly investigated by excavating approximately one cubic yard of sediment from and around the sample location. Due to the potential for high moisture content, excavated sediment (approximately 25 cubic feet) will be containerized into four 55-gallon drums in lieu of super sack bags.

The excavation will be field screened/confirmation sampled for RRO and RRO-SG using the NE Cape FUDS mobile laboratory which will be accredited by ADEC and ELAP for RRO (AK103) and RRO-SG (AK103-SG), respectively. Since RRO and RRO-SG field screening results may become the confirmation sampling results (if results are below the established clean up level), sample duplicates will be collected and analyzed at a rate of 10% of primary samples. The excavation confirmation samples will also be analyzed for TOC, which will be sent to Test America in Tacoma, Washington for analysis on a rush turn-around-time.

Field screening for cadmium and lead will not be conducted; however, confirmation sediment samples will be collected from the base of the excavation (1 total) as well as from each of the four expected sidewalls (4 total). The confirmation samples will be sent Test America in Tacoma, Washington and analyzed for cadmium and lead by EPA Method SW6020.

Following the receipt of confirmation sediment sampling results indicating that RRO, cadmium, and lead contamination has been removed or reduced to below the established

clean up level, the excavation will be backfilled with clean fill from the NE Cape borrow site.

If confirmation sampling results indicate that concentrations of RRO, cadmium, and/or lead remain in the excavation, Bristol and the NVS will contact the USACE NALEMP Program Manager (Andrea Elconin) to determine if additional funding may be available to excavate and sample additional sediment. If funding is not available or if the remaining duration of the field season does not allow for the excavation and removal of additional volumes of sediment, then the excavation will be lined with a poly liner prior to backfilling with clean fill from the NE Cape borrow site.

The locations of confirmation samples and the excavation will be photographed and will be marked and mapped using a Trimble GeoExplorer 2008 GeoXH Series handheld GPS to sub-meter accuracy after post-processing.

#### **4.4.7.1 Clean up levels for Sediment**

Bristol will compare sediment confirmation sediment sampling results to site-specific clean up levels previously provided in Table 1 of the March 2007 NE Cape FUDS Final Feasibility Study, Volume 1, March 2007 (USACE, 2007) and the 2009 Decision Document (USACE, 2009). Site specific soil and sediment clean up levels were developed based on the Human Health and Ecological Risk Assessment performed by Montgomery Watson Harza (MWH, 2004).

Where site specific clean up levels are not established, SI soil and sediment sampling results were compared to the ADEC Method Two Soil Clean up Criteria for the Under 40-inch Precipitation Zone (Title 18 AAC, Chapter 75, Section 341 [18 AAC 75 341] [ADEC, 2012]). The cleanup level from Table B1 used was the most stringent, applicable exposure pathway-specific clean up levels based on direct contact, ingestion, outdoor inhalation, or migration to groundwater.

Table 4-9 lists the estimated quantity of sediment samples to be collected along with expected analytical methods.



**Table 4-9 Sediment Sampling**

| Sample Location | Contaminant | Analytical Method | Unit | Field Screen Sampling  |                            | Confirmation Sampling  |                            |                 |
|-----------------|-------------|-------------------|------|------------------------|----------------------------|------------------------|----------------------------|-----------------|
|                 |             |                   |      | Excavation Base Sample | Excavation Sidewall Sample | Excavation Base Sample | Excavation Sidewall Sample | Field Duplicate |
| 12NVNCSD06      | RRO         | AK103             | each | 5                      | 4                          | 0                      | 0                          | 1               |
|                 | RRO-SG      | AK103             | each | 5                      | 4                          | 0                      | 0                          | 1               |
|                 | TOC         | 9060A             | Each | 0                      | 0                          | 1                      | 4                          | 1               |
|                 | Cadmium     | SW 6020           | each | 0                      | 0                          | 1                      | 4                          | 1               |
|                 | Lead        | SW 6020           | each | 0                      | 0                          | 1                      | 4                          | 1               |

Notes: Confirmation samples are not indicated in this table for RRO analytical methods because if DRO/RRO sample results are greater than the established clean up levels, then the samples will be considered field screening samples. If the RRO sample results are less than the established clean up levels, then the samples will be considered confirmation samples.

AK = Alaska Method

RRO = residual range organics

SG = silica gel clean up

SW = EPA Solid Waste Test Method

TOC = Total Organic Carbon

#### **4.4.8 Surface Water Sampling**

Three of the ten surface water samples that were collected during the 2012 SI from along the creek drainage or from surface ponds around the NVNC exhibited concentrations of PCBs ranging from 0.5 to 1.0 micrograms per liter ( $\mu\text{g/L}$ ), which were above the cleanup criteria of 0.5  $\mu\text{g/L}$  listed in the ADEC Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC, 2008). The three surface water sampling locations that exceeded clean up criteria were 12NVNCSW05/11, 12NVNCSW07, and 12NVNCSW10.

Surface water samples will be collected from these three surface water locations and sent to Test America in Tacoma, Washington to be analyzed for PCBs using EPA Method SW8082. Surface water samples will be collected and analyzed for PCBs only. Surface water samples will be collected in an order beginning at the most downgradient location and then progressing in the upgradient direction. Surface water samples will be collected from below the surface and care will be taken to minimize the potential for sediment to enter the sample containers.

##### **4.4.8.1 Clean up Levels for Surface Water**

Since the NVNC site is a potential source of ground and drinking water, the criteria that was used to determine whether the surface water is contaminated with PCBs was the drinking water cleanup levels found in the Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC, 2008).

Table 4-10 lists the estimated quantity of surface water samples to be collected along with expected analytical methods.

**Table 4-10 Surface Water Sampling**

|                 |             |                   |      | Confirmation Sampling |                 |
|-----------------|-------------|-------------------|------|-----------------------|-----------------|
| Sample Location | Contaminant | Analytical Method | Unit | Primary               | Field Duplicate |
| 12NVNCSW05/11   | PCB         | SW 8082           | each | 1                     | 1               |
| 12NVNCSW07      | PCB         | SW 8082           | each | 1                     |                 |
| 12NVNCSW10      | PCB         | SW 8082           | each | 1                     |                 |

Notes:

PCB = polychlorinated biphenyl

SW = EPA Solid Waste Test Method

## **5.0 FIELD SAMPLING PROCEDURES**

The following sections detail the sampling procedures that will be used for the project. Additional guidance and Bristol standard operating procedures (SOPs) for field sampling, sample management, and field documentation are included in Appendix G.

### **5.1 ENVIRONMENTAL AIR MONITORING**

The ACM abatement subcontractor (Satori) will perform air monitoring for this project. Air monitoring will be performed in accordance with the National Institute of Occupational Safety and Health (NIOSH) Method 7082 and in accordance with OSHA regulations found in 29 CFR 1926.62. Satori will submit lead air samples to LA Testing in California which is an American Industrial Hygiene Association (AIHA) and National Voluntary Laboratory Accreditation Program (NVLAP)-approved laboratory.

#### **5.1.1 Air Monitoring Equipment**

Satori will utilize low- and high-volume air sampling pumps, calibrated rotameters, and 37-millimeter air sampling cassettes.

#### **5.1.2 Air Sampling Plan**

Personal air samples will be collected and analyzed daily in accordance with NIOSH Method 7082. All sampling analysis shall be completed and the results provided within 48 hours after laboratory analysis is complete. The written results shall be signed by the laboratory analyst. The air sampling results shall be documented on an air-monitoring log or in the field notebook and shared with all site workers. The air-monitoring log shall contain the following information for each sample:

- Sampling and analytical method used;
- Date sample collected;
- Sample number;
- Sample type: BZ = Breathing Zone (Personal), Pre = Pre-abatement, E = Environmental, C = Abatement Clearance;

- Location/activity/name where sample was collected;
- Sampling pump number, beginning flow rate, end flow rate, average flow rate (in Liters per minute [L/min]);
- Calibration date, time, method, location, name of calibrator, and signature;
- Sample period (start time, stop time, elapsed time [minutes]);
- Total air volume sampled (liters);
- Laboratory name, location, and analytical method; and
- Printed name and a signature and date block for the individual who conducted the sampling.

### **5.1.3 Interior Abatement (Personnel Monitoring)**

Personal air monitoring will be performed on one worker in a work area containing LBP containing surfaces. All personnel samples will be collected from the worker's breathing zone. Personnel air samples will be collected at flow rates between 1.0 to 4.0 liters per minute. Two air cassette samples will be collected per day over a two-day period and submitted to the project laboratory for analysis. In addition, two field blanks will be submitted per day for analysis along with the primary samples.

Additional air monitoring may occur if the negative initial determination provides evidence that worker exposure is above the action level for any specific task or operation.

## **5.2 LBP SUSPECTED DEBRIS SAMPLING**

The sampling of suspected LBP debris will occur during the RA. Debris samples may be collected through scraping, cutting, or coring the debris with hand tools that have been decontaminated. Debris samples collected will be representative of the entire waste stream. Types and sizes of debris can vary greatly as may the sample collection methods. Debris samples will be collected directly from the source to the sample container. The following sampling procedures will be used for representative debris sample collection:

1. Label appropriate glassware with sample identification, analyses, date, and time.
2. Label the sampling location.

3. Photograph the sampling location.
4. Collect representative debris sample from desired location.
5. Place debris directly into sampling containers.
6. Secure container lids.
7. Place samples in an iced cooler.
8. Record sampling information in the field notebook, including date, time, analysis to be conducted, and sampling location.
9. Decontaminate sampling equipment and change sampling gloves between each sampling location.

### **5.3 SOIL/SEDIMENT FIELD SCREENING AND/OR CONFIRMATION SAMPLING**

Soil/sediment samples will be collected from the base and sidewalls of excavations.

Excavation locations will be based on the results of the 2012 SI.

Soil/sediment sampling locations will be marked with a GPS and noted in the field notebook.

Discrete surface soil and/or sediment samples will be collected using a clean, stainless-steel spoon or a clean, nitrile-gloved hand. The following sampling procedures will be used for discrete surface soil sample collection:

1. Determine the location of the samples.
2. Label appropriate glassware with sample identification, analyses, date and time.
3. Label the sampling location.
4. Photograph the sampling location.
5. Hand-dig sampling locations to desired depth or collect soil direct from Macro-Core sampler, as appropriate.
6. Place soil directly into sampling containers.
7. Secure container lids.
8. Place samples in an iced cooler.
9. Record sampling information in the field notebook, including date, time, analysis to be conducted, and sampling location.

10. Survey the location of the sample point with the GPS unit.
11. Decontaminate sampling equipment and change sampling gloves between each sampling location.
12. Subsurface soil samples, defined as samples collected more than 1.5 feet below ground surface, may be collected from areas as determined in the field. Samples will be collected by hand-digging with a clean shovel as appropriate. The same protocols will be followed for subsurface soil sampling as for surface soil sample. The depth at which the sample was collected will be recorded in the field notebook, and as part of the sample identification (see Section 5.6).

Sample preservation requirements for analyses are listed in Table 6-1.

#### **5.4 SURFACE WATER SAMPLING**

Surface water sampling will be conducted from 2012 surface water sampling locations which exhibited exceedances of clean up criteria. Surface water samples will be collected from an approximate depth of 6 inches to 1 foot below the water surface. Surface samples will be collected directly from the source to the sample container. Care will be taken to prevent associated sediment from entering the sample container. Additional water sampling guidance is included in Appendix G. Sample preservation requirements for analyses are listed in Table 6-1.

#### **5.5 CON/HTRW SAMPLING**

Characterization and sampling of CON/HTRW waste streams will be based on the nature of the waste streams and acceptance criteria of the recycling/disposal facility. It is expected that sample analyses may include flashpoint, pH, oil-burn specifications, DRO/RRO, TCLP RCRA metals, VOCs, SVOCs, and PCBs. Waste samples will be placed directly into specified sample containers and will be field-preserved, as appropriate. Sample preservation requirements for analyses are listed in Table 6-1.

## 5.6 SAMPLE IDENTIFICATION

Samples will be identified by the sample identification system in Table 5-1 below. Samples requiring multiple analyses and/or multiple containers will use a single, sample identification number for all containers. Additional numbers/letters may be added to the end of the code. The sample identification system is shown below in Table 5-1.

**Table 5-1 Sample Identification System**

|    |                        |      |  |    |
|----|------------------------|------|--|----|
| 1. | Year (last two digits) | 14   | e.g., 2014                             |    |
| 2. | Project Identifier     | NVNC | e.g., Native Village of Northeast Cape |    |
| 3. | Sample Type            |      |  |    |
|    | Air Sample             | AS   | Sediment Sample                        | SD |
|    | Ash Sample             | ASH  | Soil Sample                            | SL |
|    | Debris Sample          | DS   | Surface Water Sample                   | SW |
|    | CON/HTRW Sample        | CH   |  |    |
| 4. | Sample Number          |      | 01-99                                  |    |

Sample numbers are assigned sequentially. For example, 13NVNCSL01, 13NVNCSL02, and 13NVNCSL03, are the first three soil samples collected at the NVNC site. For samples at depths, an additional two-digit number will follow the above sample identifications (IDs). For example, if 13NVNCSL01 were sampled at 1.0 feet bgs, the sample ID would be 13NVNCSL01-1.0. Samples sent to the laboratory will not be renumbered.

Field quality control (QC) duplicate samples will be submitted blind to the laboratory for analysis and will be annotated using the sample identification sequence as listed in Table 5-1 above.

## 5.7 SURVEY SAMPLE LOCATIONS

Each 2012 sample location containing contaminants exceeding the cleanup levels will be relocated by ECOLAND and marked with a lath, surveyors tape, or pin flags. Bristol will write the sample identification on each corresponding sample marker. A handheld GPS



will then be used to electronically mark the drum and/or soil removal location. The latitude and longitude will also be recorded in the sampler's field notebook.

## **5.8 DECONTAMINATION**

Disposable sampling equipment will be used as much as possible to reduce the amount of supplies required for decontamination. Disposable sample scoops will be used for digging and sampling, and will be used only once. If a shovel is required for digging, the shovel will be decontaminated by spraying it with a mixture of water and Alconox® soap, until all soil is removed. The shovel will then be rinsed with deionized water. A very small amount of soapy water and rinse water will be used for decontamination. The washing will be conducted over the area that the sample was collected, and the wash water allowed to drip onto the ground. The shovel will be air dried or dried with clean paper towels.

## **5.9 WASTE HANDLING**

As part of sampling activities, disposable sampling supplies, such as nitrile gloves, paper towels, tape, disposable sample scoops and plastic bags will be collected in trash bags or other receptacles for proper disposal.

## **6.0 QUALITY ASSURANCE AND SAMPLE HANDLING**

### **6.1 QUALITY ASSURANCE**

Sampling of CON/HTRW waste streams will be conducted for disposal purposes only.

Sample duplicates, trip blanks, and temperature blanks will not be submitted with samples of CON/HTRW.

Air monitoring samples, if collected for establishing negative initial determination for LBP, will be submitted to the project laboratory with field blanks. Primary and field blank air samples will not be submitted with quality control duplicates, trip blanks, temperature blanks, or matrix spike/matrix spike duplicates (MS/MSDs).

SI sampling of soil, sediment, and surface water for this project will be conducted in accordance with ADEC Draft Field Sampling Guidance (ADEC, 2010a), ADEC Environmental Laboratory Data and Quality Assurance Requirements (ADEC, 2009), and in accordance with 40 CFR Part 761. Sample duplicates are included in the sampling program and will be collected at a ratio of 10 percent of the total number of confirmation samples. Field screening sample duplicates will be collected and submitted for soil/sediment samples receiving DRO/RRO analysis at the NE Cape FUDS mobile laboratory only.

### **6.2 QUALITY CONTROL SAMPLES**

The QC samples will be collected as split/duplicate samples for field duplicates. Since VOC analysis is not scheduled to be performed during the SI, trip blanks will not be submitted with sample coolers to the project laboratory. MS/MSDs will not be collected as part of the QC program. A discussion of each QC type is provided below.

### **6.2.1 Field Duplicates**

Field duplicate/split samples will be collected as indicated in Tables 4-6, 4-8, 4-9, and 4-10. The duplicate sample will be collected at the same location as the environmental sample, at the same time that the environmental sample is collected.

### **6.2.2 Trip Blanks**

Trip blanks are samples of methanol or analyte-free water taken from the laboratory to the sampling site and returned with the GRO and VOC samples. Since VOC analysis is not scheduled to be performed as part of the SI, trip blanks will not be submitted with sample coolers to the project laboratory.

### **6.2.3 Matrix Spike/Matrix Spike Duplicates**

Per discussions with the USACE, Alaska District, MS/MSDs are not required to be collected in conjunction with project samples for NALEMP projects since NALEMP projects do not have to meet the analysis and reporting requirements of DoD QSM 4.2. The batch laboratory control sample/laboratory control sample duplicates (LCS/LCSDs) will be the primary measurement of batch precision and accuracy for this project. LCS/LCSD reporting will be requested by Bristol prior to submission of any samples to the project laboratory.

## **6.3 AIR MONITORING FIELD BLANKS**

If required and collected, air monitoring field blanks will be submitted along with primary samples at a rate of two field blanks per day of air monitoring. If air monitoring is conducted, it is expected that air monitoring will occur over the course of two days and that two primary samples and two field blanks will be collected and submitted for analysis per day.

## 6.4 SAMPLE CONTAINERS

The volumes and containers required for sampling of air, debris, CON/HTRW, soil/sediment, and surface water are defined in Table 6-1. Pre-washed sample containers will be obtained from an EPA-approved source that prepares containers in accordance with EPA bottle-washing procedures. All sample containers will be maintained under chain-of-custody (CoC) procedures from the time of receipt to the time of sample analyses.

Sample labels will be completed with waterproof ink and will be affixed firmly to the sample container and protected with Mylar tape. The sample label will include the following information:

- Initials of sampler,
- Date and time of collection,
- Sample number,
- Analysis required, and
- Preservation.

**Table 6-1 Sample Collection, Preservatives and Holding Times for Air/Debris/Waste**

| Parameter                      | Preparation/<br>Analytical<br>Method | Container Description<br>(Minimum) <sup>1</sup>                              | Preservation/Holding<br>Time   |
|--------------------------------|--------------------------------------|--|--|
| <b>Air Samples</b>             |                                      |  |  |
| Lead in Air                    | NIOSH Method 7082                    | Cartridge; place in plastic or glass container                               | Cool 4° ± 2° C; 180 days to analysis   |
| <b>Lead Debris Samples</b>     |                                      |  |  |
| TCLP Lead                      | EPA SW6020                           | 4 oz wide-mouth amber glass jar with Teflon®-lined screw cap                 | Cool 4° ± 2° C; Six months to analysis   |
| <b>CON/HTRW Samples</b>        |                                      |  |  |
| Flashpoint                     | EPA SW1020A                          | 8 oz wide-mouth amber jar with Teflon-lined screws cap                       | 14 days to analysis  |
| pH                             | EPA SW9040                           | 8 oz wide-mouth amber jar with Teflon-lined screws cap                       | Immediate upon receipt   |
| Oil-Burn Specifications        | EPA SW9056/8082/6020                 | 8 oz wide-mouth amber jar with Teflon-lined screws cap                       | SW9056-28 days to analysis; SW8082-14 days to analysis; SW6020-180 days to analysis      |
| <b>CON/HTRW Samples</b>        |                                      |  |  |
| TCLP RCRA 8 Metals             | EPA SW6020/SW7471A                   | 4 oz wide-mouth amber glass jar with Teflon-lined screw cap                  | Cool 4° ± 2° C; 28 days (Hg) and 180 days (all other metals) for extraction and analysis |
| Volatile Organic Compounds     | EPA SW8260B                          | 4 oz wide-mouth amber glass jar with Teflon-lined silicon rubber septum seal | Cool 4° ± 2° C; 14 days to analysis of extract   |
| Semivolatile Organic Compounds | EPA SW8270C                          | 4 oz wide-mouth amber glass jar with Teflon-lined screw cap                  | Cool 4° ± 2° C; 14 days to extraction, 40 days to analysis of extract                    |
| PCBs                           | EPA SW8082                           | 4 oz wide-mouth amber glass jar with Teflon-lined screw cap                  | Cool 4° ± 2° C; 40 days to analysis of extract   |

**Table 6-1 Sample Collection, Preservatives and Holding Times for Air/Debris/Waste (continued)**

| Parameter   | Preparation/<br>Analytical<br>Method | Container Description<br>(Minimum) 1                        | Preservation/Holding<br>Time   |
|---|--------------------------------------|---|--|
| <b>Soil Samples</b>                               |                                      |   |  |
| DRO/RRO   | AK102/AK103                          | 8-oz wide-mouth, clear glass jar, TLC                       | Unpreserved, Cool 4° ± 2°C/<br>14 days to extraction/<br>40 days to analysis             |
| Total RCRA Metals plus nickel, vanadium, and zinc | EPA SW6020                           | 4 oz wide-mouth amber glass jar with Teflon-lined screw cap | Cool 4° ± 2° C; 28 days (Hg) and 180 days (all other metals) for extraction and analysis |
| PAHs  | EPA SW8270C                          | 4 oz wide-mouth amber glass jar with Teflon-lined screw cap | Cool 4° ± 2° C; 14 days to extraction, 40 days to analysis of extract                    |
| PCB   | EPA SW8082                           | 4 oz wide-mouth amber glass jar with Teflon-lined screw cap | Cool 4° ± 2° C; 40 days to analysis of extract   |
| <b>Sediment Samples</b>                           |                                      |   |  |
| RRO   | AK103                                | 8-oz wide-mouth, clear glass jar, TLC                       | Unpreserved, Cool 4° ± 2°C/<br>14 days to extraction/<br>40 days to analysis             |
| RRO-SG  | AK103-SG                             | 8-oz wide-mouth, clear glass jar, TLC                       | Unpreserved, Cool 4° ± 2°C/<br>14 days to extraction/<br>40 days to analysis             |
| TOC   | EPA 9060A                            | 8-oz wide-mouth, clear glass jar, TLC                       | Unpreserved, Cool 4° ± 2°C/<br>14 days to extraction/<br>40 days to analysis             |
| Total RCRA Metals (cadmium and lead)              | EPA SW6020                           | 4 oz wide-mouth amber glass jar with Teflon-lined screw cap | Cool 4° ± 2° C; 28 days (Hg) and 180 days (all other metals) for extraction and analysis |

**Table 6-1 Sample Collection, Preservatives and Holding  
Times for Air/Debris/Waste (continued)**

| Parameter                    | Preparation/<br>Analytical<br>Method | Container Description<br>(Minimum) <sup>1</sup> | Preservation/Holding<br>Time                      |
|------------------------------|--------------------------------------|---|---|
| <b>Surface Water Samples</b> |                                      |   |   |
| PCB                          | EPA SW8082                           | 2, 1-Liter amber glass                          | Cool 4° ± 2° C; 40 days to<br>analysis of extract |

Notes:

<sup>1</sup>Clear glass may be substituted for amber if samples are protected from exposure to light; this exception does not apply to metals.

CON/HTRW = containerized hazardous toxic waste

EPA = U.S. Environmental Protection Agency

NIOSH = National Institute of Occupational Safety and Health

oz = ounce

PCBs = polychlorinated biphenyls

RCRA = Resource Conservation and Recovery Act

SW = EPA Solid Waste Test Method

TCLP = Toxicity Characteristic Leaching Procedure

TOC = Total Organic Carbon

## 6.5 LABORATORY REPORTING LIMITS

For waste characterization sampling the laboratory reporting limits for each compound analyzed will not exceed RCRA regulatory levels. Analytical results will be compared to regulatory levels listed in 40 CFR 261 and 40 CFR 761. For SI sampling the laboratory reporting limits for each compound analyzed will not exceed ADEC clean up levels and the Laboratory Reference Limits are provided in Table 6-2. Analytical results will be compared to clean up levels and documented in the RA/SI Report at the conclusion of the project.

Table 6-2     Reference Limits and Evaluation Criteria for Soil, Sediment, and Surface Water

| Analyte  | Analytical Group | Analytical Method | Preparation Method | CASRN      | Units | Cleanup Levels and Evaluation Criteria |                     | Achievable Laboratory Limits |       |       |
|--|------------------|-------------------|--------------------|------------|-------|--|---------------------|------------------------------|-------|-------|
|  |                  |                   |                    |            |       | SEDIMENT                               | SOIL                | DL                           | LOD   | LOQ   |
| POL  |                  |                   |                    |            |       |  |                     |                              |       |       |
| Diesel Range Organics - C <sub>10</sub> to C <sub>25</sub>   | FUELS            | AK102             | SW3550B            | NS         | mg/kg | 3,500 <sup>1</sup>                     | 9,200 <sup>1</sup>  | 2.3                          | 6.50  | 20    |
| Residual Range Organics - C <sub>25</sub> to C <sub>36</sub> | FUELS            | AK103             | SW3550B            | NS         | mg/kg | 3,500 <sup>1</sup>                     | 9,200 <sup>1</sup>  | 11                           | 25.0  | 50    |
| Volatile Organic Compounds                                   |                  |                   |                    |            |       |  |                     |                              |       |       |
| Benzene  | VOC              | SW8260B           | SW5035A            | 71-43-2    | µg/kg | 25                                     | 2,000 <sup>1</sup>  | 4                            | 10.0  | 16.0  |
| Ethylbenzene   | VOC              | SW8260B           | SW5035A            | 100-41-4   | µg/kg | 6,900                                  | 6,900 <sup>2</sup>  | 10.00                        | 30.0  | 40.0  |
| Toluene  | VOC              | SW8260B           | SW5035A            | 108-88-3   | µg/kg | 6,500                                  | 6,500 <sup>2</sup>  | 10.00                        | 30.0  | 40.0  |
| m-Xylene & p-Xylene  | VOC              | SW8260B           | SW5035A            | 1330-20-7  | µg/kg | NS                                     | NS                  | 10.0                         | 30.0  | 40    |
| o-Xylene   | VOC              | SW8260B           | SW5035A            | 95-47-6    | µg/kg | NS                                     | NS                  | 10.00                        | 30.0  | 40.0  |
| Xylenes, total   | VOC              | SW8260B           | SW5035A            | 1330-20-7  | µg/kg | 63,000                                 | 63,000 <sup>2</sup> | 10.00                        | 30.0  | 40.0  |
| Polynuclear Aromatic Hydrocarbons                            |                  |                   |                    |            |       |  |                     |                              |       |       |
| Benzo(a)pyrene   | PAH              | SW8270C-SIM       | SW3550B            | 50-32-8    | µg/kg | 490                                    | 2,100 <sup>2</sup>  | 1.5                          | 2.5   | 5.0   |
| Polychlorinated Biphenyls                                    |                  |                   |                    |            |       |  |                     |                              |       |       |
| PCB-1254   | PCB              | SW8082A           | SW3550B            | 11097-69-1 | mg/kg | 0.7 <sup>1</sup>                       | 1 <sup>1</sup>      | 0.0021                       | 0.005 | 0.010 |
| PCB-1260   | PCB              | SW8082A           | SW3550B            | 11096-82-5 | mg/kg | 0.7 <sup>1</sup>                       | 1 <sup>1</sup>      | 0.0030                       | 0.005 | 0.010 |
| PCBs (sum)   | PCB              | SW8082A           | SW3550B            | 1336363    | mg/kg | 0.7 <sup>1</sup>                       | 1 <sup>1</sup>      | NS                           | NS    | NS    |
| Total Metals   |                  |                   |                    |            |       |  |                     |                              |       |       |
| Cadmium  | Metals           | SW6020A           | SW3050B            | 7440-43-9  | mg/kg | NS                                     | 5.0 <sup>2</sup>    | 0.008                        | 0.02  | 0.20  |
| Lead   | Metals           | SW6020A           | SW3050B            | 7439-92-1  | mg/kg | 530 <sup>1</sup>                       | 400 <sup>2</sup>    | 0.013                        | 0.020 | 0.20  |
| Nickel   | Metals           | SW6020A           | SW3050B            | 7440-02-0  | mg/kg | NS                                     | 86 <sup>2</sup>     | 0.071                        | 0.25  | 0.50  |
| Polychlorinated Biphenyls (For Surface Water)                |                  |                   |                    |            |       |  |                     |                              |       |       |
| PCB-1260   | PCB              | SW8082A           | 11096-82-5         | SW3520C    | µg/L  | 0.5                                    |                     | 0.039                        | 0.08  | 0.1   |

Notes:  
<sup>1</sup>Site-specific cleanup values established in 2009 Decision Document  
<sup>2</sup>Cleanup levels from 18AAC75 Section 341, Table B1, migration to groundwater  
µg/kg = micrograms per kilogram  
AAC = Alaska Administrative Code  
AK = Alaska Test Method  
CASRN = Chemical Abstracts Service Registry Number

DL= detection limit  
HPAH=High Molecular Weight PAHs  
LOD = limit of detection  
LOQ = limit of quantitation

mg/kg = milligrams per kilogram  
NS = not specified  
PAH = polynuclear aromatic hydrocarbon  
PCB = polychlorinated biphenyls

POL = petroleum, oil, and lubricants  
SIM = selective ion monitoring  
SW = EPA Solid Waste Test Method  
VOC = volatile organic compounds



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## **6.6 SAMPLE PACKAGING**

Samples will be packaged carefully to avoid breakage, contamination, or cross contamination. The following sample packaging requirements will be followed:

- Sample bottle lids will not be mixed; all sample lids will remain with the original containers.
- CON/HTRW samples will be shipped separately from SI samples.
- Coolers to be shipped to the contracted analytical laboratory or laboratories will be partially filled with packing materials (bubble wrap) to prevent the bottles from moving during shipment.
- The sample bottles will be placed in the cooler in such a way as to ensure that they do not touch one another.
- Any remaining space in the cooler will be filled with inert packing material. (Under no circumstances will material such as sawdust or sand be used.)
- A CoC record will be placed in a plastic bag and taped to the inside of the cooler lid. After a container has been sealed, a minimum of two custody seals will be affixed to the sample cooler (where the top opens) and covered with strapping tape, which is applied at least three times around the cooler at each end.

## **6.7 COOLER LABELING**

The words “This End Up” or “This Side Up” or “Fragile” will be labeled clearly on the top of the outer sample cooler; upward-pointing arrows will be placed on the sides of the package. A label that indicates the cooler should not be frozen “Do Not Freeze” will also be adhered to the sample cooler.

## **6.8 SAMPLE CUSTODY**

This section describes procedures that will be followed for sample custody. The purpose of these procedures is to ensure that the integrity of the samples is maintained during collection, transportation, storage, and analysis.

Sample ID documents will be carefully prepared so that sample ID and CoC are maintained and sample disposition controlled. Sample identification documents include, field notebooks, sample labels, custody seals, and CoC records.

### **6.8.1 CoC**

The primary objective of the CoC procedures is to provide an accurate, written record that can be used to trace the possession and handling of a sample from the moment of collection through analysis. A sample is in custody if it meets the following criteria:

- It is in an authorized person's physical possession;
- It is in an authorized person's view;
- It is locked up; or
- It is kept in a secure area that is restricted to authorized personnel.

### **6.8.2 Field Custody Procedures**

The following procedures will be used by field personnel:

- As few people as possible will handle samples.
- Only individual(s) who possess the minimum ADEC-required qualifications and experience will collect samples and will be personally responsible for the care and custody of samples collected until they are dispatched properly under CoC protocol.
- The sample collector will record sample data (for example, date of collection, time of collection, sample number, analytical requirements and matrix) in the field notebook.

### **6.8.3 CoC Record**

The CoC record will be fully completed in duplicate. In addition, if samples are known to require rapid turnaround in the laboratory because of project time constraints or analytical concerns (for example, extraction time, or sample retention period limitations), the person completing the CoC record will note these constraints in the "Remarks" section of the custody record.

## **6.9 QA SUMMARY AND ADEC CHECKLIST**

Laboratory results will be reviewed by a Bristol chemist. A QA Summary and ADEC Data Review Checklists, Version 2.7 (ADEC, 2010b), will be completed and provided with the SI Report. A copy of the ADEC Data Review Checklist is included in Appendix H.

## **7.0 RA/SI DRAFT AND FINAL REPORTING**

After completion of the fieldwork, Bristol will submit a report to the NVS, USACE, and ADEC, on behalf of the NVS, documenting all RA/SI activities and findings. The report will include photographs, sample locations, survey data, analytical results, copies of transportation and disposal paperwork, and conclusions. Figures submitted in the final RA/SI report will also depict CON/HTRW removal, debris removal, and excavation locations. Figures will also identify confirmation sampling locations.

The final RA/SI report may also contain supplemental information collected and documented by NVS field personnel.

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## 8.0 REFERENCES

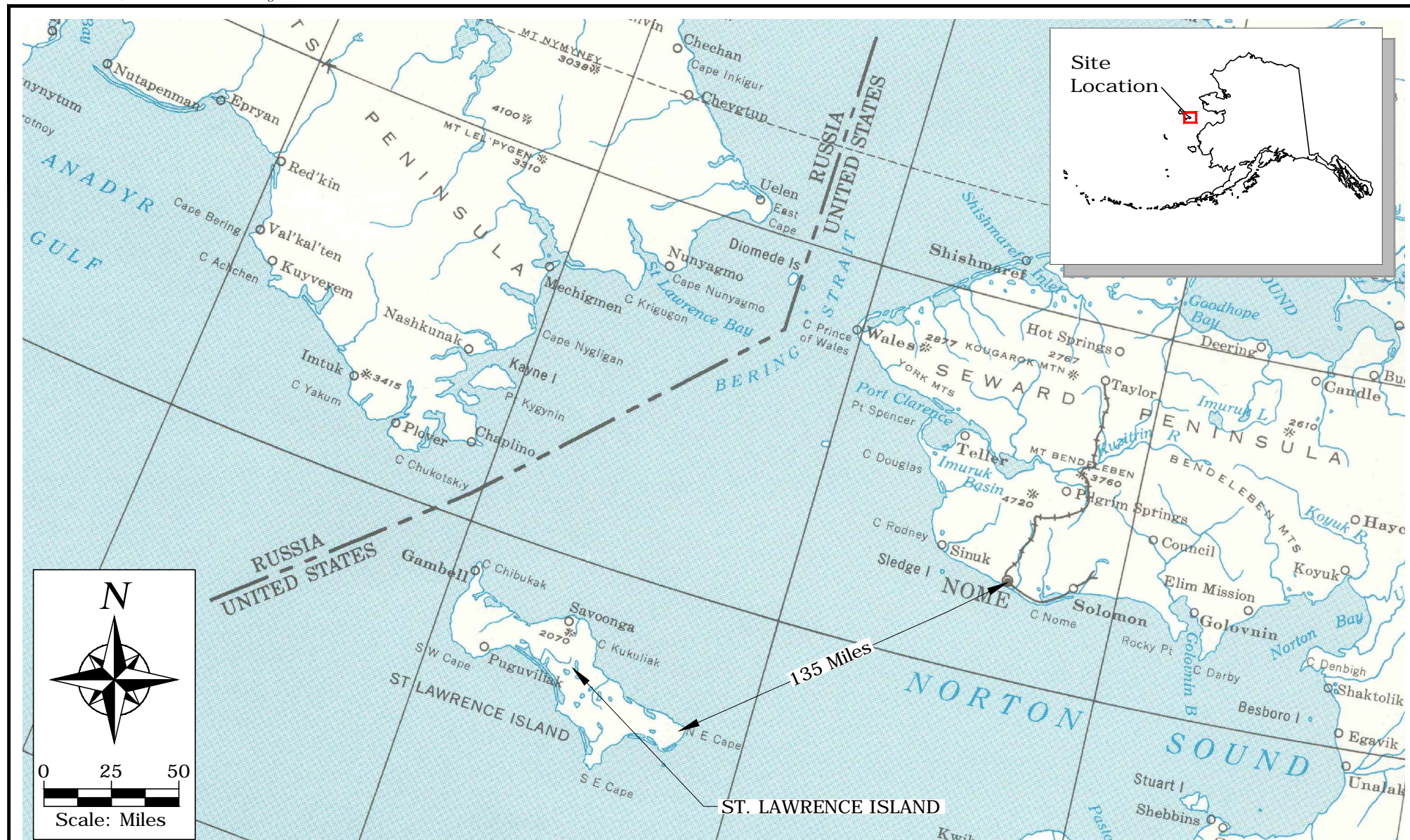
- ADEC. 2008. *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substance*. December 12.
- ADEC. 2009 (March). Environmental Laboratory Data and Quality Assurance Requirements.
- ADEC. 2010a. *Draft Field Sampling Guidance*. May.
- ADEC. 2010b. *Laboratory Data Review Checklist Version 2.7*. January.
- Alaska Department of Environmental Conservation (ADEC). 2011 (November). *Risk Assessment Procedures Manual, Draft (updated and recommended for use)*.
- ADEC. 2012. *Method Two Soil Clean up Criteria for Under 40-Inch Precipitation Zone*. Title 18 Alaska Administrative Code (AAC), Chapter 75, Section 341 (18 AAC 75 341). April 8.
- Bristol Environmental Remediation Services, LLC (Bristol). 2009 (December). *Native Village of Northeast Cape Site Investigation Report. Northeast Cape, St. Lawrence Island, Alaska*. Revision 0.
- Bristol. 2010 (April). *Strategic Project Implementation Plan. Native Village of Northeast Cape "Northeast Cape Fish Camp." St. Lawrence Island, Alaska*. Revision 0.
- Bristol. 2012 (April). *Native Village of Northeast Cape Removal Action Report. Northeast Cape, St. Lawrence Island, Alaska*. Revision 0.
- Bristol. 2013 (July). *Native Village of Northeast Cape Removal Action/Site Investigation Report, Northeast Cape, St. Lawrence Island, Alaska, Revision 1*.
- Bristol. 2014 (January). *Northeast Cape Removal Action/Site Investigation Report, Northeast Cape, St. Lawrence Island, Alaska, Revision 1*.
- Bristol. 2014a (March). *Native Village of Northeast Cape CON/HTRW Removal Technical Memorandum. Northeast Cape, St. Lawrence Island, Alaska*. Revision 1
- Montgomery Watson Harza (MWH). 2004. *Human Health and Ecological Risk Assessment, Northeast Cape Installation, St. Lawrence Island, Alaska, Final*. March.

US Army Corps of Engineers (USACE). 2007 (March). *NE Cape FUDS Final Feasibility Study, Volume 1.*

US Army Corps of Engineers (USACE). 2009 (January). *Decision Document – Hazardous, Toxic, and Radioactive (HTRW), Project #F10AK096903, Northeast Cape Formerly Used Defense Site (FUDS), St. Lawrence Island, Alaska.*

## FIGURES





Source: USGS National Atlas Sheet Number 42-43

### Legend

NALEMP Native American Lands Environmental Mitigation Program

FIGURE 1  
 NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA  
 SAVOONGA NALEMP  
 VICINITY MAP

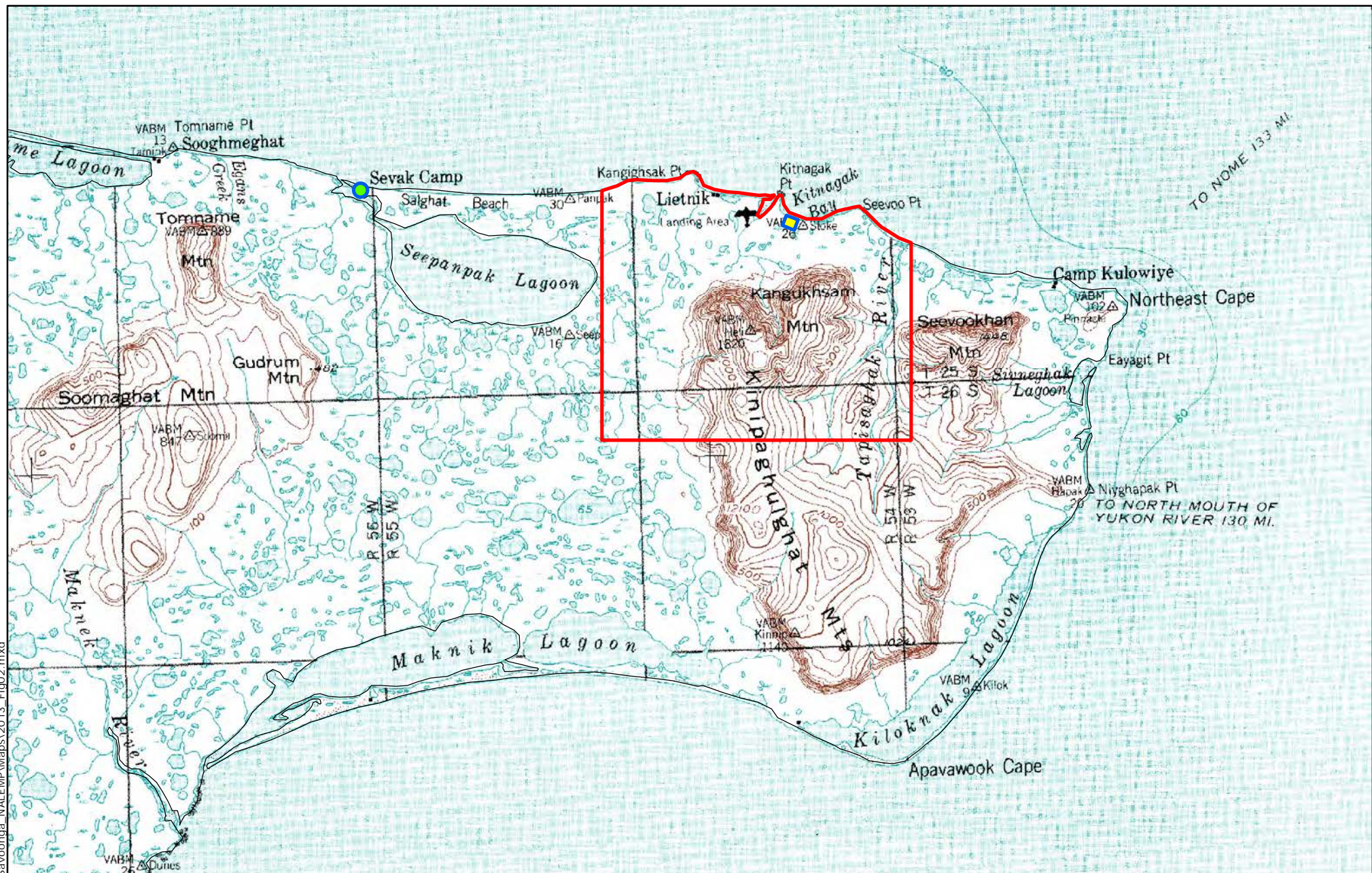
**Bristol**  
 ENVIRONMENTAL  
 REMEDIATION SERVICES, LLC  
 Phone (907) 563-0013 Fax (907) 563-6713  
 PROJECT NO. 49029

DATUM:  
 NA  
 PROJECTION:  
 NA

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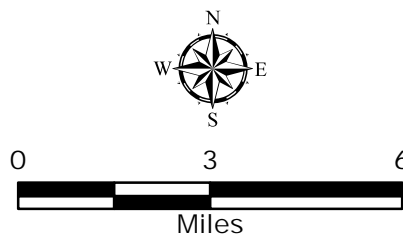
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**Note:**  
NALEMP Native American Lands Environmental Mitigation Program  
FUDS Formerly Used Defense Sites

**Legend**

-  Location of Sivenpak Camp (Sevak Camp)
-  Location of Native Village of Northeast Cape
-  Northeast Cape FUDS Project Area



**FIGURE 2**  
**NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA**  
**SAVOONGA NALEMP**  
**SITE AREA MAP**

**Bristol**

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DATUM:  
NAD 27  
PROJECTION:  
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DATE 07-03-13  
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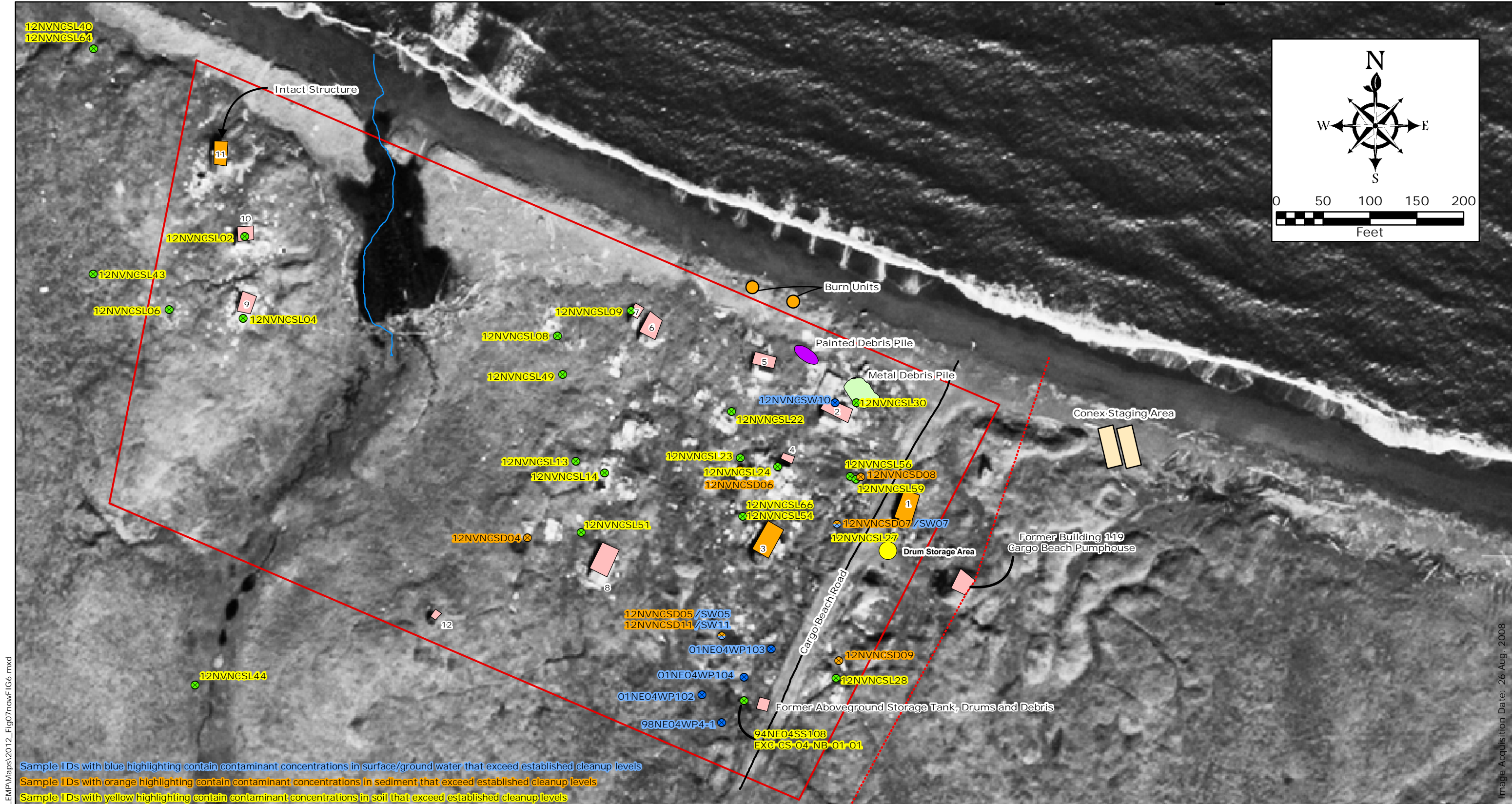












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Image Acquisition Date: 26 Aug. 2008

Sample IDs with blue highlighting contain contaminant concentrations in surface/ground water that exceed established cleanup levels  
Sample IDs with orange highlighting contain contaminant concentrations in sediment that exceed established cleanup levels  
Sample IDs with yellow highlighting contain contaminant concentrations in soil that exceed established cleanup levels

Former Fuel Pipeline

Steel Burn Unit

Drum Storage Area

Soil Sample

Sediment Sample

Water Sample

Sediment and Surface Water Sample

Former Structure

Painted Debris Pile

Metal Debris Pile

Estimated NVNC Boundaries (Not to Scale)

Current Intact Structure

Cargo Beach Road

Creek Drainage

N

W

E

S

Figure 6

Northeast Cape, St. Lawrence Island, Alaska

Native Village of Northeast Cape

2012 and Historical Exceedances of Cleanup Criteria

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Project No. 49029

DATUM:  
NAD 83

PROJECTION:  
Alaska State Plane  
Zone 9

DATE  
6/4/13

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BERS-RJ

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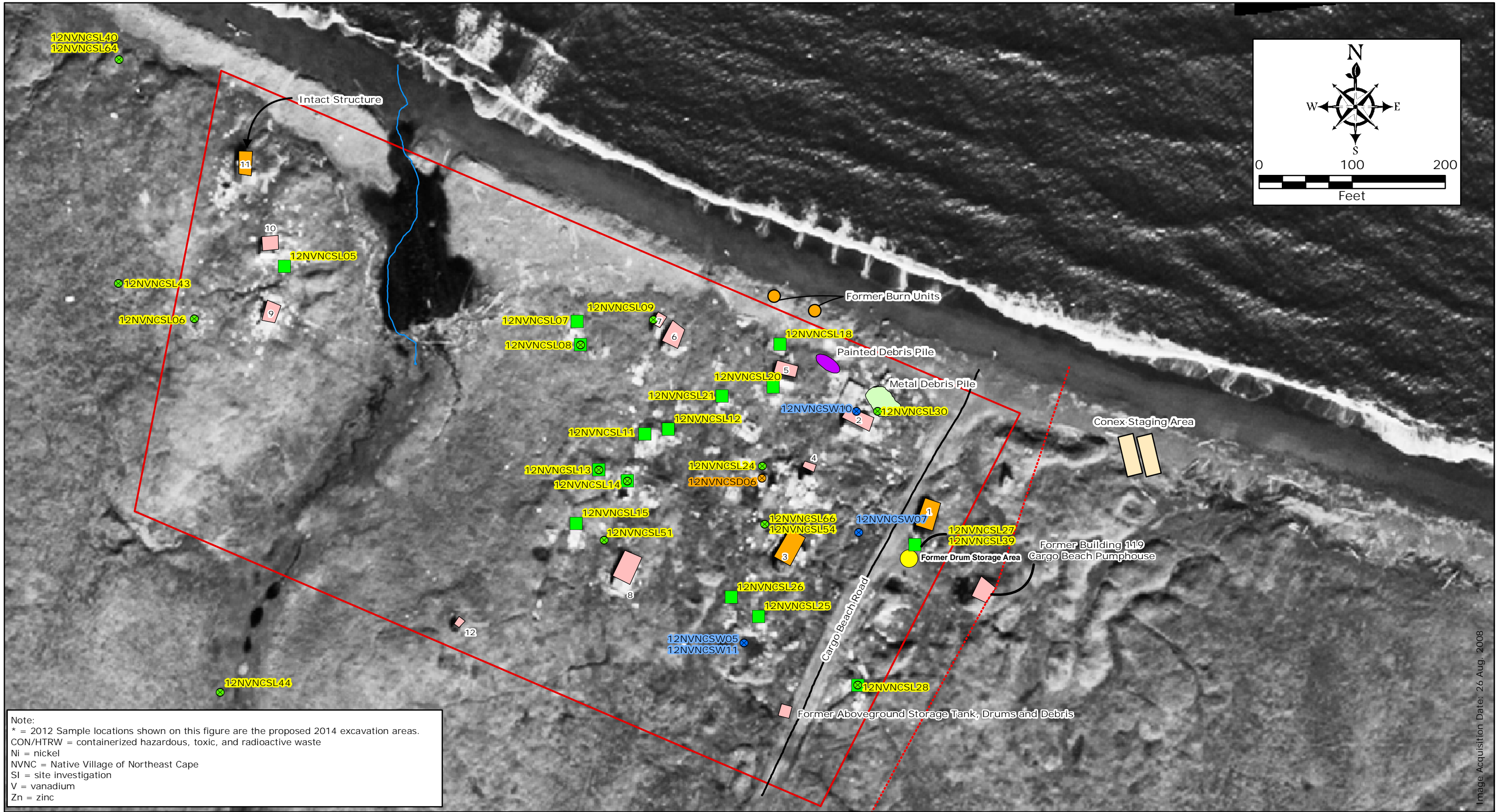
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Note:  
\* = 2012 Sample locations shown on this figure are the proposed 2014 excavation areas.  
CON/HTRW = containerized hazardous, toxic, and radioactive waste  
Ni = nickel  
NVNC = Native Village of Northeast Cape  
SI = site investigation  
V = vanadium  
Zn = zinc

### Legend

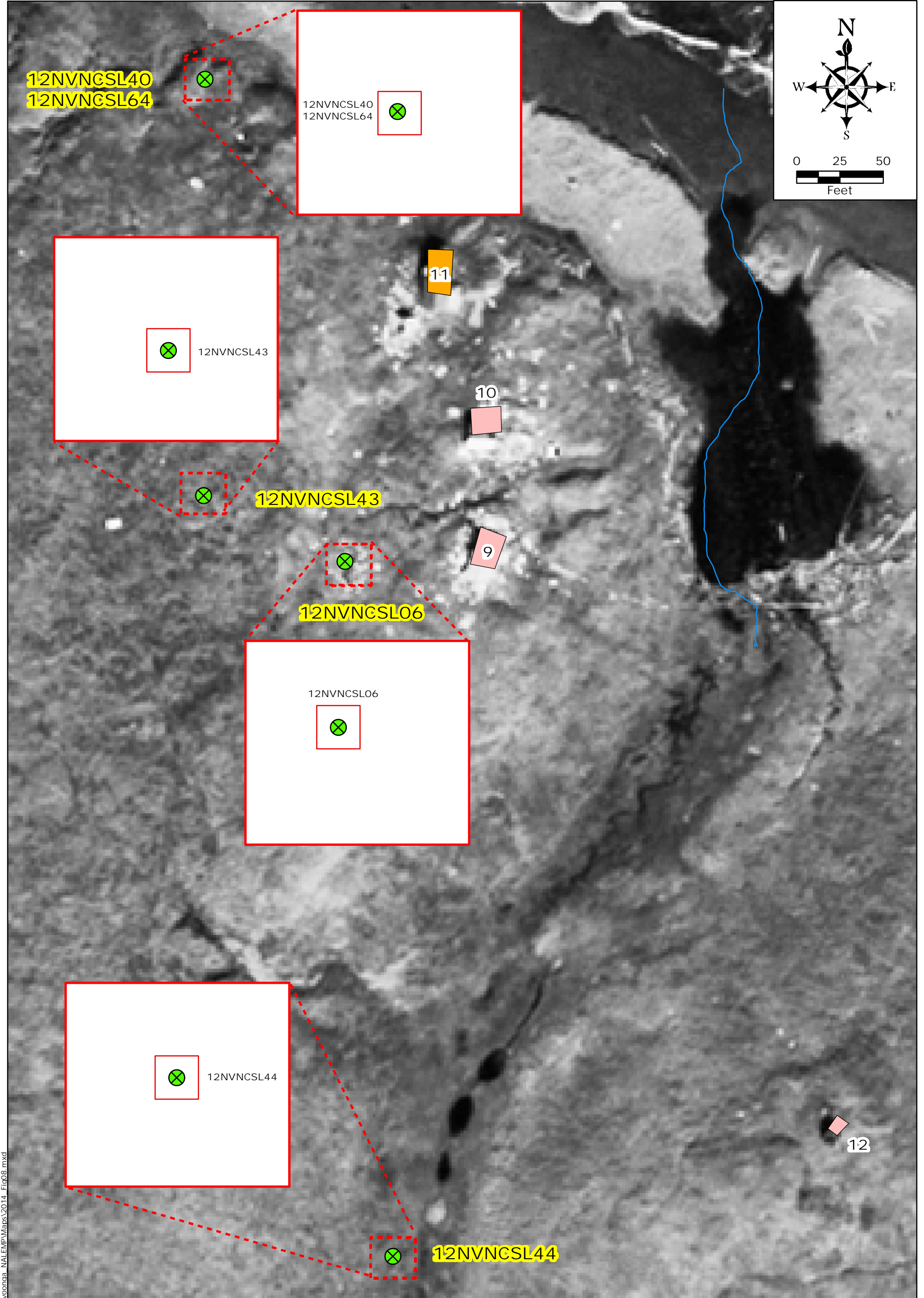
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|----------------------------|---|----------------------------|----------------------|
| Current Intact Structure   | Estimated NVNC Boundaries (Not to Scale)                                  | 2012 Sediment Sample*      | Cargo Beach Road     |
| Former Structure           | Surface Soil Sample To Be Analyzed For Total RCRA 8 Metals +Ni, V, and Zn | 2012 Soil Sample*          | Creek Drainage       |
| Former Painted Debris Pile | Former Steel Burn Unit  | 2012 Surface Water Sample* | Former Fuel Pipeline |
| Former Metal Debris Pile   | Former Drum Storage Area  |                            |                      |

Figure 7  
Northeast Cape, St. Lawrence Island, Alaska  
Native Village of Northeast Cape  
Proposed 2014 Sample and Excavation Areas

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|   |                    |            |
|---|--------------------|------------|
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| PROJECTION:<br>Alaska State Plane<br>Zone 9 | DWN.<br>BERS-RJ    | of         |
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
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Legend

 2012 Soil Sample

 Current Intact Structure

 Creek Drainage

 Former Structure



 Proposed 2014 Excavation 5'x5'

Figure 8

Northeast Cape, St. Lawrence Island, Alaska

Native Village of Northeast Cape

Close Up of Western Proposed 2014 Excavation Areas



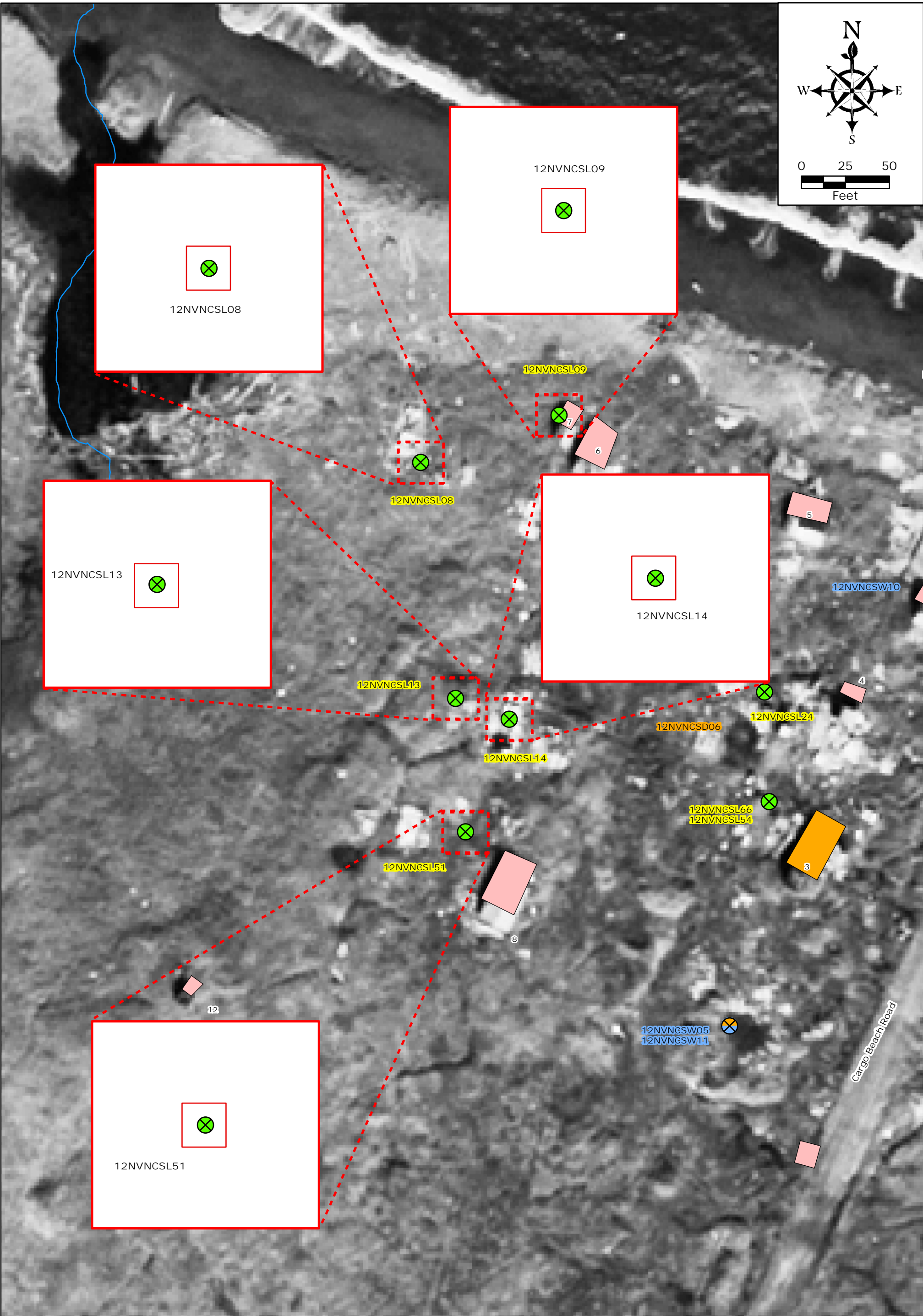
ENVIRONMENTAL  
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Project No. 49029

|   |                  |            |
|---|------------------|------------|
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Legend

2012 Soil Sample

Sediment and Surface Water Sample

Current Intact Structure

Former Structure

Proposed 2014 Excavation 5'x5'

Figure 9

Northeast Cape, St. Lawrence Island, Alaska

Native Village of Northeast Cape

Close Up of Central Proposed 2014 Excavation Areas

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Project No. 49029

DATUM:  
NAD 83

PROJECTION:  
Alaska State Plane  
Zone 9

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04-03-14

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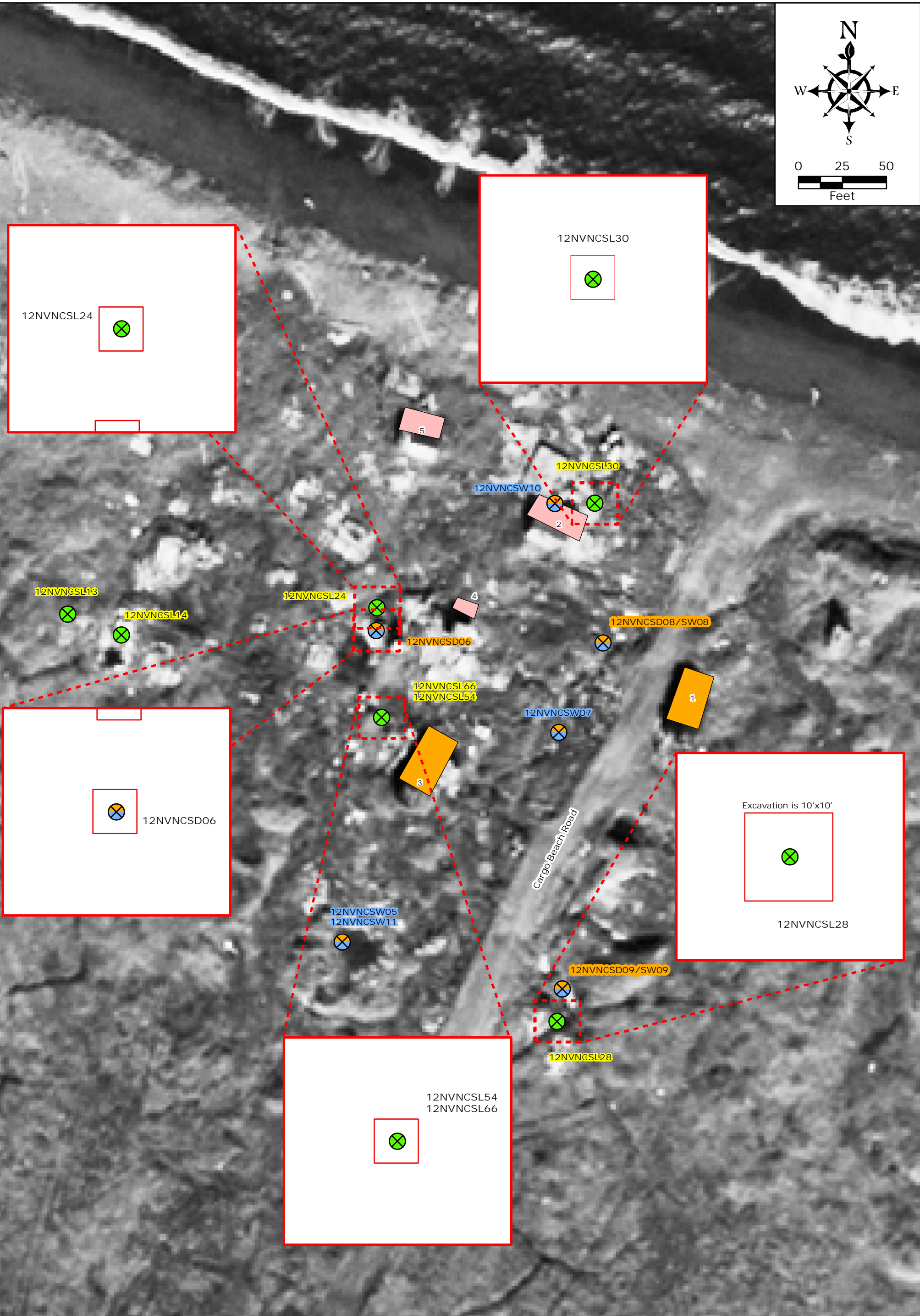
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Legend

- 2012 Soil Sample
- Sediment and/or Surface Water Sample
- Current Intact Structure
- Former Structure
- Proposed 2014 Excavation 5'x5'

Figure 10  
Northeast Cape, St. Lawrence Island, Alaska  
Native Village of Northeast Cape  
Close Up of Eastern Proposed 2014 Excavation Areas

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|   |  |                       |
|---|--|-----------------------|
| DATUM:<br>NAD 83<br>PROJECTION:<br>Alaska State Plane<br>Zone 9 | DATE<br>04-03-14<br>DWN.<br>BY-EM<br>SCALE<br>1:50<br>APPRVD.<br>BY-YU | SHEET<br>1<br>of<br>1 |
|---|--|-----------------------|

## **APPENDIX A**

Responses to USACE/ADEC Comments and  
ADEC Approval Letter

**REVIEW  
COMMENTS**

**PROJECT: NE Cape - NVNC & Sipenpak Camp – Coop. Agreement No: NALEMP-FY13-04**  
**DOCUMENT: RA/SI Work Plan Rev 0 – August 2013 Location: St. Lawrence Island, Alaska**

| <b>U.S. ARMY CORPS OF ENGINEERS</b> |                                       | <b>DATE: 23 August 2013</b><br><b>REVIEWER: Jeremy Craner</b><br><b>PHONE: 753-2628</b> | <b>Action taken on comment by: Bristol- Lyndsey Kleppin, Julie Allan, and Lesa Nelson</b>          |                            |  |
|-------------------------------------|---------------------------------------|---|--|----------------------------|--|
| <b>Item No.</b>                     | <b>Drawing Sheet No., Spec. Para.</b> | <b>COMMENTS</b>   | <b>REVIEW CONFERENCE</b><br>A - comment accepted<br>W - comment withdrawn<br>(if neither, explain) | <b>CONTRACTOR RESPONSE</b> | <b>USAED/ADEC RESPONSE ACCEPTANCE</b><br>(A-AGREE)<br>(D-DISAGREE) |

|    |         |   |  |   |   |
|----|---------|---|--|---|---|
| 1. | General | Nice job on this Work Plan – lots of thought and planning went into it. I hope things go well out there.  |  | Thank you.  | A |
| 2. | General | Suggest adding tabs to the start of each appendix to make access more user-friendly.  |  | Tabs will be provided in Rev 1.   | A |
| 3. | General | In regards to timeline, how will all this work be completed this season? If some is completed this season, will the rest be completed next season? At this point (late in field season), would it be most cost effective to conduct all work next season in order to reduce additional mob/demob and affiliated overhead costs?   |  | It is anticipated that all work will be completed during the 2014 field season.   | A |
| 4. | General | After soil/sediment removal is completed and confirmation samples are collected, the plan is to backfill with clean borrow source material (with liner if necessary). Doing so will create an eyesore due to the coarse nature of the borrow source material. Re-veg. will be sparse at best. Is this OK?   |  | Yes. The coarse backfill material will be less muddy to walk on.  | A |
| 5. | General | I had a tough time following along with what was done last season and what will be done this season – there is a disconnect between the info in the RA/SI Report and this Work Plan. Early on I immediately dialed into Figure 3 “Proposed Excavation and Confirmation Sampling Map” and was confused. The figure displays last years’ sample locations/id’s and no delineated excavation areas. Then, upon review of the RA/SI report, I determined that the displayed sample locations are only a select subset of samples that were deemed “elevated” and need associated removal work. But, this sample set does not include ALL sample locations above cleanup levels as established during the RA/SI....soil sample locations with elevated arsenic and chromium were determined to not need removal work since these metals exist at naturally elevated concentrations and |  | Additional clarification was added to the text. Please note text in Section 4.4.4: “Soil sample locations exceeding established clean up levels for the contaminants arsenic, chromium, and nickel will not be further investigated since elevated levels of naturally occurring concentrations of arsenic and chromium have been documented in the area. In addition, a review of RRO silica gel clean up results and the sample chromatograms for the 2012 sediment samples collected indicated a non-fuel pattern that | A |

**REVIEW  
COMMENTS**

**PROJECT: NE Cape - NVNC & Sipenpak Camp – Coop. Agreement No: NALEMP-FY13-04**  
**DOCUMENT: RA/SI Work Plan Rev 0 – August 2013 Location: St. Lawrence Island, Alaska**

|                                     |                                       |   |  |   |  |
|-------------------------------------|---------------------------------------|---|--|---|--|
| <b>U.S. ARMY CORPS OF ENGINEERS</b> |                                       | <b>DATE: 23 August 2013</b><br><b>REVIEWER: Jeremy Craner</b><br><b>PHONE: 753-2628</b> |  | <b>Action taken on comment by: Bristol- Lyndsey Kleppin, Julie Allan, and Lesa Nelson</b> |  |
| <b>Item No.</b>                     | <b>Drawing Sheet No., Spec. Para.</b> | <b>COMMENTS</b>   | <b>REVIEW CONFERENCE</b><br>A - comment accepted<br>W - comment withdrawn<br>(if neither, explain) | <b>CONTRACTOR RESPONSE</b>  | <b>USAED/ADEC RESPONSE ACCEPTANCE</b><br>(A-AGREE)<br>(D-DISAGREE) |

|    |                 |  |  |   |   |
|----|-----------------|--|--|---|---|
|    |                 | were thus excluded; soil samples with elevated RRO were also excluded from the presented sample set based on silica gel results.<br>**So, please add further clarification in text and figures in order to clarify the jump from RA/SI report to this Work Plan. Most of my comments will reflect this info gap. |  | <p>resembles NOM (natural organic material). Analysis following the silica gel cleanup resulted in concentrations of RRO that were reduced by an average of 50 percent. Post silica gel cleanup values are only available for four soil samples.“</p> <p>Two new figures have been added showing the proposed 2014 excavation areas.</p> <p>Analytical data from the 2012 RA/SI was reviewed and all soil and sediment sample locations containing contaminants at concentrations greater than the ADEC clean-up level were included in into Figure 3 “Proposed Excavation Map and in Table 4-6, with the exception of chromium, nickel, and arsenic. Only the analytical results for sediment post silica gel cleanup were compared to the ADEC cleanup level. Because the post silica gel cleanup values are not available in the soil, all areas with soil exceedances of RRO will be excavated and the contaminated soil removed.</p> |   |
| 6. | Pg. v           | Please correct “LBP” acronym to “lead-based paint <del>Liters</del> per minute”.   |  | Corrected.  | A |
| 7. | Pg. 10, Section | Last sentence, revise to: ...site structures (Mr. Eugene Toolies' Cabin).  |  | Corrected.  | A |



**REVIEW  
COMMENTS**

**PROJECT: NE Cape - NVNC & Sipenpak Camp – Coop. Agreement No: NALEMP-FY13-04**  
**DOCUMENT: RA/SI Work Plan Rev 0 – August 2013 Location: St. Lawrence Island, Alaska**

| <b>U.S. ARMY CORPS OF ENGINEERS</b> |                                       | <b>DATE: 23 August 2013</b><br><b>REVIEWER: Jeremy Craner</b><br><b>PHONE: 753-2628</b> | <b>Action taken on comment by: Bristol- Lyndsey Kleppin, Julie Allan, and Lesa Nelson</b>          |                            |  |
|-------------------------------------|---------------------------------------|---|--|----------------------------|--|
| <b>Item No.</b>                     | <b>Drawing Sheet No., Spec. Para.</b> | <b>COMMENTS</b>   | <b>REVIEW CONFERENCE</b><br>A - comment accepted<br>W - comment withdrawn<br>(if neither, explain) | <b>CONTRACTOR RESPONSE</b> | <b>USAED/ADEC RESPONSE ACCEPTANCE</b><br>(A-AGREE)<br>(D-DISAGREE) |

|     |   |   |  |  |  |
|-----|---|---|--|--|--|
|     | 2.6.3.3   |   |  |  |  |
| 8.  | Pg. 11, Section 2.6.3.6                             | Last sentence states: “However, the contaminants that were detected during the 2012 SI do not have the potential to bioaccumulate.” PCB’s were detected above cleanup levels in soil at 12NVNCSL28 and 12NVNCSL40/64. Please explain why these levels were not at concentrations that pose a bioaccumulation risk (mentioned in Section 2.7.5 but not in this section).   |  | Text modified to read: “One contaminant detected during the 2012 SI, PCB, has the potential to bioaccumulate.  | A  |
| 9.  | Pg. 16, Section 3.1, 2 <sup>nd</sup> to last bullet | Please add period.  |  | Period added.  | A  |
| 10. | Pg. 21, Section 4.2                                 | Second sentence, the ® symbol is used following “Rite in the Rain”. Please all add ® symbols as appropriate throughout the rest of the Work Plan...many are missing from key items. The Trimble GPS unit is described and stated that coordinates will be recorded in the field notebook. Was this the same GPS unit used in 2012? Is only sub-meter accuracy justified? If possible, I would suggest having ECO-LAND survey final sample locations...they have done work down at Cargo Beach in the past and have nearby control points. This will yield a much higher quality final survey data set. Additionally, please also state that a sketch field map with sample locations and proper id’s will be drawn in the field notebook. |  | According to the Associated Press Stylebook and Briefing in Media Law dated 2013, “The bottom line is, for almost everyone, you DON’T need to use the trademark or registered trademark symbols in your writing. It really is for advertising and commercial use, to create branding and make awareness of a company’s commercial “turf.” If you’re with a company, then protect your turf and use the symbol. If you’re not, and you’re just writing about an object or service that exists in your world that happens to be a brand name product, that’s fine, just write about it. You aren’t competing against it or trying to steal it or gather fame or fortune by | A, thanks for the info, please be consistent with either using or not using ® in the future. |

**REVIEW  
COMMENTS**

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**DOCUMENT:** RA/SI Work Plan Rev 0 – August 2013 **Location:** St. Lawrence Island, Alaska

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| <b>U.S. ARMY CORPS OF ENGINEERS</b> |                                       | <b>DATE: 23 August 2013<br/>REVIEWER: Jeremy Craner<br/>PHONE: 753-2628</b> |  | <b>Action taken on comment by: Bristol- Lyndsey Kleppin, Julie Allan, and Lesa Nelson</b> |  |
| <b>Item No.</b>                     | <b>Drawing Sheet No., Spec. Para.</b> | <b>COMMENTS</b>   | <b>REVIEW CONFERENCE</b><br>A - comment accepted<br>W - comment withdrawn<br>(if neither, explain) | <b>CONTRACTOR RESPONSE</b>  | <b>USAED/ADEC RESPONSE ACCEPTANCE</b><br>(A-AGREE)<br>(D-DISAGREE) |

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|  |  |  |  | <p>pretending to have some association with the product officially. So, you're fine. Skip it."</p> <p>The WP was reviewed and trademark symbols were added to all relevant brand name product</p> <p>The Trimble GPS unit is the same as the one used in 2012 to capture sample locations and other key features. ECO-LAND will only be used if there are no conflicts with FUDS survey needs; this work plan will be written without the assumption that they will be available. Yes, the Trimble does have sub-meter accuracy. Depending on the site and conditions, it can deliver decimeter accuracy.</p> <p>A sentence has been added stating that field sketches showing sample locations and identifications will be drawn in the field notebook.</p> <p>Please refer to comment 19 for the updated text. ECOLAND will be utilized for relocating the 2012 sample locations and the 2014 excavation locations will be documented utilizing the sub-meter Trimble GPS. The text in this section was not changed.</p> | <p>In regards to GPS unit, just because it was the same unit used in 2012 that does not mean it is the right one for the job in 2014. Accuracy is, on a good day, sub-meter AFTER post-processing in the office, if conditions (# satellites, etc.) are ideal. Decimeter accuracy is only achieved using the hand-held in conjunction with a base station plus post-processing. Relocating previously collected points in the field to sub-meter accuracy is another story, see</p> |
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|     |                                    |  |  |  | comment #19. |
| 11. | Pg. 22, Section 4.3.1              | Will Satori personnel inspect both sites for ACM prior to the start of field activities? This would minimize the potential exposure of unsuspecting workers to ACM.  |  | The Sipenpak site has been eliminated from this WP, and ACM inspection will occur prior to other field activities at NVNC.   | A            |
| 12. | Pg. 26, Section 4.3.3.2            | Revise first sentence to: "...NVNC was collected and removed <del>at</del> during the 2012 field season."  |  | Text has been corrected.   | A            |
| 13. | Pg. 27, Section 4.3.4              | Please reference Figure 3 as appropriate in this section. Also, please briefly explain what was conducted in 2012, reference the RA/SI, reference specific figures as appropriate, etc. Maybe adding figures with results to this Work Plan would be beneficial? This clarification is necessary in order to "bridge the gap" between the 2012 work and the proposed 2013 work. This is where confusion really begins... |  | The first four paragraphs from this section have been deleted (since the CON/HTRW from 2012 was sampled and disposed of in 2013), and the pertinent information (including references) moved to Section 2.3. Also, per a comment from Curtis Dunkin, Figures 4-7 from the 2012 RA-SI report have been added to this work plan and are referenced in Section 2.3. | A            |
| 14. | Pg. 29/30, Section 4.3.4.1/4.3.4.2 | If additional drums with contents are found, removed, and characterized, it is suggested that confirmation samples are collected ASAP beneath the drum to determine if the drum leaked.  |  | Text has been added to Sections 4.3.4.1 and 4.3.4.2 stating that Bristol and the NVS will contact the USACE NALEMP Program Manager (Ms. Andrea Elconin) to determine if additional funding may be available  | A            |



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|     |                       |  |  | to collect confirmation soil samples if full/partially full drums or stained soil is identified. If funding is not available, follow-up sampling will occur during a future SI.  |   |
| 15. | Pg. 37, Section 4.4   | Further clarification necessary here. Reference figures in RA/SI report and Figure 3 in this Work Plan. Add excavation areas to Figure 3? I know they are small but this may help. Somehow detail FUTURE confirmation sample locations on Figure 3, not just those from 2012 including their associated id's.  |  | Figure references added to section 4.4. Future confirmation sample locations will not be placed on the figure as they will be subject to field conditions. Proposed excavation footprints will be added to the figures.  | A, please be clear on the figure and in text. |
| 16. | Pg. 39, Section 4.4.4 | This section contains key information that explains why only a select set of sample locations are displayed on Figure 3 and leads into what/why specific work will be conducted at specific locations. I believe this information needs presented prior to this location to minimize confusion.<br>-Reference Figure 3 following first sentence.<br>-Refer to the RA/SI Report and specific figures as necessary. Reader needs background information. May be useful to present RA/SI figures with results in this Work Plan...these figures could be used to explain how the final sample set were selected for removal action work.<br>-The last paragraph states that sediment sample 12NVNCS06 will be excavated to a depth of 1-foot bgs. But, Figure 3 states that this figure is a "Proposed Excavation and Confirmation Sampling Map". Please clarify. |  | Information mentioning the exclusion of 2012 samples with elevated concentrations of arsenic and chromium has been added to samples added to the last scope of work bullet in Section 3.1.<br><br>Figure references and RA/SI Report citation added to Section 4.4.4..<br><br>Figures 4 through 7 from the RA/SI report have been added to this WP and are now Figure 3 through 6 in this WP. References to these figures have been added to Section 4.4.4.<br><br>The words "Confirmation sampling" have been removed from the title of the figure. | A   |
| 17. | Sections 4.4.5.1,     | All sections contain the following statement: "The locations of confirmation samples and the excavation will   |  | ECO-LAND will be used if there are no conflicts with FUDS survey needs;  | A   |

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|     | 4.4.5.2,<br>4.4.5.3,<br>4.4.5.4 | be photographed and will be marked and mapped using a Trimble GeoExplorer 2008 GeoXH Series handheld GPS to sub-meter accuracy after post-processing.” Suggest using ECO-LAND professional land surveyors to collect highly accurate and precise coordinate data of each final sample location. They may have some spare time between being needed on the FUDS project. |  | this WP will be written without the assumption that they will be available.   |   |
| 18. | Pg. 46,<br>Section 4.4.5.4      | Please revise second sentence...grammar issue.  |  | Second sentence has been revised.   | A   |
| 19. | Pg 57,<br>Section 5.3           | Second paragraph states: “Soil/sediment locations will be marked with a GPS and noted in the field notebook.” Will the 2012 locations be re-located using a GPS? Will new 2013 locations be surveyed using a GPS? I have not noticed lath in this area while onsite in 2013. Please clarify.  |  | Section 4.4.4 text modified to read: “Each excavation will be centered at each respective 2012 environmental sample GPS location that indicated an exceedance of established clean up criteria. The samples will be located using a sub-meter accuracy GPS containing the 2012 sample location data. “<br><br>Section 4.4.4 paragraph 2 was updated to state the following, “The 2012 sample locations will be located by ECOLAND surveyors prior to excavation activities, professional land surveyors registered in the State of Alaska, to a minimum of 1.5-foot accuracy.”<br>Additional text was added to Section 4.4.4 paragraph 3, third to last sentence, “After all contamination has been removed, excavation locations will be documented utilizing a sub- | D<br><br>If you use only a hand-held GPS unit (no base station) in the field to relocate the 2012 sample locations, then you will need to first set points in the field at each 2012 location, post-process your initial collected points in the office to ensure you are where you think you are, then |

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|     |                    |  |  |   |   |
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|     |                    |  |  | meter accuracy GPS.”<br>ECOLAND will be available on site periodically and cost approximately \$2,200 a day. The costs for a professional land surveyor were not included in the approved cost proposal.                        | make adjustments in the field based on post-processing results as necessary. Finally, you will need to collect the points again and post-process to ensure the final 2014 points line up with the 2012 points. This is usually not very easy. Please detail how you plan to relocate the 2012 locations and ensure they are within sub-meter of the “true” 2012 surveyed location within this section of the Work Plan. |
| 20. | Pg 59, Section 5.7 | First sentence states: “Each sample location will be initially marked with a lath, surveyors tape, or pin flags.” Again, will the 2012 sample locations initially be marked out using a GPS? Seems like this is a necessary step prior to removal work and subsequent confirmation sampling. Please clarify. ECO-LAND to do survey work if available? Please be sure to sketch a field map with sample locations/id’s within the |  | See responses to 17 and 19. Field sketch requirement added to Section 4.2 “Documentation”.<br><br>The text in Section 5.7 first sentence was updated to state the following, “Each 2012 sample location containing contaminants | D<br><br>You did not answer my question first question. See comment #19.  |

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|     |                     | field notebook.   |  | exceeding the clean-up levels will be relocated by ECOLAND and will be marked with a lath, surveyors tape, or pin flags.”   |   |
| 21. | Pg. 69, Section 7.0 | Please state that all survey data will be included in the report deliverables package.  |  | Survey data added as a deliverable.   | A |
| 22. | Figure 3            | <p>As mentioned in earlier comments, this figure needs some revision and detail to clarify what is being displayed and why it is important.</p> <p>-Currently titled “Proposed Excavation and Confirmation Sampling Map”. This is a poor title since it shows neither. It shows 2012 sample locations, former features, current features, and current structures. No 2013 excavation areas or confirmation sample locations are depicted. Please re-name/revise.</p> <p>-Please add locations of specific waste items (drums, etc.) found and removed during the 2012 removal action.</p> <p>-May be helpful to display sample results</p> <p>-Explain that these are removal areas based on ....</p> <p>-Some soil was removed in 2012. Please show where this removal was conducted in this figure.</p> <p>-Remove the ® following Conex.</p> <p>As previously stated, additional background information (maybe display additional figures from RA/SI report?) to tell the story leading up to what is being displayed and why only a specific sample set is shown.</p> |  | <p>Figure has been renamed “Proposed 2014 Excavation Areas”.</p> <p>Two additional figures are being added to show close ups of the 2012 sample locations and the proposed 2014 excavation boundaries.</p> <p>The locations of specific waste items (drums, general debris, paint cans, D sized battery, drums, etc.) were added to Figure 3</p> <p>2012 SI Sample Results are provided on Figures 4 and 5.</p> <p>Sections 2.6.2 and 4.4.4 describes any exceedances in the 2012 samples and that the removal areas are based on these results. In addition, Table 4-6 provides the 2012 Sample Location with the planned 2014 excavations.</p> <p>Three cubic yards of soil was removed from Additional Area 17 (Sample ID 12NVNCSL56). This has been noted on Figure 3 “2012 Sample Locations”. In addition, around 10</p> | A |

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|  |  |                            |  | <p>gallons of paint contaminated soil was removed from Additional Area 01 (Sample ID 12NVNCSL40/64).</p> <p>The ® following Conex has been removed from all applicable figures.</p> <p>Figures 4-7 (now Figures 3-6) from the 2012 RA-SI report have been included in the work plan.</p> |  |
|  |  | ----- End of Comments ---- |  |  |  |

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| <b>U.S. ARMY CORPS OF ENGINEERS</b> |                                       | <b>DATE: 20 February 2014</b><br><b>REVIEWER: Lisa K. Geist</b><br><b>PHONE: 753-5742</b> | <b>Action taken on comment by: Bristol – Lyndsey Kleppin, Julie Allan, and Lesa Nelson</b>         |                            |  |
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|----|----------------|--|--|--|---|
| 1. | General        | Please update any dates as necessary to reflect that work will be conducted during the 2014 summer field season. Was any NALEMP work conducted during the 2013 field season that should be summarized in Section 2.3?  |  | Dates updated and Section 2.3 amended to include the text: “No RA activities were conducted under NALEMP during the 2013 field season pending award of the CA.”  | A |
| 2. | Section 2.6.1. | Please update references to work performed by USACE during the 2013 field season and include relevant information/results as appropriate. Example: “During the November 2012 Restoration Advisory Board meeting that took place in Savoonga, several Savoonga residents mentioned that at one time a break in the pipe had occurred along Cargo Beach Road just up gradient from the NVNC. The USACE intends to further investigate this claim under the FUDS program during the 2013 field season.” |  | Text amended to describe work completed under FUDS and reference to 2014 RA Report added: “Four soil borings were advanced and sampled for fuel constituents. None of the samples contained contaminant concentrations exceeding regulatory cleanup levels. (Bristol, 2014)”   | A |
| 3. | Section 2.7.4  | The text states: “Initial sampling results have indicated that the aquatic environment may be affected and that petroleum and non-petroleum contaminants are present. At this point, the total area of petroleum-impacted soil does not appear to exceed one-half acre.”<br>What do you mean by “the aquatic environment may be affected” – local freshwater drainage/streams/ ponds or the marine environment? What is the basis for this conclusion?   |  | The following text was added to describe what is meant by aquatic environment,<br>“Aquatic environment refers to the surface water located on the site and surface water samples<br>12NVNCSW05, 12NVNCSW07, 12NVNCSW10, and 12NVNCSW11 (duplicate sample of 12NVNCSW05) detected PCBs at concentrations greater than the clean-up levels. In addition, sediment sample 12NVNCSW06 detected RRO, cadmium, and lead at concentrations greater than the clean-up levels. Approximately one cubic yard of sediment from 12NVNCSW06 sample location and approximately 25 square | A |

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|    |               |  |  | feet will be removed.   |  |
| 4. | Section 2.7.4 | An estimate of the petroleum-impacted soil volume or area should be made for planning purposes.  |  | The following text was added to the first paragraph describing the approximate quantity of contaminated soil, “Based on assumptions made during the 2012 RA/SI and during the development of this WP, it is estimated that 32 cubic yards of contaminated soil will be removed during the 2014 field work and a surface area of approximately 400 square feet.”   | A  |
| 5. | Section 2.7.5 | The statement that no contaminants pose a bioaccumulation risk appears incorrect, since PCBs were documented at one location above the established cleanup level of 1 mg/kg. |  | Text modified to make mention of PCB hit:<br>“Most contaminants documented to be present at the NVNC above established clean up levels are not known to pose a bioaccumulation risk; however, two documented locations contained PCBs, a bioaccumulate, above the established cleanup level of 1 mg/kg. Additional RA/SI activities are planned for the site.”<br><br>Text modified to, “...two documented locations contained PCBs, which is a bioaccumulative contaminant, above the established cleanup level of 1 mg/kg.” | Syntax seems odd. PCBs, a bioaccumulative compound,... |
| 6. | Section 2.7.5 | Removal of contaminated sediment – how will this be performed?   |  | See Section 4.4.4   | A  |
| 7. | Section 3.0   | Please update as necessary with final eligibility determination(s) and work to be performed during 2014 field season.  |  | Updated.  | A  |

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|-----|----------------------|---|--|---|---|
| 8.  | Section 3.0, Page 14 | The third task which includes soil and sediment excavation and removal. Field screening using what detection levels/methods/analytes?   |  | Text modified : “Following excavation of soil and sediment, the excavations will be field-screened for DRO and /RRO and PCBs as appropriate using with the Northeast Cape FUDS project’s on-site field laboratory. Field screening samples for the PCB excavations will be sent to Test America in Tacoma, Washington for analysis on a rush turn-around-time. Confirmation samples will be collected and analytical results confirmed prior to backfilling with clean backfill.”<br><br>The detection limits, methods, and analytes are provided in Table 6-2. | A |
| 9.  | Section 3.0, Page 14 | Please update as necessary if debris remaining after 2012 field season was successfully shipped offsite during 2013.  |  | Updated.  | A |
| 10. | Section 3.0, Page 15 | Analyte list – should include metals?   |  | RCRA 8 metals has been included in the analyte list.  | A |
| 11. | Section 3.3          | Please update the schedule for 2014. How will this be coordinated with the planned FUDS activities at the remainder of the NE Cape site?  |  | Schedule updated.   | A |
| 12. | Section 4.4          | The text states that “Pre-determined volumes of soil and sediment will be excavated and containerized for transportation and disposal.” What are these volumes? Excavations will remain open until confirmation soil sampling results are received – is a fast turnaround time planned with the fixed-based laboratory? |  | Text modified: “ An approximately five foot by five foot area centered on the soil sample location will be excavated to a depth of 2 feet using an excavator and containerized for transportation and disposal.”<br><br>A fast turnaround time will be requested for the fixed-based laboratory.  | A |



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COMMENTS**

**PROJECT: NE Cape - NVNC & Sipenpak Camp – Coop. Agreement No: NALEMP-FY13-04**  
**DOCUMENT: RA/SI Work Plan Rev 0 – August 2013 Location: St. Lawrence Island, Alaska**

| <b>U.S. ARMY CORPS OF ENGINEERS</b> |                                       | <b>DATE: 20 February 2014</b><br><b>REVIEWER: Lisa K. Geist</b><br><b>PHONE: 753-5742</b> | <b>Action taken on comment by: Bristol – Lyndsey Kleppin, Julie Allan, and Lesa Nelson</b>         |                            |  |
|-------------------------------------|---------------------------------------|---|--|----------------------------|--|
| <b>Item No.</b>                     | <b>Drawing Sheet No., Spec. Para.</b> | <b>COMMENTS</b>   | <b>REVIEW CONFERENCE</b><br>A - comment accepted<br>W - comment withdrawn<br>(if neither, explain) | <b>CONTRACTOR RESPONSE</b> | <b>USAED/ADEC RESPONSE ACCEPTANCE</b><br>(A-AGREE)<br>(D-DISAGREE) |

|     |               |  |  |   |  |
|-----|---------------|--|--|---|--|
| 13. | Section 4.4.3 | I don't believe the FUDS project will have field lab capability for PCBs during the 2014 field season. Please update how soil excavations will proceed using field screening for PCBs.   |  | The FUDS field lab will not have PCB capabilities. Samples to be analyzed for PCBs will be sent to Test America in Tacoma, Washington for a rush TAT.   | A  |
| 14. | Section 4.4.4 | The text states that "Each excavation will be centered at each respective 2012 environmental sample GPS location that indicated an exceedance of established clean up criteria." How will the field crew navigate back to these locations? Where is the lat/long of these sample locations tabulated? Will a survey crew be utilized to mark the proposed locations prior to excavation activities? What is the estimated volume of soil planned at each location (see Table 4-6)? How will sediment be excavated? |  | <p>The following text was added, "The 2012 samples will be located samples will be located using a sub-meter accuracy GPS containing the 2012 sample location data, which is provided in Appendix F. "</p> <p>The estimated volume of soil/sediment planned at each location is provided in Table 4-6.</p> <p>The following text was added, "In order to reduce the impact to the local tundra, it is expected that some of the excavations will be hand dug using shovels while others may be excavated using available heavy equipment."</p> <p>Section 4.4.4 paragraph 2 was updated to state the following, "The 2012 sample locations will be located by ECOLAND surveyors prior to excavation activities, professional land surveyors registered in the State of Alaska, to a minimum of 1.5-foot accuracy."</p> <p>Additional text was added to Section 4.4.4 paragraph 3, third to last sentence, "After all contamination has been removed, excavation locations will be documented utilizing a sub-meter accuracy GPS."</p> | Without a base station, navigating to a sample location with that accuracy is not likely without post-processing the data, backcheck by surveyors, and field verification. |

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|     |                 |   |  | ECOLAND will be available on site periodically and cost approximately \$2,200 a day. The costs for a professional land surveyor were not included in the approved cost proposal.  |   |
| 15. | Table 4-6       | Are the RRO concentrations listed post-silica gel cleanup? Previous text indicated that RRO was not a concern for soil excavations.   |  | Only the analytical results for sediment using the silica gel cleanup method were compared to the ADEC cleanup level. On soil samples, if the silica gel method was used, the analytical result associated with the silica gel method was compared to the ADEC clean-up level.<br><br>The RRO results shown on Table 4-6 (samples 12NVNCSL08, -09, -13, and -14) are non-silica gel results. These four samples have RRO results exceeding the 9,200 mg/kg cleanup criteria, so they are shown on this table as recommended for excavation in 2014. | A |
| 16. | Table 4-6       | Why is the planned excavation dimension for PCBs at 12NVNCSL28 twice the size of the other sample locations?<br><br>Also – there is a discrepancy in the RA Report that needs to be resolved prior to conducting the PCB soil excavations (see next comment).                   |  | Planned excavation is larger due to the high concentration of the PCB exceedance at this location relative to other PCB exceedances (29 mg/kg vs 2.5 and 2.90 mg/kg)  | A |
| 17. | Section 4.4.5.4 | During a teleconference regarding other concerns at NE Cape, it was brought to our attention that PCBs were identified at the NVNC at 29 mg/kg during the 2012 NALEMP investigation. Upon further review of the final RA Report (Rev1) dated August 2013, it appears there is a |  | The text of the 2012 RA-SI report is incorrect. Section 7.3.5 should state “Figure 4 shows the DP23 sampling location which is near the pond that is adjacent   | A |

**REVIEW  
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|                                     |                                       |   |  |  |  |
|-------------------------------------|---------------------------------------|---|--|--|--|
| <b>U.S. ARMY CORPS OF ENGINEERS</b> |                                       | <b>DATE: 20 February 2014</b><br><b>REVIEWER: Lisa K. Geist</b><br><b>PHONE: 753-5742</b> |  | <b>Action taken on comment by: Bristol – Lyndsey Kleppin, Julie Allan, and Lesa Nelson</b> |  |
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|  |  | <p>discrepancy in the sample location that needs to be resolved by the NALEMP project team. The text of the report, Section 7.3.5 states:</p> <p>“Two soil samples collected during the 2012 SI exhibited concentrations of PCBs greater than the established cleanup criteria of 1.0 mg/kg. Soil sample 12NVNCSL28 collected from the Debris Pile (DP) No. 23 location (DP23) exhibited a result of 29 mg/kg for the PCB-1260 congener. Figure 4 shows the DP23 sampling location which is near the pond that is adjacent to Cargo Beach Road and just south of Structure No. 1.”</p> <p>However, Figure 3 shows DP23 located east of Cargo Beach road, and approx. 200 feet south of the existing structure #1. A second debris pile identified as DP22 is shown closer (~10 feet) to structure #1, which more closely matches the description in the text.</p> <p>Also, Figure 4 shows sample location 12NVNCSL28 in this same location as DP23, 200 feet south of the existing structure #1. The samples associated with DP22 are labeled as 12NVNCSL27 and 39</p> <p>However, in the photo log of Appendix B, photo 28 is labeled: Soil Sample Location 12NVNCSL28 Collected from Location of Debris Pile #23 Date: September 8, 2012 Direction: North Photographer: L. Nelson<br/>This picture seems to conflict with the location plotted on the two figures.</p> <p>I don't know which is in error, the description of the photo or</p> |  | <p>to Cargo Beach Road and <u>approximately 200 feet south</u> of Structure No. 1.” The text of the report will be corrected.</p> |  |
|--|--|---|--|---|--|

**REVIEW  
COMMENTS**

**PROJECT: NE Cape - NVNC & Sipenpak Camp – Coop. Agreement No: NALEMP-FY13-04**  
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|     |                 |   |  |  |   |
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|     |                 | the points plotted on the figures. It is hard to make a judgment either way, since the report doesn't have the original survey data, or a complete set of original photos. The field notes also don't appear to have a corresponding sketch for that particular debris pile #23.<br><br>The soil excavation location could be questioned in the future if these discrepancies are not resolved. |  |  |   |
| 18. | Section 4.4.5.4 | Please verify if the NE Cape FUDS mobile laboratory will have the capability to analyze for PCBs.   |  | Mobile laboratory will not have PCB capability. Samples to be analyzed for PCBs will be sent to Test America in Tacoma, WA.. | A |
| 19. | Section 7.0     | I would recommend including all native files with the report deliverable.   |  | Native files will be provided with the report deliverable.   | A |
|     |                 | ----- End of Comments -----   |  |  |   |



Alaska Department of Environmental Conservation (ADEC)  
Contaminated Sites Program

**Document Reviewed:** Draft August 2013 Native Village of Northeast Cape NALEMP RA/SI Work Plan

**Commenter:** Curtis Dunkin-ADEC **Date Submitted:** March 7, 2014

Action Taken on Comment By Bristol – Lyndsey Kleppin, Julie Allan, and Lesa Nelson

| #  | Page # | Section          | ADEC Comment   | Response  |
|----|--------|------------------|--|---|
| 1. |        | Sipenpak Site(s) | Please note that the original draft of the August 2013 revision 0 work plan included site work at the Sipenpak site and that ADEC has since been informed by the Army Corps of Engineers that the 2013/14 work plan will not involve work at Sipenpak. ADEC has removed all of its original comments on the Sipenpak site from this template. Please verify that this is still the case in the RTC and also inform ADEC if this situation changes. | References to the Sipanpak site have been removed.  |
| 2. | 1      | 1.0              | Please revise last sentence of second paragraph of this section to better define ‘past military activities’. ADEC understands that the majority, if not all of the contaminated sites concerns at NVNEC Fishcamp are the result of contaminated materials having been donated by the military and not by the military activities themselves.   | “past military activities” changed to “military materials”.   |
| 3. | 5      | 2.2              | Second sentence on this page, please add PCBs and solvent-associated contaminants (PCE, TCE, etc.) to the identified COCs.   | COCs added.   |
| 4. | 6      | 2.3              | Please add a bullet that states the objective ‘to eliminate adverse impacts and exposure risks to human health and the environment’.<br><br>Last paragraph of this section, please add ‘excavation, containerization, and staging of stained soil suspected of being petroleum-contaminated’ as one of the 2012 activities.  | Bullet point added.<br><br>Text added to the last paragraph.  |
| 5. | 6      | 2.4              | Please also briefly state that NVNEC Fishcamp site is a confirmed contaminated site on ADEC’s database, that the site is currently active and regulated under 18 AAC 75, and that no changes to this work plan will be made without first notifying and receiving approval from ADEC.  | Text added to beginning of Section 2.4: “The NVNC site is a confirmed contaminated site on ADEC’s database, and is currently active and regulated |

|    |    |         |  |   |
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|    |    |         |  | under 18 AAC 75. No changes to this work plan will be made without first notifying and receiving approval from ADEC.”   |
| 6. | 8  | 2.6.1   | <p>Please clarify what is meant by the statement ‘may be one source’ in the first sentence of this section.</p> <p>Please revise the last sentence on this page; The MOC and site 13 are 1.2 aerial miles from the NVNC; site 31 is 1.5 aerial miles from the NVNC.</p>                              | <p>Text modified, sentence now reads “Spills and leaks from CON/HTRW drums and hazardous materials may be one source <u>of contamination</u>.”</p> <p>Text changed to “The NE Cape FUDS Main Operations Complex and Site 13 are located approximately 1.2 aerially miles from the NVNC and Site 31 is 1.5 aerial miles from the NVNC.”</p>  |
| 7. | 9  | 2.6.2   | <p>Please revise the first sentence of this section to state ‘analytical results indicate impacted media’ instead of ‘are believed’.</p> <p>Please state the COCs associated with each media in this section.</p>  | <p>The first sentence now states, “The 2012 SI analytical results indicate that soil, sediment, and surface water are impacted media at the site.”</p> <p>The following text was added to the end of the paragraph: “COCs, which are contaminants exceeding the ADEC clean-up level, for soil include DRO, RRO, arsenic, chromium, cadmium, lead, nickel, PCBs, and benzo(a)pyrene. COCs for sediment include RRO, cadmium, and lead. COCs for surface water include PCBs.”</p> |
| 8. | 10 | 2.6.3.3 | Air: please reference the sampling location and the date of the sample whenever discussing exceedances. Please also reference the figure that depicts the exceedance location. Was this surface exceedance of the DRO cleanup level different than the location of the stained soil removal in 2012? | <p>Sample ID (12NVNCSL66) and Figure citation added to the text.</p> <p>Approximately three cubic yards of</p>  |

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|     |    |         |  | stained soil was removed from Additional Area 3 (sample 12NVNCSL56) in 2012, ~100 feet NE of sample 12NVNCSL66.   |
| 9.  | 10 | 2.6.3.4 | Surface water: please state the COCs which are a concern and/or exceed surface water criteria. Please also apply the requests in comment # 8 above to this and all other related sections. | <p>Text was added to the end of the last paragraph of section 2.6.3.1 Soil providing COCs, associated sample IDs, and associated Figure.</p> <p>Text was added to the end of the last paragraph of section 2.6.3.4 Surface Water providing COCs, associated sample IDs, and associated Figure.</p> <p>Text was added to the end of the last paragraph of section 2.6.3.5 Sediment providing COCs, associated sample IDs, and associated Figure.</p> |
| 10. | 13 | 3.0     | <p>Second sentence of this section, please revise ‘discussed’ to ‘discusses’.</p> <p>Second paragraph of this section, wasn’t all of the ACM previously abated/removed from the NVNC?</p>  | <p>Text changed as requested.</p> <p>The second sentence in the second paragraph of this section states that ACM items are not expected. In the interest of safety and completeness, Bristol will have an AHERA-certified subcontractor briefly at the site to visually inspect the six remaining structures for ACM.</p>   |
| 11. | 14 | 3.0     | Please revise the first sentence of the second paragraph on this page by replacing ‘environmentally impacted soil’ with ‘soil and sediment for which                                       | Text changed as requested.  |



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|     |    |       | <p>analytical results indicate that concentrations of contaminants exceed the established ADEC cleanup levels for the NVNEC Fishcamp site’.</p> <p>In regards to the comment paragraph above, please see comment # 22 below. ADEC suggests that the project team discuss this issue in the near future.</p> <p>Third paragraph on this page, where have the additional waste streams been staged/stored since they were generated in 2012? <i>Please note, that is comment was generated prior to the NVS providing ADEC with the draft Dec. 2013 Technical Memorandum which contains this information. Please provide references and or specific information from the final tech memo as needed for clarity.</i></p> | <p>See comment #22. Bristol is available to discuss with the project team which cleanup levels to use at the site (NEC alternative levels or Method 2), and the possibility of ICs and/or long-term monitoring.</p> <p>The third paragraph has been deleted, and the following text has been added to the end of Section 2.3: “No RA activities were conducted under NALEMP during the 2013 field season pending award of the CA and 2012 waste streams were stored in a Connex at the Northeast Cape site. Waste streams generated during the 2012 field season RA activities were sampled, characterized, and transported for disposal in 2013, including A total of three drums and four 1-cubic yard Super Sack® bags of CON/HTRW (Bristol, 2014a).”</p> |
| 12. | 18 | 3.2.3 | <p>Who are the personnel who will be conducting the field work including screening and sampling activities? Which individual’s or individuals’ field notes will be utilized as a formal record? Work plan should specifically clarify who is conducting specific activities.</p>  | <p>The Field Manager is yet to be determined, but will likely be Lyndsey Kleppin. Her name has been added to Section 3.2.1., and text has been added stating that the Field Manager’s notes</p>  |

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|     |    |         |   | will be utilized as a formal record of field activities.   |
| 13. | 29 | 4.3.4.2 | How is it determined that visible staining is the result of petroleum contamination?  | Text added “Staining will be determined to be of petroleum origin if fuel odor is observed.”   |
| 14. | 38 | 4.4     | Second paragraph of this section (and throughout the rest of the document where applicable) statements regarding work to be completed in 2013 and/or 2014 should be revised since this work is now planned for the 2014 field season.<br>Last sentence of the second paragraph please state the source of the backfill. | Dates have been changed accordingly.<br><br>The last sentence of the second paragraph currently states: “Excavations confirmed as clean or as having concentrations of contaminants below established clean up levels will be backfilled with clean fill from the NE Cape FUDS fill site that is located up Kangukhsam Mountain from the NE Cape Main Operations Complex.” |
| 15. | 38 | 4.4.1   | Please revise the first sentence of this section; states ‘...permits may be required but it is not anticipated that any permits will be required...’.   | The first part of the sentence has been deleted, so the sentence now reads “It is not anticipated that federal, state, or local permits will be required.”   |
| 16. | 39 | 4.4.3   | This section, as well as the logistics associated with all other field laboratory sample analyses should be revised due to the unknown scope of the 2014 NEC field season (whether or not a field lab will be available, etc.).   | The field lab will be available under FUDS work, so no revisions were made to this section.  |

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| 17. | 40    | 4.4.4     | <p>What about the lead acid batteries that were removed and disposed of in 2012? Although the locations of the batteries were not noted (GPS, field notes, etc.) all future soil, sediment, and water samples associated with the NVNC should include all known COCs – not just the specific analytes previously identified with a specific site.</p> <p>How are other potentially but unconfirmed contaminated areas of concern (i.e. the location of the batteries mentioned above) going to be evaluated and/or investigated?</p> | <p>Analytical samples were collected from the former locations of the lead acid batteries and analyzed for the entire suite of analyses. Based on the sampling conducted in 2012, specific analytes exceeded the clean-up levels at certain locations at the NVNC site and based on this knowledge the FY13 CA SOW is only funded to analyze samples for analytes specific to those locations/excavations.</p> <p>All areas of concern suspected of contamination or areas where debris was removed were sampled and analyzed for the entire suite of COCs in 2012. The FY13 CA SOW is based off of the 2012 analytical data.</p> |
| 18. | 41-42 | Table 4-6 | <p>Please clarify whether the information provided in the table refers to 2012 or that which is being proposed for 2014 and/or both and revise the title of the table and footnotes accordingly.</p> <p>Are the excavation dimensions proposed for 2014 based upon what appears to be 2012 characterization results of extent of contaminants and their concentrations or are they historical removal dimensions?</p> <p>A new figure should be generated which depicts the sample and excavation</p>                                | <p>Table Title changed to “2012 Sample Locations and Contaminants, Proposed 2014 Excavation Dimensions and Square Footage”.</p> <p>The proposed 2014 excavation dimensions are based on the 2012 characterization results. The last column of the table is now called “Proposed 2014 Excavation Dimensions (feet)”.</p> <p>Three additional figures are being added</p>   |

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|     |  |                     | locations.  | to show close ups of the 2012 sample locations and the proposed 2014 excavation boundaries.  |
| 19. |  | 2012 Report Figures | Figures 4-7 from the final 2012 RA-SI report should be included in this work plan for field reference and consideration of potential data gaps and associations to other nearby contaminated sites.   | Figures 4-7 from the 2012 RA-SI report have been included. These figures are now Figures 3 through 6.  |
| 20. |  | Figure 2            | Are there other camps in the vicinity of NEC (i.e. Camp Kulowiye) which may have also had materials transported to them which originated from the military activity at NEC?   | This WP will only cover sites that have received an eligibility determination.   |
| 21. |  | Figure 3            | <p>Please state the year in which the aerial photo was taken.</p> <p>Assuming that all of the depicted analytical samples were collected in 2012, the legend should state the associated year for the three matrices of samples.</p> <p>A new figure should be added that depicts all of the previous sample locations where ADEC's Method Two Cleanup Criteria were exceeded.</p> <p>A new figure should be added which depicts the known/proposed 2014 sample locations, proposed extents of excavations, staging areas, etc.</p> | <p>The date of the aerial photo has been added to all figures where applicable.</p> <p>The legend has been changed to denote that the samples were collected in 2012.</p> <p>See response to comment #19 – New Figure 6 (previously Figure 7) from the 2012 RA-SI report shows the 2012 and historical sample locations where cleanup levels were exceeded.</p> <p>See response to comment #18 – Four new figures (Figures 7 through 10) are being added. Proposed sample locations for the 2014 excavations are not being placed on the figure as they will be subject to field conditions. Text in Sections 4.4.5 and 4.4.6 describe the proposed confirmation sampling.</p> |
| 22. |  | CSM                 | Biota and ingestion of wild/farmed foods should be selected as a media and a  | The CSM graphic has been updated as  |

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|     |  | Graphic              | <p>pathway respectively; for which all receptors should be selected as C/F. The same should be applied to the ingestion of groundwater and dermal absorption pathways for surface water and the respective receptors. Human Health Conceptual Site Model and ‘established cleanup levels’:</p> <p>Alternative cleanup levels which ADEC approved for the NEC FUDS generally require institutional controls and/or long-term monitoring (i.e. MOC, site 28 drainage, etc.). It should be noted that since there is currently short-term seasonal residential activity occurring at the NVNEC, it should be evaluated whether or not it will be protective of human health to apply the NEC FUDS alternative cleanup levels which exceed the most stringent 18 AAC75 Method Two concentrations, without also possibly considering institutional controls and/or LTM at NVNEC sites.</p> | <p>requested.</p> <p>See response to comment # 11. Bristol is available to discuss with the project team which cleanup levels to use at the site (NEC alternative levels or Method 2), and the possibility of ICs and/or long-term monitoring.</p> |
| 23. |  | Draft 2013 Tech Memo | <p>ADEC Checklists: Please note, this is a follow up comment to ADEC’s comments submitted on 3-6-14 for the draft 2013 Technical Memorandum; the draft Dec. 2013 Rev0 document did not include the required ADEC Checklists nor the Laboratory Data Quality Review. Please include those documents and discuss them in either new or applicable existing sections of the final document.</p>  | <p>The revised Tech Memo will include the ADEC Checklists and Laboratory Data Quality Review.</p>  |
| 24. |  |                      | <b>End of ADEC Comments</b>   |  |

Alaska Department of Environmental Conservation (ADEC)  
Contaminated Sites Program

**Document Reviewed:** Draft August 2013 Native Village of Northeast Cape NALEMP RA/SI Work Plan

**Commenter:** Curtis Dunkin-ADEC **Date Submitted:** March 7, 2014

Action Taken on Comment By Bristol – Lyndsey Kleppin, Julie Allan, and Lesa Nelson; **ADEC Reviewed RTCs on April 23, 2014**

| #  | Page # | Section          | ADEC Comment   | Response   |
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| 1. |        | Sipenpak Site(s) | Please note that the original draft of the August 2013 revision 0 work plan included site work at the Sipenpak site and that ADEC has since been informed by the Army Corps of Engineers that the 2013/14 work plan will not involve work at Sipenpak. ADEC has removed all of its original comments on the Sipenpak site from this template. Please verify that this is still the case in the RTC and also inform ADEC if this situation changes. | References to the Sipanpak site have been removed.<br><b>ADEC-Accepted April 23, 2014</b>  |
| 2. | 1      | 1.0              | Please revise last sentence of second paragraph of this section to better define ‘past military activities’. ADEC understands that the majority, if not all of the contaminated sites concerns at NVNEC Fishcamp are the result of contaminated materials having been donated by the military and not by the military activities themselves.   | “past military activities” changed to “military materials”.<br><b>ADEC-Accepted April 23, 2014</b>   |
| 3. | 5      | 2.2              | Second sentence on this page, please add PCBs and solvent-associated contaminants (PCE, TCE, etc.) to the identified COCs.   | COCs added.<br><b>ADEC-Accepted April 23, 2014</b>   |
| 4. | 6      | 2.3              | Please add a bullet that states the objective ‘to eliminate adverse impacts and exposure risks to human health and the environment’.<br><br>Last paragraph of this section, please add ‘excavation, containerization, and staging of stained soil suspected of being petroleum-contaminated’ as one of the 2012 activities.  | Bullet point added.<br><b>ADEC-Accepted April 23, 2014</b><br><br>Text added to the last paragraph.<br><b>ADEC-Accepted April 23, 2014</b> |
| 5. | 6      | 2.4              | Please also briefly state that NVNEC Fishcamp site is a confirmed contaminated site on ADEC’s database, that the site is currently active and regulated under 18 AAC 75, and that no changes to this work plan will be   | Text added to beginning of Section 2.4:<br>“The NVNC site is a confirmed contaminated site on ADEC’s database,                             |

|    |   |       |   |  |
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|    |   |       | made without first notifying and receiving approval from ADEC.  | and is currently active and regulated under 18 AAC 75. No changes to this work plan will be made without first notifying and receiving approval from ADEC.”<br><b>ADEC-Accepted April 23, 2014</b>   |
| 6. | 8 | 2.6.1 | <p>Please clarify what is meant by the statement ‘may be one source’ in the first sentence of this section.</p> <p>Please revise the last sentence on this page; The MOC and site 13 are 1.2 aerial miles from the NVNC; site 31 is 1.5 aerial miles from the NVNC.</p> | <p>Text modified, sentence now reads “Spills and leaks from CON/HTRW drums and hazardous materials may be one source <u>of contamination</u>.”</p> <p><b>ADEC-Accepted April 23, 2014</b></p> <p>Text changed to “The NE Cape FUDS Main Operations Complex and Site 13 are located approximately 1.2 aerially miles from the NVNC and Site 31 is 1.5 aerial miles from the NVNC.”</p> <p><b>ADEC-Accepted April 23, 2014</b></p>   |
| 7. | 9 | 2.6.2 | <p>Please revise the first sentence of this section to state ‘analytical results indicate impacted media’ instead of ‘are believed’.</p> <p>Please state the COCs associated with each media in this section.</p>   | <p>The first sentence now states, “The 2012 SI analytical results indicate that soil, sediment, and surface water are impacted media at the site.”</p> <p><b>ADEC-Accepted April 23, 2014</b></p> <p>The following text was added to the end of the paragraph: “COCs, which are contaminants exceeding the ADEC clean-up level, for soil include DRO, RRO, arsenic, chromium, cadmium, lead, nickel, PCBs, and benzo(a)pyrene. COCs for sediment include RRO, cadmium, and lead. COCs for surface water include PCBs.”</p> |

|    |    |         |  |   |
|----|----|---------|--|---|
|    |    |         |  | <b>ADEC-Accepted April 23, 2014</b>   |
| 8. | 10 | 2.6.3.3 | Air: please reference the sampling location and the date of the sample whenever discussing exceedances. Please also reference the figure that depicts the exceedance location. Was this surface exceedance of the DRO cleanup level different than the location of the stained soil removal in 2012? | <p>Sample ID (12NVNCSL66) and Figure citation added to the text.</p> <p><b>ADEC-Accepted April 23, 2014</b></p> <p>Approximately three cubic yards of stained soil was removed from Additional Area 3 (sample 12NVNCSL56) in 2012, ~100 feet NE of sample 12NVNCSL66.</p> <p><b>ADEC-Accepted April 23, 2014; please incorporate the RTC into the narrative to clarify the association between the subject sample location and removal action/area.</b></p> <p>Additional text was added to the end of the last paragraph of page 6 in Section 2.3, which stated “In addition, approximately three cubic yards of stained soil was removed from soil sample location 12NVNCSL56, which is approximately 100 feet northeast of sample location 12NVNCSL66 during the 2012 field activities (Figure 3). Soil sample 12NVNCSL66 was collected after the stained soil was removed and the soil sample did not exceed cleanup criteria.”</p> |
| 9. | 10 | 2.6.3.4 | Surface water: please state the COCs which are a concern and/or exceed surface water criteria. Please also apply the requests in comment # 8 above   | Text was added to the end of the last paragraph of section 2.6.3.1 Soil   |



|     |    |     |   |  |
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|     |    |     | to this and all other related sections.   | <p>providing COCs, associated sample IDs, and associated Figure.<br/> <b>ADEC-Accepted April 23, 2014</b><br/> Text was added to the end of the last paragraph of section 2.6.3.4 Surface Water providing COCs, associated sample IDs, and associated Figure.<br/> <b>ADEC-Accepted April 23, 2014</b><br/> Text was added to the end of the last paragraph of section 2.6.3.5 Sediment providing COCs, associated sample IDs, and associated Figure.<br/> <b>ADEC-Accepted April 23, 2014</b></p>   |
| 10. | 13 | 3.0 | <p>Second sentence of this section, please revise ‘discussed’ to ‘discusses’.</p> <p>Second paragraph of this section, wasn’t all of the ACM previously abated/removed from the NVNC?</p> | <p>Text changed as requested.<br/> <b>ADEC-Accepted April 23, 2014</b><br/> The second sentence in the second paragraph of this section states that ACM items are not expected. In the interest of safety and completeness, Bristol will have an AHERA-certified subcontractor briefly at the site to visually inspect the six remaining structures for ACM. <b>ADEC-Accepted April 23, 2014; please include the RTC in the narrative</b><br/> The above statement is already included in the WP on Page 14, second paragraph. It states, “The first primary task is to abate and remove any</p> |

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|     |    |     |  | remaining ACM found to be present in and around the remaining structures located at the NVNC and Sipenpak Camp. ACM items are not expected; however, an AHERA-certified subcontractor will be utilized to visually inspect the interior and exteriors of the six remaining structures and to properly abate, remove, and containerize items suspected of containing ACM.”   |
| 11. | 14 | 3.0 | <p>Please revise the first sentence of the second paragraph on this page by replacing ‘environmentally impacted soil’ with ‘soil and sediment for which analytical results indicate that concentrations of contaminants exceed the established ADEC cleanup levels for the NVNEC Fishcamp site’.</p> <p>In regards to the comment paragraph above, please see comment # 22 below. ADEC suggests that the project team discuss this issue in the near future.</p> <p>Third paragraph on this page, where have the additional waste streams been staged/stored since they were generated in 2012? <i>Please note, that is comment was generated prior to the NVS providing ADEC with the draft Dec. 2013 Technical Memorandum which contains this information. Please provide references and or specific information from the final tech memo as needed for clarity.</i></p> | <p>Text changed as requested.<br/><b>ADEC-Accepted April 23, 2014</b></p> <p>See comment #22. Bristol is available to discuss with the project team which cleanup levels to use at the site (NEC alternative levels or Method 2), and the possibility of ICs and/or long-term monitoring.<br/><b>ADEC-Accepted April 23, 2014</b></p> <p>The third paragraph has been deleted, and the following text has been added to the end of Section 2.3: “No RA activities were conducted under NALEMP during the 2013 field season pending award of the CA and 2012 waste streams were stored in a Connex</p> |

|     |    |         |   |  |
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|     |    |         |   | at the Northeast Cape site. Waste streams generated during the 2012 field season RA activities were sampled, characterized, and transported for disposal in 2013, including A total of three drums and four 1-cubic yard Super Sack® bags of CON/HTRW (Bristol, 2014a).”<br><b>ADEC-Accepted April 23, 2014</b>                                |
| 12. | 18 | 3.2.3   | Who are the personnel who will be conducting the field work including screening and sampling activities? Which individual’s or individuals’ field notes will be utilized as a formal record? Work plan should specifically clarify who is conducting specific activities.   | The Field Manager is yet to be determined, but will likely be Lyndsey Kleppin. Her name has been added to Section 3.2.1., and text has been added stating that the Field Manager’s notes will be utilized as a formal record of field activities.<br><b>ADEC-Accepted April 23, 2014</b>   |
| 13. | 29 | 4.3.4.2 | How is it determined that visible staining is the result of petroleum contamination?  | Text added “Staining will be determined to be of petroleum origin if fuel odor is observed.”<br><b>ADEC-Accepted April 23, 2014</b>  |
| 14. | 38 | 4.4     | Second paragraph of this section (and throughout the rest of the document where applicable) statements regarding work to be completed in 2013 and/or 2014 should be revised since this work is now planned for the 2014 field season.<br>Last sentence of the second paragraph please state the source of the backfill. | Dates have been changed accordingly.<br><b>ADEC-Accepted April 23, 2014</b><br>The last sentence of the second paragraph currently states: “Excavations confirmed as clean or as having concentrations of contaminants below established clean up levels will be backfilled with clean fill from the NE Cape FUDS fill site that is located up |

|     |    |       |   |   |
|-----|----|-------|---|---|
|     |    |       |   | Kangukhsam Mountain from the NE Cape Main Operations Complex.”<br><b>ADEC-Accepted April 23, 2014</b>   |
| 15. | 38 | 4.4.1 | Please revise the first sentence of this section; states ‘...permits may be required but it is not anticipated that any permits will be required...’. | The first part of the sentence has been deleted, so the sentence now reads “It is not anticipated that federal, state, or local permits will be required.”<br><b>ADEC-Accepted April 23, 2014</b> |

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| 16. | 39 | 4.4.3 | <p>This section, as well as the logistics associated with all other field laboratory sample analyses should be revised due to the unknown scope of the 2014 NEC field season (whether or not a field lab will be available, etc.).</p> | <p>The field lab will be available under FUDS work, so no revisions were made to this section. <b>ADEC April 23, 2014; ADEC does not disagree with the RTC however other sections need to be revised to indicate which laboratory will conduct which sampling (i.e. section 4.4.5.4 states Test America but nothing is indicated in sections 4.4.5.3 and 4.4.5.2). Also, the field laboratory narrative section should be amended to state ‘pending ADEC-approval and adequate certification of the proposed field lab for the 2014 FUDS work.</b></p> <ul style="list-style-type: none"> <li>- Text was added to the second sentence of Section 4.4.3, “The field laboratory is pending ADEC-approval and adequate certification for the 2014 FUDS work.”</li> <li>- Text was added to the second to last sentence on Page 49, Section 4.4.5.3, “The confirmation samples will be sent TestAmerica in Tacoma, Washington and analyzed for benzo(a)pyrene by EPA Method SW8270C-SIM.”</li> </ul> |
|-----|----|-------|--|--|

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  | <ul style="list-style-type: none"> <li>- Section 4.4.5.3 was updated to include, “The confirmation samples will be sent TestAmerica in Tacoma, Washington and analyzed for cadmium and/or lead by EPA Method SW6020.”</li> <li>- Text was added to the first paragraph of section 4.4.5.4, “The confirmation samples will be sent TestAmerica in Tacoma, Washington and analyzed for PCBs by EPA Method SW8082.”</li> <li>- Text was added to third paragraph Section 4.4.6, “The confirmation samples will be sent TestAmerica in Tacoma, Washington and analyzed for cadmium and lead by EPA Method SW6020.”</li> <li>- Text was added to the 2<sup>nd</sup> paragraph, “...and sent to TestAmerica in Tacoma, Washington to be analyzed for PCBs using EPA Method SW8082.”</li> </ul> |
|--|--|--|--|--|

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| 17. | 40 | 4.4.4 | <p>What about the lead acid batteries that were removed and disposed of in 2012? Although the locations of the batteries were not noted (GPS, field notes, etc.) all future soil, sediment, and water samples associated with the NVNC should include all known COCs – not just the specific analytes previously identified with a specific site.</p> <p>How are other potentially but unconfirmed contaminated areas of concern (i.e. the location of the batteries mentioned above) going to be evaluated and/or investigated?</p> | <p>Analytical samples were collected from the former locations of the lead acid batteries and analyzed for the entire suite of analyses. Based on the sampling conducted in 2012, specific analytes exceeded the clean-up levels at certain locations at the NVNC site and based on this knowledge the FY13 CA SOW is only funded to analyze samples for analytes specific to those locations/excavations.</p> <p>All areas of concern suspected of contamination or areas where debris was removed were sampled and analyzed for the entire suite of COCs in 2012. The FY13 CA SOW is based off of the 2012 analytical data.</p> <p><b>ADEC April 23, 2014; ADEC does not disagree with the RTC however it is unclear to ADEC for example how the ‘unknown locations’ of the former battery removal areas are going to be investigated.</b></p> <p>Batteries were removed from within the footprint of the former structures and debris piles. While the specific location of the batteries were not documented and analytical samples were not collected from exact location of the</p> |
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|  |  |  |  | <p>battery removal area, analytical samples from the debris piles and former structure footprints were collected. The debris piles and former structure footprints were sampled for either all or some of the following analytes: GRO, DRO, RRO, VOCs, SVOCs, PAHs, RCRA 8 Metals, and PCBs. The analytical methods were chosen on a site to site basis depending on the type of debris removed from the area.</p> <p><b>It was also ADEC's understanding (per RTCs and approval of the final 2012 work plan) that the 2012 sampling was not going to be conclusive and that a more robust SI was to follow on all identified areas of concern after the focused removal and sampling efforts of 2012. Further clarification is necessary.</b></p> <p>The 2014 WP incorporates all activities that were scoped for the 2014 field season (previously the 2013 field season). Confirmation samples will be collected to determine if all contaminants at concentrations greater than the cleanup level were removed from the area of concern. If it is determined that a more robust SI is</p> |
|--|--|--|--|---|



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|-----|-------|-----------|--|--|
|     |       |           |  | required at a later date Bristol is open to discuss.   |
| 18. | 41-42 | Table 4-6 | <p>Please clarify whether the information provided in the table refers to 2012 or that which is being proposed for 2014 and/or both and revise the title of the table and footnotes accordingly.</p> <p>Are the excavation dimensions proposed for 2014 based upon what appears to be 2012 characterization results of extent of contaminants and their concentrations or are they historical removal dimensions?</p> <p>A new figure should be generated which depicts the sample and excavation locations.</p> | <p>Table Title changed to “2012 Sample Locations and Contaminants, Proposed 2014 Excavation Dimensions and Square Footage”.</p> <p><b>ADEC-Accepted April 23, 2014</b></p> <p>The proposed 2014 excavation dimensions are based on the 2012 characterization results. The last column of the table is now called “Proposed 2014 Excavation Dimensions (feet)”. <b>ADEC-Accepted April 23, 2014; please also discuss this in the narrative for clarity</b></p> <p>- Text was added in Section 4.4.4 paragraph 2, “...and the proposed 2014 excavation dimensions are based on the 2012 site characterization results.”</p> <p>Three additional figures are being added to show close ups of the 2012 sample locations and the proposed 2014</p> |

|     |  |                     |   |  |
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|     |  |                     |   | excavation boundaries.<br><b>ADEC-Accepted April 23, 2014</b>  |
| 19. |  | 2012 Report Figures | Figures 4-7 from the final 2012 RA-SI report should be included in this work plan for field reference and consideration of potential data gaps and associations to other nearby contaminated sites.   | Figures 4-7 from the 2012 RA-SI report have been included. These figures are now Figures 3 through 6.<br><b>ADEC-Accepted April 23, 2014</b>   |
| 20. |  | Figure 2            | Are there other camps in the vicinity of NEC (i.e. Camp Kulowiye) which may have also had materials transported to them which originated from the military activity at NEC?   | This WP will only cover sites that have received an eligibility determination.<br><b>ADEC-Accepted April 23, 2014</b>  |
| 21. |  | Figure 3            | <p>Please state the year in which the aerial photo was taken.</p> <p>Assuming that all of the depicted analytical samples were collected in 2012, the legend should state the associated year for the three matrices of samples.</p> <p>A new figure should be added that depicts all of the previous sample locations where ADEC's Method Two Cleanup Criteria were exceeded.</p> <p>A new figure should be added which depicts the known/proposed 2014 sample locations, proposed extents of excavations, staging areas, etc.</p> | <p>The date of the aerial photo has been added to all figures where applicable.<br/><b>ADEC-Accepted April 23, 2014</b></p> <p>The legend has been changed to denote that the samples were collected in 2012.<br/><b>ADEC-Accepted April 23, 2014</b></p> <p>See response to comment #19 – New Figure 6 (previously Figure 7) from the 2012 RA-SI report shows the 2012 and historical sample locations where cleanup levels were exceeded.<br/><b>ADEC-Accepted April 23, 2014</b></p> <p>See response to comment #18 – Four new figures (Figures 7 through 10) are being added. Proposed sample locations for the 2014 excavations are not being placed on the figure as they will be subject to field conditions. Text in Sections 4.4.5 and 4.4.6 describe the proposed confirmation sampling.</p> |

|     |  |                      |  |  |
|-----|--|----------------------|--|--|
|     |  |                      |  | <b>ADEC-Accepted April 23, 2014</b>  |
| 22. |  | CSM Graphic          | <p>Biota and ingestion of wild/farmed foods should be selected as a media and a pathway respectively; for which all receptors should be selected as C/F. The same should be applied to the ingestion of groundwater and dermal absorption pathways for surface water and the respective receptors. Human Health Conceptual Site Model and 'established cleanup levels':</p> <p>Alternative cleanup levels which ADEC approved for the NEC FUDS generally require institutional controls and/or long-term monitoring (i.e. MOC, site 28 drainage, etc.). It should be noted that since there is currently short-term seasonal residential activity occurring at the NVNEC, it should be evaluated whether or not it will be protective of human health to apply the NEC FUDS alternative cleanup levels which exceed the most stringent 18 AAC75 Method Two concentrations, without also possibly considering institutional controls and/or LTM at NVNEC sites.</p> | <p>The CSM graphic has been updated as requested.</p> <p><b>ADEC-Accepted April 23, 2014</b></p> <p>See response to comment # 11. Bristol is available to discuss with the project team which cleanup levels to use at the site (NEC alternative levels or Method 2), and the possibility of ICs and/or long-term monitoring.</p> <p><b>ADEC-Accepted April 23, 2014</b></p> |
| 23. |  | Draft 2013 Tech Memo | ADEC Checklists: Please note, this is a follow up comment to ADEC's comments submitted on 3-6-14 for the draft 2013 Technical Memorandum; the draft Dec. 2013 Rev0 document did not include the required ADEC Checklists nor the Laboratory Data Quality Review. Please include those documents and discuss them in either new or applicable existing sections of the final document.  | <p>The revised Tech Memo will include the ADEC Checklists and Laboratory Data Quality Review.</p> <p><b>ADEC-Accepted April 23, 2014</b></p>   |
| 24. |  | Figure 7             | Figure 7: Titled 'Proposed 2014 Excavation Areas' however the figure nor the legend depict anything associated with excavation (although figures 8-10 adequately depict the proposed excav. areas). ADEC recommends adding a heading in the legend above the 2012 samples which states: 'Proposed 2014 Removal Areas'  | Figure 7 was updated to include a note stating, "*2012 sample locations shown on this figure are the proposed 2014 excavation areas."  |
| 25. |  |                      | <b>End of ADEC Comments</b>  |  |

## Nelson, Lesa

---

**From:** Dunkin, Curtis S (DEC) <curtis.dunkin@alaska.gov>  
**Sent:** Monday, May 19, 2014 10:13 AM  
**To:** Nelson, Lesa  
**Cc:** ryannogiyuk@yahoo.com; Andrea.B.Elconin@usace.army.mil; Ellingboe, Tyler  
**Subject:** RE: Latest Responses to ADEC Comments on the Draft Savoonga NALEMP 2014 Removal Action and Site Investigation Work Plan (UNCLASSIFIED)

Hi Lesa, thank you for following up and clarifying my concerns; which are all adequately addressed via the summary and proposed sample additions in your email below. Please revise the work plan narratives and associated figures to include the 2011 and 2012 info as well as the proposed sampling locations; and also include this email chain in the final work plan. I will send the project team a letter approving the final revisions and to finalize the work plan. Please contact me if you have any questions. Thanks again and regards

### Curtis Dunkin

Environmental Program Specialist  
ADEC Contaminated Sites Program  
555 Cordova Street  
Anchorage, AK 99501  
Phone: 907-269-3053

---

**From:** Nelson, Lesa [mailto:lnelson@bristol-companies.com]  
**Sent:** Monday, May 19, 2014 10:03 AM  
**To:** Dunkin, Curtis S (DEC)  
**Cc:** ryannogiyuk@yahoo.com; Andrea.B.Elconin@usace.army.mil; Ellingboe, Tyler  
**Subject:** RE: Latest Responses to ADEC Comments on the Draft Savoonga NALEMP 2014 Removal Action and Site Investigation Work Plan (UNCLASSIFIED)

Good Morning Curtis,

We looked into the lead acid battery issue. During the 2011 field season 4 broken lead acid batteries were removed from the debris pile areas depicted on Figure 3 of the 2012 Report. It is unknown which debris pile they were removed from but they were removed from the documented debris piles. During the 2012 field season samples were collected from all of the former debris pile areas and samples were analyzed for Total RCRA 8 Metals + Ni, V, and Zn in all but 15 of the debris pile areas. We are proposing that during this field season we collect samples from these areas and analyze them for Total RCRA 8 Metals + Ni, V, and Zn. There will be an additional 15 samples plus two duplicates.

In regards to the stained soil removal, two samples (12NVNCSL56 and 59) were collected from the excavation on the northeastern area of the site.

The stained soil that was removed on the northwestern area of the site was just a small removal of surface soil that contained spilled paint. The footprint of the soil removal was extremely small. The single soil sample contained elevated concentrations of DRO, RRO, BAP, and PCBs. This area is scoped for soil removal during the 2014 field season and confirmation soil samples will be collected per the ADEC draft field sampling guidance Tables 2A and 2B.

Please let us know if this addresses your concerns and we will update the WP accordingly.

Respectfully,

**Lesla Nelson**

Environmental Scientist  
Bristol Environmental Remediation Services, LLC  
Phone : (907) 563-0013

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**From:** Dunkin, Curtis S (DEC) [<mailto:curtis.dunkin@alaska.gov>]  
**Sent:** Friday, May 16, 2014 2:54 PM  
**To:** Nelson, Lesa  
**Cc:** [ryannogiyuk@yahoo.com](mailto:ryannogiyuk@yahoo.com); [Andrea.B.Elconin@usace.army.mil](mailto:Andrea.B.Elconin@usace.army.mil); Ellingboe, Tyler  
**Subject:** RE: Latest Responses to ADEC Comments on the Draft Savoonga NALEMP 2014 Removal Action and Site Investigation Work Plan (UNCLASSIFIED)

Lesa and Robert, all, thank you for providing ADEC with the latest RTCs and the revision 2 work plan; all of which are acceptable to ADEC with the exception to RTCs in #17. This potentially represents a significant data gap that ADEC has concerns could be compounding due to how the subsequent investigations have progressed over the years; i.e. stained soil and batteries have been removed however from ADEC's perspective some of the AOCs were not adequately documented (although previous work plans stated they would be and that future investigation work would be conducted if necessary) and/or confirmation sampled. For example, there is no documentation of the battery locations, #'s of batteries at each location, the potential size of the area of concern, the condition of the batteries, etc. This is compounded with the fact that either all 'or some' of the COCs were analyzed as stated in the RTC. Are there former structures where batteries could have been removed and either no confirmation sample was collected and/or lead was not included in the analysis? This issue is important to ADEC since the NVNEC Fishcamp is intended for residential and subsistence activities. It is not ADEC's intention to require unnecessary sampling and work, however, known data gaps should be clearly identified and the work plan should address how those are going to be adequately managed. If it is known that all of the i.e. battery removal areas were specifically analyzed for lead with results below cleanup level, then this should be documented. Also i.e. if stained soil removal was followed up with confirming the extent or lack of further documentation then this should also be documented. In re: to POL-contaminated soil, ADEC guidance requires at least two confirmation samples should have been collected for the first 250 square feet, not just one. Please contact me if you have any questions. Thanks and regards

**Curtis Dunkin**

Environmental Program Specialist  
ADEC Contaminated Sites Program  
555 Cordova Street  
Anchorage, AK 99501  
Phone: 907-269-3053

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**From:** Nelson, Lesa [<mailto:lnelson@bristol-companies.com>]  
**Sent:** Thursday, April 24, 2014 1:08 PM  
**To:** Dunkin, Curtis S (DEC)  
**Cc:** [ryannogiyuk@yahoo.com](mailto:ryannogiyuk@yahoo.com); [Andrea.B.Elconin@usace.army.mil](mailto:Andrea.B.Elconin@usace.army.mil); Ellingboe, Tyler  
**Subject:** Latest Responses to ADEC Comments on the Draft Savoonga NALEMP 2014 Removal Action and Site Investigation Work Plan (UNCLASSIFIED)

Good Afternoon,

Attached are Bristol's latest responses to ADEC comments on the Draft Savoonga NALEMP 2014 RA and SI Work Plan. Our responses are highlighted in yellow. Also attached is the updated Work Plan and revised Figure 7.

Please respond at your earliest convenience.

Respectfully,

**Lesa Nelson**

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## **APPENDIX B**

### 2012 Sample Location Survey Data



### Appendix B 2012 GPS Locations Proposed for 2014 Excavations and/or Sampling

| Easting             | Northing            | Coordinate System | Media                | Sample ID                             |
|---------------------|---------------------|-------------------|----------------------|---------------------------------------|
| 1815780.11100000000 | 3409812.52389000000 | NAD83 AK SP9, ft  | Sediment Sample      | 12NVNCSD06                            |
| 1815267.13736000000 | 3410040.23917000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL05                            |
| 1815170.45394000000 | 3409984.01205000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL06                            |
| 1815581.40438000000 | 3409981.02608000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL07                            |
| 1815585.05178000000 | 3409955.91876000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL08                            |
| 1815663.61347000000 | 3409982.78353000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL09                            |
| 1815654.21585000000 | 3409860.04988000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL11                            |
| 1815679.60497000000 | 3409865.38380000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL12                            |
| 1815604.79235000000 | 3409821.80885000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL13                            |
| 1815635.36263000000 | 3409809.94305000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL14                            |
| 1815580.61957000000 | 3409764.24696000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL15                            |
| 1815799.25950000000 | 3409956.59794000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL18                            |
| 1815792.18552000000 | 3409910.67826000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL20                            |
| 1815736.97092000000 | 3409901.15881000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL21                            |
| 1815780.47004000000 | 3409825.49054000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL24                            |
| 1815776.27519000000 | 3409664.12831000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL25                            |
| 1815747.24012000000 | 3409684.86317000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL26                            |
| 1815944.19624000000 | 3409741.25220000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL27 and duplicate = 12NVNCSL39 |
| 1815882.83851000000 | 3409590.49329000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL28                            |
| 1815904.24855000000 | 3409884.79604000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL30                            |
| 1815089.57348000000 | 3410262.47795000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL40 and duplicate = 12NVNCSL64 |
| 1815088.86822000000 | 3410021.96469000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL43                            |
| 1815198.05034000000 | 3409582.74177000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL44                            |
| 1815610.46940000000 | 3409745.93996000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL51                            |
| 1815783.10822000000 | 3409763.03356000000 | NAD83 AK SP9, ft  | Soil Sample          | 12NVNCSL54 and duplicate = 12NVNCSL66 |
| 1815760.72866000000 | 3409635.57172000000 | NAD83 AK SP9, ft  | Surface water Sample | 12NVNCSW05 and duplicate 12NVNCSW11   |
| 1815883.86063000000 | 3409754.68183000000 | NAD83 AK SP9, ft  | Surface Water Sample | 12NVNCSW07                            |
| 1815881.59741000000 | 3409884.53502000000 | NAD83 AK SP9, ft  | Surface Water Sample | 12NVNCSW10                            |

## **APPENDIX C**

### Conceptual Site Model

## Human Health Conceptual Site Model Scoping Form

**Site Name:**

**File Number:**

**Completed by:**

### Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

**General Instructions:** *Follow the italicized instructions in each section below.*

### 1. General Information:

**Sources** *(check potential sources at the site)*

- |  |  |
|--|--|
| <input type="checkbox"/> USTs                          | <input checked="" type="checkbox"/> Vehicles         |
| <input checked="" type="checkbox"/> ASTs               | <input type="checkbox"/> Landfills                   |
| <input type="checkbox"/> Dispensers/fuel loading racks | <input type="checkbox"/> Transformers                |
| <input checked="" type="checkbox"/> Drums              | <input type="checkbox"/> Other: <input type="text"/> |

**Release Mechanisms** *(check potential release mechanisms at the site)*

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Spills | <input checked="" type="checkbox"/> Direct discharge |
| <input checked="" type="checkbox"/> Leaks  | <input checked="" type="checkbox"/> Burning          |
|  | <input type="checkbox"/> Other: <input type="text"/> |

**Impacted Media** *(check potentially-impacted media at the site)*

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> Surface soil (0-2 feet bgs*)  | <input checked="" type="checkbox"/> Groundwater      |
| <input checked="" type="checkbox"/> Subsurface soil (>2 feet bgs) | <input checked="" type="checkbox"/> Surface water    |
| <input type="checkbox"/> Air                                      | <input type="checkbox"/> Biota                       |
| <input checked="" type="checkbox"/> Sediment                      | <input type="checkbox"/> Other: <input type="text"/> |

**Receptors** *(check receptors that could be affected by contamination at the site)*

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> Residents (adult or child)                      | <input checked="" type="checkbox"/> Site visitor     |
| <input type="checkbox"/> Commercial or industrial worker                            | <input type="checkbox"/> Trespasser                  |
| <input checked="" type="checkbox"/> Construction worker                             | <input type="checkbox"/> Recreational user           |
| <input checked="" type="checkbox"/> Subsistence harvester (i.e. gathers wild foods) | <input type="checkbox"/> Farmer                      |
| <input checked="" type="checkbox"/> Subsistence consumer (i.e. eats wild foods)     | <input type="checkbox"/> Other: <input type="text"/> |

**2. Exposure Pathways:** *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

*If the box is checked, label this pathway complete:*

Complete

Comments:

A review of soil sample results indicate concentrations of DRO/RRO, benzo[a]pyrene, and PCB-1254, and PCB-1260 at concentrations above established cleanup levels. In addition, the metals arsenic, cadmium, lead, and chromium were also detected above cleanup levels.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

*If both boxes are checked, label this pathway complete:*

Complete

Comments:

DRO was detected in soil samples above the site-specific cleanup level of 9,200 mg/kg. DRO is listed in Appendix B as a volatile compound of concern which has the potential to permeate the skin.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☐

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☐

*If both boxes are checked, label this pathway complete:*

Incomplete

Comments:

Although some soil thawing takes place during the short summer months, underlying permafrost and frozen soil make the potential ingestion of groundwater at the site unlikely. The Native Village of Northeast Cape is located in a tidal area on the Bering Sea coast, so ingestion of groundwater does not appear to be a current or future exposure pathway.

## 2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future?



Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities).



*If both boxes are checked, label this pathway complete:*

Complete

Comments:

Site surface water bodies are not currently being used as drinking water sources; however, could potentially be used as drinking water sources in the future.

## 3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods?



Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)?



Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.)



*If all of the boxes are checked, label this pathway complete:*

Incomplete

Comments:

Contaminants present at the site above established cleanup levels are not known to pose a bioaccumulation risk.

### c) Inhalation-

#### 1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.)



Are the contaminants in soil volatile (see Appendix D in the guidance document)?



*If both boxes are checked, label this pathway complete:*

Complete

Comments:

With the possible exception of DRO present exceeding established site cleanup levels, inhalation of outdoor air appears to be an unlikely exposure pathway. Persistent winds at the site make the inhalation of contaminants in outdoor air unlikely.

## 2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminated soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures)



Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)?



*If both boxes are checked, label this pathway complete:*

Complete

Comments:

A review of soil sampling results indicate one detection of DRO in surface soil within 30-feet of a current site structure (residence).

**3. Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

**Dermal Exposure to Contaminants in Groundwater and Surface Water**

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

*Check the box if further evaluation of this pathway is needed:*

☐

Comments:

Due to the climate and nature of the site, dermal exposure of contaminants in groundwater and surface water does not appear to be an exposure pathway of concern. Only one contaminant PCB-1260 was detected in surface water samples at concentrations just above the ADEC-established cleanup level of 0.5 micrograms per liter with the highest concentration. Three surface water samples and one sample duplicate exhibited concentrations of PCB-1260 at or above the cleanup level. The highest detection of PCB-1260 in surface water was 1.0 micrograms per liter.

**Inhalation of Volatile Compounds in Tap Water**

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

*Check the box if further evaluation of this pathway is needed:*

☐

Comments:

The three remaining cabins at the site due not have plumbing and inhalation of volatile compounds in tap water is not applicable.

## Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM<sub>10</sub>). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.
- Chromium is present in soil that can be dispersed as dust particles of any size.

Generally, DEC direct contact soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because it is assumed most dust particles are incidentally ingested instead of inhaled to the lower lungs. The inhalation pathway only needs to be evaluated when very small dust particles are present (e.g., along a dirt roadway or where dusts are a nuisance). This is not true in the case of chromium. Site specific cleanup levels will need to be calculated in the event that inhalation of dust containing chromium is a complete pathway at a site.

*Check the box if further evaluation of this pathway is needed:*



Comments:

The majority of the Native Village of Northeast Cape site is covered with a vegetative mat (tundra) making the inhalation of fugitive dust an unlikely exposure pathway. However, the inhalation of fugitive dust may occur currently or in the future to industrial or construction work workers if activities include the excavation of subsurface soils.

## Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

*Check the box if further evaluation of this pathway is needed:*



Comments:

The nature and climate of the Native Village of Northeast Cape site and a review of sediment sampling results indicate that direct contact with sediment is an unlikely exposure pathway. One sediment sample collected from a small seasonal surface pond exhibited a concentration of lead (650 mg/kg) which is above the established site-specific sediment cleanup level of 530 mg/kg.



**4. Other Comments** *(Provide other comments as necessary to support the information provided in this form.)*

# HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Native Village of Northeast Cape  
Northeast Cape, St. Lawrence Island, Alaska

Completed By: Tyler Ellingboe, Bristol Project Manager

Date Completed: December 28, 2012

**Instructions:** Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.

| (1)<br>Check the media that could be directly affected by the release. | (2)<br>For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.  |
|--|--|
| Media  | Transport Mechanisms   |
| <input checked="" type="checkbox"/> Surface Soil (0-2 ft bgs)          | <input checked="" type="checkbox"/> Direct release to surface soil <i>check soil</i><br><input checked="" type="checkbox"/> Migration to subsurface <i>check soil</i><br><input checked="" type="checkbox"/> Migration to groundwater <i>check groundwater</i><br><input checked="" type="checkbox"/> Volatilization <i>check air</i><br><input checked="" type="checkbox"/> Runoff or erosion <i>check surface water</i><br><input type="checkbox"/> Uptake by plants or animals <i>check biota</i><br><input type="checkbox"/> Other (list): _____ |
| <input checked="" type="checkbox"/> Subsurface Soil (2-15 ft bgs)      | <input checked="" type="checkbox"/> Direct release to subsurface soil <i>check soil</i><br><input checked="" type="checkbox"/> Migration to groundwater <i>check groundwater</i><br><input checked="" type="checkbox"/> Volatilization <i>check air</i><br><input type="checkbox"/> Uptake by plants or animals <i>check biota</i><br><input type="checkbox"/> Other (list): _____   |
| <input checked="" type="checkbox"/> Ground-water                       | <input checked="" type="checkbox"/> Direct release to groundwater <i>check groundwater</i><br><input checked="" type="checkbox"/> Volatilization <i>check air</i><br><input checked="" type="checkbox"/> Flow to surface water body <i>check surface water</i><br><input checked="" type="checkbox"/> Flow to sediment <i>check sediment</i><br><input type="checkbox"/> Uptake by plants or animals <i>check biota</i><br><input type="checkbox"/> Other (list): _____  |
| <input checked="" type="checkbox"/> Surface Water                      | <input checked="" type="checkbox"/> Direct release to surface water <i>check surface water</i><br><input checked="" type="checkbox"/> Volatilization <i>check air</i><br><input checked="" type="checkbox"/> Sedimentation <i>check sediment</i><br><input type="checkbox"/> Uptake by plants or animals <i>check biota</i><br><input type="checkbox"/> Other (list): _____  |
| <input checked="" type="checkbox"/> Sediment                           | <input checked="" type="checkbox"/> Direct release to sediment <i>check sediment</i><br><input checked="" type="checkbox"/> Resuspension, runoff, or erosion <i>check surface water</i><br><input type="checkbox"/> Uptake by plants or animals <i>check biota</i><br><input type="checkbox"/> Other (list): _____   |

| (3)<br>Check all exposure media identified in (2). | (4)<br>Check all pathways that could be complete. The pathways identified in this column <b>must</b> agree with Sections 2 and 3 of the Human Health CSM Scoping Form.   | (5)<br>Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure. |                                  |   |                      |                                   |                       |       |
|--|--|---|----------------------------------|---|----------------------|-----------------------------------|-----------------------|-------|
| Exposure Media                                     | Exposure Pathway/Route   | Current & Future Receptors  |                                  |   |                      |                                   |                       |       |
|  |  | Residents (adults or children)  | Commercial or Industrial workers | Site visitors, trespassers, or recreational users | Construction workers | Farmers or subsistence harvesters | Subsistence consumers | Other |
| <input checked="" type="checkbox"/> soil           | <input checked="" type="checkbox"/> Incidental Soil Ingestion<br><input checked="" type="checkbox"/> Dermal Absorption of Contaminants from Soil<br><input checked="" type="checkbox"/> Inhalation of Fugitive Dust                | C/F   | C/F                              | C/F   | C/F                  | C/F                               | C/F                   |       |
| <input checked="" type="checkbox"/> groundwater    | <input checked="" type="checkbox"/> Ingestion of Groundwater<br><input type="checkbox"/> Dermal Absorption of Contaminants in Groundwater<br><input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water                | C/F   | C/F                              | C/F   | C/F                  | C/F                               | C/F                   |       |
| <input checked="" type="checkbox"/> air            | <input checked="" type="checkbox"/> Inhalation of Outdoor Air<br><input checked="" type="checkbox"/> Inhalation of Indoor Air<br><input checked="" type="checkbox"/> Inhalation of Fugitive Dust                                   | C/F   | C/F                              | C/F   | C/F                  | C/F                               | C/F                   |       |
| <input checked="" type="checkbox"/> surface water  | <input checked="" type="checkbox"/> Ingestion of Surface Water<br><input checked="" type="checkbox"/> Dermal Absorption of Contaminants in Surface Water<br><input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water | C/F   | C/F                              | C/F   | C/F                  | C/F                               | C/F                   |       |
| <input checked="" type="checkbox"/> sediment       | <input checked="" type="checkbox"/> Direct Contact with Sediment   | C/F   | C/F                              | C/F   | C/F                  | C/F                               | C/F                   |       |
| <input checked="" type="checkbox"/> biota          | <input checked="" type="checkbox"/> Ingestion of Wild or Farmed Foods  | C/F   | C/F                              | C/F   | C/F                  | C/F                               | C/F                   |       |

## Appendix C: Blank Ecoscoping Form

Site Name: Native Village of Northeast Cape, St. Lawrence Island, AK  
Completed by: Tyler Ellingboe, Bristol Project Manager  
Date: May 7, 2013

*Instructions: Follow the italicized instructions in each section below. "Off-ramps," where the evaluation ends before completing all of the sections, can be taken when indicated by the instructions. Comment boxes should be used to help support your answers.*

### 1. Direct Visual Impacts and Acute Toxicity

Are direct impacts that may result from the site contaminants evident, or is acute toxicity from high contaminant concentrations suspected? *Check the appropriate box.*

- ☐ Yes – describe observations below and evaluate all of the remaining sections without taking any off-ramps.  
☒ No – go to next section.

Comments:

No visual impacts from contaminants are apparent.

### 2. Terrestrial and Aquatic Exposure Routes

*Check each terrestrial and aquatic route that could occur at the site.*

#### Terrestrial Exposure Routes

- ☐ Exposure to water-borne contaminants as a result of wading or swimming in contaminated waters or ingesting contaminated water  
☐ Contaminant uptake in terrestrial plants whose roots are in contact with contaminated surface water  
☐ Contaminant migration via saturated or unsaturated groundwater zones and discharge at upland "seep" locations (not associated with a wetland or water body)  
☐ Contaminant uptake by terrestrial plants whose roots are in contact with soil moisture or groundwater present within the root zone (generally no more than 4 feet below ground surface)  
☒ Particulates deposited on plants directly or from rain splash  
☒ Incidental ingestion and/or exposure while animals grub for food, burrow (up to 2 feet for small animals or 6 feet for large animals), or groom

- ☐ Inhalation of fugitive dust or vapors disturbed by foraging or burrowing activities
- ☐ Bioaccumulatives (other than PAHs, which bioaccumulate more readily in aquatic environments) taken up by soil invertebrates, which are in turn eaten by higher food chain organisms (see the Policy Guidance on Developing Conceptual Site Models)
- ☐ Other site-specific exposure pathways

#### Aquatic Exposure Routes

- ☐ Contaminated surface runoff migration to water bodies through swales, drainage ditches, or overland flow
- ☐ Aquatic receptors exposed through osmotic exchange, respiration, or ventilation of surface waters
- ☐ Contaminant migration via saturated or unsaturated groundwater zones and discharge at "seep" locations along banks or directly to surface water
- ☐ Deposition into sediments from upwelling of contaminated groundwater
- ☒ Aquatic receptors may be exposed directly to contaminated sediments through foraging or burrowing, or indirectly exposed due to osmotic exchange, respiration, or ventilation of sediment pore water.
- ☒ Aquatic plants rooted in contaminated sediments
- ☐ Bioaccumulatives (see the Policy Guidance on Developing Conceptual Site Models) taken up by sediment invertebrates, which are in turn eaten by higher food chain organisms
- ☐ Other site-specific exposure pathways

*If any of the above boxes are checked go on to the next section. If none are checked, end the evaluation and check the box below.*

☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

#### Comments:

PCBs have an affinity for soil/sediment and are not expected to go into solution easily. Saturated soils in the area should minimize fugitive dust issues. Underlying permafrost and frozen soil, present the majority of the year, make potential ingestion of groundwater unlikely.

### 3. Habitat

*Check all that may apply. See Ecoscoping Guidance for additional help.*

- ☐ Habitat that could be affected by the contamination supports valued species (i.e., species that are regulated, used for subsistence, have ceremonial importance, have commercial value, or provide recreational opportunity)
- ☐ Critical habitat or anadromous stream in an area that could be affected by the contamination
- ☒ Habitat that is important to the region that could be affected by the contamination

- ☐ Contamination is in a park, preserve, or wildlife refuge

*If any of the above boxes are checked go on to the next scoping factor. If none are checked, end the evaluation and check the box below.*

- ☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

There are no known threatened or endangered species within the vicinity of the site. The relatively small footprint of the site should present little or no impact to the island's caribou herd. Contamination present could impact the Native Village of Savoonga's goal to re-populate the area.

#### 4. Contaminant Quantity

*Check all that may apply. See Ecoscoping Guidance for additional help.*

- ☐ Endangered-, threatened-, or species of special concern are present  
☒ The aquatic environment is or could be affected  
☒ Non-petroleum contaminants may be present, or the total area of petroleum-contaminated surface soil exceeds one-half acre

*If any of the above boxes are checked go on to the next scoping factor. If none are checked, end the evaluation and check the box below.*

- ☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Diesel-range and residual-range organics, polynuclear aromatic hydrocarbons, cadmium, lead, and PCBs have been detected in surface soil above established cleanup levels. Cadmium and lead have been detected in sediment above cleanup levels. PCBs have been detected in surface water above the ADEC cleanup level.

#### 5. Toxicity Determination

*Check all that apply.*

- ☐ Bioaccumulative chemicals are present (see Policy Guidance on Developing Conceptual Site Models)  
☒ Contaminants exceed benchmark levels (see the Ecological Benchmark Tool in RAIS, available at: [http://rais.ornl.gov/tools/eco\\_search.php](http://rais.ornl.gov/tools/eco_search.php))

*If either box is checked complete a detailed Ecological Conceptual Site Model (see DEC's Conceptual Site Model Guidance) and submit it with the form to you DEC Project Manager.*

*If neither box is checked, check the box below and submit this form to your DEC Project Manager.*

☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Contaminants present at the site above established cleanup levels are not known to pose a bioaccumulation risk. Additional site investigation activities are planned for the site.

## **APPENDIX D**

### Asbestos and Lead-Based Paint Hazard Abatement Plan



# Asbestos Hazard Abatement Plan

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NALEMP Removal Action Cooperative Agreement  
Contract # NALEMP-FY-11-01  
Native Village of Northeast Cape  
St. Lawrence Island, Alaska

## Prepared For:

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Bristol Environmental Remediation Services, LLC  
111 W 16<sup>th</sup> Avenue  
Third Floor  
Anchorage, AK 99501





## Project Specific Work Plan

|                                   |   |
|-----------------------------------|---|
| Project Location:                 | Native Village of Northeast Cape<br>"Northeast Cape Fish Camp"<br>Saint Lawrence Island, Alaska   |
| Client :                          | POC: Tyler Ellingboe, Project Manager<br>Bristol Environmental Services.<br>111 W 16th Ave, third floor<br>Anchorage, AK 99501-5109   |
| Abatement<br>Contractor:          | POC: Alan Caldwell, Project Manager<br>Satori Group, Inc.<br>1310 E. 66 <sup>th</sup> Avenue, Suite 2<br>Anchorage AK 99518<br>(907) 332-0456 Phone<br>(907) 332-0457 Fax       |
| Industrial<br>Hygiene Laboratory: | Satori Group, Inc.<br>POC: Alan Caldwell, Industrial Hygienist<br>1310 E. 66 <sup>th</sup> Avenue, Suite 2<br>Anchorage, AK 99518<br>(907) 332-0456 Phone<br>(907) 332-0457 Fax |

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## ACRONYM LIST

---

|        |   |
|--------|---|
| AAC    | Alaska Administrative Code                                    |
| ACBM   | Asbestos Containing Building Material                         |
| ACM    | Asbestos Containing Materials                                 |
| AHERA  | Asbestos Hazard Emergency Response Act                        |
| AIHA   | American Industrial Hygiene Association                       |
| AKDOL  | Alaska Department of Labor                                    |
| ANSI   | American National Standards Institute                         |
| AS     | Alaska Statutes   |
| ASTM   | American Society for Testing and Materials                    |
| BLM    | Bureau of Land Management                                     |
| BZ     | Breathing Zone  |
| C      | Abatement Clearance   |
| CFM    | Cubic Feet per Minute   |
| CFR    | Code of Federal Regulations                                   |
| CPR    | Cardiopulmonary Resuscitation                                 |
| DOL    | Department of Labor   |
| DOT    | Department of Transportation                                  |
| EPA    | Environmental Protection Agency                               |
| f/cc   | Fibers per cubic centimeter                                   |
| FAA    | Federal Aviation Administration                               |
| GFCI   | Ground Fault Circuit Interrupter                              |
| HEPA   | High Efficiency Particulate Air                               |
| HVAC   | Heating, Ventilation, and Air Conditioning                    |
| IEA    | Initial Exposure Assessment                                   |
| IHT    | Industrial Hygienist Technician                               |
| L/min  | Liters per minute   |
| MSDS   | Material Safety Data Sheets                                   |
| NAM    | Negative Air Machine  |
| NEA    | Negative Exposure Assessment                                  |
| NESHAP | National Emissions and Standards for Hazardous Air Pollutants |
| NFPA   | National Fire Protection Agency                               |
| NIOSH  | National Institute for Occupational Safety and Health         |
| NRC    | National Response Center                                      |
| NVLAP  | National Volunteer Lab Accreditation Program                  |
| OSHA   | Occupational Safety and Health Administration                 |
| PPE    | Personal Protective Equipment                                 |
| PCM    | Phase Contrast Microscopy                                     |
| PEL    | Permissible Exposure Limit                                    |
| PF     | Protection Factor   |
| PLM    | Polarized Light Microscopy                                    |
| PM     | Project Manager   |
| POC    | Point of Contact  |
| Pre    | Pre-abatement   |
| SSHP   | Site Safety Health Plan                                       |
| TWA    | Time Weighted Average   |
| TEM    | Transmission Electron Microscopy                              |
| UL     | Underwriters Laboratories                                     |

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## APPENDICIES

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**ATTACHMENT 1: LBP HAZARD ABATEMENT PLAN**

**ATTACHMENT 2: AHA ASBESTOS / LBP REMOVAL**

## References

The latest revision of the following Standards will be followed during all hazardous materials removal activities. In any instance where adopted standards are in conflict with each other, the most stringent shall apply.

Potentially applicable publications:

### CODE OF FEDERAL REGULATIONS (CFR)

#### **OSHA Regulations**

|                      |   |
|----------------------|---|
| 29 CFR Part 1910     | Occupational Safety and Health Standards - General Industry |
| 29 CFR Part 1910.134 | Respiratory Protection                                      |
| 29 CFR Part 1910.141 | Sanitation  |
| 29 CFR Part 1910.147 | Control of Hazardous Energy (lock-out/tag-out)              |
| 29 CFR 1910.1000     | Air Contaminants  |
| 29 CFR Part 1926     | Occupational Safety and Health Standards for Construction   |
| 29 CFR 1910.1200     | Hazard Communications                                       |

#### **EPA Regulations**

|                 |  |
|-----------------|--|
| 40 CFR Part 61  | EPA Asbestos NESHAPS   |
| 40 CFR 262      | Standards Applicable to Generators of Hazardous Waste            |
| 40 CFR 263      | Standards Applicable to Transporters of Hazardous Waste          |
| 40 CFR 270      | EPA Administered Permit Programs: Hazardous Waste Permit Program |
| 40 CFR 273      | Standards for Universal Waste Management                         |
| 40 CFR Part 311 | Worker Protection  |
| 40 CFR 763      | Asbestos Hazard Emergency Response Act                           |

#### **NIOSH Regulations**

|                |  |
|----------------|--|
| 42 CFR Part 84 | Approval of Respiratory Protective Devices |
|----------------|--|

#### **DOT Regulations**

|            |   |
|------------|---|
| 49 CFR 171 | General Information, Regulations and Definitions  |
| 49 CFR 172 | Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information and Training Requirements |
| 49 CFR 173 | Shippers – General Requirements for Shipments and Packaging   |
| 49 CFR 178 | Specifications of Packaging   |

### ALASKA ADMINISTRATIVE CODE (AAC)

|                    |   |
|--------------------|---|
| 18 AAC 60          | Solid Waste Management                    |
| 8 AAC 61.600 - 790 | Alaska Asbestos Abatement Certification   |
| 8 AAC 61           | Occupational Health and Safety-Asbestos   |
| 8 AAC 61.110       | Additional Hazard Communication Standards |

### ALASKA STATUTES (AS)

|              |                                       |
|--------------|---------------------------------------|
| AS 45.50.447 | Titles Relating to Industrial Hygiene |
| AS 18.31     | Health and Safety – Asbestos          |

FEDERAL STANDARDS

313B Material Safety Data Sheets (MSDS)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2 Fundamentals Governing the Design and Operation of Local Exhaust Systems

ANSI Z87.1 Errata; Z87.1a) Occupational and Educational Eye and Face Protection

ANSI Z88.2 Respiratory Protection

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4397 Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications

ASTM E 96 Water Vapor Transmission of Materials

ASTM E 1368 Visual Inspection of Asbestos Abatement Projects

ENVIRONMENTAL PROTECTION AGENCY

EPA 340/1-90-018 Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance

EPA 340/1-90-019 Asbestos/NESHAP Adequately Wet Guidance

EPA 560/5-85-024 Guidance for Controlling Asbestos-Containing Materials in Buildings

UNDERWRITERS LABORATORIES (UL)

NL 586 High-Efficiency Particulate Air Filter Units

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701 (1999) Fire Tests for Flame Propagation of Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH 94-113 NIOSH Manual of Analytical Methods

UNITED STATES ARMY CORPS OF ENGINEERS

EM 385 1-1 Sept. 15 2008

## **BACKGROUND & PURPOSE**

Bristol Environmental Services (herein Bristol) has subcontracted Satori Group, Inc. (herein Satori) for completing hazardous material abatement at the Northeast Cape Fish Camp located adjacent to the NE Cape FUDS site on St. Lawrence Island, Alaska.

The purposes of this plan are as follows:

1. To protect the safety and health of the hazardous materials workers and others involved in the project.
2. To avoid contamination outside the project work area by asbestos fibers or other hazardous materials originating within the project.
3. To assure compliance with applicable federal and state regulations for asbestos, lead and hazardous materials in construction.
4. To assure compliance with requirements of the Owner generated contract.

### **Description of Work**

Based on the scope of work, the following asbestos containing materials will be removed during the abatement action prior to building demolition:

| Item Title       | Quantity | Condition  | Removal Method                    |
|------------------|----------|------------|-----------------------------------|
| ACM Tile/ Mastic | Unknown  | Good/ Fair | Class II, HEPA Vacuum, Hand tools |
| ACM CAB          | Unknown  | Good       | Class II HEPA Vacuum, Hand tools  |

## **GENERAL COMMENTS – REGULATIONS**

### **Definitions**

In the Occupational Safety and Health Administration (OSHA) regulations, “asbestos containing material” means any material containing more than 1% asbestos. Tile and mastic along with other materials installed prior to 1981 must be considered asbestos containing, unless an industrial hygienist determines that any of these materials are asbestos-free using recognized analytical techniques.

Friable: The EPA’s Asbestos Hazard Emergency Response Act (AHERA) and NESHAP regulations define the term friable as the following: a material that when dry may be crumbled, pulverized, or reduced to powder by hand pressure. This definition includes previously non-friable material after such previously non-friable material becomes damaged to the extent that when dry, it may be crumbled, pulverized, or reduced to powder by hand pressure.

### **Unacceptable Practices**

The following work practices shall not be used:

- High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.



- Compressed air used to remove asbestos containing materials, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.
- Dry sweeping, shoveling, or other dry clean up.
- Employee rotation as a means of reducing employee exposure to asbestos.

## CONTRACTOR QUALIFICATIONS

Satori Group's personnel qualifications are summarized in the below table. Satori Group has provided environmental services throughout Alaska since 2001. In addition to being an American Industrial Hygiene Association (AIHA) laboratory, Satori Group is also an EPA certified Lead Based Paint (LBP) firm and State of Alaska recognized training provider for AHERA Contractor/Supervisor courses. Satori's project experience includes work throughout Alaska involving asbestos abatement, hazardous materials surveys, groundwater monitoring, health and safety training, LBP inspections and risk assessments and other services.

Satori Group has worked directly for several federal agencies, including, but not limited to: United States Army Corp of Engineers (USACE), Federal Aviation Administration (FAA), United States Coast Guard (USCG), Bureau of Land Management (BLM), United States Air Force (USAF). In addition, Satori Group has subcontracted with several large corporations including: Jacob's Engineering, Kiewit Construction, Neeser Construction, Weston Solutions, and others.

A summary of project personnel that will contribute to contract execution includes:

| Project Staff | Position                                |                 | Industry / Work Experience | Education            |
|---------------|---|-----------------|----------------------------|----------------------|
| 1 & 2         | Contract/Project Manager                | Alan Caldwell   | 9                          | Bachelors of Science |
| 3             | Health & Safety Manager                 | Alan Caldwell   | 9                          | Bachelors of Science |
| 4             | Industrial Hygiene Technicians          | Multiple        | Varying                    | Varying              |
| 5             | Competent Person                        | Charlie Skannes | 9                          | High School          |
| 6             | Finance                                 | Jill Lucas      | 8                          | Bachelors of Science |
| 7             | Administration                          | Mary Williams   | 4                          | Office Specialist    |
| 8             | Certified 40-hr Alaska Asbestos Workers | Multiple        | Varying                    | Varying              |

## **Project Organization**

General project information and organization is provided on the work plan cover page. The following positions and responsibilities are identified for this project.

**Prime Contractor Representative:** POC Tyler Ellingboe. He will be responsible for contractual agreements. He will schedule and coordinate activities for the subcontractors who work at this project.

**Project Staff 1&2: Satori Contract/Project Manager:** Alan Caldwell, Satori. Mr. Caldwell will review and authorize contract agreements with SBC and any required subcontractors. Changes to the contract scope of work, schedule, or cost impacts will be addressed by Mr. Caldwell. In addition, project progress invoicing will reviewed, confirmed, and submitted by the Contract Manager. Mr. Caldwell has many years of environmental consulting experience and holds numerous health and safety certifications.

**Project Staff 3: Health and Safety Site Manager/ Industrial Hygienist:** Alan Caldwell, Satori. Mr. Caldwell will manage Industrial Hygiene Technicians (IHTs) associated with the project, insure project monitoring is protective of human health and the environment, and review health and safety hazards that may be encountered for various tasks. Mr. Caldwell has nine years of experience in the health and safety field. Mr. Caldwell is a board approved AIHA Asbestos Analyst Registry (AAR) participant, approved Alaska 40-hr Contractor/Supervisor instructor, certified EPA LBP Risk Assessor, and holds many additional health and safety certifications.

**Project Staff 4: Independent Industrial Hygiene Technicians:** Satori Group, Inc. will perform air monitoring during this project. All technicians will perform air monitoring in accordance with recognized industry standards and applicable regulations. All analysis of samples will be done by a certified NIOSH 582 technician.

**Project Staff 5: Competent Person:** Charlie Skannes, Satori. -- In addition to current State of Alaska asbestos worker certification, Mr. Skannes has over 10 years asbestos abatement experience with construction safety and health hazards, engineering controls, safe work practices and personal protective equipment. He will submit daily logs and reports to the Project Manager (PM). The competent person shall be available at all times during hazardous material abatement efforts and have the authority to stop work.

**Project Staff 6: Finance:** Jill Lucas, Satori. Ms. Lucas will complete certified payroll during the contract execution. She will receive, review, and confirm all project costs including vendors, subcontractors, and all other costs. Ms. Lucas has managed Satori Group finances, completed salaried and certified payroll, and provide job cost accounting since company inception.

**Project Staff 7: Administration:** Mary Williams, Satori. Ms. Williams will assist in several key office functions. She will complete data entry for accounting, coordinate staff logistical requirements, review all worker training requirements and expiration dates, and other key office duties. Ms. Williams is experienced with Satori Group's office procedures, computer programs, and nearly all office equipment operations.

**Project Staff 8: Workers:** Satori personnel. Each worker on the site will have a current Alaska Department of Labor (AKDOL) asbestos Certificate of Fitness, medical approval; respirator fit test, Hazwoper, and site-specific hazard communication training.

## **PRE-WORK NOTIFICATIONS AND SITE INSPECTIONS**

### ***Notifications***

Satori will notify the Department of Labor (DOL) for all workers to fulfill the requirement under state law. Satori will provide copies of this work plan; discuss and respond to questions, record concerns, and respond to all reasonable requests within Satori's authority. The supervisors of any other construction trades present in the general area as well as the adjacent inhabitants will be notified of the abatement activity prior to starting work and of the closure of the work areas to unauthorized personnel.

At this time no USEPA notice will need to occur under the 40 CFR 61 Subpart M NESHAP standard. If threshold amounts pertaining to the notification are achieved, work will be stopped for 10 working days during which time notice to USEPA will be given in accordance with the regulation.

### ***Schedule***

The project schedule will be set with the General Contractor once submittal approval has been received. No work will commence on site until approval of submittals has been received.

### ***Site Inspection/Unexpected Discovery of Asbestos***

The Competent Person will inspect each identified work area prior to beginning any abatement efforts to determine whether conditions conform to those as indicated in the work plan. If the Competent Person identifies any condition that differs from the work plan or which presents any special problem, which should be brought to the attention of the Owner, then the Competent Person will notify Satori's Project Manager.

### ***Site Control***

For general site control, Satori shall maintain a regulated area around each abatement work area. Smoking will be strictly prohibited to a designated location outdoors. Entry to the regulated area will be limited to those people with prior clearance and who have current asbestos abatement certifications. The controlled area will be secured at the end of each work shift; however demarcated work areas may remain overnight. The entry point will be properly labeled with Asbestos Danger signs.

### ***Site Control Log***

A "Regulated Area Sign In/Out Log" will be kept on the outside of the regulated area. All personnel will be required to sign this form and provide the following information: name, organization, time of arrival, time of departure, asbestos certification card number, social security number, and the type of respiratory protection utilized. All workers entering the work area will be required to sign-in and sign-out each time they enter or leave the work area.

Entry to asbestos control areas will be restricted to only those people with prior clearance and designated representatives who have a current Asbestos Abatement Certification card from the State of Alaska.

## ***Posting Regulatory Required Permits and Notices***

At the entrance to the job site or the on-site office, the Competent Person shall post all required notices and permits, specifically, the AKDOL approval for each worker. AKDOL has been provided a list of workers on the project.

## ***REQUIRED PERSONNEL PROTECTIVE EQUIPMENT (PPE)***

Abatement personnel for Satori, asbestos consultants and any authorized visitor(s) will be provided with ½ face respirator, disposable full body protective clothing (e.g., Disposable coveralls), head coverings, and gloves prior to entering the designated work areas.

### ***Air Purifying Respirators***

For all disturbance activities, personnel will wear NORTH™ half-face air-purifying respirators equipped with HEPA filters and chemical cartridges. The respirators are National Institute for Occupational Safety and Health (NIOSH) certification as required by 29 CFR 1910.134. Satori ensures that those individuals who wear respirators receive fit testing and respiratory training initially and at least once a year thereafter. In addition, Satori ensures;

- a record of fit testing and training is maintained;
- a certification from an occupational physician is received permitting the individual to wear respiratory protection;
- employees are wearing respirators properly;
- employees care for and store their respirators per standard operating procedures.

Respirators will be visually inspected before and after each use. This inspection procedure will include inspecting for any signs of wear or warping of the face piece, defects in the valve system, and damage to straps. All respirators will be cleaned with alcohol wipes after each use, dried, and placed in plastic bags for storage after being decontaminated from usage in regulated area. Use and maintenance of respirators shall be in compliance with Satori Group, Inc.'s Respiratory Protection Plan.

### ***Whole Body Protection***

Personnel working at the project site shall be provided with whole body protection.

### ***Coveralls***

Personnel will wear disposable-breathable suits (asbestos abatement) or full body polyethylene coated disposable coveralls suits (chemical hazard abatement). These suits have hoods and booties and will afford the workers adequate protection.

### ***Gloves***

Personnel will be issued, and will be required to wear, gloves where those gloves can be reasonably expected to prevent injury. The Competent Person will maintain a supply of varying types and sizes of gloves. Leather or leather palmed gloves will be issued for most removal activities.

### ***Foot Coverings***

Personnel will wear leather steel-toed safety boots that provide ankle protection whenever working at the site. This protection will conform to ANSI Z41.1- 1969.

### ***Protective Eye Wear***

Personnel will be issued, and will be required to wear, safety glasses or goggles whenever the personnel are on site. The Competent Person will maintain an adequate supply of glasses or goggles for employee use. Eye protection will conform to ANSI Z87.1-2003.

## ***WORKER PROTECTION***

### ***Site Specific Training***

The Competent Person will provide the site-specific training prior to beginning work at the site. No site workers will be allowed to begin work on site until the site-specific training is completed and documented by the Competent Person. This training will address this Hazardous Materials Work Plan (HMWP), Site Safety and Health Plan (SSHP), and all safety and health issues, and procedures pertinent to site operations. All workers must possess a valid "Alaska Department of Labor, Certificate of Fitness" for Asbestos Abatement.

Additionally, all workers must have completed the following training and orientation:

1. Hazard Communication training as required by 29 CFR 1910.1200
2. Respiratory Protection Training as required by 29 CFR 1910.134
3. First Aid and Cardiopulmonary Resuscitation (CPR) Training (min. 2 employees)
4. Emergency response procedures
5. The site safety and health plan for this project
6. The respiratory protection program & requirements
7. The asbestos abatement work plan & procedures

Upon arrival at the site, employees will be further trained in the following areas:

- Project introduction and orientation;
- Requirements and responsibilities for accident prevention and maintaining a safe and healthful work environment;
- Hazard communication training for all hazardous materials brought on site;
- Job hazards and the means to control/eliminate those hazards including applicable activity hazard analyses located in the Site Safety and Health Plan;
- Selection and use of PPE;
- Employee and supervisor responsibilities for reporting all accidents and incidents;
- Decontamination procedures;
- Procedures for reporting and correcting unsafe conditions or practices.

### ***Medical Surveillance***

Use of respiratory protection is restricted to individuals who have been determined to be "medically fit" by a licensed physician within the preceding 12 months. Medical surveillance will be provided in accordance with 29 CFR 1926.1101(m), and as follows:

- Prior to assignment of the employee to an area where negative pressure respirators are worn;
- When the employee is assigned to an area where exposure to asbestos may be at or above the permissible exposure limit for 30 or more days per year, or engage in Class I, II, or III work for a combined total of 30 or more days per year, a medical examination will be given within 10 working days following the thirtieth day of exposure; at least annually thereafter.

All personnel working on this project are entered into Satori's Medical Surveillance program and have current medical approval for wearing respirators to conduct hazardous material abatement.

## **INITIAL EXPOSURE ASSESSMENT**

Initial exposure assessments (IEA) in accordance with 29 CFR 1926.1101(f) (2) are provided to verify that the personnel will be wearing proper PPE on this project.

The following is the Initial Exposure Assessment for the project:

Tasks: Various Class II Removal Projects:

Reference Project #1: Satori – 3401 Minnesota Drive Abatement  
Date: 2/1/13  
Satori Project Number: 10923  
TWA Results (8 hr) – 0.016 f/cc

Reference Project #1: Satori – Cordova Electric Building  
Date: 1/13/13  
Satori Project Number: 10916  
TWA Results (8 hr) – 0.019 f/cc

Pursuant to 29 CFR 1926.1101 (f) (2) (ii). *An Initial Exposure Assessment takes into consideration both the monitoring results and all observations, information or calculations which indicate employee exposure to asbestos, including any previous monitoring conducted in the workplace, or of the operations of the employer which indicate the levels of airborne asbestos likely to be encountered on the job.*

The Initial Exposure Assessment accounts for competent personnel encountering asbestos abatement projects where knowledge and experience from similar projects exists.

The Competent Person shall review exposure data immediately before or at the initiation of any operation to determine the expected exposures during the operation. This assessment will be completed in time to comply with the requirements, which are triggered by exposure data or lack of negative exposure assessment, and to assure that all control systems planned are appropriate and will work properly.

## **HYGIENE FACILITIES AND PRACTICES**

### **DECONTAMINATION AREA EXIT PROCEDURES**

The anticipated removal work will be done under Class II conditions. If the material becomes friable due to sanding, grinding or aggressive removal, the following procedures will be executed for Class I decontamination:

#### ***Class I Decontamination***

1. Equipment/Dirty Room - This room is where employees will remove and dispose of their contaminated disposable clothing prior to leaving the work area and entering the shower room. Surfaces of the equipment room shall be wet wiped after each shift.

2. Shower Room - Shower facilities will be provided in accordance with 29 CFR 1910.141, "Sanitation." One shower will be located within each decontamination facility, hot and cold water, and soap will be made available within each shower and clean towels will be provided. If hot water service can be secured from an adjacent building a backflow protection device will be installed at the point of connection. Should sufficient hot water not be available from an adjacent building then an electric water heater will be provided. Flow and temperature controls for the shower system will be located within the shower and shall be adjustable by the user. The wastewater from the shower shall be collected and filtered to remove lead contamination. The filters and residue resulting from the shower shall be disposed of as lead contaminated material.
3. Clean Room: The clean change room is used for disrobing and donning disposable clothing and respirators prior to entering the containment area. It is also used for redressing after leaving the containment area. A container to hold personal gear shall be provided for each worker in the clean room. The floor of the clean room shall be kept dry and clean at all times. Water from the shower shall not be allowed to wet the floor in the clean room.

All water from the shower unit and any other recovered water will be filtered in a series of stages with the final filtration stage sufficient to meet discharge standard of 18 AAC 70. All filters will be properly disposed of.

Floor areas in the three-stage decontamination unit will be kept dry and clean. No equipment, bags or other miscellaneous materials will be allowed to accumulate inside the decontamination unit. Good housekeeping practices will be consistently maintained

### ***Class II Decontamination***

The following procedures will be executed for Class II operations for decontamination:

1. Each person shall HEPA vacuum thoroughly the other persons clothing before leaving the regulated area.
2. A pump sprayer with clean potable water will be staged adjacent to the regulated area exit. Workers will wash their hands, remove their respirators, and wash their faces whenever leaving the regulated area.
3. Respirators will be stored in Ziploc™ bags after cleaning.
4. The Sign in/Sign out log will be signed each time entry/egress is made into the containment.
5. Employees shall remove their protective clothing and deposit the clothing in labeled impermeable bags or container for disposal as ACM.
6. Each worker must shower at the end of the workday. This may be done at the worker's living quarters immediately after arrival.

***Note: For major or life threatening injuries, the injury takes precedence over any contamination. When possible, contamination spread should be minimized through decontamination or covering the contamination.***

### ***Material and Equipment Decontamination***

Equipment and surfaces of containers filled with ACM shall be cleaned prior to being removed from the regulated area. Any tools, equipment, and reusable PPE (safety glasses, hardhats) that have

been used for asbestos in the regulated area shall be decontaminated before leaving the regulated area. Use the following procedures for decontamination of equipment and materials:

1. Equipment will be washed and scrubbed in soapy water to remove the gross contamination and wiped dry with a clean cloth. Water generated during hand washing and hand tool cleaning will be disposed of into asbestos disposal bags that contain disposable coveralls, gloves, cleaning rags, or other asbestos decontamination materials.
2. Items that cannot be fully decontaminated will be bagged and sealed before taken out of containment.

## REGULATED AREAS

Regulation of asbestos projects will be accomplished by using asbestos danger ribbon at all entryways to the work area. Within the work areas, HEPA filter equipped fan units will be used as a nuisance dust engineering control and provide airflow between the regulated area and the outside air. All entry and egress locations will have "Danger Asbestos" signs prominently placed until the area is deemed acceptable for re-entry.

Asbestos danger ribbon will contain the following text and appearance:

Sign size: 3" x 1000 ft  
Use: All entrances, exits, load-outs, critical barriers and perimeter demarcations in combination with asbestos danger tape.



## Signs

OSHA compliant "Danger Asbestos" signs will be posted on site. Only one entrance will be available during abatement for access to the work areas. All access to regulated areas will be restricted and strictly enforced when abatement of ACM begins.

Signs at any potential entry location will contain the following text and appearance:

Sign size: 10" w x 14" h  
Use: All entrances, exits, load-outs, critical barriers and perimeter demarcations in combination with asbestos danger tape.





## **Warning Labels**

Warning labels will be affixed to each ACM danger bag containing debris. The labels will contain the following text and appearance:

Sign size: 3" w x 5" h

Use: All wrap and cut piping, wrapped storage tanks or other asbestos materials not disposed of into labeled "Danger Asbestos" bags.



## **Local Exhaust System**

All abatement work will be done on the exterior of buildings or in locations where windows have already been removed. It is not anticipated that local exhaust will be needed for this project. If local exhaust will be required it will be provided by use of one HEPA equipped Negative Air Machines (NAM's) conforming to ANSI Z9.2. All NAM's will be equipped with manufacturer recommended primary filters and pre-filters. For Class I removal operations a NPE will be erected and conform with 29 CFR 1926.1101 (g) Methods of Compliance.

## **Tools**

Only HEPA equipped vacuums will be used inside of the regulated areas. HEPA vacuums will be maintained in good working order, provide adequate negative pressure and contain the necessary attachments to thoroughly clean areas. Maintenance activities that may release asbestos fibers (bag removal) will be accomplished inside the regulated area. Vacuums will be wet wiped before leaving the regulated area, sealed at the nozzle end, and placed into clean asbestos danger bag for transport.

All hand tools, ladders, extension cords or other equipment will be vacuumed and wet wiped. Smaller hand tools and extension cords will be bagged before removal from the regulated area.

## **Utilities**

The abatement project will require water for wetting purposes. Electrical needs will be required for high volume sampling pumps, HEPA ventilation equipment, HEPA vacuums, and electrical tools and is also available at the site. All devices and extension cords will be fitted with a Ground Fault Circuit Interrupter (GFCI) at the electrical source.

## **Prohibitions in the Regulated Area**

Workers shall **NOT** eat, drink, smoke, chew tobacco or gum, or apply cosmetics in Regulated Areas.

## **ENGINEERING CONTROLS**

If compliant practices are followed, minimal engineering controls are required to reduce fiber concentrations in the work area for worker protection and to prevent the escape of particulates from the work site during abatement work. For this abatement project, the primary engineering controls will be the use of site security, regulated area, HEPA vacuums, wet methods, immediate cleanup, and burial. HEPA equipped fan units will be used in regulated areas for control of nuisance dust.

## ***Hazardous Materials Removal – Sequence of Operations***

The abatement is divided into the following individual efforts sequenced accordingly:

- Pre-work Notification and Inspections
- Regulated Area Setup
  - Signage
  - Decontamination Supplies
- Removal of ACM using Class II Procedures
  - Removal of various ACM
- Visual clearance
- Regulated area decommissioning and breakdown
- Transport and disposal

The exact sequence will be coordinated on-site with the Satori Competent Person and the Owner's Representative in order to minimize disturbance and to expedite the completion of the project.

## ***REMOVAL OF ASBESTOS***

Unless indicated that any material is a non-asbestos product, assume it contains asbestos and treat it in the manner prescribed by the following procedures. If suspect asbestos materials are observed that are not identified in this work plan, notify the Competent Person immediately. Do not sand, dry sweep, dry scrape, drill, saw, bead blast, or mechanically chip or pulverize.

If the suspect ACM accidentally becomes disturbed during the work, stop work until the job can be evaluated by a Competent Person. Do not resume work until the job can be evaluated and supervised by a Competent Person. Additional work practices and engineering controls are required to continue work.

## ***PRE-ABATEMENT ACTIVITIES***

### ***Inside Abatement***

1. Obtain and review copies from Competent Person of:
  - a. Work practice(s) to be used including required personal protective equipment
  - b. Work Notification(s) (as applicable)
  - c. Schedule for work
2. Review this section "WORK PRACTICES" for specific material being abated.
3. Obtain recommended tools, equipment and materials.
4. Move tools, equipment and materials to work area.
5. Secure work area, and establish controlled regulated area.
6. Put on all required personal protective equipment.
7. Sign "Regulated Area Sign In/Out Log"
8. Air monitoring begins: environmental, area and personal air monitoring.

## ***ASBESTOS ABATEMENT ACTIVITIES***

### ***Removal Materials and Equipment***

1. ½ face North 7700 respirator with P100 HEPA cartridges or PAPR.
2. Breathable full body coveralls

3. Gloves.
4. Safety glasses.
5. Rubber boots, steel-toed.
6. Water: Prior to ACM removal or disturbance of ACM, water will be used.
7. Danger Asbestos Bag: Large size heavy-duty impermeable bag made from 6 mil (0.15 mm) thick polyethylene, with a label stating, "DANGER CONTAINS ASBESTOS FIBERS. AVOID CREATING DUST, CANCER AND LUNG DISEASE HAZARD."
8. Encapsulant.
9. HEPA Filter Vacuum Cleaners: Use wet/dry tank-type vacuum cleaner equipped with a HEPA filter and metal floor attachment (no brush).
10. Miscellaneous Equipment: Provide as needed the following equipment: hand sprayer, knives, wire brushes, spray glue, and duct tape.
11. Use a GFCI for any electrical connections in a wet environment.
12. 2,000 Cubic Feet per Minute (CFM) HEPA ventilation fan with 12" exhaust tubing for nuisance dust control.

### ***TASK 1: REMOVAL OF VARIOUS CLASS II MATERIALS –UNKNOWN***

All removal of Class II materials will be performed within regulated asbestos removal areas and under asbestos abatement conditions. The following steps will be used during removal of Class II materials

1. Personnel will don appropriate PPE inclusive of ½ Face Air Purifying Respirator with HEPA filters, sign "Regulated Area Sign In/Out Log", enter work area and place a polyethylene sheet under the affected area to minimize final cleaning.
2. A pump sprayer will be positioned adjacent to the disturbance area to reduce the potential for visible emissions.
3. Using hand tools, remove ACM debris.
4. Clean surfaces to remove any remaining debris.
5. Place all debris and associated contaminated materials in 6 mill polyethylene labeled "Danger" bags.
6. Wet debris before closing "Danger" bag and seal appropriately.
7. Personnel will follow Decontamination Area Exit Procedures.

## ***ENVIRONMENTAL AIR MONITORING***

Satori Group, Inc will perform air monitoring for this project. Air monitoring will be performed in accordance with all applicable state, federal and local regulations.

### ***Air Monitoring equipment***

Satori will utilize low and high volume air sampling pumps, calibrated rotameters, and 25 mm PCM cassettes.

### ***Air Sampling Plan***

Asbestos air samples will be analyzed by Phase Contrast Microscopy, by the Industrial Hygienist. The IH is experienced with air sampling and has obtained the NIOSH 582 or equivalent training. Method of analysis will be NIOSH 7400 A Counting Rules. In house quality assurance procedures as required by the analytical procedures used are complete and up to date. Results will be provided within 24 hours.

NIOSH Method 7402 Transmission Electron Microscopy (TEM) will be used for confirmation of PCM results that show excessive fibers or those overloaded with dust if requested. Turn around time for TEM analysis will be 72-hours.

All sampling analysis shall be completed and the results provided within 24 hours after completion of a sampling period. The written results shall be signed by the laboratory analyst. The air sampling results shall be documented on a daily air-monitoring log. The daily air-monitoring log shall contain the following information for each sample:

- a. Sampling and analytical method used;
- b. Date sample collected;
- c. Sample number;
- d. Sample type: BZ = Breathing Zone (Personal), Pre = Pre-abatement, E = Environmental, C = Abatement Clearance;
- e. Location/activity/name where sample collected;
- f. Sampling pump manufacturer, model and serial number, beginning flow rate, end flow rate, average flow rate (in Liters per minute (L/min));
- g. Calibration date, time, method, location, name of calibrator, signature;
- h. Sample period (start time, stop time, elapsed time (minutes));
- i. Total air volume sampled (liters);
- j. Sample results shall be reported in fibers per cubic centimeter (f/cc);
- k. Laboratory name, location, analytical method, analyst, and confidence level.
- l. In addition, the printed name and a signature and date block for the individual who conducted the sampling.

### ***Interior Abatement***

- Personal Monitoring
  - a. For each work area, personal air monitoring will be performed on 25% of workers, performing each task to determine an eight-hour TWA. Personal air sampling will also include daily 30-minute excursion limit sampling. Excursion limit sampling will be performed on personnel expecting to receive the highest level of exposure.
  - b. All personnel samples will be collected from the worker's breathing zone with two or more samples to determine the TWA. If overloading of samples occurs, additional samples will be collected. Personnel air samples will be collected at flow rates between 0.5 to 2.5 liters per minute.
- Area Monitoring
  - a. For each work area, a minimum of two (2) air samples will be collected within the regulated areas.
  - b. A target volume of 500-1,200 liters of air will be collected from each sample location on a daily basis. If background "nuisance" dusts are high, multiple cassettes may be required to keep the samples from becoming overloaded.
- Environmental Monitoring
  - a. Environmental air sampling will be performed outside of the work area at the perimeter barriers. A minimum of two (2) samples will be taken outside the regulated area

preferably at critical barrier locations. Environmental samples are used to determine if asbestos fibers are being contained within the work area and ensure areas outside of the work area remain uncontaminated.

- a. Two (2) air samples will be collected in adjacent occupied areas.
- b. One (1) sample will be collected in the decontamination area
- c. One (1) samples from the waste load out area while waste load out is ongoing. No samples are necessary if no load out operation is performed.
- d. A target volume of 500-1,200 liters of air will be collected at each location on a daily basis. If background “nuisance” dusts are high, multiple cassettes may be required to keep the samples from being overloaded.
- e. One (1) sample located at the exhaust(s) of HEPA filtration units every other day if applicable. This sample will be placed at a sufficient distance as not to be in the main velocity air stream.

- Clearance Air Monitoring

- a. It is not anticipated that clearance monitoring will be done at this time. All buildings that will be worked on will be demolished and removed.

### ***VISUAL INSPECTION***

Satori will perform a visual inspection of each abated area to confirm complete removal of hazardous materials and detailed cleaning of abated areas. A visual inspection certification form will be completed and acknowledged by the IHT and Competent Person. Once completed and before the clearances are taken, the client will be notified and allowed to have their representative on site to inspect the containment area to ensure the scope of work has been completed and removal is complete.

### ***Clean up and Tear Down***

1. Package and label asbestos waste for disposal.
2. Clean tools, equipment, and work area using wet wiping and HEPA vacuuming as appropriate and return tools and equipment to outside work area.
3. Complete visual inspection.
4. Transport waste to designated asbestos waste storage area.
5. Return decontaminated tools, equipment and remaining materials to transport vehicle.
6. Restore normal accessibility to work area.

### ***Loading, Transport and Disposal***

1. Load all adequately wetted ACM in disposal bags or leak tight containers.
2. Post warning signs as described above.
3. Carefully load containerized waste in fully appropriate vehicles for transport.
4. Do not transport un-bagged materials on open trucks.
5. Fill out required manifest for transport of material.
6. Coordinate with Bristol for waste transport to be done by Bristol.

7. Retain copies of the hazardous waste manifests and return to the CP.
8. At completion of the job, the CP shall submit copies of all waste manifests to the Owner's Representative.

### ***Disposal Bags***

6 mil (0.15 mm) thick leak-tight "Danger Asbestos" polyethylene bags.

## **WASTE HANDLING**

Satori will confirm all ACM disposal containers that are not pre-printed with asbestos danger labels received a warning label, as specified in *Regulated Areas, Warning Labels*. Information that must be presented on every asbestos container:

---

DANGER  
CONTAINS ASBESTOS FIBERS  
AVOID CREATING DUST  
CANCER AND LUNG DISEASE HAZARD  
BREATHING AIRBORNE FIBERS IS  
HAZARDOUS TO YOUR HEALTH  
RQ-ASBESTOS WASTE  
CLASS 9  
NA2212-PG III

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### ***Disposal of Asbestos Containing Material***

All asbestos containing 6-mil danger bags, and/or other asbestos materials properly disposed of in leak-tight containers will be marked with a generator label prior to loading and transport. The ACM will only be disposed of at an asbestos approved facility. Labels will be affixed in prominent locations and contain the following information:

Example:

---

|                   |   |
|-------------------|---|
| <b>Generator:</b> | <b>Native Village of Northeast Cape</b> |
| <b>Location:</b>  | <b>St Lawrence Island AK</b>            |

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All asbestos containing/contaminated material resulting from onsite operations will be transported by Bristol.

## **ADDITIONAL RESPONSIBILITIES OF SATORI GROUP**

Satori Group will notify the State of Alaska DOL prior to the start of asbestos abatement activities. In addition, a list of employees will be submitted that will be involved in the asbestos abatement activities along with their State of Alaska DOL certificate of fitness identification number, expiration date, social security number, and the estimated dates the asbestos abatement activities will be performed.

### ***Emergencies***

The emergency procedures and other general safety concerns will be available and/or posted at the project job site. The listing of emergency numbers will be posted at the clean room location. Satori Group personnel will receive instructions in emergency recognition and response. Select Satori field staff personnel are also trained in Cardio Pulmonary Resuscitation (CPR) on an annual basis, in blood borne pathogen protection on an annual basis, and in standard first aid every three years. At

least two First Aid and CPR/First Aid trained person will be present during any task performed onsite with the potential for exposure to safety and health hazards.

### ***Equipment Failure***

Any equipment that fails or lacks appropriate safeguards will be immediately repaired or removed from service.

### ***Respirator Failure***

If a workers respirator fails, they will immediately leave the work area, decontaminate, and inform the competent person. The respirator will then be labeled as defective and either disposed of or placed in a separate area to be fixed.

### ***HEPA-Vacuum Failure***

Any HEPA-vacuums that fail will be immediately repaired or taken out of service. If they are used as local exhaust ventilation (for glovebags or mini-enclosures) and fail, the operation will cease immediately and the openings for make-up air sealed. Work will not proceed until the problem has been corrected and the ventilation smoke tested.

### ***Local Exhaust Failure***

The operation will cease immediately and the openings for make-up air sealed. Work will not proceed until the problem has been corrected and the ventilation smoke tested.

### ***Fire***

At least one 10-pound ABC type fire extinguisher will be immediately accessible to the workers. Workers will be trained in their use and fire response procedures. If a fire cannot be immediately extinguished, workers will evacuate the work area, breaching critical barriers if necessary. Workers will then gather at the designated evacuation point for further instructions.

### ***Potential Fiber Release Episodes***

If environmental air samples collected outside the work area indicate concentrations significantly above the background concentration, the affected area will be isolated and the cause investigated. If the cause is other than interference particulate (non-asbestos dust), the affected area will be decontaminated by wet wiping, HEPA-vacuuming, and/or steam cleaning. The area will pass a visual inspection and aggressive clearance air sampling, or be re-cleaned.

### ***Medical***

If the injury requires no more than first aid, the worker will be decontaminated before leaving the work area for treatment. If emergency care is required, the worker will be removed from the work area under the care of personnel with valid first aid certification. First aid will be performed. The emergency care provider will be contacted for instructions, and informed of the possible contamination of the worker(s). In life threatening situations, the first call made should be to medical emergencies at 911.

### **24-hour emergency contact list**

The following table provides emergency telephone numbers in the event you need to contact Satori Group and/or other agencies or services after normal work hours:

Due to the remote nature of the work the following emergency procedures will be used. All contact numbers are listed below.

- Emergencies will be handled on site by EMT III Paramedic.
- If Paramedic can not handle injury a charter flight arraigned through Bering air will occur.
- Injured person will be taken to Norton Sound Regional Hospital in Nome AK for treatment.
- If need be another charter flight will be arraigned to take person to Providence Hospital in Anchorage AK

### **Emergency Contact List**

| <b>NAME OF CONTACT</b>   | <b>OFFICE</b>                       | <b>CELL</b>    |
|--|-------------------------------------|----------------|
| <b>Emergency (on site EMT III Paramedic)</b>                                       |                                     |                |
| Norton Sound Regional Hospital   | 907-443-3311                        |                |
| Providence Hospital  | 907-562-2211                        |                |
| National Response Center (NRC) (Federal reporting for a spill or release to water) | (800) 424-8802                      |                |
| Alaska Department of Environmental Conservation                                    | (907) 465-5340<br>or (800) 478-9300 |                |
| <b>NAME OF CONTACT</b>   | <b>OFFICE</b>                       | <b>CELL</b>    |
| U.S. Environmental Protection Agency   | (800) 424-4372                      |                |
| Satori Group Anchorage Office  | (907) 332-0456                      |                |
| Alan Caldwell, Project Manager   | (907) 332-0456                      |                |
| Alan Caldwell, Health and Safety Manager   | (907) 332-0456                      | (907) 350-9919 |




**SIGNATURE SHEET**

Contractor certifies that this submittal accurately and completely describes the coordinated project work of itself, estimated quantities of ACM to be removed, determined clearance requirements, subcontractors, and testing laboratories and that the owner can rely upon this certification.

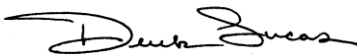


Alan Caldwell, Project Designer  
Satori Group, Inc.  
AHERA Project Designer # 121-ROC698-042



Alan Caldwell, Project Manager  
Satori Group, Inc.

Satori Group has no citations on record with the Federal, State, or Local agencies.



Derek Lucas, Principal  
Satori Group, Inc.

**ATTACHMENT 1: LBP HAZARD ABATEMENT PLAN**



# Lead-Based Paint Abatement Plan

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NALEMP Removal Action Cooperative Agreement

Contract # NALEMP-FY-11-01

Native Village of Northeast Cape

St. Lawrence Island, Alaska

## Prepared For:

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Bristol Environmental Remediation Services, LLC

111 W 16<sup>th</sup> Avenue

Third Floor

Anchorage, AK 99501



Prepared by

Satori Group, Inc.

1310 East 66th Avenue, Suite 2

Anchorage, Alaska 99518

May 2014

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## Description of Activities

Lead based paint (LBP) has been found at the site on various painted surfaces. Satori Group will utilize OSHA and EPA approved removal methods, trained personnel, engineering controls, and waste disposal procedures during all site operations as outlined below:

### ***LBP Disturbance***

Unless indicated through laboratory testing that any material does not contain LBP, treat it in the manner prescribed by the following procedures. If suspect materials are observed that are not identified in this work plan, notify the Competent Person (CP) immediately. Do not sand, dry sweep, dry scrape, drill, saw, bead blast, or mechanically chip or pulverize any component that may contain LBP.

The painted wood will be removed prior to the demolition operation. If additional LBP material accidentally becomes disturbed during the work, stop work until the job can be evaluated by a CP. Do not resume work until the job can be evaluated and supervised by a Competent Person.

Additional work practices and engineering controls are required to continue work.

### ***Pre-Cleaning***

No pre-cleaning is anticipated due to the intent to remove regulated hazardous materials and demolish the structures.

### **Pre-Abatement Activities**

1. Obtain and review copies from CP of:
  - a. Work practice(s) to be used including required personal protective equipment
  - b. Work Notification(s) (as applicable)
  - c. Schedule for work
2. Review this section "Lead Compliance Plan",
3. Obtain recommended tools, equipment and materials
4. Move tools, equipment and materials to work area.
5. Pre-clean work area if debris is present.
6. Secure work area and establish controlled regulated area.
7. Put on all required personal protective equipment (if required).
8. Sign "Regulated Area Sign In/Out Log"
9. Air monitoring personnel begins personal air monitoring.

### ***LBP Disturbance Activities***

All employees will have training as defined in 29CFR 1926.62 and any all disturbances of lead materials will be performed within demarcated areas. The following steps will be used during removal operations:

- 1 Personnel will don appropriate a ½ face APR with HEPA filters, enter the demarcated area.

- 2 Satori will monitor personnel for lead exposure during these operations and based on the analytical findings, will create an exposure assessment to discontinue the monitoring as applicable.

### **Removal Materials and Equipment**

The following equipment will be used for LBP disturbance at the project site.

1. ½ face North 7700 respirator with P-100 HEPA cartridges.
2. Breathable full body coveralls.
3. Gloves.
4. Safety glasses or goggles.
5. Rubber boots, steel-toed.
6. Hard Hats.
7. Polyethylene sheeting (minimum 6-mil thick).
8. HEPA Filter Vacuum Cleaners: Use wet/dry tank-type vacuum cleaner equipped with a HEPA filter and metal floor attachment (no brush).
9. Miscellaneous Equipment: Provide as needed the following equipment: Utility or hook knife, hand sprayer, hammer or mallet, wire brush, chisel, duct tape.
10. Use a GFCI for any electrical connections in a wet environment.

### **Crew size**

The crew size will vary depending on need and amount of materials to be removed. Any personnel who will be removing LBP will be trained in accordance with 29 CFR 1926.62.

### **Engineering Controls**

Satori will use engineering controls if needed to mitigate exposures to employees who are involved in LBP disturbances. They may include:

- Local ventilation (if indoors)
- Water
- HEPA vacuums
- Regulated area

The air monitoring results will be used to assess the effectiveness of the engineering controls and to see if any additional controls are needed throughout the project.

### **INITIAL DETERMINATION**

The Competent Person shall perform an exposure assessment immediately before or at the initiation of an operation to determine the expected exposures during the operation. This assessment will be completed in time to comply with the requirements, which are triggered by exposure data or lack of negative exposure assessment, and to assure that all control systems planned are appropriate and will work properly. The Initial Exposure Assessment (IEA) will be based on the following:

- a. If feasible, the results of employee exposure monitoring; and

- b. The IEA will include consideration of all observations, information or calculations, which indicate employee exposure to LBP, including any previous monitoring conducted in the workplace, or of the operations that indicate the airborne levels of lead likely to be encountered.

### **Lead Air Sampling**

Lead air sampling will commence during removal operations in accordance with 29 CFR 926.62. Low volume air sampling pumps and 37-mm mixed cellulose ester (MCE) filter cassettes will be used to collect lead air samples. In addition to worker breathing zone air samples, environmental samples will be positioned on the outside of the regulated area.

**TABLE 3.1-1 PROJECT-SPECIFIC AIR MONITORING REQUIREMENTS  
LEAD**

| INSTRUMENT   | TASK – TORCH CUTTING | ACTION LEVELS   |  | FREQUENCY <sup>1</sup>  | CALIBRATION <sup>2</sup>   |
|--|----------------------|---|--|---|--|
| Low Volume Air Sampling Pump with sampling train that includes 37-mm cassette. | BZ –Breathing        | 30 $\mu\text{g}/\text{m}^3$<br>OSHA 8hr<br>“Action Level” | 50 $\mu\text{g}/\text{m}^3$<br>OSHA 8hr<br>PEL | Monitor 25% of workers inside regulated work area disturbing lead | Each sample collected requires a secondary calibration device (rotameter). |

#### Notes:

<sup>1</sup>Air monitoring shall be conducted in accordance with NIOSH 7082 method.

<sup>2</sup>Calibrations of flow rates shall be completed on every sample collected.

$\mu\text{g}/\text{m}^3$  = microgram per cubic meter of air

PEL= Permissible Exposure Limit

BZ= Breathing Zone

$\leq$  = less than

$\geq$  = greater than

All lead air samples collected will be analyzed by an approved laboratory accredited by the Environmental Lead Laboratory Accreditation Program (ELLAP). Samples will be analyzed using Atomic Absorption Spectrometry (AAS) in accordance with National Institute for Occupational Safety and Health (NIOSH) Method 7082.

### **Personnel Protective Equipment (PPE)**

Personnel for Satori, consultants and any authorized visitor(s) will be provided with disposable full body protective clothing (e.g., Disposable coveralls), head coverings, and gloves prior to entering the designated work areas. Consultants/visitors will be required to provide their own respiratory protection (if entering areas that require respiratory protection).

## **AIR PURIFYING RESPIRATORS**

For the scheduled LBP disturbance operations, personnel will wear either NORTH™ half-face air-purifying respirators equipped with HEPA filters or PAPR's as determined by the CP or SSHO. The respirators are National Institute for Occupational Safety and Health (NIOSH) certification as required by 29 CFR 1910.134. Satori ensures that those individuals who wear respirators receive fit testing and respiratory training initially and at least once a year thereafter. In addition, Satori ensures;

- a record of fit testing and training is maintained;
- a certification from a Occupational physician is received permitting the individual to wear respiratory protection;
- employees are wearing respirators properly;
- employees care for and store their respirators per standard operating procedures.

Respirators will be visually inspected before and after each use. This inspection procedure will include inspecting for any signs of wear or warping of the face piece, defects in the valve system, and damage to straps. All respirators will be cleaned with alcohol wipes after each use, dried, and placed in plastic bags for storage after being decontaminated from usage in regulated area. Use and maintenance of respirators shall be in compliance with Satori Group, Inc.'s Respiratory Protection Plan.

## **Whole Body Protection**

Personnel working at the project site shall be provided with whole body protection.

### **Coveralls**

Personnel will wear disposable-breathable suits (lead abatement) or full body polyethylene coated disposable coveralls suits. These suits have hoods and booties and will afford the workers adequate protection.

### **Gloves**

Personnel will be issued, and will be required to wear, gloves where those gloves can be reasonably expected to prevent injury. The CP will maintain a supply of varying types and sizes of gloves. Leather or leather palmed gloves will be issued for most demolition activities.

### **Foot Coverings**

Personnel will wear leather steel-toed safety boots that provide ankle protection whenever working at the site. This protection will conform to ANSI Z41.1- 1969. For work inside the regulated work area, personnel are required to wear rubber steel-toed boots.

### **Head Covering**

Personnel will be issued, and will be required to wear, hardhats whenever the personnel are on the project site.



**Protective Eye Wear**

Personnel will be issued, and will be required to wear, safety glasses, goggles or tinted face shields depending on the hazards encountered. The Competent Person will maintain an adequate supply of protective eye wear equipment for employee use. Eye protection will conform to ANSI Z87.1-2003.

Prior to donning protective clothing, each garment will be visually inspected to identify defects, such as tears, cracks, holes, and delaminating, which may allow contaminants to penetrate the clothing. The surface of the clothing will also be inspected for any signs of wearing, cracking, or degradation. Any openings or possible penetration points identified in this inspection process will be sealed and/or masked. Clothing that is contaminated or discolored will be discarded. Protective clothing ensembles will also be evaluated for proper fit before being worn. Other protective equipment such as protective eyewear and goggles will be inspected for structural integrity and cleanliness. Eyewear that is severely scratched will be discarded.

**Housekeeping procedures**

All work areas will be demarcated with Lead Danger ribbon during disturbance activities. The Competent Person will inform all other trades on site about unauthorized areas. OSHA approved work methods will be used to mitigate the spread of contaminants from beyond the regulated area.

**HYGIENE FACILITIES AND PRACTICES**

All hygiene facilities and practices will be in accordance with 29 CFR 1926.62 (i) *Hygiene facilities and practices for employees*. Workers will not be allowed to eat, drink, or smoke around LBP disturbance areas. Workers will be instructed to fully wash all exposed body parts in clean water before leaving the regulated area to prevent the spread of any lead and to prevent ingestion of lead.

**Administrative Controls**

If compliant work practices are followed, minimal administrative controls will be needed during the project. If unacceptable levels of LBP are found in the air monitoring, Satori will implement additional administrative controls such as an employee rotation schedule in compliance with 29 CFR 1926.62 (e)(4).

**Medical Surveillance**

Use of respiratory protection is restricted to individuals who have been determined to be “medically fit” by a licensed physician within the preceding 12 months. Medical surveillance will be provided in accordance with 29 CFR 1926.62 (f) and (j) Medical Surveillance, and as follows:

- To any employees occupationally exposed on any day to lead at or above the action level. Initial medical surveillance consists of biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels.

All personnel working on this project are entered into Satori’s Medical Surveillance program and have current medical approval for wearing respirators to conduct hazardous material abatement.

## Competent Person and Employee Training

### ***Worker Training***

All workers on site will have training in Lead Awareness in accordance with 29 CFR 1926.62 (I) *Employee Information and Training*.

Additionally, all workers must have completed the following training and orientation:

1. Hazardous Waste Operations initial, refresher and supervisor training in accordance with 29 CFR 1926.65 and 29 CFR 1910.120
2. Hazard Communication training as required by 29 CFR 1910.1200 (Site Specific)
3. Respiratory Protection Training as required by 29 CFR 1910.134
4. First Aid and Cardiopulmonary Resuscitation (CPR) Training (min. 2 employees)
5. Emergency response procedures
6. The Accident Prevention Plan for this project
7. The respiratory protection program & requirements
8. The LBP compliance plan & procedures

Site specific training to comply with Hazard Communication standard will be conducted before the start of the project and reviewed as needed at the daily safety meetings. All training will be documented and submitted with the daily reports.

### **Waste Generation**

All waste generated from this operation will be given to Bristol. Any disposal of material will occur after a TCLP sample has been taken of the waste stream to identify if the material shall be treated as a RCRA waste for transport and disposal.

**ATTACHMENT 2: AHA ASBESTOS / LBP REMOVAL**



## TASK: ACM/LBP DEBRIS ABATEMENT

**Minimum Personal Protective Equipment (PPE):** Level D PPE (Long pants, shirts with minimum 4" sleeve, steel toe boots, safety glasses, hard hat for overhead hazards, leather work gloves, and hearing protection, as required)

**Location:** St Lawrence Island NE Cape

**Prepared by:** Alan Caldwell SOHO

| Activity   | Potential Hazards                                      | Recommended Controls   | Equipment   | Inspections  | Training  |
|--|--|--|---|--|---|
| Mobilization/Demobilization and Site Preparation                                       | Slips, trips, or falls on walking and working surfaces | <ul style="list-style-type: none"> <li>➤ Determine the best access route prior to transporting equipment and tools</li> <li>➤ Continuously inspect the work area for slip, trip, and fall hazards</li> <li>➤ Pay attention; ensure safe and secure footing</li> <li>➤ Maintain clean work areas by following good housekeeping procedures</li> <li>➤ Be alert for uneven and variable terrain</li> <li>➤ Wear slip resistant footwear when walking/working on slippery surfaces or slopes</li> </ul> | <ul style="list-style-type: none"> <li>➤ Hand tools</li> </ul>                              | <ul style="list-style-type: none"> <li>➤ Supervisor to inspect the area before work begins</li> </ul>              | <ul style="list-style-type: none"> <li>➤ Required on site training per APP</li> </ul> |
| Mobilization/Demobilization and Site Preparation are applicable throughout the project | Site Traffic   | <ul style="list-style-type: none"> <li>➤ Be aware of potential vehicle traffic while on site</li> <li>➤ Follow posted warnings and rules for travel around site</li> <li>➤ Set up secure area for equipment to be staged for project</li> </ul>  | <ul style="list-style-type: none"> <li>➤ Personal Trucks</li> <li>➤ Base Traffic</li> </ul> | <ul style="list-style-type: none"> <li>➤ Restricted areas delineated and signed properly</li> </ul>                | <ul style="list-style-type: none"> <li>➤ Required on site training per APP</li> </ul> |
|  | Eye Injury   | <ul style="list-style-type: none"> <li>➤ Use approved safety glasses with rigid side shields</li> </ul>  | <ul style="list-style-type: none"> <li>➤ ANZI 87.1 glasses</li> </ul>                       | <ul style="list-style-type: none"> <li>➤ Properly inspect glasses to ensure no cracks, chips in glasses</li> </ul> | <ul style="list-style-type: none"> <li>➤ Required on site training per APP</li> </ul> |
|  | Cuts Punctures abrasions                               | <ul style="list-style-type: none"> <li>➤ Wear leather work gloves when handling materials or using tools</li> </ul>  | <ul style="list-style-type: none"> <li>➤ Approved gloves per work to be done</li> </ul>     | <ul style="list-style-type: none"> <li>➤ Ensure gloves have no holes / are intact</li> </ul>                       | <ul style="list-style-type: none"> <li>➤ Required on site training per APP</li> </ul> |



|  |                    |  |  |   |   |
|--|--------------------|--|--|---|---|
| <p><u>Note:</u> Each workday shall begin with a mandatory daily safety meeting for all on-site workers project</p> | Dropped Objects    | <ul style="list-style-type: none"> <li>➤ Steel toe boots meeting ANZI Z 41</li> </ul>  | <ul style="list-style-type: none"> <li>➤ Steel toe boots meeting ANZI Z 41</li> </ul>                | <ul style="list-style-type: none"> <li>➤ Inspect boots for holes</li> </ul>   | <ul style="list-style-type: none"> <li>➤ Required on site training per APP</li> </ul>                                 |
|  | Thermal            | <ul style="list-style-type: none"> <li>➤ Employees will have appropriate clothing for variable weather</li> <li>➤ Use of long sleeves or application of sunscreen with a high sun protection factor (SPF) on exposed skin encouraged</li> <li>➤ Employees will take breaks and drink plenty of fluids, as necessary, to prevent heat stress</li> </ul> | <ul style="list-style-type: none"> <li>➤ Proper clothing</li> <li>➤ Water coolers on site</li> </ul> | <ul style="list-style-type: none"> <li>➤ Work in teams with buddy. Checking each hour to ensure early signs or symptoms of heat related / cold related problems are recognized and properly treated.</li> </ul> | <ul style="list-style-type: none"> <li>➤ Training required on all heat disorders and cold disorders in APP</li> </ul> |
|  | Biological Hazards | <ul style="list-style-type: none"> <li>➤ Workers will inspect the work area carefully and avoid placing hands and feet into concealed areas</li> <li>➤ Look in direction of travel for biological hazards to avoid</li> </ul>  | <ul style="list-style-type: none"> <li>➤ None</li> </ul>   | <ul style="list-style-type: none"> <li>➤ Supervisor to inspect the area before work begins. Workers continuously inspect</li> </ul>   | <ul style="list-style-type: none"> <li>➤ Required on site training per APP</li> </ul>                                 |
|  | Noise              | <ul style="list-style-type: none"> <li>➤ Hearing protection will be worn with a noise reduction rating capable of maintaining Noise personal exposure below 85 dBA (ear muffs or plugs)</li> <li>➤ The SSHO will determine the need for hearing protection</li> <li>➤ All equipment will be equipped with manufacturer's required mufflers</li> </ul>  | <ul style="list-style-type: none"> <li>➤ Dosimeter ( If needed)</li> </ul>                           | <ul style="list-style-type: none"> <li>➤ Supervisor to continuously inspect during work hours</li> </ul>  | <ul style="list-style-type: none"> <li>➤ Required on site training per APP</li> </ul>                                 |



|  |  |   |   |   |   |
|--|--|---|---|---|---|
| <b>ASBESTOS LEAD<br/>BASED PAINT<br/>ABATEMENT</b> | Asbestos/lead<br>Exposure  | <ul style="list-style-type: none"> <li>➤ Follow approved APP for sampling hazardous materials</li> </ul>  | <ul style="list-style-type: none"> <li>➤ Hand tools</li> </ul>  | <ul style="list-style-type: none"> <li>➤ Competent person to inspect daily per OSHA 29 CFR 1926.1101</li> </ul>   | <ul style="list-style-type: none"> <li>➤ Only certified workers allowed to remove Asbestos</li> </ul>   |
|  | Cross<br>contamination/Cont<br>act with potentially<br>contaminated<br>materials | <ul style="list-style-type: none"> <li>➤ Wear appropriate protective clothing and equipment to safeguard against potential contamination (nitrile gloves, dust masks, etc.)</li> <li>➤ Only essential personnel will be in the work area</li> <li>➤ All personnel will follow good hygiene practices</li> <li>➤ Proper decontamination procedures will be followed</li> </ul> | <ul style="list-style-type: none"> <li>➤ Hand tools</li> <li>➤ Pump sprayers</li> <li>➤ HEPA vacuums</li> </ul>       | <ul style="list-style-type: none"> <li>➤ Competent person to ensure daily per OSHA 29 CFR 1926.1101</li> </ul>  | <ul style="list-style-type: none"> <li>➤ Only certified workers allowed to remove Asbestos</li> </ul>   |
|  | Dust/Fibers  | <ul style="list-style-type: none"> <li>➤ Wear negative pressure, half-face, air-purifying respirators with particulate filters or PAPR and/or supplied air respiratory protection determined by air monitoring</li> <li>➤ respiratory protection must be worn</li> <li>➤ Lightly spray the area with amended water to keep the fiber release to a minimum</li> </ul>          | <ul style="list-style-type: none"> <li>➤ NORTH ½ face respirator</li> <li>➤ Airless sprayer / pump sprayer</li> </ul> | <ul style="list-style-type: none"> <li>➤ Competent person to ensure inspection daily</li> <li>➤ Workers to inspect daily / before each usage</li> </ul> | <ul style="list-style-type: none"> <li>➤ Only certified workers allowed to remove Asbestos</li> <li>➤ Medical approval for respirator wear</li> </ul> |
| <b>DEBRIS LOAD OUT</b>                             | Waste segregation  | <ul style="list-style-type: none"> <li>➤ Proper disposal receptacles shall be established prior to the start of removal</li> </ul>  | <ul style="list-style-type: none"> <li>➤ Connex containers</li> </ul>   | <ul style="list-style-type: none"> <li>➤ Competent person to inspect daily to ensure proper signage intact</li> </ul>                                   | <ul style="list-style-type: none"> <li>➤ Certified asbestos workers</li> </ul>  |

## **APPENDIX E**

### Site Safety and Health Plan

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Attachment 1 Activity Hazard Analysis (AHA) Tables

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## ACRONYMS AND ABBREVIATIONS

|          |   |
|----------|---|
| ACM      | asbestos-containing material                          |
| AHA      | Activity Hazard Analysis                              |
| ANSI     | American National Standards Institute                 |
| Bristol  | Bristol Environmental Remediation Services, LLC       |
| C.I.H.   | Certified Industrial Hygienist                        |
| CFR      | Code of Federal Regulations                           |
| CON/HTRW | Containerized Hazardous, Toxic, and Radioactive Waste |
| CPR      | cardiopulmonary resuscitation                         |
| EM       | Engineer Manual                                       |
| GI       | gastrointestinal                                      |
| HWAP     | Hazardous Waste Accumulation Point                    |
| LBP      | lead-based paint                                      |
| NE Cape  | Northeast Cape  |
| NVNC     | Native Village of Northeast Cape                      |
| NVS      | Native Village of Savoonga                            |
| OP       | Occupational Physician                                |
| OSHA     | Occupational Safety & Health Administration           |
| PCBs     | polychlorinated biphenyls                             |
| PCDDs    | polychlorinated dibenzo-p-dioxins                     |
| PCDFs    | polychlorinated dibenzofurans                         |
| PEL      | permissible exposure limit                            |
| POLs     | petroleum, oil, lubricants                            |
| PPE      | personal protective equipment                         |
| QA/QC    | quality assurance/quality control                     |
| RA       | removal action  |
| SI       | site investigation                                    |
| SSHO     | Site Safety and Health Officer                        |
| SSHP     | Site Safety and Health Plan                           |
| TLV      | Threshold Limit Value                                 |
| TWA      | time-weighted average                                 |
| USACE    | US Army Corps of Engineers                            |
| WP       | Work Plans  |

## **1.0 INTRODUCTION**

This Site Safety and Health Plan (SSHP) has been developed as a control mechanism for the work to be performed during the Native Village of Northeast Cape (NVNC) and Sipek Camp Removal Action (RA) and Site Investigation (SI) that will be performed at Northeast Cape (NE Cape), Saint Lawrence Island, Alaska, under the Native American Lands Environment Mitigation Program. The US Army Corps of Engineers® (USACE), Alaska District, has contracted with the Native Village of Savoonga (NVS), and Bristol Environmental Remediation Services, LLC (Bristol) as its prime subcontractor, to accomplish the activities.

The work comprises the preparation of plans and reports; mobilization and demobilization; removal of asbestos-containing material (ACM); lead-based paint (LBP) renovation, repair, and painting; removal of surface debris; collection, sampling, and containerization of Containerized Hazardous, Toxic, and Radioactive Wastes (CON/HTRW); the excavation of contaminated soil and/or sediment; and the collection of soil, sediment, and surface water environmental samples as part of the SI.

Potential environmental contaminants that may be encountered during RA activities include petroleum hydrocarbons, polynuclear aromatic hydrocarbons (PAHs), heavy metals, polychlorinated biphenyls (PCBs), and ACM.

Working safely is a condition of employment at all Bristol work sites and facilities. Bristol values the good health and safety of all workers and maintains a goal of “zero” accidents for all projects.

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## **2.0 SITE DESCRIPTION AND PROJECT OVERVIEW**

The general work scope activities described above will be performed at the NVNC and Sipekap Camp site locations.

Saint Lawrence Island is located in the Bering Sea, near the territorial waters of Russia, approximately 135 air miles southwest of Nome, Alaska.

The remote location will require Bristol to charter an airplane from Nome and Savoonga to the NE Cape. Accommodations for field personnel are expected at Bristol's field camp located at the NE Cape airstrip.

### **2.1 SITE DESCRIPTION**

The NVNC was once a year-round village site used by the Siberian Yupik Eskimos of Saint Lawrence Island, Alaska. The NVNC has also been termed "Northeast Cape Fish Camp" and "Fish Camp" by various government agencies and past environmental contractors. The NVNC site located at the NE Cape of Saint Lawrence Island is mainly used by the residents of the NVS and the Native Village of Gambell as a traditional fishing, hunting and food-gathering camp. The site is also used throughout the year as a rest stop to wait out storms and bad weather, and as a source of drinking water that is hauled to other locations in the area.

The Sipekap Camp, located approximately 10 miles west of Kitnagak Bay along the north coast of Saint Lawrence Island, is located along the beach near the outlet of Seepanpak Lagoon. The Sipekap Camp is also used for subsistence activities and as shelter during inclement weather.

### **2.2 SCOPE OF WORK**

The scope of work for the RA/SI is as follows:

- Mobilization and demobilization of personnel and equipment to and from the NE Cape of Saint Lawrence Island;

- Document and map field activities and conditions at the NVNC using detailed notes, photographs, and a Global Positioning System (GPS);
- Abatement and removal of ACM-containing items from around the NVNC and Sipekap Camp sites;
- Renovation, repair, and encapsulation of building materials containing LBP from the three remaining livable structures located at the NVNC and from the two remaining livable structures located at the Sipekap Camp site;
- Collection, containerization, transportation, and disposal of building materials, metallic/non-burnable debris, and CON/HTRW collected from the Sipekap Camp site, including the removal of the partially collapsed structure;
- Sampling, characterization, transportation, and disposal of CON/HTRW items remaining at the NVNC from the 2012 field season; and
- Excavation, containerization, transportation, and disposal of environmentally impacted soil/sediment located at the NVNC site, including the collection of confirmation samples, the backfilling of excavations with clean fill, and the collection of confirmation surface water samples.

A summary of the primary activities that will be performed during the RA/SI will include:

- **Mobilization and Demobilization** – Includes transportation of all materials, personnel, and equipment to and from the site.
- **Work Plans** – Draft and final WPs will be prepared for this project.
- **Removal Action** – An RA will be performed to abate and remove physical and environmental hazards associated with building debris and CON/HTRW.
- **Site Investigation** - An SI will be performed with environmental samples to be collected from areas of contaminated soil and sediment removal and from areas of documented surface water contamination
- **RA/SI Draft and Final Reporting** – Documents field activities and results of the RA/SI and presents the information in a detailed report.

### **3.0 PROJECT ROLES AND RESPONSIBILITIES**

All Bristol employees engaged in hazardous waste operations are required to maintain Occupational Safety & Health Administration (OSHA) certification under 29 Code of Federal Regulations, Part 1910.120 (29 CFR 1910.120) and 29 CFR 1926.65. This includes safety and health professionals, quality assurance/quality control (QA/QC) professionals, and all Project Managers. Employee training certifications are tracked to ensure that no employee is without current certification.

Bristol employees, NVS workers, and subcontractors assigned to this project will be expected to comply with the requirements of this SSHP and Bristol policies.

#### **3.1 BRISTOL PERSONNEL**

##### ***Project Manager, Tyler Ellingboe***

Tyler Ellingboe, the Project Manager, is responsible for ensuring project tasks are completed on schedule and within budget, recommending and justifying project modifications, implementing methods of tracking materials and resources, coordinating work with subcontractors, and complying with normal safety procedures and regulatory requirements.

##### ***Safety and Health Manager, Clark Roberts, C.I.H.***

Clark Roberts, Certified Industrial Hygienist (C.I.H.), will manage and implement Bristol's Safety and Health Program for this project. As the Health and Safety Manager (HSM), he will monitor project compliance with Bristol's Occupational Health and Safety Manual (Bristol Industries, 2005). Mr. Roberts works with Bristol's Site Safety and Health Officer (SSHO) assigned to individual projects to develop and implement effective SSHPs. For this project, Mr. Roberts will be responsible for the following:

- Developing, implementing, overseeing and enforcing the SSHP;
- Providing consultation as needed to ensure the SSHP is fully implemented;
- Coordinating any modification to the SSHP;



- Providing continued support for upgrading or downgrading the level of personal protection;
- Reviewing accident reports and the results of daily inspections; and
- Serving as a member of the Bristol's QA/QC staff.

### ***Site Safety and Health Officer, TBA***

The Field Manager will also serve as the SSHO and will be responsible for compliance with safety and health activities. He/she will conduct a daily safety briefing and address worker safety concerns. The SSHO will be responsible for communicating safety issues and concerns, and reporting safety incidents to the Project Manager.

### ***Field Manager***

The Field Manager will be responsible for managing the logistical elements of equipment and personnel mobilization, execution of field RA/SI activities, and demobilization. It is estimated that the Field Manager will be on-site for two weeks during the project. The Field Manager will provide oversight of subcontractors in technical activities and will be responsible for health and safety of personnel while on site. The Field Manager will also be responsible for mapping and documentation of all field and sampling activities. Once the project is underway, personnel from the NVS will lead the field effort with support from Bristol.

### ***Equipment Operator***

Bristol will provide an equipment operator that will support field activities on an as-needed basis. It is expected that the equipment operator will aid with the excavation and containerization of contaminated soil. The equipment operator will also move heavy equipment and shipping containers around the site as required.

### ***Regulatory Compliance Manager/Transportation and Disposal Coordinator***

The Regulatory Compliance Manager/Transportation and Disposal Coordinator, Mr. Tyler Ellingboe, will oversee all activities related to the collecting, manifesting, transporting, and disposing of all hazardous materials/wastes generated at the site. He will work closely

with the Field Manager and waste management personnel to ensure that wastes are properly identified, packaged, transported, and disposed of.

### ***First-Aid/CPR Personnel***

All Bristol full-time employees who perform fieldwork are required to maintain certification in first-aid/cardiopulmonary resuscitation (CPR) from the American Red Cross. These personnel have received training in universal precautions and the use of personal protective equipment (PPE), as required by the OSHA bloodborne pathogen standard, 29 CFR 1910.1030. In addition, a medical infirmary will be located at the construction camp and will be attended by a full-time licensed Emergency Medical Technician (EMT) III/Paramedic.

## **3.2 NVS PERSONNEL**

### ***Project Manager***

The NVS Project Manager, Robert Annogiyuk, is responsible for ensuring that all tasks for the scope of work are achieved successfully. The Project Manager will coordinate the effort, and provide the necessary NVS resources to meet the project objectives and requirements.

### ***NVS Field Representative(s)***

The NVS field representative(s) will contribute his/their knowledge of the history of the Department of Defense facility at NE Cape and will perform debris removal activities under the RA. One NVS Field Representative, with support from Bristol, will be elected and trained as the SSHO and field lead for when the Bristol Field Manager is not on site.

## **3.3 SUBCONTRACTORS**

Satori Group, Inc. (Satori) will provide State of Alaska, Licensed Asbestos Abatement Technicians (as required) to properly identify, package, and label asbestos-containing material (ACM) items for off-site transportation and disposal. Satori will perform LBP renovation, repair, and painting activities at the five remaining cabin locations. Satori

will also conduct air monitoring and sampling for lead exposure (as required). All subcontractors will comply with the applicable portions of this SSHP as a condition of work. Satori personnel job descriptions are discussed in the ACM and LBP Hazard Abatement Plans included as Appendix C.

### **3.4 TEMPORARY CONSTRUCTION CAMP**

The remote location and conditions found at the NE Cape will require Bristol to construct, staff, and maintain a temporary work camp on the island. The construction camp, including berthing facilities, mess facilities, and office space, will be located on the NE Cape airport parking area pad.

Bristol will require the camp operator to provide the following items:

- Drinking water,
- Toilets;
- Washing facilities;
- Food service;
- Waste disposal; and
- Vermin/vector control.

## **4.0 HAZARD ANALYSIS**

This section describes the general chemical, physical and biological hazards that are associated with the sampling activities that will be conducted at the NVNC and Sipenpak Camp sites. This section also discusses task-specific hazards and the control measures that will be instituted to manage them. To support this discussion, an Activity Hazard Analysis (AHA) table has been prepared for the task in accordance with USACE Engineer Manual (EM) 385-1-1 (USACE, 2008) and ER 385-1-92 (USACE, 2007) and is presented in Attachment 1.

### **4.1 GENERAL CHEMICAL HAZARDS**

The structures and debris remaining at the NVNC and/or Sipenpak Camp sites may have ACM. Some of the remaining and downed structures may also be covered with paint that may contain inorganic lead pigments. During sampling of the structures and remaining debris, asbestos and lead exposures may be possible as contaminated dust is released into the ambient air. These exposures; however, will be controlled by work practices to minimize dust.

Excavation and sampling of soil will be performed at PCB impacted areas. Due to the extremely low vapor pressures of these compounds, exposure during sampling activities should be minimal, as long as PPE is worn to prevent contact.

Small quantities of CON/HTRW may be identified during site investigation (SI) activities. CON/HTRW present at either the NVNC and/or the Sipenpak Camp sites may include ACM, suspected LBP containing debris, suspected petroleum-stained soil, buried and surface drums, lead acid batteries, small metal cans of suspected oil-based paint, grease, and or lubrication oil.

The types of hazardous materials that may be encountered and their health effects are discussed in the following sections.

#### **4.1.1 Asbestos**

Asbestos is a white or white-brown fibrous mineral with a high-heat capacity that has been used for decades as an insulating material for pipes, wall paneling, floor tiles, roof structures, and gaskets, among other things. Asbestos is also found as an additive to mastics and sealants. Unless disturbed, asbestos poses no health risk. If suspended in the air and inhaled, however, asbestos can cause fibrosis of the lung (a condition called asbestosis) and possibly lung cancer and/or cancer of the gastrointestinal (GI) tract. Asbestos does not pose a health hazard from routes of exposure other than inhalation or ingestion.

Wet methods are used to control airborne fiber releases whenever asbestos is removed or disturbed. The use of respiratory protection is required to control worker exposures when this material is handled. The eight-hour Permissible Exposure Limit (PEL) time-weighted average (TWA) and Threshold Limit Value (TLV) TWA for asbestos is 0.1 fibers per cubic centimeter.

Sampling of asbestos is not a planned RA/SI activity; however, some of the NVNC and Sipekap Camp remaining structures may contain ACM. Some of these buildings and structures are also covered with paint that may contain inorganic lead pigments.

Although ACM and LBP debris sampling may or may not occur during this phase of fieldwork, asbestos and lead exposures may be possible as contaminated dust is released into the ambient air. These exposures, however, will be controlled by work practices to minimize dust.

#### **4.1.2 Inorganic Lead**

Lead is a systemic poison that affects a variety of organ systems, including the nervous system, kidneys, reproductive system, hematopoietic system and GI tract. The primary route of lead exposure is through inhalation, but it can also be ingested when lead dust or unwashed hands contaminate food, drink, or cigarettes. Once in the body, lead enters the

bloodstream and circulates to various organs. Lead concentrates and remains in bone for many years. The amount of lead the body stores increases as exposure continues, with possible cumulative effects.

An acute, short-term dose of lead could cause acute encephalopathy with seizures, coma, and death. However, short-term exposures of this magnitude are rare, especially in occupational settings. Reversible kidney damage can occur from acute exposure, as can anemia.

Symptoms of chronic, long-term overexposure include, appetite loss, nausea, metallic taste in the mouth, lead line on gingival tissue, constipation, anxiety, anemia, pallor of the face and the eye rounds, excessive tiredness, weakness, insomnia, headache, nervous irritability, fine tremors, numbness, muscle and joint pain, and colic accompanied by severe abdominal pain. Paralysis of wrist and, less often, ankle extensor muscles may occur after years of increased lead absorption. Kidney disease may also result from chronic overexposure, but few, if any, symptoms appear until severe kidney damage has occurred. Decreased sex drive, impotence, and sterility in men, and decreased fertility, abnormal menstrual cycles, and miscarriages in women characterize reproductive damage due to lead overexposure. Children, due to their developing organ systems, are at greatest risk for damage from lead. Potential sources of lead at the NE Cape site include releases of gasoline and building paint.

#### **4.1.3 CON/HTRW Collection and Processing**

Personal protective equipment will be worn to reduce the potential for exposure during the collection, sampling, and containerization of CON/HTRW. Workers who will help handle the removal of drums, contaminated soil, and other CON/HTRW, will be trained about the heavy equipment operator's visibility limitations. Site workers will wear reflective vests to increase their visibility. Soil removed will be dug, placed in containers

for disposal off site, and drums will be transported to the Hazardous Waste Accumulation Point (HWAP) for segregation and containment prior to disposal.

Expected chemical hazards associated with the sampling, collection, and containerization of CON/HTRW include those from petroleum, oil, and lubricants (POLs), lead acid batteries, and heavy metals associated with paint products.

#### **4.1.4 Polychlorinated Biphenyls**

PCB is a generic term for a range of polychlorinated biphenyl compounds used commercially in heat transfer media and in the chemical/coatings industry. PCBs have been marketed commercially under the trade names Askarel® and Aroclor®, with a designation referring to the percent weight of chlorine.

Prolonged skin contact with PCBs may cause acne-like symptoms, known as chloracne. Irritation to eyes, nose, and throat may also occur. Acute and chronic exposure can cause liver damage and symptoms of edema, jaundice, anorexia, nausea, abdominal pain and fatigue. PCBs are a suspected carcinogen. Skin exposure may contribute to uptake of these chemicals; therefore, skin exposure will be evaluated and controlled.

The likelihood of exposure at the NE Cape site should be minimal due to the extremely low vapor pressure of PCBs, which prevents evaporation (and inhalation) of these compounds and the fact that these compounds are insoluble in water. The primary route of potential exposure for workers is anticipated to be through skin contact. Therefore, PPE to prevent contact with PCBs will be used. Workers are required to wear appropriate gloves (latex or nitrile) at a minimum when handling soil that may be contaminated with PCBs.

The PEL and TLV TWA for PCBs with 54 percent chlorine content is 0.5 milligrams per cubic meter (mg/m<sup>3</sup>), while the PEL and TLV TWA for PCBs with 42 percent chlorine is 1.0 mg/m<sup>3</sup>. Sources of PCBs include, fluorescent light ballasts, transformer oil, waste oil,

tank sediments and transformer pads. There is also potential for PCB-contamination in some painted surfaces.

## **4.2 GENERAL PHYSICAL HAZARDS**

This section provides a description of the possible physical hazards that are associated with the planned field activities.

### **4.2.1 Heavy Equipment and Vehicle Operation**

Excavators, front-end loaders, and other heavy equipment may be used on this project to demolish structures, remove debris, and move intermodal containers. There is a potential for workers to be struck by these vehicles or to be injured by contact with exposed mechanical parts (i.e., gears and pulleys). In addition, there is a risk of vehicle accidents and of fire during refueling. To control these hazards, regulated work areas will be established around each job site, and safe distances will be maintained between workers and mechanical equipment. Mobile equipment will be equipped with backup alarms, and spotters will be used to direct equipment operators, particularly when dumping soil and rock, operating cranes, and loading haul trucks. In addition, all exposed gears and pulleys on mechanical equipment will be guarded to eliminate pinch and grab hazards. Vehicles will be equipped with fire extinguishers, and spill-control equipment will be available during refueling operations in case a fuel, hydraulic fluid, or lubricant release occurs.

All equipment and vehicles brought to the job site will be inspected for structural integrity, cleanliness, operational performance, and proper functioning of safety devices in accordance with the manufacturers' specifications before being placed into service.

Equipment not conforming to operational and safety requirements will be repaired and re-inspected. Inspection forms are included in Attachment 2.



#### **4.2.2 Operator Qualifications**

Equipment operators must be qualified to operate the specific type of equipment or vehicle to which each has been assigned. In addition, each operator must be proficient in the type of equipment he/she will be using. The Bristol Site Superintendent (SS) on the NE Cape formerly used defense site project will ensure that a proficiency test is administered to each operator for each type of equipment operated. Equipment operators may also be required to be certified to operate certain types of OSHA-regulated vehicles, such as forklifts. The SS will maintain a list of operators and the equipment each operator is qualified to operate.

#### **4.2.3 Weather Hazards**

Saint Lawrence Island is subject to high winds, rain and snow. On occasion, weather conditions can become severe enough as to present a danger to those working outdoors. In these situations, work will stop, and the personnel will seek protection from the wind in a building.

#### **4.2.4 Thermal Stress**

Because all planned work activities will be conducted outside where environmental conditions are typically wet, cold and windy, there is a significant risk that site workers could develop cold stress. In addition, when conditions are warm, there is a possibility that workers could develop heat stress depending on their work activities. The likelihood of such thermal illnesses occurring is dependent on environmental conditions, the level of work activity, and the personal control measures that are used to manage heat loads (work/rest cycles, use of clothing and/or cooling devices, hydration, etc.). Appropriate control measures will be taken to manage these thermal stress concerns. In addition, all site workers will be instructed in the recognition and control of thermal stress symptoms and in treatment procedures. To guard against cold injury, appropriate clothing will be

required. A summary of the cold stress prevention guidelines is provided in Attachment 3.

#### **4.2.5 Building Hazards**

The partially collapsed structure located at the Sipekap Camp is in a state of disrepair due to age and weathering. Puncture and tripping hazards are present around the structure. Because of such hazards, building entry and demolition of remaining structure walls will be conducted from areas deemed safe for access. Steel insoles may be used to reduce the potential of injury from stepping on unseen sharp objects.

#### **4.2.6 Slips, Trips and Falls**

There is a potential for site personnel to fall through defective flooring in the abandoned structure and to slip on debris. The work area will also have uneven surfaces that could present a trip hazard for site personnel. Also, the entire project site is subject to wet weather that makes most walking surfaces slick and increases the potential for slips and falls. The primary concern about the structures is weak flooring that could collapse underfoot.

### **4.3 BIOLOGICAL HAZARDS**

The primary biological hazards of concern at the NE Cape sites are polar bears, foxes, and bacteriological hazards.

#### **4.3.1 Polar Bears**

Polar bears may be found on Saint Lawrence Island year-round. Their presence on the island is relatively common when the ice pack is near shore. Some may become stranded on the island from late spring to fall when the ice pack retreats from the shore. Polar bears are protected under the Marine Mammal Protection Act of 1972. It is illegal to disturb a polar bear in any way without a permit. Polar bears are the largest land

carnivores in the world. Adult males can weigh more than 1,500 pounds and reach a height of more than four feet at the shoulder; females are usually smaller.

Polar bears can cover hundreds of miles in a few days and cross steep slopes and rough ice at speeds of 25 miles per hour (mph) for short periods of time. They can swim at speeds of six mph. Polar bears have an excellent sense of smell and will home in on a possible food source from many miles away. Their eyesight is equal to humans.

Polar bear tracks look like human footprints, although the bears are larger. The bear's droppings look like loose puddles of black tar. Polar bears are carnivores and are also curious. They have been known to eat things that are distinctly inedible, such as rubber, plastic, rope, engine oil, and antifreeze.

All polar bears should be treated as unpredictable. In general, they are tolerant of humans and will steer clear of people, if given the opportunity. However, polar bears tend to be more curious than brown or black bears and often approach closely to investigate people or objects. Bluff charges occur very rarely, and a charging bear should be treated as a direct attack.

A worker should play dead if attacked by a female bear with cubs. The body position to take on the ground should minimize the exposure of vital areas. Hands should be placed behind the neck with fingers interlocked, forearms and elbows should be drawn up to protect the face, and knees should be raised to a fetal position. The female bear views people as a threat to her cubs, and she will probably leave once the worker is immobilized. He or she should remain completely passive until the bears have left the area.

If a lone bear attacks, the motive is probably predation, and the worker should get away or fight for his or her life. While the odds are against an unarmed person, fighting back is something the bear is unlikely to expect. Fighting back may gain the worker valuable

time, and a nearby worker may be able to help. Fieldworkers should always work in pairs.

Polar bears will investigate anything that could potentially turn up food. They will follow roads and snowmachine trails and have been attracted to industrial activity by sounds and odors. A bear watch should be maintained when people are working outside. If people are prepared and are able to detect a bear when it is at least 500 feet away, there is ample time to move to a safe location. Running or making sudden movements may cause the bear to attack, while backing away slowly is more likely to result in the bear leaving the area. The best response during any bear encounter is to move to a safe location as quickly as possible but without running if the bear is near.

To minimize the risk from polar bears, practice the following:

- Locate storage areas away from any cooking, food, or sleeping quarters. Remember that only early detection and avoidance of polar bears guarantees safety.
- Be vigilant.
- Always check outside before leaving a building. If working outside, post a lookout.
- Never carry food.
- Do not feed wildlife.
- If a bear, bear tracks, or droppings, are spotted, notify the SSHO immediately.
- Avoid bloodstains seen on ice or snow, which probably indicate the location of a polar bear kill. Notify the SSHO immediately.
- Know where the bears are and how many there are.
- Minimize potential bear hiding places (e.g., unskirted structures).
- Dispose of garbage and waste materials correctly. Keep food in a secured area in bear-proof containers. Trucks and other vehicles cannot be considered secure because polar bears looking for food have been known to break into vehicles.
- Equip one person per field area with a firearm.

### **4.3.2 Foxes**

Rabid cross foxes may also be encountered at the NE Cape project area. Extreme caution should be exercised to avoid any work activities in close proximity to a cross fox. Work in areas that cross foxes may inhabit should always be performed in pairs.

### **4.3.3 Bacteriological Hazards**

Potential bacteriological hazards, such as salmonella, fecal coliforms, and hepatitis are associated with the landfills and septic systems at NE Cape. To avoid contamination, these areas will be entered only during sampling activities. All personnel will wear the appropriate PPE and follow the necessary decontamination procedures when entering these areas.

## **4.4 TASK-SPECIFIC HAZARDS**

The following sections describe in greater detail the hazards associated with each specific task. Attachment 1 contains the AHA table, completed in accordance with the USACE's EM 385-1-1 (USACE, 2008), identifying the activity, potential hazards, controls and inspections, training, PPE, and monitoring required for each task.

### **4.4.1 ACM and LBP Renovation, Repair, and Painting**

The health and safety program for ACM abatement and LBP Renovation, Repair, and Painting activities is discussed in Satori's Asbestos Hazard Abatement Plan and the Lead-Based Paint Abatement Plan included in Appendix C of the 2013 Work Plan.

### **4.4.2 Debris Removal**

A significant aspect of the work will involve manually moving, handling, and disposing of drums, containers, abandoned equipment, and pieces of building debris that litter the site. This labor-intensive work poses the risk of back injury from heavy lifting and lacerations from contact with sharp objects.

To control these hazards, workers will be instructed to use proper lifting techniques when moving heavy loads. These techniques will include using mechanical lifting devices (forklifts, etc.) whenever feasible and having others help to lift exceptionally heavy loads if mechanical lifting devices cannot be used. Workers will also wear leather or abrasive-proof gloves when handling sharp objects.

#### **4.4.3 Sampling**

Sampling activities will be performed in accordance with the sampling section of the WP. Environmental samples will be collected from different matrices. Hazards associated with sampling are primarily chemical in nature and are discussed in Section 4.1 of this SSHP. The level of PPE used will depend on the type and location of samples collected. The physical hazards include sprains and strains from improper lifting or overexertion, and cuts from sharp metal edges, as well as slips, trips and falls. Sampling crews may be required to walk on uneven or slick surfaces. Running and “horse play” will not be tolerated on site, and workers will “stop and look” when entering a new area.

#### **4.4.4 CON/HTRW Collection and Processing**

Personal protective equipment will be worn while workers collect and process surface and subsurface drums. Some of the drums are scattered about the ground surface and some are partially buried in the subsurface. The hazards associated with collecting drums are similar to those associated with the removal of miscellaneous nonhazardous debris. Some of the drums may have rough edges that can cause cuts. Leather or cut-resistant gloves will be worn to minimize the potential for cuts while handling the drums. Most of the drums are 55-gallon capacity and appear to be empty; however, drums with contents were identified during previous SI activities. Proper lifting techniques will be used to minimize the potential for back injuries.

Drums may contain unknown or uncharacterized contaminants. Drums that appear to contain liquid will be sampled in accordance with the WP. Personal protective equipment will be worn in accordance with the AHA tables in Attachment 1.

#### **4.4.5 Petroleum Hydrocarbon, Polynuclear Aromatic Hydrocarbons, Heavy Metals, and/or PCB Contaminated Soil/Sediment Removal**

Contaminated soil and sediment will be excavated, containerized, transported, and disposed of in accordance with the WP. Approximately 34 cubic yards of soil and/or sediment are expected to be generated during the RA effort. Workers and operators will communicate accordingly regarding the equipment operator's visibility limitations. Level D PPE will be worn, including safety vests. Soil removed will be excavated, placed in containers for disposal off site, and will be placed at the HWAP for segregation and containment prior to disposal.

## 5.0 TRAINING REQUIREMENTS

All Bristol personnel assigned to the project will have some degree of training. All site workers will be qualified to perform their designated duties based on their experience, education, and training. Training requirements anticipated for the project are summarized in Table 5-1.

**Table 5-1 Training Requirements Summary**

| Activity/Personnel                 | Training Requirement  |
|------------------------------------|---|
| All site personnel                 | Task- and site-specific training, including Hazard Communication  |
| All personnel who enter work zones | 40-hr HAZWOPER, 8-hr Refresher, 3 days of on-the-job supervision  |
| Supervisors in work zones          | 8-hr HAZWOPER Supervisor  |
| At least 1 personnel at all times  | Red Cross-Certified First-aid/CPR   |
| Asbestos abatement personnel       | Worker, Supervisor, and Air Monitoring Training, as required (Identified in Asbestos Hazard Abatement Plan, Appendix 2) |

Notes:

CPR = cardiopulmonary resuscitation

HAZWOPER = Hazardous Waste Operations and Emergency Response

### 5.1 SAFETY BRIEFINGS

A safety briefing will be conducted on the days that personnel are performing project work at the site. The Bristol field personnel/SSHO will conduct the briefing and log the discussion in the field notebook.

### 5.2 FIRST-AID AND CPR

All Bristol full-time employees who perform fieldwork have received first-aid and CPR training that has been taught by a certified instructor and approved by the American Red Cross. All first-aid/CPR provider certifications will be reviewed and updated prior to personnel deployment to NE Cape. Persons trained in first aid and CPR have received instruction on bloodborne pathogens in accordance with 29 CFR 1910.1030. Site-specific



briefings will include information about site-specific bloodborne pathogen hazards. All personnel will be provided with bloodborne pathogen awareness training, emphasizing avoidance of contact with all body fluids. Although the risk of bloodborne pathogen contact is considered remote, bloodborne pathogen contact during administration of first-aid could occur. Any employee involved in an exposure incident will be offered a post-exposure evaluation consisting of prophylaxis and hepatitis-B virus immunization within 24 hours of exposure.

### **5.3 HAZARD COMMUNICATION**

The SSHO, as part of the site-specific training, will provide hazard communication training for all hazardous materials on site. The purpose of a hazard communication or employee right-to-know program is to ensure that the hazards of chemicals located at the site are communicated to site personnel and visitors in accordance with 29 CFR 1926.59.

Site hazard communication pertinent to this project includes the following.

#### **5.3.1 Asbestos**

The level of asbestos training provided will depend on the type of work to be done and personnel responsibilities. All personnel involved with asbestos-related work will receive some level of training. All asbestos abatement activities will be performed by State of Alaska, Licensed Asbestos Abatement Workers.

#### **5.3.2 Lead**

All personnel who may be exposed to lead will receive training equivalent to hazard communication training for lead.

#### **5.3.3 CON/HTRW Collection and Handling**

All personnel who will be involved with CON/HTRW collection, sampling, and handling will receive training equivalent to hazard communication for container handling.

#### **5.3.4 Polychlorinated Biphenyls**

All personnel who may be exposed to PCB contaminated soil will receive training equivalent to hazard communication training for PCBs.

(Intentionally blank)

## **6.0 PERSONAL PROTECTIVE EQUIPMENT**

Personal protective equipment will be provided when hazard control methods are determined to be impractical or inadequate to protect the worker. By providing for the proper selection, training, use, and maintenance of PPE, worker exposure to hazardous agents can be minimized. The PPE program will be monitored by the SSHO to determine its effectiveness. The site hazards, or potential hazards, specific to this project regarding PPE are those associated with the following:

- Dust/asbestos and lead dust;
- Slips, trips, and falls;
- Contaminated soil; and
- Heat stress and cold stress.

The level of PPE selected and used will protect employees from the hazards and potential hazards they are likely to encounter, as identified in the AHA tables (Attachment 1). Due to the nature of the tasks involved in the project, and the size of the NE Cape sites, the SSHO will choose PPE on a daily basis, depending on the operation, location of the work, and the hazards involved in each task. The level of PPE protection will be upgraded or downgraded based on changes in site conditions.

Some factors that may indicate the need to reevaluate site conditions and PPE selections follow:

- Encountering or handling contaminants other than those previously identified;
- A change of weather;
- A change in a work activity that increases or decreases contact with contaminants; and
- A change in ambient levels of contaminants.

All PPE changes must be approved by the SSHO. The types of protective equipment that will be worn for each specific work activity will be selected, used, inspected and

maintained in accordance with 29 CFR 1910.120(g)(5), 29 CFR 1926.65(g)(5), and 29 CFR 1910.134.

Personal protection Levels C, D, and modified D will be available for use during the planned project activities. The general PPE components that make up these levels are listed below. Each worker will be responsible for inspecting his or her equipment for cracks, holes, and proper fitting.

### **6.1 LEVEL C**

Level C PPE includes the following:

- National Institute for Occupational Safety & Health-approved full-face or half-mask air purifying respirator, with the appropriate cartridges;
- Chemical-resistant coveralls, with head coverings as required;
- Chemical-resistant outer and inner gloves;
- Hard hats at all times: Hard hats will comply with American National Standards Institute (ANSI) Z89.1-1969, Safety Requirements for Industrial Head Protection;
- Safety glasses at all times: Safety glasses will comply with ANSI Z87.1-1968, Practice for Occupational and Educational Eye and Face Protection; and
- Hearing protection as required.

### **6.2 LEVEL D**

Level D PPE includes the following:

- Rubber or other water-resistant boots are required;
- Safety glasses during sampling of soil or building materials: Safety glasses will comply with ANSI Z87.1-1968, Practice for Occupational and Educational Eye and Face Protection;
- Leather gloves as required; and
- Rain gear as required.

### **6.3 MODIFIED LEVEL D**

Modified Level D PPE will be worn when there is the risk of skin contact with chemical contaminants (e.g., oil), but with no risk of exceeding air monitoring limits. Modified Level D is the same as Level C, without the use of a respirator.

(Intentionally blank)

## **7.0 MEDICAL SURVEILLANCE PROGRAM**

Bristol will comply fully with 29 CFR 1910.120(f)(6) and 29 CFR 1926.65(f)(6) at all times. It is unclear if the NVS has a medical surveillance program for their field workers, so Bristol personnel and their subcontractor Satori will handle all hazardous materials identified on site. In addition, ACM abatement personnel will have current a State of Alaska, Department of Labor ACM Certificate of Fitness, medical approval, respiratory fit test, Hazardous Waste Operations and Emergency Response (HAZWOPER), and site-specific hazard communication training.

### **7.1 MEDICAL PROGRAM**

The medical program administered by Bristol (for Bristol personnel) includes provisions and procedures for the following:

- Pre-employment and exit physicals as required;
- Drug testing;
- Respirator fit-testing;
- Ongoing medical surveillance (see below);
- Hearing tests; and
- Vision tests.

The specific requirements for this project include all of the above. These physicals and tests will be completed before the workers begin working on site. The Occupational Physician (OP) performing the physical examinations will be given a list of known site hazards and contaminants prior to performing fit-for-work examinations and testing. A board-certified medical physician, Dr. Alexander T. Baskous, will provide the examinations.

Due to limitations on medical treatment availability at the NE Cape sites, employees with certain manageable health conditions requiring special prescriptions or other needs may



be medically restricted from working at the site. The OP will determine factors for employee disqualification under the medical program.

All site work will be performed in accordance with the most recent version of the EM 385-1-1.

## **8.0 SITE CONTROL MEASURES**

### **8.1 BUDDY SYSTEM**

The buddy system will be employed at all times during site activities. Employees will be required to be within the visual or aural presence of at least one other person at the project site.

### **8.2 COMMUNICATIONS**

In case of a site emergency, workers should immediately leave a dangerous situation and inform fellow workers. The SSHO will contact the emergency personnel required to handle the emergency condition.

### **8.3 PREVENTION OF ALCOHOL AND DRUG USE**

The use of alcohol or illicit drugs at the NVNC and Sipenpak Camp sites are prohibited. The SSHO will immediately terminate personnel from the site who are involved in such activities.

(Intentionally blank)

## **9.0 DECONTAMINATION PROCEDURES**

Decontamination procedures will be performed to protect people both on and off site, and to minimize the spread of contamination. Decontamination of sampling equipment, if required, will involve brushing and sweeping off the equipment, followed by a soap wash and rinse. Hand tools and other items may remain in contaminated areas until the task is complete. Disposable sampling equipment will be used wherever possible.

(Intentionally blank)

## **10.0 EMERGENCY PROCEDURES**

In case of a site emergency, immediate action will be taken to protect life, property, and the environment. The following sections describe the response systems and the line of communications required.

### **10.1 MEDICAL EMERGENCIES**

Medical assistance will be limited at the NVNC and Sipekpaq Camp sites. The coinciding FUDS project will provide an accessible medical clinic with a full-time, on-site Emergency Medical Technician, (EMT-III/Paramedic). The EMT will be available at all times during site work. First-aid kits will be available for field team use in on-site trucks.

If a medical emergency is beyond the capability of Bristol and island personnel, a medical evacuation will be initiated by the EMT and coordinated with the Norton Sound Regional Hospital located in Nome, Alaska, or with Providence Alaska Medical Center, located in Anchorage, Alaska.

Workers will be instructed to contact emergency assistance through company radios and satellite phones. Emergency evacuation routes will be discussed in the daily safety meetings.

### **10.2 SITE SECURITY DURING EMERGENCIES**

Site security during emergencies and other unexpected events will be the responsibility of the SSHO. His primary responsibility will be to ensure the safe evacuation, treatment, and transport of site personnel, as warranted by the emergency.

### **10.3 COMMUNICATIONS**

A satellite telephone will be used to communicate emergency information.

## 10.4 EMERGENCY INFORMATION

Emergency information will be posted in each vehicle on site and will include the following:

| Organization/Personnel                     | Phone Number        |
|--|---------------------|
| FUDS NE Cape EMT-III/Paramedic             | On-Site Radio       |
| Norton Sound Regional Hospital             | 907-443-3311        |
| Providence Alaska Medical Center-Anchorage | 907-562-2211        |
| Bristol Project Manager – Tyler Ellingboe  | 907-563-0013        |
| Safety and Health Manager – Clark Roberts  | 210-863-9445 (cell) |

## 10.5 ADVERSE WEATHER OR OTHER ENVIRONMENTAL CONDITIONS

In case of adverse weather or other environmental conditions, the SSHO, in consultation with the NVS Representative(s), will determine if work can continue without compromising worker health and safety. The following adverse conditions could prompt a safety review:

- High winds;
- Extreme cold;
- Heavy precipitation;
- Fog;
- Volcanic action; and/or
- Earthquakes.

## 11.0 REFERENCES

Bristol Industries, LLC. 2005. *Occupational Health and Safety Manual*.

US Army Corps of Engineers (USACE). 2007. *Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive (HTRW) Activities*. Engineering Requirement (ER) 385-1-92.

USACE. 2008. *Safety and Health Requirements Manual*. Engineer Manual (EM) 385-1-1.



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## **ATTACHMENT 1**

### **Activity Hazard Analysis (AHA)**

AHA No. 1 – Sampling

AHA No. 2 – Debris and Contaminated Soil Removal and  
Disposal

AHA No. 3 – Miscellaneous CON/HTRW Removal

| Activity Hazard Analysis No. 1<br>Sampling |                             | Analyzed By/Date _____ Reviewed By/Date: _____   |
|--|-----------------------------|--|
| Principal Tasks                            | Potential Hazards           | Recommended Controls (Level D PPE site wide for all operations)  |
| General activity                           | Slips, trips, falls         | <ul style="list-style-type: none"> <li>• Use care during foot travel, and clear the area of slip and trip hazards</li> <li>• Use barricades</li> <li>• Use guardrails</li> <li>• Cover holes</li> </ul>  |
|  | Back Injury                 | <ul style="list-style-type: none"> <li>• Use proper lifting technique.</li> <li>• Buddy system for heavy lifts</li> <li>• Use lifting/transport equipment</li> </ul>   |
|  | Crushing Injuries           | <ul style="list-style-type: none"> <li>• Use caution when setting loads</li> <li>• Wear required PPE</li> </ul>  |
|  | Dropped Objects             | <ul style="list-style-type: none"> <li>• Use caution around equipment lift materials</li> <li>• Wear required PPE</li> </ul>   |
|  | Eye Injury / Hearing Loss   | <ul style="list-style-type: none"> <li>• Wear required PPE</li> </ul>  |
|  | Struck by equipment/objects | <ul style="list-style-type: none"> <li>• Wear required PPE</li> <li>• Backup Alarms on all equipment</li> <li>• Traffic control and Watchman</li> </ul>  |
|  | Contact with soils          | <ul style="list-style-type: none"> <li>• Wear required PPE</li> </ul>  |
| Equipment operations                       | Equipment Failure           | <ul style="list-style-type: none"> <li>• Inspect equipment prior to daily operation</li> <li>• Ensure all roll cages and guards are in place and back up alarms operate</li> <li>• OEM equipment modifications <u>only</u></li> <li>• Machine guarding and enclosures</li> </ul> |

|  |  |  |
|--|--|--|
| Activity Hazard Analysis No. 1<br>Sampling (cont.) |  | Analyzed By/Date _____ Reviewed By/Date: _____   |
| <b>Principal Tasks</b>                             | <b>Potential Hazards</b>                         | <b>Recommended Controls (Level D PPE site wide for all operations)</b>   |
| Vehicle Operation                                  | Rollover   | <ul style="list-style-type: none"> <li>• Stay within the speed limit specified</li> <li>• Follow manufacturer's recommended payload</li> </ul>   |
| <b>Equipment to be Used</b>                        | <b>Inspection Requirements</b>                   | <b>Training Requirements</b>   |
| Trucks, Hand Tools                                 | Daily inspection of equipment prior to operation | <ul style="list-style-type: none"> <li>• Utilize only trained and experienced operators for operation of equipment</li> <li>• Site specific training – Toolbox safety meetings</li> <li>• 40 hour HAZWOPER</li> <li>• HazCom Training</li> </ul> |

| Activity Hazard Analysis No. 2<br>Debris and Contaminated Soil Removal and Disposal |   | Analyzed By/Date: _____ Reviewed By/Date: _____   |
|---|---|---|
| Principal Tasks   | Potential Hazards                                 | Recommended Controls (Level D PPE site wide for all operations)   |
| General Activity  | Slips, trips, falls                               | <ul style="list-style-type: none"> <li>• Use care during foot travel, and clear the area of slip and trip hazards</li> <li>• Use barricades</li> <li>• Use guardrails</li> <li>• Cover holes.</li> </ul>  |
|   | Back Injury                                       | <ul style="list-style-type: none"> <li>• Use proper lifting technique.</li> <li>• Buddy system for heavy lifts</li> <li>• Use lifting/transport equipment</li> </ul>  |
|   | Crushing Injuries                                 | <ul style="list-style-type: none"> <li>• Use caution when setting loads.</li> <li>• Machine guards/enclosures</li> <li>• Wear required PPE:               <ul style="list-style-type: none"> <li>○ Hard Hat</li> <li>○ Steel Toed Boots</li> <li>○ Safety Glasses w/ side shields</li> <li>○ Reflective Vest</li> <li>○ Hearing Protection, as needed.</li> </ul> </li> </ul> |
|   | Dropped Objects                                   | <ul style="list-style-type: none"> <li>• Use caution around equipment lift materials.</li> <li>• Wear required PPE.</li> </ul>  |
|   | Eye Injury / Hearing Loss                         | <ul style="list-style-type: none"> <li>• Wear required PPE.</li> </ul>  |
|   | Struck by equipment/objects                       | <ul style="list-style-type: none"> <li>• Wear required PPE</li> <li>• Backup Alarms on all equipment</li> <li>• Traffic control and Watchman</li> </ul>   |
|   | Contact with or inhalation of hazardous materials | <ul style="list-style-type: none"> <li>• Limit personnel in area (site control)</li> <li>• Use impermeable PPE/Level C protection as warranted</li> </ul>   |

|   |  |  |
|---|--|--|
| Activity Hazard Analysis No. 2<br>Debris and Contaminated Soil Removal and Disposal (cont.) |  | Analyzed By/Date: _____ Reviewed By/Date: _____  |
| <b>Principal Tasks</b>  | <b>Potential Hazards</b>                         | <b>Recommended Controls (Level D PPE site wide for all operations)</b>   |
| Equipment operations  | Equipment Failure                                | <ul style="list-style-type: none"> <li>Inspect equipment prior to daily operation.</li> <li>Ensure all roll cages and guards are in place and back up alarms operate</li> <li>OEM equipment modifications <u>only</u>.</li> <li>Machine guarding and enclosures</li> </ul> |
| Vehicle Operation   | Rollover<br><br>Material Spill/Contact           | <ul style="list-style-type: none"> <li>Stay within the speed limit specified.</li> <li>Follow manufacturer's recommended payload.</li> <li>Inspect containers before transport</li> <li>Spill Kits</li> <li>Use impermeable PPE/Level C protection as warranted</li> </ul> |
| <b>Equipment to be Used</b>   | <b>Inspection Requirements</b>                   | <b>Training Requirements</b>   |
| Trucks, Hand Tools, Backhoes  | Daily inspection of equipment prior to operation | <ul style="list-style-type: none"> <li>Utilize only trained and experienced operators for operation of equipment.</li> <li>Site specific training – Toolbox safety meetings</li> <li>40 hr Hazwoper</li> <li>HazCom Training</li> </ul>                                    |

| Activity Hazard Analysis No. 3<br>Miscellaneous CON/HTRW Removal |   | Analyzed By/Date: _____ Reviewed By/Date: _____   |
|--|---|---|
| Principal Tasks  | Potential Hazards                                 | Recommended Controls (Level D PPE site wide for all operations)   |
| General Activity   | Slips, trips, falls                               | <ul style="list-style-type: none"> <li>• Use care during foot travel, and clear the area of slip and trip hazards</li> <li>• Use barricades</li> <li>• Use guardrails</li> <li>• Cover holes.</li> </ul>  |
|  | Back Injury                                       | <ul style="list-style-type: none"> <li>• Use proper lifting technique.</li> <li>• Buddy system for heavy lifts</li> <li>• Use lifting/transport equipment</li> </ul>  |
|  | Crushing Injuries                                 | <ul style="list-style-type: none"> <li>• Use caution when setting loads.</li> <li>• Machine guards/enclosures</li> <li>• Wear required PPE:               <ul style="list-style-type: none"> <li>○ Hard Hat</li> <li>○ Steel Toed Boots</li> <li>○ Safety Glasses w/ side shields</li> <li>○ Reflective Vest</li> <li>○ Hearing Protection, as needed.</li> </ul> </li> </ul> |
|  | Dropped Objects                                   | <ul style="list-style-type: none"> <li>• Use caution around equipment lift materials.</li> <li>• Wear required PPE.</li> </ul>  |
|  | Eye Injury / Hearing Loss                         | <ul style="list-style-type: none"> <li>• Wear required PPE.</li> </ul>  |
|  | Struck by equipment/objects                       | <ul style="list-style-type: none"> <li>• Wear required PPE</li> <li>• Backup Alarms on all equipment</li> <li>• Traffic control and Watchman</li> </ul>   |
|  | Contact with or inhalation of hazardous materials | <ul style="list-style-type: none"> <li>• Limit personnel in area (site control)</li> <li>• Use impermeable PPE/Level C protection as warranted</li> </ul>   |

| Activity Hazard Analysis No. 3<br>Miscellaneous CON/HTRW Removal (cont.) |   | Analyzed By/Date: _____ Reviewed By/Date: _____  |
|--|---|--|
| Principal Tasks  | Potential Hazards   | Recommended Controls (Level D PPE site wide for all operations)  |
| Container Movement   | Crushing from Container Free Movement<br>Struck by Equipment/Objects<br>Leak/Spill<br>Contact Splash or Inhalation of Hazardous Materials | <ul style="list-style-type: none"> <li>• Blocks/chocks</li> <li>• Barricades</li> <li>• Watchman during container movement</li> <li>• Wear required PPE</li> <li>• Backup alarms on all equipment</li> <li>• Traffic control and watchman</li> <li>• Use MSDS for guidance</li> <li>• Spill kits</li> <li>• Use chemical splash PPE/Level C protection as warranted</li> <li>• Limit personnel in area (site control)</li> </ul> |
| Vehicle Operation  | Rollover  | <ul style="list-style-type: none"> <li>• Stay within the speed limit specified.</li> <li>• Follow manufacturer's recommended payload.</li> </ul>   |
|  | Material Spill/Contact  | <ul style="list-style-type: none"> <li>• Inspect containers before transport</li> <li>• Spill kits</li> <li>• Trained operators only</li> </ul>  |
| Equipment Operations   | Equipment Failure   | <ul style="list-style-type: none"> <li>• Utilize only trained and experienced operators for operation of equipment</li> <li>• Site specific training-toolbox safety meetings</li> <li>• 40-hour HAZWOPER and HazCom training required</li> </ul>   |
| Trucks, Hand Tools, Backhoes   | Daily inspection of equipment prior to operation  | <ul style="list-style-type: none"> <li>• Utilize only trained and experienced operators for operation of equipment.</li> <li>• Site specific training – Toolbox safety meetings</li> <li>• 40 hr Hazwoper and HazCom Training</li> </ul>   |



## **ATTACHMENT 2**

### **Field Forms**

Toolbox Safety Meeting Record

Equipment Operator's Checklist



## TOOLBOX SAFETY MEETING RECORD

DATE: \_\_\_\_\_

### SUBJECTS:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_

|     | PRINTED NAME | SIGNATURE | COMPANY |
|-----|--------------|-----------|---------|
| 1.  | _____        | _____     | _____   |
| 2.  | _____        | _____     | _____   |
| 3.  | _____        | _____     | _____   |
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| 24. | _____        | _____     | _____   |
| 25. | _____        | _____     | _____   |
| 26. | _____        | _____     | _____   |
| 27. | _____        | _____     | _____   |
| 28. | _____        | _____     | _____   |
| 29. | _____        | _____     | _____   |
| 30. | _____        | _____     | _____   |

## Equipment Operator's Checklist

**Company:** \_\_\_\_\_ **Operator:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Equipment Type:** \_\_\_\_\_ **Model:** \_\_\_\_\_

| Equipment Items         | Good Condition | Needs Attention | Notes: |
|-------------------------|----------------|-----------------|--------|
| Steering Brakes         |                |                 |        |
| Wheels, Tires, Tracks   |                |                 |        |
| Horn, Back-up Alarm     |                |                 |        |
| Seatbelt, Safety device |                |                 |        |
| Roll over Protection    |                |                 |        |
| Fire Extinguisher       |                |                 |        |
| Equip. Maintenance      |                |                 |        |
| Any Other Deficiency    |                |                 |        |

## Site Work Inspection

| Site Work Inspection    | None | Yes | Notes: |
|-------------------------|------|-----|--------|
| Material Obstructions   |      |     |        |
| Slip, Trip, & Fall Def. |      |     |        |
| Ruts, Holes, Hazards    |      |     |        |
| Barricades / Perimeter  |      |     |        |
| Trenches/Excavations    |      |     |        |
| Overhead Power lines    |      |     |        |
| Traffic Exposures       |      |     |        |
| Any Other Deficiency    |      |     |        |

### Safety Comments:

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**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

### **ATTACHMENT 3**

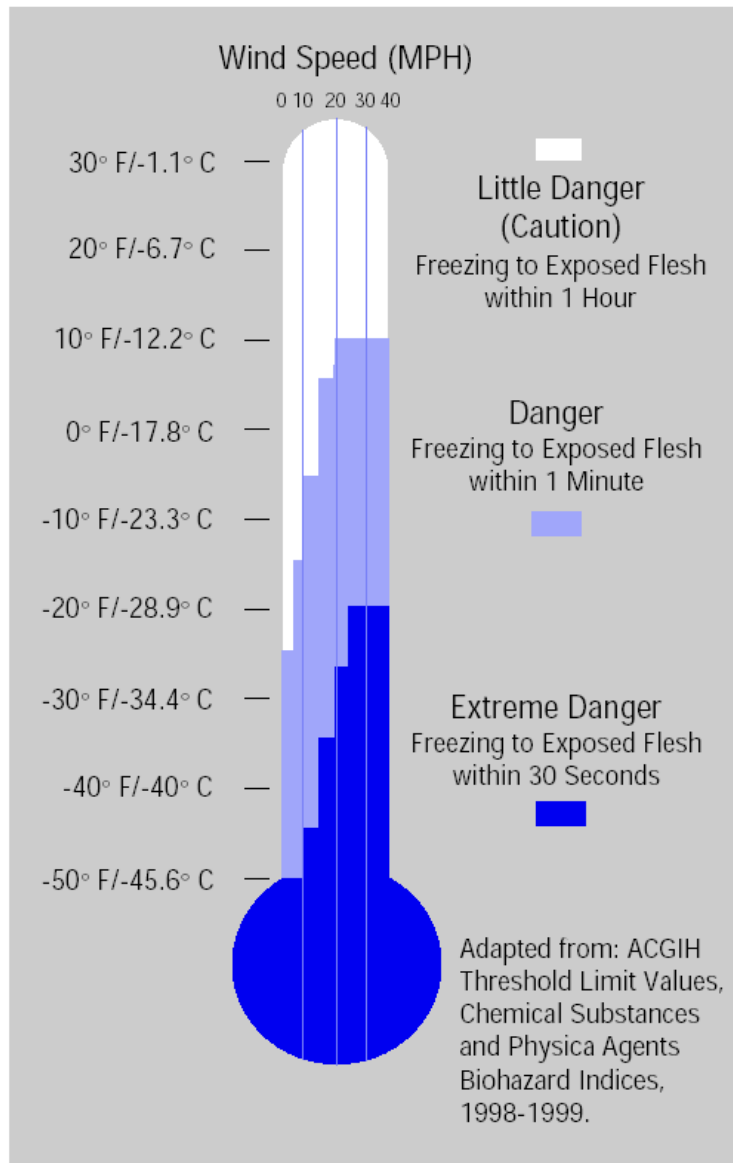
#### Cold Stress Prevention Guidelines

# THE COLD STRESS EQUATION

**LOW TEMPERATURE + WIND SPEED + WETNESS  
= INJURIES & ILLNESS**

When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death may result.

**Hypothermia** can occur when *land temperatures* are **above** freezing or *water temperatures* are below 98.6°F/ 37°C. Cold-related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet clothing.



# FROST BITE

## *What Happens to the Body:*

FREEZING IN DEEP LAYERS OF SKIN AND TISSUE; PALE, WAXY-WHITE SKIN COLOR; SKIN BECOMES HARD and NUMB; USUALLY AFFECTS THE FINGERS, HANDS, TOES, FEET, EARS, and NOSE.

## *What Should Be Done: (land temperatures)*

- Move the person to a warm dry area. Don't leave the person alone.
- Remove any wet or tight clothing that may cut off blood flow to the affected area.
- **DO NOT** rub the affected area, because rubbing causes damage to the skin and tissue.
- **Gently** place the affected area in a warm (105°F) water bath and monitor the water temperature to **slowly** warm the tissue. Don't pour warm water directly on the affected area because it will warm the tissue too fast causing tissue damage. Warming takes about 25-40 minutes.
- After the affected area has been warmed, it may become puffy and blister. The affected area may have a burning feeling or numbness. When normal feeling, movement, and skin color have returned, the affected area should be dried and wrapped to keep it warm. **NOTE:** If there is a chance the affected area may get cold again, do not warm the skin. If the skin is warmed and then becomes cold again, it will cause severe tissue damage.
- Seek medical attention as soon as possible.

# HYPOTHERMIA - (Medical Emergency)

## *What Happens to the Body:*

NORMAL BODY TEMPERATURE (98.6° F/37°C ) DROPS TO OR BELOW 95°F (35°C); FATIGUE OR DROWSINESS; UNCONTROLLED SHIVERING; COOL BLUISH SKIN; SLURRED SPEECH; CLUMSY MOVEMENTS; IRRITABLE, IRRATIONAL OR CONFUSED BEHAVIOR.

## *What Should Be Done: (land temperatures)*

- Call for emergency help (i.e., Ambulance or Call 911).
- Move the person to a warm, dry area. Don't leave the person alone. Remove any wet clothing and replace with warm, dry clothing or wrap the person in blankets.
- Have the person drink warm, sweet drinks (sugar water or sports-type drinks) if they are alert. **Avoid drinks with caffeine** (coffee, tea, or hot chocolate) or alcohol.
- Have the person move their arms and legs to create muscle heat. If they are unable to do this, place warm bottles or hot packs in the arm pits, groin, neck, and head areas. **DO NOT** rub the person's body or place them in warm water bath. This may stop their heart.

## *What Should Be Done: (water temperatures)*

- Call for emergency help (Ambulance or Call 911). Body heat is lost up to 25 times faster in water.
- **DO NOT** remove any clothing. Button, buckle, zip, and tighten any collars, cuffs, shoes, and hoods because the layer of trapped water closest to the body provides a layer of insulation that slows the loss of heat. Keep the head out of the water and put on a hat or hood.
- Get out of the water as quickly as possible or climb on anything floating. **DO NOT** attempt to swim unless a floating object or another person can be reached because swimming or other physical activity uses the body's heat and reduces survival time by about 50 percent.
- If getting out of the water is not possible, wait quietly and conserve body heat by folding arms across the chest, keeping thighs together, bending knees, and crossing ankles. If another person is in the water, huddle together with chests held closely.

### ***How to Protect Workers***

- Recognize the environmental and workplace conditions that lead to potential cold-induced illnesses and injuries.
- Learn the signs and symptoms of cold-induced illnesses/injuries and what to do to help the worker.
- Train the workforce about cold-induced illnesses and injuries.
- Select proper clothing for cold, wet, and windy conditions. Layer clothing to adjust to changing environmental temperatures. Wear a hat and gloves, in addition to underwear that will keep water away from the skin (polypropylene).
- Take frequent short breaks in warm dry shelters to allow the body to warm up.
- Perform work during the warmest part of the day.
- Avoid exhaustion or fatigue because energy is needed to keep muscles warm.
- Use the buddy system (work in pairs).
- Drink warm, sweet beverages (sugar water, sports-type drinks). Avoid drinks with caffeine (coffee, tea, or hot chocolate) or alcohol.
- Eat warm, high-calorie foods like hot pasta dishes.

### ***Workers Are at Increased Risk When...***

- They have predisposing health conditions such as cardiovascular disease, diabetes, and hypertension.
- They take certain medication (check with your doctor, nurse, or pharmacy and ask if any medicines you are taking affect you while working in cold environments).
- They are in poor physical condition, have a poor diet, or are older.



## **APPENDIX F**

### **Resumes of Key Bristol Personnel**

Patrick Braley

Julie Clark

Tyler Ellingboe

Matthew Faust

Marty Hannah

Lyndsey Kleppin

Lesa Nelson



## PATRICK BRALEY

Site Supervisor /  
Senior Environmental Technician

### Years Experience

Total: 20; Bristol: 6

### Areas of Expertise

Site Supervisor/Oversight

Quality Control

Safety and Health

Underground Storage Tank (UST)  
removal and Site Restoration

Site Investigation/Remediation

Mobilization and Demobilization to  
sites in Alaska and Lower 48 states

Sampling and Monitoring

Field Logistics

Experience with multiple field  
screening instruments and tests

### Training and Certifications

40-hr HAZWOPER; 8-hr Refresher

8-hr HAZWOPER Supervisor  
Training

30-hr OSHA Construction Safety and  
Health

USACE Contractor Quality  
Management for Contractors

Certified Erosion and Sediment  
Control Lead (AK-CESCL)

ADEC Qualified Sampler

Hazardous Materials Transportation  
Refresher (DOT/IATA)

CPR and First Aid for Adults / AED

NITON Analyzers LLC  
Manufacturer's Training Course

### Education

A.S., Environmental Science, Texas  
State Technical College, Waco,  
Texas, 2000

Mr. Braley started in vertical construction in 1990 as a laborer and quickly moved through carpenter's apprentice and journeyman positions. He has worked on project sites throughout Alaska and the lower 48 states. Since 2004 he has gained invaluable experience in the areas of directing field activities, environmental site investigation and field data collection. He has supervised the excavation, cleaning and removal of USTs, associated piping, dispensers and site demolition/restoration; collected soil, sediment, air quality and water samples; tested air, water and soil quality using a variety of field screening instruments; and oversaw the installation of borings, wells, and exploration drill holes for the U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (USACE), Federal Aviation Administration (FAA), and Alaska Department of Environmental Conservation (ADEC). Mr. Braley knows and understands field logistics and is adept at performing technical tasks in any area including remote locations. Mr. Braley has gained valuable experience in obtaining subcontractor quotes, agreements, scheduling and coordinating field activities / logistics.

As a Site Supervisor / Senior Environmental Technician, Mr. Braley is responsible for obtaining subcontractor, quotes and agreements; scheduling and coordinating field activities / logistics; mobilization and demobilization of gear and personnel to and from job sites; Mr. Braley is also experienced in collecting, quality control, and sample management for a variety of media including soil, air quality, sediment, surface and groundwater sample collection.

### Project Experience

- ◆ **Site Supervisor/SSHO, Drakes Refinery/Rosebush EPA, Mt. Pleasant, Michigan (12/2011).** Work included a site characterization to evaluate the presence or absence of petroleum hydrocarbon contamination in soil and groundwater. Collected multiple groundwater samples from temporary wells and assisted with the collection of soil samples.

- ◆ **Site Supervisor/SSHO, Chiefs Place, EPA, White earth, Minnesota (11/2011)** Oversight for the excavation, product removal, inerting, and cleaning of a 650 gallon UST. Collected water parameters and analytical samples from temporary water wells. Assisted with soil borings and collection of analytical samples.
- ◆ **Site Supervisor/SSHO, Site Inspections and Removal Response Actions at Former Army Air Field Properties: USACE, Ft. Sumner, New Mexico (10/2011)** Excavated two former UST sites where tanks had previously been removed. Located native soils and performed HANBY field screenings to determine if contamination was present. Took analytical samples to determine site closure. Formerly Used Defense Site (FUDS).
- ◆ **Site Supervisor/SSHO, Savoonga, NALEMP, USACE, Native Village of North East Cape, Alaska (8/2011)** Responsible for the supervision and safety of 6 man crew on a USACE supported, NALEMP project. Work included oversight of building demolition, segregation of lead based products, petroleums, oils, lubricants. All burnable material was incinerated on site, and hazardous material was categorized and shipped to a facility for disposal.
- ◆ **Site Supervisor/SSHO, Multiple Site Assessment and Closure, Toppenish Auto, Linker Referral, Yesterdays Treasure, and Burkeybile, , EPA, Yakama Nation Reservation, Toppenish, Washington (7/2011).** Supervised the exploration and excavation of potentially contaminated soils at four former gas stations. Removed a total of two 1000 gallon UST's from one site, and a 10,000 gallon UST from another including the pumping and containment of product, inerting UST's, cleaning and disposing of UST's, and collecting soil samples at each abandoned UST sight.
- ◆ **Field Supervisor, Site Investigation, EPA, Yakama Nation, Toppenish, Washington (5/2011 – 6/2011).** Solely identified and cataloged potential Leaking Underground Storage Tanks (LUST) sites on the 1.3 million acre Yakama Nation Indian Reservation to assist the EPA in determining if an individual site meets the eligibility criteria of the EPA's LUST Trust Fund.
- ◆ **Site Supervisor/SSHO, Site Inspections and Removal Response Actions at Former Army Air Field Properties, USACE, Carlsbad, New Mexico (4/2011).** Served as Safety Officer and Field Logistics lead. Work included oversight of a Geoprobe direct push rig, assisting with the collection of soil samples and site characterization, restoration and demobilization at a Formerly Used Defense Site (FUDS).
- ◆ **Site Supervisor/SSHO, Site Inspections and Removal Response Actions at Former Army Air Field Properties, USACE, Fort Sumner, New Mexico (10/2010 – 11/ 2010).** Served as Safety Officer and supervised both Sonic and Air rotary drilling for the installation of BarCad monitoring wells at a Formerly Used Defense Site (FUDS). Worked closely with airport personel, multiple contractors, and National Aeronautics and Space Administration (NASA).
- ◆ **Site Supervisor/SSHO Site Assessment, EPA, Makah Reservation, Neah Bay, Washington (10/2010).** Supervised the excavation of a 5000 gallon UST, including the pumping and containment of product, inerting UST, cleaning and disposing of UST, and collecting soil samples at an aboned UST sight.

- ◆ **Lead Environmental Technician, Certified Erosion Control Lead, ADEC Qualified Sampler, Pipeline Location and Removal or Abandonment – Petroleum, Oil and Lubricant (POL), USACE, Alaska District, Fort Wainwright, Fairbanks, Alaska (09/2010 – 10/2010).** Supervised the installation and maintained a storm water pollution prevention plan for Canol pipeline project. Responsible for project soil sampling in accordance with ADEC and USACE procedures. Field screening and sampling of soil from excavations and stockpiles was performed to characterize site conditions and determine disposal requirements for impacted soils during the removal of an abandoned fuel supply line.
- ◆ **Environmental Technician, Groundwater Collection and Sampling, FAA, Cold Bay, Alaska (07/2010).** Developed and collected groundwater samples from monitoring wells using water and bladder pump.. Project objectives were to determine limits of soil and groundwater contamination at six former living quarters, one duplex, the former FAA water treatment plant, and the FAA Shop Building.
- ◆ **Environmental Technician, Groundwater Collection and Sampling, EPA, Menominee Nation, Neopit, Wisconsin (05/2010 and 08/2010).** Collected groundwater samples from existing monitoring wells and sediment and surface water samples from Wolf River. Supervised the excavation and removal of petroleum contaminated soils, and collected soil samples at an abandoned fuel depot. The project also involves the repair, startup, and operation and maintenance (O&M) of an existing air sparge/soil vapor extraction remediation (AS/SVE) system, and conducting remedial cleanup activities.
- ◆ **Site Supervisor/SSHO, Site Assessment, EPA, White Earth, Minnesota (05/2010).** Supervised the excavation and removal of USTs, including the pumping and containment of product, inertion of USTs, cleaning and disposal of USTs, and soil sampling at an abandoned gas station.
- ◆ **Site Supervisor/SSHO, Site Assessment, EPA, Ferdinand, Idaho (11/2009).** Supervised the excavation and removal of contaminated soil, collected soil samples, installed soil borings and determined lithology, installed groundwater monitoring wells, and collected groundwater samples at an abandoned gas station.
- ◆ **Site Supervisor/SSHO, Site Assessment, EPA, Hoopa Reservation, California (2009).** Supervised the excavation and removal of eight USTs, including the pumping and containment of product, inerting USTs, cleaning and disposal of USTs, and soil sampling at two abandoned gas stations.
- ◆ **Site Supervisor/SSHO, Site Assessment, EPA, Menominee Reservation, Wisconsin (2010).** Supervised the excavation and removal of contaminated soil, and collected soil samples. Installed soil borings and groundwater monitoring wells, and collected groundwater samples at an abandoned fuel depot.
- ◆ **Environmental Technician, Groundwater Collection and Sampling, EPA, Souix Reservation, Pine Ridge, South Dakota (2010).** Collected groundwater samples from existing groundwater monitoring wells.

- ◆ **Environmental Technician, Groundwater Project Assistance, FAA Cold Bay, Alaska (2010).** Assisted in installation, developing, collecting and sampling of groundwater monitoring wells.
- ◆ **Site Supervisor/SSHO Site Assessment Project, EPA, Makah Reservation, Washington (6/2008).** Supervised the excavation and removal of two 10,000 gallon USTs, including the pumping and containment of product, inertion of USTs, cleaning and disposal of USTs, utilizing HANBY kits to field screen excavation before collecting confirmation soil samples and coordinating the backfill and compacting of excavation at an abandoned gas station.
- ◆ **Environmental Technician, RRS Remediation Action Project, USACE, Hoonah Island, Alaska (2006, 2007, and 2008).** Assisted in collecting soil samples, performed field screening for PCBs using Ensysis test kits and assisted with the Contractor Quality Control Systems Manager duties, and In 2007 and 2008, functioned as Site Superintendent/Site Safety and Health Officer, as needed. Delineated areas of PCB soil contamination, directed soil excavation based on field laboratory results, manifested contaminated soil for transport, collected confirmation samples for laboratory analysis populating the manifests for tracking of containers containing PCB and diesel contaminated soils. The project consisted of excavating, manifesting, and transporting over 3,345 tons of polychlorinated biphenyls (PCB)-contaminated soil, collecting 320 samples for field laboratory analysis, and collecting over 522 analytical samples for fixed laboratory analysis. Assisted in the delineation to determine the extent and magnitude of PCB and diesel contamination.
- ◆ **Environmental Technician, Site Assessment, FAA, King Salmon, Aleutian Islands, Alaska (2008).** Assisted in surveying, soil sample collection, and screened soil samples using the Geoprobe® Ultraviolet Optical Screening Tool™ (UVOST).
- ◆ **Lead Environmental Technician, UST Removal, EPA, Santa Clara Pueblo, New Mexico (2008).** Assisted in the excavation and removal of USTs, performed field screening and collected soil samples.
- ◆ **Lead Environmental Technician, UST Removal, EPA project, Navajo Reservation, Arizona (2007).** Assisted in the excavation and removal of USTs, and collected soil samples at an abandoned gas station.
- ◆ **Environmental Technician, Development and Installation of Soil Borings and Monitoring Wells, EPA, Colorado River Indian Tribes Reservation South of Phoenix, Arizona (2007 - Present).** Assisted with the installation and development of soil borings and monitoring wells. Collected physical parameters and soil and water samples from the wells.
- ◆ **Environmental Technician, Treatability Study, USACE, Alaska District, Joint Base Elmendorf-Richardson, Alaska (2005, 2006 and 2007).** Assisted in the installation and sampling of groundwater monitoring wells including the installation of injection wells for the purpose of bio-remediation.
- ◆ **Environmental Technician, Landfill Removal Project, FAA, Cape Yakataga, Alaska (2006).** Assisted with the removal activities, and collected soil samples.

- ◆ **Environmental Technician, Site Investigation Project, FAA, Skwentna, Alaska (2006).** Solely performed a site investigation, which included Geophysics and test pits of an inert landfill that is encroaching into the Skwentna River
- ◆ **Environmental Technician, Puntilla Lake/Rainy Pass Project, Alaska, FAA (2006).** Performed field screenings for the presence of petroleum hydrocarbons using an Infrared Spectrometer (Horiba OCMA 350).
- ◆ **Environmental Technician, Military Working Dog Facility Excavation, USACE, Alaska District, Joint Base Elmendorf-Richardson, Alaska (2006).** Conducted field screenings for petroleum contaminants before, during, and after excavation of the Fort Richardson working dog kennel.
- ◆ **Environmental Technician, Biorka Island White Alice Site, FAA (2006).** Assisted in site investigation including test pits and trenches to determine presence of petroleum contaminated soils, and collected groundwater, soil, and sediment samples.
- ◆ **Lead Environmental Technician, Environmental Due Diligence Audit (EDDA), FAA Lake Clark, Alaska(2006).** Assisted surveyor in locating the corners for proposed FAA camera tower, and photographed the surrounding environment for impact study.
- ◆ **Environmental Technician, PenAir King Salmon Monitoring Project, PenAir, King Salmon, Aleutian Islands (2006).** Sampled existing monitoring wells.
- ◆ **Environmental Technician, PenAir Sampling Project, Dillingham, Alaska (2006).** Assisted in groundwater and soil sample collection.
- ◆ **Environmental Technician, Drum Cleanup and Disposal, Iliamna, Alaska (2005).** Supervised four team members in the classification, decontamination, and disposal of more than 1,000 drums at a site in Iliamna, Alaska.
- ◆ **Environmental Technician, Sampling Program, Northern Dynasty Mines, Inc., Iliamna, Alaska (2004).** Sampled surface water and sediment of streams and ponds, and assisted in hydrographic studies along a proposed haul road corridor for a background study for Northern Dynasty Mines, Inc., Pebble Mine gold-copper prospect.
- ◆ **Environmental Technician, Marine Life Sampling Program, Northern Dynasty Mines, Inc., Iliamna Bay and Iniskin Bay, Alaska (2004).** Worked alongside marine biologist collecting marine plant life, and biologics for a background study for Northern Dynasty Mines. Work was conducted with a 6 man crew aboard a 50 foot charter vessel for 7 days.
- ◆ **Survey technician, Kodiak Island, ADOT.** Work included staking out roadways.
- ◆ **Survey Technician Tooksook Bay, Alaska.** Work included Topographical survey for proposed road construction.
- ◆ **Survey Technician, Nome, Alaska.** Work included Topographical survey of Nome to Council HWY.
- ◆ **Survey Technician, Elim, Alaska, FAA.** Work included staking runway, roadways and slopes for the Elim airstrip extension.

- ◆ **City of Waco, Texas, Public Works, Water Department (2001 - 2003).** Involved with water utilities plant operations and maintenance at the Riverside Treatment Plant which treats an average of 13 million gallons of water per day from Lake Waco with a maximum capacity of 24 million gallons per day, and the Mount Carmel Treatment Plant which treats an average of 28 million gallons of water per day with a maximum capacity of 42 million gallons per day. Other responsibilities include collecting an average of 430 samples every 24 hours during the water treatment process.





JULIE CLARK

Project Manager / Environmental Scientist

### Years Experience

Total: 10; Bristol: 2

### Areas of Expertise

Project Management Field Team Lead

Site Assessment and Characterization

Contaminated Site Remediation

Soil Boring and Monitoring Well Installation

Environmental Sampling

Quality Control

### Training and Certifications

OSHA 30-hr Construction Safety and Health

Construction Quality Management for Contractors, USACE, Anchorage, Alaska

8-hr HAZWOPER Supervisor Training

EPA 40-hr HAZWOPER

EPA 8-hr HAZWOPER Refresher, current

CPR and First Aid for Adults

ADEC Field Qualified Sampler

DOT/IATA Dangerous Goods Shipper's Training; Refresher

Defensive Driving Training

### Education

B.S., Natural Science, University of Alaska Anchorage, 2001

Ms. Clark is a project manager and environmental scientist with over 10 years of experience in environmental consulting. She has extensive experience in project management, leading and directing field activities, field data collection, data analysis, and data evaluation and reporting. She has worked with a variety of government and private sector clients, including US Army Corps of Engineers® (USACE), U.S. EPA, ADEC, U.S. Army, U.S. Air Force, and BP Exploration. Ms. Clark has managed leaking underground storage tank projects, HTRW site assessments, hazardous waste sampling and analysis, and property assessment and cleanup projects. She has performed as the field team lead at numerous projects and sites throughout Alaska and the lower 48, including remote locations not accessible by road, and during the winter on the arctic North Slope of Alaska. As a lifelong Alaskan resident, Ms. Clark knows and understands Alaska logistics and is adept at performing technical tasks in remote locations and challenging conditions.

### Project Experience

- ◆ **Project Manager/Field Team Lead, EPA Region 5, Former Boivin Oil Company Site, Menominee Reservation, Neopit, Wisconsin (03/2010 – Present; \$657K).** Prepared planning documents and periodic summary reports for a cost-reimbursable project to assess and characterize the impact from leaking USTs at a former wholesale fuel distribution and retail gasoline station site. Activities have included periodic groundwater monitoring of approximately 40 site monitoring wells, installing soil borings to assess subsurface contamination in the area of the tanks, installing permanent monitoring wells, excavating contaminated soil, and collecting surface water and sediment samples from a nearby river to evaluate potential impacts to the river. The project also involves operation and maintenance (O&M) of an air sparge/soil vapor extraction remediation (AS/SVE) system, and working closely with the EPA project manager to recommend and conduct appropriate remedial cleanup activities.



- ◆ **Project Manager/Field Team Lead, EPA Region 5, North Mobil Hub Oil Site, Isabella Indian Reservation, Mount Pleasant, Michigan (09/2010 – Present; \$206K).** Managed and led the field effort for a cost-reimbursable site characterization project to evaluate the presence or absence of petroleum hydrocarbon contamination in soil and groundwater at a former Mobil gasoline station. Characterization activities included the installation of multiple soil borings and temporary wells, and the collection of soil and groundwater samples. Prepared the planning documents and the final summary report.
- ◆ **Project Manager/Field Team Lead, EPA Region 5, Chief's Place and White Earth Grocery Sites, White Earth Reservation, Mahnomen, Minnesota (03/2010 – 07/2010 and 09/2011 – Present; \$200K).** Prepared planning documents and final summary report for a site assessment to evaluate the presence or absence of leaking underground storage tanks and potential hydrocarbon releases into the soil and groundwater at two former retail gasoline station sites. USTs were removed at the White Earth Grocery site in May 2010 and confirmation soil samples collected in order to assess the site and obtain site closure. Assessment activities were unable to be performed at the Chief's Place site in May 2010, so Bristol returned to the site in November 2011 to perform a site assessment and removed one UST and collected confirmation samples from the UST excavation. Performed site characterization activities, including the installation and sampling of soil borings and temporary wells to delineate the extent of contamination. Prepared the final report for assessment and characterization activities at the Chief's Place site.
- ◆ **Project Manager/Field Team Lead, EPA Region 5, Drake's Refinery and Rosebush Station Sites, Isabella Indian Reservation, Mount Pleasant, Michigan (03/2011 – Present; \$186K).** Managed a cost reimbursable site characterization project at two former retail gasoline sites to evaluate the presence or absence of petroleum hydrocarbon contamination in soil and groundwater. Prepared planning documents and directed the field effort, which consisted of the installation of soil borings and temporary wells and the collection of soil and groundwater samples. Worked closely with the onsite EPA project manager to make decisions during the field activities. Wrote the final characterization report describing findings and recommendations for further action.
- ◆ **Project Manager, EPA Region 10, Former Neah Bay Resort, Makah Reservation, Neah Bay, Washington (08/2010 – 01/2011; \$55K).** Prepared planning documents and final summary report for a site assessment to evaluate the presence or absence of leaking underground storage tanks and potential hydrocarbon releases into the soil and groundwater at a former resort site. USTs were removed and confirmation soil samples collected in order to perform the assessment and evaluate site conditions and obtain site closure.
- ◆ **Assistant Project Manager, USACE, Site Inspections of Kiska MMRP and Amchitka HTRW, CON/HTRW, and MMRP, Kiska and Amchitka Islands, Alaska (06/2010 – 04/2011).** Assistant Project Manager and primary author of planning documents for a MMRP project to locate and document WWII munitions on Kiska and Amchitka Islands, as well as to perform visual monitoring at approximately 20 HTRW locations on Amchitka to document current conditions at those locations. Responsibilities included participating in technical project planning (TPP) meetings with project stakeholders and the preparation of planning documents (including a Uniform Federal Policy Quality Assurance Project Plan [UFP-QAPP]).

Planning documents were prepared in compliance with the USACE Alaska District's Manual for Electronic Deliverables (MED).

- ◆ **Field Team Lead/Environmental Scientist, USACE Alaska District, NE Cape Site 28 Sampling, St. Lawrence Island, Alaska (07/2011 – Present).** Delineated soil and sediment contamination in an approximately 10-acre wetland at a remote subarctic site through the collection of over 200 soil and sediment samples. Prepared a Technical Memorandum in compliance with USACE Alaska District's MED that summarized findings from the 2011 investigation and recommended future activities. Will lead a field effort to map the sediment areas in the wetland during the summer of 2012.
- ◆ **Field Team Lead/Environmental Scientist, EPA Region 9, Painted Desert Inn, Navajo Reservation, Navajo, Arizona (07/2010).** Conducted field activities to characterize petroleum hydrocarbon contamination at a leaking UST site. Duties included the installation and sampling of soil borings and monitoring wells, as well as oversight of the drilling, environmental, and laboratory subcontractors. .
- ◆ **Field Team Lead/Environmental Scientist, EPA Region 9, Newcomb Trading Post, Navajo Reservation, Newcomb, New Mexico (07/2010).** Lead field activities to characterize petroleum hydrocarbon contamination at a former trading post and leaking UST site. Characterization activities included the installation and sampling of soil borings and monitoring wells. Oversaw the drilling, environmental, and laboratory subcontractors.
- ◆ **Field Team Lead/Environmental Scientist, EPA Region 9, Sweetwater Trading Post, Navajo Reservation, Sweetwater, Arizona (07/2010).** Characterized petroleum hydrocarbon contamination at a former trading post and leaking UST site. Characterization activities included the installation of soil borings and monitoring wells, collecting soil and groundwater samples, and overseeing the drilling, environmental, and laboratory subcontractors.

## Professional Experience

- ◆ **Environmental Scientist, OASIS Environmental, Anchorage, Alaska (06/2006 – 01/2010).** **Managed** several projects and performed numerous investigations as the field team technical leader. Involved in all phases of an environmental investigation, including preparing planning documents, logistical planning and scheduling, collecting environmental samples of various media, managing subcontractors, analyzing and interpreting data, preparing summary reports, and client interaction.
  - Brownfield Assessment at the Copper Valley School, Alaska Department of Environmental Conservation (ADEC) Tazlina, Alaska (2009). Conducted a site visit to determine potential hazardous environmental conditions at the site, a debris inventory, and interviews with persons in the community with knowledge about the site. Primary author of a cleanup plan and general cost estimate to address issues identified during the site visit. Responsible for resource and regulatory agency coordination, budget management of the fixed price contract, and invoicing.
  - Project Manager/Field Team Lead, Additional Assessment Activities, U.S. Army Corps of Engineers (USACE), King Salmon Air Station (2008 - 2009). Drilled soil borings and collected samples to further delineate historical contaminated areas throughout the base.

Performed field screening to assist in real-time decision making, such as selecting appropriate locations for the installation of permanent monitoring wells. Responsible for client coordination and interaction, scheduling, invoicing, and tracking of the scope and fixed-price budget.

- Assistant Project Manager/Field Team Lead, Monitoring in Support of a Base-wide Contaminant Plume Analysis, US Air Force, Elmendorf Air Force Base in Anchorage, Alaska (2008 - 2009). Led multiple field efforts in the collection of groundwater, surface water, and soil samples for the long-term monitoring of management areas. Performed operation, maintenance, and monitoring of a wetlands remediation system and a biovent system. Developed project work plans and summary reports.
- Field Team Lead, Release Investigation of a Former Dry Cleaning Facility, ADEC, Fairbanks, Alaska (2007 - 2009). Drilled and sampled over 70 test borings for source identification and characterization of the chlorinated solvent plume at dry cleaning facility. Performed field screening using the Color-Tec® Method for real-time monitoring of chlorinated compounds in soil and groundwater. Sampled existing monitoring wells and oversaw the installation of new monitoring wells. Assisted the project manager with the preparation of project reports, including a statistical analysis of the data.
- Field Team Lead, Release Investigation of a Former Dry Cleaning Facility, ADEC, Fairbanks, Alaska (2008 - 2009). Drilled and collected samples from 45 test borings to identify and characterize the source of a chlorinated solvent plume. Performed field screening using the Color-Tec Method for the detection of chlorinated compounds in soil and groundwater. Installed, developed, and sampled new monitoring wells. Managed all waste generated during the investigation as F-listed hazardous waste. Assisted with the preparation of summary reports.
- Site Lead/Field Team Lead, Reserve Pit Excavation, BP Exploration, Prudhoe Bay, Alaska (2006 - 2009). Provided a wide variety of support at numerous exploration pads on Alaska's North Slope to obtain closure with ADEC. Duties included the direction of excavation, segregation and proper disposal or treatment of soils from exploration drill sites throughout Greater Prudhoe Bay, as well as determining the adequate removal of contaminated material through the collection of confirmation samples. Since many exploration sites are not connected to the Prudhoe Bay road system, work was performed in arctic conditions during the winter months to minimize damage to the fragile tundra.
- Site Lead/Field Team Lead, Compliance Monitoring, BP Exploration, Prudhoe Bay, Alaska (2006 - 2009). Performed solid waste facility compliance monitoring work on numerous project sites, conducting site inspection and water/soil sampling throughout the Greater Prudhoe Bay area.
- Field Team Lead, Big Lake Water Quality Sampling, ADEC, Big Lake, Alaska (2009). Collected water samples and water quality readings from 12 locations on Big Lake, which was classified by ADEC in 2006 as an impaired water body under the federal Clean Water Act. Samples were collected on 13 different days of low, moderate, and high watercraft activity (including Memorial Day, Independence Day, and Labor Day weekends) to document petroleum contaminant concentrations, determine whether or not the lake continued to exceed water quality standards, and investigate the relationship between motorized watercraft usage and petroleum hydrocarbon loading to the lake.

- Environmental Scientist/ADEC-Qualified Sampler, Thermal Treatment of Petroleum Contaminated Soil, USACE FUDS Remediation Project, Umiat, AK (2006). Responsible for sampling thermally remediated petroleum-contaminated soil at a remote site. Obtained post-treatment MULTI INCREMENT® confirmation samples for field screening with an IR analyzer and laboratory analytical testing; performed stockpile and burn-pad footprint field screening and MULTI INCREMENT® sampling; and performed waste disposal sampling. Coordinated shipment of samples to the project laboratory.
- ♦ **Environmental Scientist, North Wind, Inc., Anchorage, Alaska (03/2002 – 05/2006).** Staff environmental scientist performing field work, chemical sampling, data analysis, and reporting for environmental investigations. Quickly gained knowledge and experience to become a primary field team leader and project manager for several small projects.
  - Project Manager, Hazardous Waste Sampling, U.S. Army Garrison in Alaska (2005 - 2006). The project consisted of the characterization of hazardous waste at a number of military sites across Alaska. Samples were collected from drums at centralized hazardous waste accumulation facilities or oil/water separators and underground storage tanks at various buildings to characterize the waste for proper transportation and disposal. Supervised the day-to-day performance of the contract, including client coordination, scheduling, and budget tracking. In charge of data evaluation and reporting, as well as subcontractor management.
  - Project Manager, Surface Water Quality Sampling, Matanuska-Susitna Borough, Palmer, Alaska (2004 - 2006). Investigation was conducted to provide background information prior to proposed development in the Hatcher Pass area. Collected surface water quality samples from the Little Susitna River three times a year. Responsible for measuring and recording physical parameters of the river and collecting analytical samples. Managed subcontractors and wrote and submitted letter reports to the client after each sampling event.
  - Field Team Lead/Task Manager, Field Data Collection, USACE, Fort Wainwright, Alaska (2003 - 2006). Performed data collection and associated reporting at several CERCLA sites. Scope of work included investigation of hydrocarbons in soil and groundwater, semi-annual monitoring of over 100 monitoring wells, routine monitoring of seven air sparging/soil vapor extraction (AS/SVE) systems, routine monitoring of a water supply well, and periodic reporting of results. Authored comprehensive annual reports to document the results of field efforts, as well as intermediate reports provided to the client for each site after every sampling event.
  - Field Team Lead, Soil Sample Collection at the Taku Gardens Area, USACE, Fort Wainwright, Alaska (2005 - 2006). Supervised field samplers to characterize the extent and concentration of PCB contamination on this 54-acre housing site. Performed field tests to determine the PCB concentration using ENSYS test kits, and depending on the results, sent samples to the laboratory for analysis. Responsible for sample collection and shipping, and interfacing with the analytical laboratory. Assisted with the preparation of periodic reports submitted to the client.
  - Field Team Member, Columbia Space Shuttle Recovery, Lufkin, Texas (2003). Participated in the emergency response after the Columbia space shuttle disaster. Field screened potentially hazardous debris to determine if it posed a risk to human health or the environment, and collected GPS coordinates of debris for location mapping, which contributed to refining the daily debris search areas.



## TYLER ELLINGBOE

### Project Manager / Senior Waste Specialist

#### Years Experience

Total: 16; Bristol 2.5

#### Areas of Expertise

Project Management

Hazardous/Nonhazardous Waste  
Materials Management

Regulatory Compliance

Logistics

Sampling

#### Training and Certifications

40-hr Hazardous Waste Operation  
& Emergency Response  
(HAZWOPER)

HAZWOPER Refresher

HAZWOPER Site Worker and  
Supervisor Training

RCRA Hazardous Waste  
Regulations/Land Disposal  
Restrictions

Hazardous Materials  
Transportation (49CFR 172.700-  
704) / IATA and Refresher

HAZCAT® Chemical Identification  
System Training

Physical Sampling for Hazardous  
Materials and Contaminants  
Training

Toxic Substances Control Act  
Training (TSCA)

#### Education

M.S., Engineering and Science  
Management – Science Option,  
University of Alaska Anchorage,  
Alaska, 2007

B.S., Biological Sciences-Fish and  
Wildlife Management Option,  
Montana State University,  
Bozeman, Montana, 1994

Mr. Ellingboe's education and specialized training have allowed him to develop skills in project management, chemical identification and characterization, and logistics over the previous 16 years. He has served as project manager for clients ranging from small privately-owned businesses to larger corporations, and from municipal and borough household waste programs to federal projects and contracts. His knowledge of the WAC, OSHA, RCRA, CERCLA, DOT, IATA, and TSCA regulations have been crucial to timely job completion while maintaining regulatory compliance. Mr. Ellingboe is a State of Alaska Qualified Sampler, and has extensive experience in sampling, identification, consolidation, labeling, lab-packing, packaging, profiling, manifesting, and transporting of hazardous / nonhazardous waste materials. Supervision and direction of project staff and the handling of personnel and equipment scheduling have also been his primary responsibilities. He has been accountable for regulatory and contract compliance, waste tracking, and reporting requirements. His various projects have led to a wide range of experiences in both local and remote, arctic areas and conditions.

#### Project Experience

- ◆ **Project Manager/Senior Waste Specialist, Groundwater and Landfill Gas Monitoring, Joint Base Elmendorf Richardson (JBER) Landfill, USACE, Alaska (01/2012 – current).** Providing support for environmental monitoring activities at the JBER Landfill including the performance of annual groundwater sampling and analysis from existing groundwater monitoring wells and quarterly landfill gas monitoring from existing gas probes. Preparing annual groundwater monitoring reports and quarterly landfill gas monitoring technical memorandums.
- ◆ **Project Manager/Senior Waste Specialist, UST Corrective Action Hot Tanks, USACE, Alaska District, Joint Base Elmendorf-Richardson (JBER), Alaska (09/2010 – current).** Preparing planning documents to guide and support UST corrective action procedures at



seven sites. Field work is scheduled for the 2012 field season. Corrective actions to be performed include excavation and disposal of contaminated soil, backfilling of excavations with clean soil, installation of soil borings using air rotary drilling methods, installation of groundwater monitoring wells, and collection of soil and groundwater samples for laboratory analysis. Upon conclusion of corrective action activities, a Corrective Action Report will be prepared and will include a risk assessment using the ADEC Method 4 Risk Calculator.

- ◆ **Project Manager/Senior Waste Specialist, Class V Underground Injection Control (UIC) Closure – Building 722, USACE, Alaska District, Joint Base Elmendorf-Richardson, Alaska (06/2010 – 12/2010; \$273K).** Prepared planning and final reporting documents. Performed the excavation and removal of a 1940s era septic tank and cesspool. Conducted soil sampling for site characterization, confirmation, and wastestream disposal. Performance evaluation sampling was a required part of the project. Excavated, transported, and removed approximately 170 tons of petroleum hydrocarbon impacted soil. Prepared all required waste stream profiling and manifesting paperwork and coordinated all subcontractors.
- ◆ **Senior Waste Specialist, Removal of Polychlorinated Biphenyl (PCB)-Containing Transformers at a Formerly Used Defense Site (FUDS), USACE, Albuquerque District, Deming, New Mexico (04/2010 – 11/2010; \$640K).** Project was at the former Deming Army Airfield. Oversaw the preparation of all waste material profiling and manifesting paperwork required for proper disposal. Supervised the subcontractor and the removal, packaging, transportation, and disposal of Toxic Substances Control Act (TSCA)-regulated PCB waste from the site to the disposal/recycling facility.
- ◆ **Senior Waste Specialist, NE Cape In Situ Chemical Oxidation (Phase I ISCO) and Intrusive Drum Removal/Landfill Cap Project, USACE, Alaska District, Northeast Cape of St. Lawrence Island, Alaska (04/2009 – 12/2010; \$13.8M).** Supported the preparation of waste management planning documents. Responsible for proper characterization, containerization, and profiling of waste streams for disposal. This project also required the preparation of non-hazardous and uniform hazardous waste manifests and Canadian transit notices and movement documents. The shipping of RCRA and Non-RCRA waste by barge from a remote site in an Alaskan subarctic setting presented a series of logistical challenges.
- ◆ **Project Manager, Native American Lands Environmental Mitigation Program (NALEMP) Site Investigation, Removal Action, and Site Investigation, Native Village of Savoonga (NVS), Native Village of Northeast Cape, St. Lawrence Island, Alaska (01/2009 –current; \$62K).** Prepared the planning documents, conducted a reconnaissance of all the sites, performed a hazardous materials building survey, and collected samples from areas of concern. Prepared the Reconnaissance Report and helped the NVS plan the next phase of work. Project site was the Native Village of Northeast Cape “Fish Camp” located at the Northeast Cape of St. Lawrence Island, Alaska. The NALEMP was developed by the Department of Defense (DoD) to address environmental issues from past DoD activities on Indian lands. The NVS obtained funding under the NALEMP Program from the USACE to identify and mitigate military impacts to Native land. Bristol subcontracted to the NVS to assist them in conducting the first phase of the Site Investigation/Removal Action at several areas of concern and supported the tribe with the preparation of Fiscal Year 2009 -2012 Facilitated Cooperative Agreement documents between the tribe and the USACE. In 2011, coordinated the on-site combustion of non-hazardous building debris and the collection and subsequent

shipment of lead-based paint containing construction debris and asbestos-containing material off-site. For 2012, scheduled field activities include the collection and management of remaining debris, the off-site shipment of non-burnable, non-hazardous debris, the off-site shipment of hazardous materials found on-site during the site investigation, and the performance of a site investigation including the collection of surface water, sediment, and soil samples for laboratory analysis.

◆ **Project Manager, Native American Lands Environmental Mitigation Program (NALEMP) Site Reconnaissance, Debris Removal, and Investigation, Native Village of Tetlin (NVT), Lucy David and Lulu David Native Allotments, Tetlin, Alaska (09/2009 – current).**

Prepared the planning documents including the Strategic Project Implementation Plan and Work Plans. Fieldwork conducted in 2011 included the performance of a subsurface investigation utilizing a Geoprobe direct-push drilling rig, the installation of temporary well points, and the collection of groundwater and subsurface and surface soil samples. Test pits and trenches were also excavated near debris fields to assess whether buried metal and/or debris were present and to facilitate the collection of additional soil samples for laboratory analysis. Background surface soil samples were also collected from each allotment and analyzed for Resource Conservation and Recovery Act (RCRA) metals. The field work also included the identification, containerization, and removal of hazardous and non-hazardous environmental hazards, including drums and debris. Logistical challenges included the coordination of mobilization/demobilization to the site, the removal and transport of non-hazardous debris to the local landfill, and the removal, transport, and disposal of hazardous materials to properly permitted treatment, storage, and disposal facilities (TSDFs).

◆ **Project Manager, Leaking Underground Storage Tank Investigations and Remediation, EPA, Region 8, Several States (09/2008 – 09/2011; \$1.2M).** This was a three-year contract with EPA to investigate and remediate leaking underground storage tank sites on Indian Lands in Colorado, Montana, North and South Dakota, Utah, and Wyoming. Supervised the performance of site assessments / characterizations and/or remedial actions 12 sites on 5 reservations. Projects have included installing soil borings and groundwater monitoring wells, collecting analytical samples, evaluating and upgrading existing remediation systems, and designing and installing remediation systems. Removal actions including soil excavation and removal and groundwater monitoring well pumping and removal have also occurred. Responsible for contracts, budgets and invoices, monthly progress reports to the EPA, and oversight of all field activities and reports.

◆ **Task Manager / Senior Waste Specialist, NALEMP Site Investigation and Removal Action, Gulkana, Alaska (09/2008 – 07/2009; \$80K).** The NALEMP was developed by the Department of Defense (DoD) to address environmental issues from past DoD activities on Indian lands. The Village of Gulkana, Alaska, obtained funding under the NALEMP Program from the U.S. Army Corps of Engineers (USACE) to identify and mitigate military impacts to Native land. Bristol subcontracted to the Gulkana Village Council (GVC) to assist them in conducting the first phase of a Site Investigation/Removal Action at several areas of concern. Bristol prepared the planning documents, conducted a reconnaissance of all the sites, and collected samples from areas of concern. Bristol prepared the Reconnaissance Report and is working with the GVC to plan the next phase of work.

## Professional Experience

- ◆ **Contract Manager, Emerald Alaska, Inc. (02/2001 – 09/2008).** Played a vital role on the DLA/DRMO contract that Emerald held for the military in the State of Alaska. Ensured that all contract requirements were fulfilled accurately and within specified time constraints. With support from the team, ensured that all service requests for hazardous waste management from the U.S. Army, U.S. Air Force (USAF), and Coast Guard and National Guard were completed correctly, according to all RCRA/DOT/TSCA regulations.
  - Primary responsibilities included project and contract oversight, interpreting data, decision making, and preparation of all necessary paperwork to properly manage and transport all hazardous and nonhazardous wastes to final disposal facilities. Also supervised environmental specialists and other project personnel on a variety of commercial customer projects, both locally and in remote locations.
- ◆ **Transportation Manager, Emerald Alaska, Inc. (February 2001 – September 2008).**
  - Primary responsibility was to coordinate and provide all proper documentation for shipping hazardous and nonhazardous wastes from Anchorage to the Lower 48 via road, rail, air, and marine systems. Some of the documentation prepared included the following: bill of lading, hazardous and nonhazardous waste manifests, Canadian manifests, and transit notices. Coordinated inbound and outbound loads to maximize efficiency, reduce costs, and remain compliant with transfer facility waste storage times. In 2004, managed the incident-free transportation of over 12 million pounds of hazardous and nonhazardous wastes to both intrastate and interstate destinations.
- ◆ **Philip Services Corp., Anchorage, Alaska (03/1995 – 02/2001).**
  - Environmental Specialist II for Foster Wheeler, St. Lawrence Island, Alaska (May - October 2000). Served as the on-site regulatory specialist on a remedial action and demobilization project for the USACE. Directly responsible for all regulatory compliance in regards to the following agencies: EPA, Alaska Department of Environmental Conservation (ADEC), CERCLA, and TSCA. Guided field personnel in the characterization, consolidation, sampling, and shipment off site of all hazardous and nonhazardous waste materials off site.
  - Environmental Specialist II for Linder Construction, Pedro Dome, Alaska. (May - August 1999). Directly responsible for the shipment of all TSCA-regulated wastes off site during a PCB excavation and removal project for the USACE. He prepared and submitted all related and required paperwork to Linder and the USACE representative for review and approval. Labeled, marked, and placarded all waste containers for shipment and coordinated all waste loading and off-loading activities between each waste transporter.
  - Environmental Specialist II for UIC Construction, Barrow and Kotzebue, Alaska (May - July 1999). Supervised the removal of hazardous and nonhazardous wastes from the borough landfills. Prepared and completed all required paperwork and properly containerized, labeled, marked, and shipped all wastes off site.
  - Environmental Specialist II for Phillips Alaska, Inc. / British Petroleum (BP). Prudhoe Bay and Kuparuk Oilfields, Alaska (March 1999 - February 2001). Served as the project manager for the ongoing waste management contracts with Phillips/BP. Responsible for properly containerizing, labeling, marking, and shipping of all waste materials off site.



Primary responsibility was the preparation of all required paperwork to properly manage and transport all hazardous and nonhazardous wastes off site and to final disposal facilities according to all applicable laws and regulations.

- Environmental Specialist II for Bristol Environmental Services (BES), Kodiak and Alaska Peninsula National Wildlife Refuges, Alaska (October 1998). Responsible for the remote waste cleanup of a radio antenna site and the cleanup of abandoned drums along the Bristol Bay coastline. Daily transportation was via helicopter. Also responsible for properly containerizing, labeling, marking, and shipping all waste materials off site.
- Environmental Specialist II for Jacobs Engineering Group, Inc. Cape Chiniak, Kodiak, Alaska (September 1998). Conducted environmental sampling of soil stockpiles and excavations at an interim remedial action project at Little Navy Annex and Cape Chiniak Tracking Station. Also responsible for the proper characterization, labeling, loading, placarding, and manifesting of hazardous waste shipments off site.
- Environmental Specialist II for BES/Nugget Joint Venture, King Salmon, Alaska (June - July 1998). Worked on a remedial action cleanup at Rapids Camp for the USAF. Various duties included the proper containerizing, labeling, marking, and shipping of all waste materials off site. Conducted environmental sampling of a soil excavation, abandoned drums, and soil at various other sites. Held accountable for maintaining records and reporting all findings to the JV, the USAF representatives, and the ADEC.
- Environmental Laborer for Linder Construction, Adak Naval Station, Alaska (February - April 1998). Worked as a laborer on a tank cleaning and fuel pipeline pigging project. Participated in the cleaning and purging of six large-volume fuel tanks and a 10-inch gasoline fuel line.
- Environmental Specialist II for BES/Nugget JV, King Salmon, Alaska (July - October 1997). Conducted sampling of unknown hazardous waste drums that had been excavated from a barrel dumpsite at a remedial action cleanup at the local USAF base. Conducted air, liquid, and soil sampling using various field-screening techniques and equipment. Photoionization detectors (PIDs), immunoassay test kits, and the HAZCAT® Chemical Identification System were employed. Directed a crew of laborers in the maintenance of the drum accumulation pad. Responsible for maintaining records and for reporting all findings to the JV, the USAF representatives, and the ADEC.
- Environmental Specialist II for Oil Spill Consultants, National Park Service, Alaska. (July - October 1997). Responsible for the cleanup and disposal of hazardous and nonhazardous wastes generated from six national parks around the State of Alaska. Directly responsible for the proper identification, packaging, marking, labeling, and loading for shipment of all wastes.
- Environmental Specialist for CET, Grand Forks, North Dakota (May – June 1997). Worked on the Red River Flood Disaster Relief. Supervised the collection, handling, transportation, and disposal of household hazardous waste collected during the relief effort.
- Environmental Specialist for City of Kodiak, Dog Bay Harbor (May 1997). Active participant in the inerting and removal of a 6,000-gallon used oil underground storage tank. Assisted in the removal of the tank and the screening of the surrounding soil using

qualitative methods such as visual, olfactory and PIDs. Participated in the collection of confirmation and characterization soil samples from the excavation and excavated soil stockpile.

- Site Supervisor/Project Manager for Kenai Peninsula Borough, City and Borough of Kodiak Island, and City of Juneau, Alaska (May 1997 - February 2001). Site Supervisor / Project Manager in the successful management of the household hazardous waste (HHW) contracts that Phillips held with the cities and boroughs. Site Supervisor during the completion of HHW/ Conditionally Exempt Small Quantity Generator (CESQG) collection events and industrial waste pick-ups for the three cities and boroughs. Primary responsibilities included: developing health and safety plans, project schedules, budgeting, consolidation, labpacking, and preparation of monthly and semi-annual reports.
- Facility Supervisor/Project Manager for Municipality of Anchorage, Anchorage Regional Landfill, Alaska (April 1996 - April 1997). Managed the facility crew at a year-round HHW/CESQG collection facility. Completed billing and month-end reports and acted as the liaison between the public, the Municipality of Anchorage, and Philip Services. Acted as the facility safety and spill contingency coordinator and as the regulatory compliance officer. Kept inventories of volume of wastes in storage and supplies on hand. Directly responsible for all waste shipments off site. Hired temporary employees during peak business months.
- Chemist/Environmental Specialist/Lead Technician for Municipality of Anchorage, Anchorage Regional Landfill (March 1995 - April 1996). Sampled and identified unknown hazardous materials and performed QA/QC on the various facility waste streams. Primary duties included: labpacking chemicals for shipment and disposal, record keeping, and supervision of the facility crew. Directly responsible for the accepting and checking in all waste into the facility received from the public, as well as the proper and safe consolidation of these wastes. Also held accountable for all waste shipments out of the facility and ensuring that these shipments complied with all DOT/EPA regulations. Conducted facility inspections, led safety meetings, and acted as the facility manager during the manager's absence.
- ◆ **Laboratory Technician for Northwest Technical Services, Prudhoe Bay, Alaska (Summer 1991).** Temporary employee contracted to ARCO to work in the Prudhoe Bay Oil Field. Stationed at Flow Station 2 in the post-water treatment laboratory and performed qualitative analysis on the water and oil streams throughout the plant. Conducted oil/water extraction techniques and reported his findings to plant operators and to the main lab.
- ◆ **Laboratory Technician for Northwest Technical Services. Kuparuk Oil Field, Alaska. (Summers of 1989, 1990, and 1992).** Temporary employee contracted to ARCO to work in the Kuparuk Oil Field. Stationed at the Seawater Treatment Plant. Foremost responsibility was to conduct qualitative analyses on the various water streams throughout the plant. Tests conducted included: TSS, pH, salinity, and residual chlorine. Reported findings to the plant operators and to the field's head chemist. Also aided the plant operators with the basic operations of the plant when called upon.
- ◆ **Fish and Wildlife Technician I for State of Alaska Department of Fish and Game, Anchorage/Fairbanks, Alaska (06/1994 – S09/ 1994).** Monitored and sampled the commercial fishery on the lower Yukon River. Duties included: scale sampling, age/sex/length determinations, and heavy interaction with the local fishing population.

Interpretation of data was also one of his main duties. Also worked on a remote sonar project on the upper Yukon drainage performing remote camp maintenance and the collection of biological data

### Additional Training and Certifications

Confined Space Awareness

Powered Industrial Lift Truck Training

Permit Required Confined Space Training

Performance Management, Planning, and Development Training

FEMA IS-195 Basic Incident Command System Training

First Aid and CPR for Adults, MEDIC FIRST AID® International

Essentials of Communication Training

Lead-based Paint Renovator Initial



MATTHEW E. FAUST, PG

Geologist

### Years Experience

Total: 9; Bristol: 8

### Areas of Expertise

Project Management

Installation of Soil Borings and  
Monitoring Wells

Contaminated Site Assessments /  
Remediation

Sampling and Monitoring

Geologic Diagrams and Research

Environmental Documentation and  
Permitting

### Licenses

Professional Geologist, State of  
Alaska (No. 662)

### Affiliations

Member, American Institute of  
Professional Geologists (AIPG)

### Training and Certifications

Certified PG, AIPG

40-hour and HAZWOPER  
Supervisor

Hazardous Materials  
Transportation (DOT & IATA)

Sampling for Defensible  
Environmental Decisions

24-hour RCRA Hazardous Waste  
for Supervisors

30-hour OSHA Construction Safety  
and health Training

### Education

B.S., Geosciences, Honors, Pacific  
Lutheran University, Tacoma,  
Washington, 2002

M.S., Geoscience, University of  
Nevada, Las Vegas, 2005

Mr. Faust is a geologist who has gained invaluable experience in environmental investigations, exploration geology, and geologic studies since he began his career in 2002. His background is fortified by his work experience as project manager and as field lead, including contracting, budgeting, and directing field activities. His expertise includes collecting rock, sediment, groundwater, surface water, and vegetation samples; testing water quality; logging drill core and soil borings; and supervising the installation of borings, wells, and exploration drill holes. He has extensive experience in the removal, transport, and disposal of petroleum underground storage tanks as well as contaminated soil. He has performed various roles (including Field Lead and Contractor Quality Control Systems Manager) on Formerly Used Defense Sites (FUDS) in New Mexico as well as served as Project Manager for remote Alaska FUDS projects that are off of the road system and not accessible year round. He has managed projects for clients that include the US Environmental Protection Agency (EPA) and the US Army Corps of Engineers - Alaska District, and has coordinated projects with regulators that include the EPA and the Alaska Department of Environmental Conservation. In addition, Mr. Faust has extensive experience in writing environmental documents, including site assessment plans, site assessment reports, site characterization reports, technical memorandums, Phase I Site Assessments, Environmental Assessments (EAs), and Findings of No Significant Impact (FONSIs), as well as Accident Prevention Plans and Site Safety and Health Plans following the guidance of Engineers Manual 385-1-1. He has also constructed diagrams such as geologic maps, well diagrams, and cross sections.

### Project Experience

- ◆ **Technical Lead, Ramah Ranch Remedial Investigation (RI) and Interim Removal Action (IRA), USACE, Albuquerque District (9/2011 – Present; \$924K).** Responsibilities include participating in technical project planning (TPP) meetings and preparation of planning documents (including a Uniform Federal Policy Quality

Assurance Project Plan [UFP-QAPP]), providing technical guidance to the project manager, serving as field lead for the RI and IRA phases of the project, and participating in the preparation of reports. The work will include a site characterization/RI and an IRA at a rocket propellant impact site in New Mexico. The work completed to date includes preparation of TPP meeting materials.

**Project Manager, Caines Head Site Inspection (SI), USACE Alaska District, Resurrection Bay, Alaska (6/2010 – Present; \$365K).** Project management responsibilities include interacting with the client and project stakeholders, organizing TPP meetings, overseeing the preparation of planning documents (including a UFP-QAPP) and reports, and managing subcontractors and Bristol field staff. During the field portion of the project responsibilities will include serving as field lead and directing SI activities. The Caines Head site is near Seward, Alaska but is only accessible by boat. The SI will involve locating 14 petroleum storage tank site and verifying their presence or absence, as well as collecting soil, groundwater, and surface samples at various locations across the site to verify the presence or absence of contamination.

- ◆ **Project Manager, Liberty Bell Baseline Environmental Sampling 2010, Metallica Resources Alaska, Inc. (Metallica), Ferry, Alaska (4/2010 – 12/2010; \$24K).** Planned and conducted two surface water sampling events as part of a baseline environmental study at the Metallica Resources Liberty Bell Mine project near Ferry, Alaska. Tasks included managing the project, selecting the laboratory and the analytes, selecting sample locations, and collecting and filtering samples. Wrote a report summarizing field activities, comparing the analytical results to the relevant water quality criteria, and providing recommendations for future environmental studies.
- ◆ **Technical Lead, Site Inspections and Removal Response Actions at Former Army Air Field Properties: Hobbs, Carlsbad, Deming & Fort Sumner, New Mexico; and at Former Air Force Station Properties: Las Cruces and Tierra Amarilla, New Mexico (10/2009 – Present; \$4.8M).** Responsibilities include participating in TPP meetings and preparation of planning documents, including a UFP-QAPP, providing technical guidance to the project manager, serving as field lead for most the SI phases of the project, and participating in the preparation of reports. Work includes site inspections, removal response actions, and final closure response actions at six formerly used defense sites (FUDS) in New Mexico. The work completed to date includes a removal action at Tierra Amarilla including site restoration, a final closure response action for two underground storage tank sites at the Las Cruces FUDS, and site inspections and removal response actions at the Deming FUDS.
- ◆ **Project Manager, Former Skelly Tier 2 Assessment and Corrective Action, EPA, Winnebago, Nebraska (09/2009 – 08/2011; \$120K).** Project management responsibilities included interacting with the client and subcontractors, overseeing the preparation of planning documents and reports, and managing the field staff. The site assessment phase of the project involved delineating the extent of soil contamination at a LUST site. The corrective action phase of the project included removal of USTs and the removal and proper disposal of over 500 tons of contaminated soil.

- ◆ **Project Manager, Liberty Bell Baseline Environmental Sampling 2009, Metallica Resources Alaska, Inc., Ferry, Alaska (03/2009 – 12/2009; \$25K).** Planned and conducted two surface water sampling events as part of a baseline environmental study at the Metallica Resources Liberty Bell Mine project near Ferry, Alaska. Tasks included managing the project, selecting the laboratory and the analytes, selecting sample locations, and collecting and filtering samples. Wrote a report summarizing field activities, comparing the analytical results to the relevant water quality criteria, and providing recommendations for future environmental studies.
- ◆ **Field Supervising Geologist, Region Nine LUST Site Assessment & Corrective Action, Environmental Protection Agency, Arizona and New Mexico (09/2008 – 10/2009; \$1.6M).** The project consisted of site assessments and site characterizations multiple sites on Indian Lands for the EPA Region 9. Sites were located on the Hopi Reservation in Arizona, and on the Navajo Nation in New Mexico. Tasks included supervising the removal of USTs, installing soil borings and monitoring wells, and collecting soil and groundwater samples.
- ◆ **Project Manager, 1005 Site Assessment Review, EPA, Winnebago and Omaha Reservations, Nebraska (09/2008 - 12/2008; \$7.6K).** Reviewed existing site assessment reports for five leaking underground storage tank (LUST) sites on the two Reservations in Nebraska. Reviewed reports to determine whether Nebraska Department of Environmental Quality (NDEQ) requirements for Tier 1 Site Assessments had been met, whether action levels had been exceeded, and whether a Tier 2 Site Assessment would be required for each of the five sites. Other tasks included interacting with the EPA project manager, creating a budget for the project, conducting the site assessment reviews, and writing the report.
- ◆ **Project Manager, 1004 Former Skelly Site Assessment, U.S. EPA, Winnebago Reservation, Nebraska (08/2008 - 04/2009; \$65K).** Conducted a site assessment at a potential LUST site on the Reservation following NDEQ guidelines for a Tier 1 Site Assessment. Tasks included setting up subcontracts and budgets, writing the work plan, installing soil borings and monitoring wells, collecting soil and groundwater samples, and writing a technical memorandum summarizing the results of the site assessment, including recommendations for future site work.
- ◆ **Project Manager, Gambell Monitoring Well Decommissioning Project, USACE, Alaska District, Gambell, Alaska (06/2008 - 12/2008; \$38K).** Managed the project, wrote the work plan, directed field activities, and wrote the final technical memorandum. Project was the decommissioning of 17 monitoring wells according to Alaska Department of Environmental Conservation guidelines near Gambell on Saint Lawrence Island.
- ◆ **Project Manager, Liberty Bell Baseline Environmental Sampling 2008, Metallica, Ferry, Alaska (06/2008 – 12/2008; \$22K).** Planned and conducted two surface water sampling events as part of a baseline environmental study at the Metallica Resources Liberty Bell Mine project near Ferry, Alaska. Tasks included managing the project, selecting the laboratory and the analytes, selecting sample locations, and collecting and filtering samples. Wrote a report summarizing field activities, comparing the analytical results to the relevant water quality criteria, and providing recommendations for future environmental studies.



- ◆ **Field Team Leader, Hoonah Radio Relay Station (RRS) Remedial Action Phase II, USACE, Hoonah, Alaska (2008; \$4M).** Assisted with writing work plans, functioned as the Contractor Quality Control Systems Manager, delineated areas of PCB soil contamination, directed soil excavation based on field laboratory results, manifested contaminated soil for transport, collected confirmation samples for laboratory analysis, and assisted with writing the final report. The project consisted of excavating, manifesting, and transporting over 3,345 tons of polychlorinated biphenyls (PCB)-contaminated soil, collecting 320 samples for field laboratory analysis, and collecting over 522 analytical samples for fixed laboratory analysis.
- ◆ **Project Manager, B-6 Winnebago Review, Environmental Protection Agency, Winnebago Reservation, Nebraska (2008; \$8.5K).** Responsibilities included interacting with the EPA project manager, creating a budget for the project, conducting the site assessment reviews, and writing the report. Project consisted of reviewing existing site assessment reports for a LUST site on the Reservation. Reports were reviewed to determine whether NDEQ requirements for Tier 1 Site Assessments had been met, whether action levels had been exceeded, and whether a Tier 2 Site Assessment would be required.
- ◆ **Field Supervising Geologist, B-2 Region Nine LUST Sites, Environmental Protection Agency, Arizona and New Mexico (12/2007 – 09/2008; \$1.5M).** The project consisted of site assessments and site characterizations at six sites on Indian Lands for the EPA Region 9. Sites were located on the Colorado River Indian Tribes Reservation and the Hopi Reservation in Arizona, and on the Navajo Nation in New Mexico. Tasks included supervising the removal of petroleum underground storage tanks (USTs), installing soil borings and monitoring wells, and collecting soil and groundwater samples.
- ◆ **Geologist, Newhalen Groundwater Monitoring Project, Newhalen Tribal Council, Newhalen, Alaska (2007; \$32K).** Responsibilities included supervising the installation of the monitoring wells, collecting soil and groundwater samples, training local Tribal personnel in groundwater sampling procedures, and assisting in writing the final report. The project consisted of installing two monitoring wells near the Newhalen Landfill site, and one monitoring well at the Old Fuel Spill site.
- ◆ **Lead Environmental Sampler, Hoonah Radio Relay Station (RRS) Remedial Action, USACE, Hoonah, Alaska (2007; \$1.8M).** Responsibilities included assisting with writing work plans, conducting EnSys PCB field screening, directing soil excavation based on field screening results, manifesting contaminated soil for transport, collecting confirmation samples for laboratory analysis, and assisting with writing the final report. The project consisted of excavating, manifesting, and transporting over 1,550 tons of PCB-contaminated soil, conducting 360 field screening analyses, and collecting over 280 laboratory analytical samples.
- ◆ **Geologist, Liberty Bell Mine Environmental Sampling 2007, Metallica, Ferry, Alaska (2007; \$14K).** Planned and conducted a sampling event of surface water as part of a baseline environmental study. Tasks included selecting the laboratory and the analytes, selecting sample locations, and collecting and filtering samples. Wrote a report summarizing field activities, comparing the analytical results to the relevant water quality criteria, and providing recommendations for future environmental studies.

- ◆ **Geologist, SUN Property Environmental Sampling Project, Andover Ventures, Brooks Range, Alaska (2007; \$15K).** Planned and conducted a helicopter-supported sampling event of surface water as part of a baseline environmental study. Responsibilities included selecting the laboratory and the analytes, selecting sample locations, and collecting and filtering samples. Wrote a report summarizing field activities, comparing the analytical results to the relevant water quality criteria, and providing recommendations for future environmental studies. Work was conducted out of a remote exploration camp on the flanks of the Brooks Range in northern Alaska.
- ◆ **Field Supervising Geologist, B-11 Region 6 Site Assessments, EPA, Laguna and Santa Domingo Pueblos, New Mexico (2007; \$500K).** Responsibilities included supervising the removal of petroleum underground storage tanks (USTs), installing soil borings and monitoring wells, and collecting soil and groundwater samples. The project consisted of site assessments and site characterizations at five sites on Indian Lands for the EPA Region 6.
- ◆ **Geologist, B-6 EPA Site Assessments, EPA, Tohono O'odham Reservation and the Navajo Nation in Arizona and New Mexico (2006 - 2007; \$1.3M).** Tasks included supervising the removal of USTs, installing soil borings and monitoring wells, collecting soil and groundwater samples, and writing Site Assessment and Site Characterization Reports describing field activities, analytical results, and providing recommendations for future assessment and remediation on the sites. Conducted site assessments and site characterizations at nine sites on the two Reservations. Field Supervising Geologist on three of the nine sites.
- ◆ **Geologist, Pebble Mine Geological Project, Northern Dynasty Mines, Inc. (Northern Dynasty), near Iliamna, Alaska (2006).** Conducted downhole acoustic and caliper logging of exploration drill holes at Northern Dynasty's Pebble gold-copper prospect.
- ◆ **Geologist, Site Assessment, PenAir, Dillingham, Alaska Project (2006; \$50K).** Conducted a site assessment of a contaminated site, including the installation of soil borings and the collection of soil and groundwater samples. Wrote a Site Assessment Report summarizing the results of the fieldwork and providing recommendations for future remediation at the site.
- ◆ **Geologist, Baseline Environmental Sampling, Alaska Earth Sciences, Bee Creek Prospect, near Chignik Bay, Alaska (2006; \$9.2K).** Planned and conducted a helicopter-supported sampling event of surface water as part of a baseline environmental study at the Full Metal Minerals/Metallica Resources joint venture Bee Creek Prospect. Tasks included selecting the laboratory and the analytes, selecting sample locations, collecting and filtering samples, and training a local hire in the sampling process. Wrote a report summarizing field activities, comparing the analytical results to the relevant water quality criteria, and providing recommendations for future environmental studies.
- ◆ **Geologist, Hatchery Feasibility Study, Choggiung Ltd, East Creek Hatchery, near Nunavagaluk Lake, Dillingham, Alaska (2006).** Conducted a site visit, including the collection of groundwater and soil samples. Wrote a Characterization Report summarizing the results of the site visit and providing recommendations for future remediation at the site.



- ◆ **Geologist, Groundwater and Surface Water Sampling, PenAir, King Salmon, Alaska (2006).** Sampled groundwater and surface water during biannual sampling events at the PenAir contaminated site in King Salmon, Alaska. Wrote reports summarizing the sampling events.
- ◆ **Geologist, Huslia Landfill Road Project, Alaska Department of Transportation and Public Facilities (ADOT&PF), Huslia, Alaska (2006).** Conducted research for, and wrote a Phase I Environmental Due Diligence Audit (EDDA) for the construction of a landfill access road by the ADOT&PF at Huslia, Alaska.
- ◆ **Geologist, Phase I EDDAs, Federal Aviation Administration (FAA), Huslia, Selawik, and Adak, Alaska (2003 - 2006).** Conducted research for and wrote Phase I EDDAs for the installation of navigational aids by the FAA at remote Alaska sites.
- ◆ **Geologist, Pebble Road Project, Northern Dynasty, near Iliamna, Alaska (2004 -2006).** Sampled surface water, stream and pond sediment, and vegetation along a proposed haul road corridor for a background study for the Pebble gold-copper prospect.
- ◆ **Geologist, CAMPTEx Mineral Prospect Review, Bristol Bay Native Corporation, Bristol Bay Region (2004).** Conducted research for and wrote prospect summaries for several promising mineral prospects located in the Bristol Bay region. Summaries were to be used in marketing the prospects to exploration companies.
- ◆ **Geologist, Anaconda Collection Indexing, Alaska Minerals at Risk Program, (2003).** Supervised a group of four indexers in digitizing and indexing a large collection of material, including reports, maps, and other documents, that were generated by the now-defunct Anaconda Minerals Company while working in partnership with Cook Inlet Region Incorporated (CIRI). The Anaconda Collection was donated by CIRI to the University of Alaska, and the indexing was funded by the Alaska Minerals at Risk Program.
- ◆ **Geologist, Digital Index Development, Bristol Bay Native Corporation, Anchorage, Alaska (2003).** Created a digital index of all reports, maps, documents, and other material owned by Bristol Bay Native Corporation, related to mineral, oil, and gas resources of the Bristol Bay region.
- ◆ **Geologist, Phase I EDDA, Bristol Bay Housing Authority, Dillingham, Alaska (2003).** Conducted research for and wrote a Phase I EDDA for the Bristol Bay Housing Authority for a proposed Boys and Girls Club at Dillingham, Alaska.
- ◆ **Geologist, EAs and FONSI Projects, FAA, Numerous Locations throughout Alaska (2002 - 2004).** Conducted research for and helped write EAs and FONSI for the installation of navigational aids by the FAA at remote Alaska sites in St. George, Buckland, Savoonga, Ambler, Anvik, Cape Yakataga, Emmonak, Hooper Bay, Huslia, Noatak, Selawik, and Togiak.
- ◆ **Geologist, EAs for Road Projects, Bureau of Indian Affairs (BIA), Remote Alaska Sites (2002 - 2004).** Conducted research for and helped write EAs for the BIA-funded road design projects for remote Alaska sites in Chenega Bay, Andreafski, Emmonak, Ugashik, and Koliganek.

## Additional Training and Certifications

Defensive Driving Training

CPR and First Aid for Adults, MEDIC FIRST AID® International

8-Hour HAZWOPER Training, Bristol Industries

Hazardous Materials Transportation – (DOT/IATA) Section 1.5 IATA Compliance

Hazardous Materials Transportation – (DOT/IATA) 49 CFR 172.700-704 Compliance

EnviroStat, Inc., Sampling for Defensible Environmental Decisions

30-Hour OSHA Construction Industry Outreach Training Program, OSHAcampus.com™



MARTY HANNAH

Environmental Scientist / Project Chemist

### Years Experience

Total: 19; Bristol: 2.5

### Areas of Expertise

Environmental Chemistry

Toxicology

Environmental Site Investigations

Quality Assurance/Quality Control

Site Remediation

Laboratory Data Reduction and Evaluation

### Training and Certifications

EPA 40-hour HAZWOPER

EPA 8-hour HAZWOPER refresher, current

CPR and First Aid for Adults

DOT/IATA Dangerous Goods Shipper's Training

USAF Flight Line Training-Elmendorf AFB

BP North Slope Red Book Training for handling waste generated on the North Slope

Smith Safe Driving Course-Provided by BP Exploration A

### Education

B.S., Biology, Emphasis in Toxicology, Chemistry and Emergency Medicine, Mankato State University, Mankato, Minnesota 1992

M.S., Environmental Quality Science, Emphasis on Remedial Feasibility Studies, University of Alaska Anchorage, 2005

Mr. Hannah has worked in the environmental field since 1992. He became part of Bristol's environmental remediation team in 2009. His expertise encompasses environmental chemistry, data management, site assessment and remediation projects, site investigations, and quality assurance /quality control (QA/QC) requirements. He has worked on projects for private clients, as well as federal and state agencies and is familiar with the standards and procedures for compliance with these agencies. Mr. Hannah's expertise includes management and transportation of hazardous waste materials at remote arctic project sites. He has extensive experience performing EPA analyses in environmental laboratories and managing mobile laboratories. In addition, he has served as Research Professional/Laboratory Manager for the University of Alaska, Anchorage School of Engineering, and has been responsible for all aspects of a scientific field equipment business as the sole proprietor of Hannah Instrumentation.

As an Environmental Scientist/Project Chemist for Bristol Environmental Remediation Services, LLC, Mr. Hannah is responsible for initial project proposal and attention to cost control preparation of site-specific DQOs with SAP and QAPP documentation, contract negotiation, master service agreements, invoice tracking and coordination of field teams, providing oversight of sample collection and laboratory data reduction, and presentation of the site contamination and risk-based calculations, data validation QA/QC effort, including ADEC and DoD electronic submittals. Mr. Hannah provided these services on all of the Bristol projects below.

### Project Experience

- ◆ **Field Chemist, Mercury in Soil Delineation, Nova Gold, Nome, Alaska (08 – 09/2009; \$120K).** Performed environmental assessment of mercury and arsenic contamination at a former gold processing facility. Duties **included creation of a work plan, sample and analysis plan**, and procedures for field analysis of mercury (mobile laboratory). Performed analysis of soil samples on site to delineate the extent and concentration of mercury

contamination. Directed drillers on continued sample collection based on field analytical results. Wrote project report for submittal to the ADEC.

- ◆ **Environmental Scientist, Spill Response, Iliamna Development Corporation, near the Iliamna River, Alaska (06/2009 – Present; \$165K).** Provided support to client in response to fuel spills near the Iliamna River and Lake Iliamna. Oversaw removal and treatment of fuel contaminated soil. Coordinated client personnel in spill response-containment and determined the best methods for remediation of contaminated soil and proper waste disposal. Coordinated the development and operation of a land farm to remediate fuel contaminated soil. Collected soil and surface water samples and installed monitoring wells. Advised client on regulatory requirements and submittals to State agencies, as well as development of remedial methods for reduction of contaminants in impacted soils. Primary author of spill reports submitted to State agencies. Designed a passive fuel collection system for winter operation at this remote site.
- ◆ **Project Chemist, former White Alice Site, USACE, Alaska District, Northeast Cape, St. Lawrence Island, Alaska (06/2009 – present; \$30M).** Provided support to field activities at Northeast Cape for remedial pilot tests and removal of contaminants at a Formerly Used Defense Site (FUDS). Operated an on-site mobile laboratory for analysis of fuels and PCBs in soil as well as monitored natural attenuation. Coordinated the submittal of samples and evaluated laboratory data for quality and representativeness to the site. Functioned as the primary point of contact for fixed lab, project managers, and field personnel regarding procedures and submittal of samples for analyses. Responsible for data quality/data review, laboratory reports and electronic data deliverables.
- ◆ **Environmental Scientist/Project Chemist, USACE, Omaha District, Tinker Air Force Base, Oklahoma City, Oklahoma. (10/2010 – Present).** Collected soil-gas samples and evaluated an aircraft refueling system to determine if fuels had leaked from the system. Coordinated with base personnel and contractors in the gathering of information about site conditions and the determination of the extent of fuel contamination. Prepared documents and coordinated with sub-contractors for the next phases of the site investigation.
- ◆ **Environmental Scientist/Remediation Specialist, Various Base-Wide Remediation Projects, USACE, Alaska District, Joint Base Elmendorf-Richardson (09/2006 – 05/2009; \$1.8M).** Supported monitoring, and operation and maintenance of a variety of remedial systems, including sites located within the active airfield and numerous other sites on the installation. Responsible for dig permits, well installation and decommissioning, soil borings, sample collection and soil gas vapor analysis, along with operation and maintenance of bioventing systems and constructed remediation wetlands.
- ◆ **Field Chemist/Environmental Scientist, POL-Contaminated Soil Remediation Project, USACE, Alaska District, Umiat, Alaska (06 – 09/2006; \$1.8M).** Collected field and confirmation soil samples using multi-incremental sampling (MIS) on thermal infrared (IR)-treated soil at a remote formerly used defense site. Developed and prepared the methods, testing, instrumentation, and environmental controls for field analysis of samples by U.S. Environmental Protection Agency (EPA) Method 1664. Coordinated the shipping of rush samples, equipment, and materials to and from this remote arctic site

- ◆ **Environmental Scientist, QA/QC Officer, Environmental Data Manager, Site Assessment and Remediation Contracts, BP Exploration (Alaska) North Slope, Alaska (04/2006 – 05/2009; \$5+M).** Provided QA and procedural input in the development and release of an extensive overhaul of BP's environmental Quality Assurance Program Plan. Reviewed laboratory data and prepared quality assurance verification reports for all related environmental projects. Designed and developed procedures for remediation systems and remote sensing at various arctic sites throughout BP lease areas.
- ◆ **Field Scientist, Monitoring and Remedial Action, Chevron, Anchorage and Fairbanks, Alaska (10/2006 – 05/2009; \$800KM).** Performed monitoring and remedial action on former and existing Chevron gasoline stations and bulk fuel plants. Performed as Field Lead on soil, groundwater, and surface water sampling events. Supported implementation and operation of remedial systems. Responsible for operation and maintenance of existing remedial systems. Treatment technologies included soil vapor extraction, air sparging, granular activated carbon water treatment, and free-product recovery using high-vacuum extraction.

## Professional Experience

- ◆ **Project Chemist, Environmental Scientist, HM & DG Shipping Specialist, Field Equipment Manager, OASIS Environmental, Anchorage, Alaska (2006 - 2009).** Responsible for Quality Assurance Program Plans, standard field procedures, and management of laboratory data. Managed, shipped, and serviced all scientific monitoring instrumentation and support equipment for OASIS' five offices. Equipment included photoionization detectors (PIDs)/flame-ionization detectors, multi-gas meters, water quality multi-meters, pumps, and a wide variety of other field equipment.
  - Project Chemist, various projects. Responsible for laboratory data management, QA program plans, final review and validation of laboratory data on numerous Alaska Department of Environmental Conservation (ADEC), Federal, and private projects. Additional responsibilities included completion of ADEC laboratory data checklists, quality of analytical data reviews, flagging of tabulated data and application of matrix concentrations to various site cleanup goals.
- ◆ **Owner-Sole Proprietor, Hannah Instrumentation, Anchorage, Alaska (1998 - 2009).** Responsible for all aspects of a scientific field equipment business that leased PIDs, multi-gas meters, water quality multi-meters, pumps and other equipment used by environmental personnel performing site investigations, and monitoring and remediation services. Provided analytical equipment and chemical analysis support for mobile laboratory operations using gas chromatographs, IR spectrophotometers, and other field instrumentation for quantifying a wide variety of contaminants of concern.
- ◆ **Client Services Coordinator, North Creek Analytical, Anchorage, Alaska (1999 – 2004).** Duties included support for clients and laboratories for all aspects of environmental sampling and analyses for contaminants of concern. Performed tasks such as filling client bottle orders, receiving samples, and forwarding them to the proper laboratories within specified temperature and packing regulations. He also provided support to NCA mobile laboratories in Amchitka, Adak, Prudhoe Bay, and Livengood, Alaska.

- ◆ **Organic Chemist/GC Analyst, Semivolatiles for Columbia Analytical Services, Anchorage, Alaska (1993 – 1998).** Performed analyses of environmental samples on various matrices for contaminants of concern such as fuels, poly-chlorinated biphenyls (PCBs), pesticides and PAHs. Performed maintenance and repair of gas chromatographs and data systems. Managed waste stream and led effort to reduce the hazardous waste generation. Other duties included supporting laboratory personnel in compliance with Federal, state and municipal regulations for safety and other code compliance.
- ◆ **Organic Chemist/GC Analyst, Analytica Alaska (1992 – 1993).** Performed analyses on soils and waters for Alaska and EPA methods AK101 and EPA 8021B (GRO/BTEX).
- ◆ **Research Professional-Laboratory Manager, University of Alaska Anchorage, School of Engineering (1998 – 2005).** Responsible for all aspects of physical and research laboratories, including all health, safety, and environmental (HSE) policies and procedures in teaching and research laboratories. Maintained chemical inventories and instructed researchers and graduate students in proper handling of chemicals and operation of various physical and analytical systems and instrumentation. Performed numerous tasks either solely or in support of environmental remediation feasibility studies on contaminated soils and waters.
- ◆ **Assistant Laboratory Manager, Applied Science and Engineering Technology (ASET) Laboratory, University of Alaska Anchorage (2002 - 2005).** Utilized state-of-the-art instrumentation in support of chemistry, biology, and engineering research. Duties included selection, procurement, installation and operation of the instrumentation, as well as ancillary personal protective equipment. Prepared Standard Operating Procedures for the operation of analytical instrumentation and analysis using a wide variety of analytical methods used in the laboratory.

## Publications

Extent and Variability of Biogenic Interference in Cold Regions Soils. Journal of Cold Regions Engineering, September 1999. C.R. Woolard, D.M. White, J.L. Walworth, M.E. Hannah.





### Years Experience

Total: 4; Bristol 4

### Areas of Expertise

Environmental Sampling

Risk Assessment

Geologic Research

Borehole Geophysical Logging

### Training and Certifications

OSHA 30-hour Construction Safety and Health

USACE Construction Quality Management (CQM) for Contractors

USACE Quality Control System (QCS)

Northwest Environmental Training Center Contaminant Chemistry and Monitored Natural Attenuation Workshop

40-Hour Hazardous Waste Operations and Emergency Response (HAZWOPER)

8-Hour HAZWOPER Refresher

Hazardous Materials Transportation, (DOT/IATA) 49 CFR 172.700-704 and Section 1.5 IATA Compliance

Alaska Department of Environmental Conservation 8-Hour Soil Vapor Intrusion Course

CPR and First Aid with current 4-Hour Refresher

Rigging and Slinging

### Education

B.A., Geology, Carleton College, Northfield, Minnesota 2004

Ms. Kleppin began her career in 2007 and specializes in exploration geology and geophysical investigations at contaminated sites throughout Alaska. She is proficient in producing geologic maps, well diagrams, cross sections and reports. Ms. Kleppin has several years of experience in the environmental field performing surface water, groundwater, soil and sediment sampling, as well as administrative and technical support, field logistics, instrumentation, risk assessment, and technical writing.

### Project Experience

- ◆ **Environmental Scientist, Northeast Cape Hazardous, Toxic, and Radioactive Waste Remediation, USACE, Alaska District, St. Lawrence Island, Alaska (06/2010 - 09/2010).** Conducted soil, groundwater and surface water sampling, directed UVOST investigation and generated boring logs for petroleum and PCB impacted sites. Interpreted and reported UVOST and laboratory analytical data to create guidance for future excavation activities. The project objective was to perform debris and soil removal actions at 10 sites across the project area; construct a landfill cap at one site; and initiate a natural attenuation monitoring program at another.
- ◆ **Environmental Scientist, Puntilla Lake Phase 2 Release Investigation, Federal Aviation Administration, Rainy Pass, Alaska (06/2010 - 10/2010).** Assisted field activities including UVOST probe advancement, soil and groundwater sampling, sample packing and shipment and monitoring well installation for characterization of a petroleum-impacted site. The project objective was to determine the extent soil and groundwater impacts resulting from petroleum releases at three former USTs.

- ◆ **Field Scientist, Native American Lands Environmental Mitigation (NALEMP) Site Assessment, Unalakleet, Alaska (05/2010 - 07/2010).** Conducted preliminary site assessment and assisted in preparation of the Strategic Project Implementation Plan (SPIP) for submittal to the USACE. NALEMP was developed by the Department of Defense (DoD) to address environmental issues from past DoD activities on Indian lands.
- ◆ **Project Scientist, Investigation and Remediation of Leaking Underground Storage Tank (LUST) Sites on Indian Lands, U.S. Environmental Protection Agency (EPA) Contract, Idaho (11/2009 - 03/2010).** Conducted Idaho Department of Environmental Quality Risk Evaluation Phase 2 for a petroleum-impacted site. Authored report presenting results of the RE-2. The project consisted of evaluating LUST-eligible sites; performing site assessments and remedial investigations; developing risk-based decision documents; conducting remediation activities; and providing other technical support to EPA as required to ensure that LUSTs located on Indian Lands no longer pose a threat to human health and the environment.
- ◆ **Field Manager, Native American Lands Environmental Mitigation (NALEMP) Site Assessment, Tetlin, Alaska (10/2009 - 02/2010).** Conducted preliminary site assessment and prepared the Strategic Project Implementation Plan (SPIP) for submittal to the USACE. NALEMP was developed by the Department of Defense (DoD) to address environmental issues from past DoD activities on Indian lands.
- ◆ **Field Manager, Monitoring Well Inventory Project, USACE, Alaska District, Fort Richardson, Alaska (07/2009 - 03/2010).** Conducted background research and field investigations of 250+ points using a Trimble GPS unit to create a comprehensive, SDSFIE compatible monitoring well database for USACE. The database included determination of active/inactive status based on sampling event records and location within active operable units or POL release sites. The project objective was to evaluate existing monitoring well databases and maps and conduct field inspections at each well location to create a database of existing wells and provide recommendations for database management and well decommissioning at Fort Richardson.
- ◆ **Environmental Scientist, Groundwater Sampling-Operating Unit 3, Fairbanks Environmental Services, Fort Wainwright, Alaska (04/2009 - 05/2009).** Collected low-flow groundwater samples for DRO, GRO, VOC, EDB, PAH, iron (II), lead, and sulfate analysis. The objective of the project was to provide field assistance for FES's USACE Alaska District contract to conduct groundwater sampling at Fort Wainwright.
- ◆ **Geologist, Investigation and Remediation of Leaking Underground Storage Tank (LUST) Sites on Indian Lands, U.S. Environmental Protection Agency (EPA) Contract, (01/2009 - 04/2009).** Created soil boring logs and collected analytical soil samples. Generated lithologic cross sections and well diagrams for Region 9 Navajo sites using gINT Geotechnical software and produced technical memos reporting remedial investigations; developing risk-based decision documents; conducting groundwater monitoring events. The project consisted of evaluating LUST-eligible sites; performing site remediation activities; and providing other technical support to EPA as required to ensure that LUSTs located on Indian Lands no longer pose a threat to human health and the environment.



- ◆ **Geologist, BBNC Responsible Resource Development, Bristol Bay Native Corporation Land Department, Anchorage (01/2009 - 02/2009).** Researched and prepared historical and geologic background summary of land in the vicinity of the Agulowak River. The project objective was to provide background data to assist mineral appraisal for a prospective land exchange area.
- ◆ **Field Manager, Borehole Geophysical Logging Program, Pebble Partnership, Iliamna, Alaska (02/2008 - 12/2008).** Developed site-based Standard Operating Procedure for ABI Acoustic Televiwer, 2PCA-100 Caliper, Full Wave Sonic Sonde and 4WNA Winch; revised procedures to optimize data quality and downhole tool recovery; performed maintenance and repairs on equipment; trained operators and provided regular reports to site staff; coordinated and managed downhole geophysical surveys for boreholes exceeding 6,000 feet in depth. The objective of the project was to provide geotechnical field support for exploration activities at the prospect.
- ◆ **Field Geologist, Pebble Project Support, Northern Dynasty, Iliamna, Alaska (05/2007 - 12/2008).** Conducted borehole geophysical surveys with and provided general field support for Northern Dynasty's Pebble Cu-Au-Mo prospect near Iliamna, Alaska. Additional activities included surface water and soil sampling, ground topographic surveying, corelogging, geotechnical logging, and logistical support. The objective of the project was to provide geologic field support for exploration activities at the prospect.

### Professional Experience

- ◆ Weekend Programs Lead Teacher for the Pacific Science Center in Seattle, Washington (2006 to 2007). Taught interactive science lessons and assisted in curriculum development.
- ◆ Assistant to the Director for Osservatorio Geologico di Coldigioco in Italy (2005 to 2006). Provided winter logistics and maintenance for geologic observatory.
- ◆ Adjunct Chemistry Instructor for University of Alaska Anchorage (2005). Duties included laboratory instruction, creating and grading chemistry exams.
- ◆ Field Studies Instructor for 3D Education and Adventure, Isle of Wight, England (2004). Activity and field studies instructor at outdoor education camp for schoolchildren.
- ◆ Prudhoe Bay summer hire for NANA Corporation, Prudhoe Bay, Alaska (2001). Seasonal laborer at field camp facility in the Prudhoe Bay oilfield.



LESA NELSON

Environmental Scientist

### Years Experience

Total: 8; Bristol: <1

### Areas of Expertise

Project Management

Field Team Lead

Site Assessment and Characterization

Contaminated Site Remediation

Soil Boring and Monitoring Well  
Installation

Environmental Sampling

Quality Control

### Training and Certifications

OSHA 30-hr Construction Safety and  
Health

CQM for Contractors, USACE,  
Anchorage, Alaska

8-hr HAZWOPER Supervisor

EPA 40-hr HAZWOPER

EPA 8-hr HAZWOPER Refresher

CPR and First Aid for Adults

ADEC Field Qualified Sampler

DOT/IATA Dangerous Goods Shipper's  
Training

AHERA Asbestos Building Inspector - 24  
Hours

Lead Awareness

EPA Preliminary Assessment & Site  
Investigation

4-hr confined space

ICS for First Responders Level 100

ICS for First Responders Level 200

IS-00340 Hazardous Materials  
Prevention

Radiological Emergency Preparedness  
IS-00331

Form-II-Lite

Fundamentals of Superfund

### Education

B.S., Environmental Science- emphasis  
in Biology; Minor in Environmental  
Policy, Pacific University, Oregon, 2004

Ms. Nelson began her career in environmental consulting in 2004. She has extensive experience in project management, leading and directing field activities, field data collection, data analysis, and data evaluation and reporting. She has worked with a variety of government and private sector clients, FAA, U.S. EPA, ADEC, US Army Corps of Engineers® (USACE), AFCEE, 611<sup>th</sup> CES, Alaska Air National Guard, Washington State Department of Fish and Game, and New Jersey Department of Environmental Protection (NJDEP). Ms. Nelson has managed and led a variety of environmental, remedial, and natural resource investigations, and has specific knowledge of applicable state and federal environmental regulations in Alaska, Washington, Oregon, and Idaho. She has performed as the field team lead at numerous projects and sites throughout Alaska and the lower 48, including remote locations not accessible by road. As a lifelong Alaskan resident, Ms. Nelson knows and understands Alaska logistics and is adept at performing technical tasks in remote locations and challenging conditions.

### Project Experience

- ◆ **Project Manager, EPA Region 5, Former Hub Oil/Beard Oil Property Site – Isabella Indian Reservation, Michigan (09/2012 – Present).** Prepared planning documents and periodic summary reports for a cost-reimbursable project to assess and characterize the impact from leaking USTs at a former Mobil Oil Gas Station. Activities include property boundary survey, passive soil gas monitoring, soil borings and soil sampling, installation of groundwater monitoring wells, two rounds of groundwater monitoring, and working closely with the EPA subject matter expert to recommend and conduct appropriate remedial cleanup activities.
- ◆ **Project Manager, EPA Region 5, Former Rosebush Station Site – Isabella Indian Reservation, Michigan (09/2012 – Present).** Prepared planning documents and periodic summary reports for a cost-reimbursable project to assess and characterize the impact from leaking USTs at a

former petroleum service station. Activities include soil-gas monitoring, installation of groundwater monitoring wells; two rounds of groundwater monitoring, a risk assessment, and working closely with the EPA subject matter expert to recommend and conduct appropriate remedial cleanup activities.

- ◆ **Project Manager, EPA Region 5, Drake's Refinery Stations, Inc. Site – Isabella Indian Reservation, Michigan (09/2012 – Present).** Prepared planning documents and periodic summary reports for a cost-reimbursable project to assess and characterize the impact from leaking USTs at a former retail gasoline station site. Activities include passive soil gas monitoring, installation of groundwater monitoring wells, two rounds of groundwater monitoring, and working closely with the EPA subject matter expert to recommend and conduct appropriate remedial cleanup activities.
- ◆ **Environmental Scientist, Groundwater and Landfill Gas Monitoring, Joint Base Elmendorf Richardson, USACE, Alaska (09/2012 – Present).** Providing support for environmental monitoring activities at the JBER Landfill including installation of two additional background wells and the performance of annual groundwater sampling and analysis from existing groundwater monitoring wells. Assisting with annual groundwater monitoring reports and quarterly landfill gas monitoring technical memorandums.
- ◆ **Environmental Scientist, Underground Storage Tank (UST) Corrective Action Hot Tanks, USACE, Alaska District, Joint Base Elmendorf-Richardson, Alaska (07/2012 – Present).** Assisting with the d of groundwater monitoring wells, and collection of groundwater samples for laboratory analysis. Assisting with a Corrective Action Report.
- ◆ **Environmental Scientist, Native American Lands Environmental Mitigation Program (NALEMP) Site Investigation, Removal Action, and Site Investigation, Native Village of Savoonga (NVS), Native Village of Northeast Cape, St. Lawrence Island, Alaska (09/2012 –Present; \$62K).** The NALEMP was developed by the Department of Defense (DoD) to address environmental issues from past DoD activities on Indian lands. The NVS obtained funding under the NALEMP Program from the USACE to identify and mitigate military impacts to Native land. Bristol subcontracted to the NVS to assist them in conducting the first phase of the Site Investigation/Removal Action at several areas of concern and supported the tribe with the preparation of Fiscal Year 2009 -2012 Facilitated Cooperative Agreement documents between the tribe and the USACE. Ms. Nelson assisted with scheduling field activities include the collection and management of remaining debris, the off-site shipment of non-burnable, non-hazardous debris, the off-site shipment of hazardous materials found on-site during the site investigation, and the performance of a site investigation including the collection of surface water, sediment, and soil samples for laboratory analysis.
- ◆ **Environmental Scientist, King Salmon Release Investigation, FAA, King Salmon, Alaska (08/2012 – Present).** Assisted with data interpretation and preparation of site investigation report presenting results of UltraViolet Optical Screening Tool (UVOST™), analytical data, and providing Hydrocarbon Risk Calculator (HRC) evaluation of selected sites. The purpose of this site investigation is to determine the limits of petroleum

contamination associated with fuel tanks and distribution systems at current and former FAA facilities at the King Salmon Airport.

## Professional Experience

- ◆ **Environmental Scientist, Ahtna Government Services/Ahtna Environmental Services, Anchorage, Alaska (04/2010 – 06/2012).** Assisted with managing several projects and performed numerous investigations as the field team technical leader. Involved in all phases of an environmental investigation, including preparing planning documents, logistical planning and scheduling, collecting environmental samples of various media, managing subcontractors, analyzing and interpreting data, preparing summary reports, and client interaction.
  - Assistant Project Manager/Field Team Lead, AFCEE, Installation Restoration Program Sites at Lake Louise Recreation Camp, Lake Louise, Alaska (April 2010 to June 2012). Prepared planning documents and periodic summary reports at a former U.S. Air Force Recreational Facility. Activities included Feasibility Studies, Proposed Plans, Community Meeting, and a Record of Decision. In 2010, a debris removal occurred and Ms. Nelson was the field supervisor ADEC field sampler. Field screening was performed utilizing a PID and samples were collected from excavations and analyzed for fuel constituents, pesticides, PCBs, and RCRA metals. Ms. Nelson completed a UFP-QAPP for the remedial action scheduled for September 2012, which will include contaminated soil removal, a baseline drum assessment utilizing a dive team, and investigation of a debris area.
  - Project Manager/Advisor/ADEC Qualified Sampler, Native Village of Port Heiden Cooperative Agreement, Port Heiden, Alaska (May to October 2011). Ms. Nelson assisted in developing and implementing the petroleum and PCB contaminated soil cleanup. In addition, Ms. Nelson provided mentorship to the locals so they can build their capabilities on conducting their own cleanups in the future.
  - Assistant Project Manager, FAA IDIQ Projects, FAA McGrath Station, McGrath, Alaska (July 2011 to June 2012). Ms. Nelson utilized the HRC to assess the potential risk at multiple areas of concern at the FAA McGrath Station and wrote the HRC report. Ms. Nelson inserted all of the field boring logs into the gINT soil boring program to allow for the CAD drafter to produce cross sections.
  - Assistant Project Manager/Field Team Lead, FAA IDIQ Projects, RCO/ RTR Site, Juneau, Alaska (2010). Ms. Nelson managed the asbestos abatement, demolition, site remediation, monitoring well decommissioning, and an EDDA for the RCO/RTR site, which included the writing of the work plans and reports and site work.
  - Assistant Project Manager, FAA IDIQ Projects, Moses Point Site, Moses Point, Alaska (2010). Ms. Nelson managed the logistics and site remediation at the Moses Point site, which included the review of the work plan, site work, and writing summary reports. The site investigation included in-situ field screening using a Niton XRF screening device for lead analysis and subsurface soil sampling for lead analysis. The remediation portion of the project included removal of a lead shielded cable, impacted soil, and the disposal of broken lead-acid batteries. The disposal of the batteries included completing all paperwork required to ship hazardous materials via air. Ms. Nelson conducted a GPS survey utilizing the Trimble® R8 GPS system.

- Environmental Scientist/Field Team Lead, FAA IDIQ Projects, Sisters Island Site, Sisters Island, Alaska (2010). Ms. Nelson conducted groundwater monitoring of 23 on-site wells analyzed for fuel constituents using the non-purge method due to shallow groundwater and slow recharge rate. Ms. Nelson also prepared the groundwater sampling report.
- Environmental Scientist, FAA IDIQ Projects, Farewell Site, Farewell, Alaska (2010). Ms. Nelson wrote the EDDA for Parcels A and B of the FAA Farewell Station. Ms. Nelson also assisted with field activities, which included completing boring logs in the field, visual assessments of burial pits, and lead sampling. In addition, Ms. Nelson conducted a GPS survey utilizing the Trimble® R8 GPS system.
- ◆ **Environmental Scientist, TechLaw, Inc., Anchorage, Alaska (May 2006 to February 2010).** Staff environmental scientist managing projects, performing field work, chemical sampling, data analysis, and reporting for environmental investigations. Quickly gained knowledge and experience to become a primary field team leader and project manager for several small projects.
  - Field Scientist, EPA Region 10, Federal PM2.5 Performance Evaluation Program (November 2007 to February 2010). Ms. Nelson was responsible for conducting at a minimum eight audits in Oregon, eight audits in Idaho, eight audits in Washington, and five audits in Alaska annually.
  - Field Scientist, EPA Region 10, EPA Through-the-Probe or Back-of-the-Analyzer Performance Evaluation for Ozone, CO, SO<sub>2</sub>, and NO<sub>2</sub> ambient air instruments (November 2007 to February 2010). Ms. Nelson was responsible for conducting Performance Evaluations of the Washington, Oregon, Idaho, and Alaska State, Local, and Tribal agencies Ozone, CO, SO<sub>2</sub>, and NO<sub>2</sub> ambient air instruments.
  - Assistant Project Manager/Project Manager, Various EPA Region 10 Projects in Washington, Oregon, and Idaho (2004 - 2010). For the following EPA projects, Ms. Nelson was responsible for managing the budgets, writing and preparing the PAs, HRS Memos, Recommendation letters, SQAPs, and the SI reports. During the field events, she was the field team lead and CLP coordinator. The projects consisted of surface soil, sediment, and/or drinking water sampling for TAL Metals, SVOCs, VOCs, pesticides, PCBs, dioxins, UDMH, NDMA, perchlorate, 1,4-dioxane, TPH-d, and TPH-g. Instruments and programs utilized during this sampling event included the HRS Quickscore, MultiRae Plus, the Ludlum radiation detector, Lumex mercury monitor, and Forms II lite.
    - L.O.G. Wrecking PA and SI, Seaside, Oregon (2009-2010)
    - Sunshine Valley Road Landfill SI, Damascus, Oregon (2009-2010)
    - Former Farragut Naval Training Center/Idaho Department of Fish & Game Farragut Firing Range PA and SI, Athol, Idaho (2008-2010)
    - Keizer Area Wide Groundwater Site HRS Memorandum and Quickscore, Keizer, Oregon (2009)
    - Nike Winslow SI, Bainbridge, Washington (2009-2010)
    - Nike Midway SI, Des Moines, Washington (2009-2010)
    - Medical Lake Nike SI, Medical Lake, Washington (2009-2010)
    - Ames-Bancroft Mercury Mine PA and SI, Mt Hood National Forest, Oregon (2008)



- Hood River Spray Manufacturing Company PA and SI, Hood River, Oregon (2008)
- 13 South Nevada Street Targeted Brownfield Assessment (TBA), Seattle, Washington (2008)
- City of Palouse- Old Palouse Producers TBA, Palouse, Washington (2007)
- Bremerton Gas Works TBA, Bremerton, Washington (2006)
- Environmental Scientist, EPA Region 10, Southeast Idaho (2008-2009). Ms. Nelson was responsible for assisting in the writing and preparing of the HRS Memos and Quickscores for the following southeast Idaho mine sites: Diamond Gulch Mine, Dry Valley Mine, Gem of the Mountains Mine, Independence 81 Mine, Ivanhoe Mine, Nevada Mine, Ohio Mine, Oregonian Mine, Snowclad Mine, Star Mine, and Utah Mine. Programs utilized during this project included the HRS Quickscore.
- Project Manager, Washington State Department of Fish and Wildlife, Phase I ESA at Johnson Farms, Belfair, Washington (2008). Ms. Nelson was responsible for the proposal, managing the budget, and writing and preparing the Phase I ESA Report.
- Environmental Scientist, EPA Region 1 School Cleanout Campaign Demonstration Project (2008). Ms. Nelson assisted in compiling an identifiable chemical worksheet consisting of names, CAS numbers, and types of containers required for specific chemicals, proper labels, locations, uses, quantities, MSDS available, and storage codes, which will assist schools in assessing chemicals located at their facility, storage needs, and disposal needs.
- Environmental Scientist, New Jersey Department of Environmental Protection, Review of Leaking Underground Storage Tank (LUST) Reports (2008). Ms. Nelson reviewed approximately 32 Remedial Action Progress Reports (RAPRs), Baseline Ecological Risk Assessments (BEEs), Remedial Action Reports, or Classification Exception Area (CEA) Monitoring Reports for NJDEP.
- ◆ **Natural Resource Scientist II, North Wind., Anchorage, Alaska (June 2004 to March 2006).** Staff scientist performing field work, chemical sampling, data analysis, and reporting for environmental investigations.
  - Hurricane Katrina Emergency Response, New Orleans, Louisiana
  - Soil Sampling Class V UIC, Fort Richardson, Alaska
  - Groundwater and soil sampling at Taku Gardens, Fort Wainwright, Alaska
  - Groundwater Sampling at Operational Unit (OU) 2 in Fort Wainwright, Alaska
  - Hazardous Waste Sampling at Fort Richardson and Fort Wainwright, Alaska
  - Fort Wainwright OU5 Remedial Actions, Fort Wainwright, Alaska
  - Weed Survey at Clear, Alaska
  - Little Susitna River Water Sampling at Palmer, Alaska.

## **APPENDIX G**

### **Bristol Field Sampling SOPs**

|         |  |
|---------|--|
| BERS-01 | Soil Sampling                                |
| BERS-02 | Groundwater Sampling                         |
| BERS-03 | Sample Management                            |
| BERS-04 | Field Measurement Test Equipment             |
| BERS-05 | Equipment Decontamination                    |
| BERS-09 | Investigation-Derived Waste (IDW) Management |
| BERS-11 | Field Documentation                          |
| BERS-17 | Trimble GeoXH Global Positioning Systems     |

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## SOIL SAMPLING

### STANDARD OPERATING PROCEDURE

**Summary:** Soil samples may be collected using a variety of methods and equipment. The methods and equipment used are dependent on the depth of the desired sample, the type of the sample required, and the soil type. Manual techniques and equipment, such as hand augers, are usually used for surface or shallow, subsurface soil sampling. Power-operated equipment is usually associated with collecting deep samples, but this equipment can also be used for collecting shallow samples.

Soil samples collected for volatile organic compound (VOC) analysis are handled in a manner that minimizes the loss of contaminants due to volatilization and biodegradation. Where required to meet project objectives, field extraction and preservation with methanol are performed to ensure sample integrity and representativeness during sample handling and transport.

**Health and Safety:** Sampling activity should only be conducted in accordance with an approved Site Health and Safety Plan.

**Personnel Qualifications:** Sampling personnel will be trained and certified as hazardous site workers per Title 29 Code of Federal Regulations, Part 1910.120(e) [29 CFR 1910.120(e)]. If applicable, additional qualification requirements will be specified in the site Quality Assurance Project Plan (QAPP) and will be met.

**Equipment and Materials:** Prior to deployment in the field, the requisite sampling equipment and materials will be identified, secured, and inspected for signs of damage or potential contamination. Sampling equipment will be selected to preserve the chemical and physical integrity of the samples. Equipment selection will be based on the depth of the samples to be collected and, to a certain extent, the characteristics of the material being sampled. Equipment used for sampling trace contaminants should be constructed of inert materials, such as Teflon<sup>®</sup> or stainless steel. Ancillary equipment, such as auger flights, post hole diggers, etc., may be constructed of other materials if this equipment does not come in contact with the samples. However, plastic, chromium, galvanized, painted, or rusted equipment should not be used for routine soil sampling operations.

- Sample containers for collecting samples using the methanol extraction and preservation method must be prepared and weighed in advance by the laboratory performing the analysis. Required equipment may include disposable plastic syringes and a clean, sharp utility knife.
- Surface soil is generally classified as soil between the ground surface and 6 inches below ground surface (bgs). Surface soil sampling equipment typically consists of spoons, shovels, hand-augers, push tubes, and post-hole diggers.

- Subsurface soil is generally soil that is at least 6 inches bgs, and can be collected using manual or powered sampling devices. Manual sampling devices consist of hand augers, push tubes, and post-hole diggers. Powered devices typically consist of power augers; split-spoon samplers, which are driven with a drill rig drive-weight assembly or hydraulically pushed using drill rig hydraulics; continuous split-spoon samplers; specialized hydraulic cone penetrometer rigs; and/or backhoes.
- In addition to soil sampling equipment, sampling support equipment may include Global Positioning System (GPS) or survey equipment for locating sample points, organic vapor analyzer with a photoionization detector (PID), tape measures, survey stakes or flags, stainless steel buckets/bowls or disposable aluminum pie pans, canvas/plastic sheet, pre-cleaned sample containers, decontamination supplies and equipment, safety equipment, logbooks, camera, chain-of-custody forms, and supplies for sample labeling, packaging, and shipping.
- Sample containers will be of the type and size specified in the governing QAPP.

## **Field Screening**

Field-screening samples are typically collected either before or concurrently with laboratory analytical samples. Field screening before sample collection can help guide the selection of the most appropriate location to collect a laboratory analytical sample. Collecting field-screening samples concurrently with laboratory samples can help establish a correlation between screening and analytical results at a particular site. Field screening is commonly performed using an organic vapor analyzer, such as a PID.

### ***Headspace PID Screening***

Headspace PID screening samples are collected by filling a resealable Ziploc<sup>®</sup> bag approximately one-third to one-half full of freshly exposed or uncovered soil, and immediately sealing the bag. The soil should be agitated and then allowed to warm for approximately five minutes to an hour, to allow the headspace vapors to develop. After the headspace vapors have developed, insert the tip of a calibrated PID into the void headspace of the bag, and record the highest reading.

### ***In-Situ PID Screening***

In some instances, where a limited volume of soil is available for field screening, such as soil cores from a direct-push rig or split spoon, using the headspace method may use up material that potentially could be used for a laboratory analytical sample. In these cases, field screening of the soil may be performed by making small divots approximately every 6 inches along the length of the core, and inserting the calibrated PID tip just above the freshly exposed divot, taking care not to touch the material. Record the highest reading at each location in the field logbook or field form.

## Surface Soil Sampling

1. If a thick, matted root zone is encountered at or near the surface, remove it before collecting the sample.
2. Carefully remove the top layer of soil or debris to the desired sample depth with a pre-cleaned spade.
3. Using a pre-cleaned, stainless steel scoop, spoon, or trowel, remove and discard a thin layer of soil from the area that came in contact with the spade.
4. Collect samples following procedures described in the General Soil Sampling Procedures Section.

**Subsurface Soil Sampling:** Subsurface samples can be collected using hand or power augers, Geoprobe<sup>®</sup>, split-spoon samplers, or from backhoes.

- Augering is the most common method used to collect shallow subsurface samples. The auger is used to bore a hole to the desired sampling depth. VOC samples are generally collected directly from the sampling device. Non-VOC samples are collected after thorough mixing. If a core sample is required, the auger tip is replaced with a thin wall tube sampler, and the system is lowered into the borehole and driven to the required sample depth. The system is withdrawn and the core is collected from the thin wall tube sampler.
- Geoprobe sampling uses a direct-push system that employs percussion power to essentially “hammer” sampling equipment (Macro-Core<sup>®</sup> samplers) into the subsurface to extract soil for laboratory analysis. The advantage of using a Geoprobe is that there is a much smaller hole diameter and minimal soil cuttings. The Macro-Core sampler is a solid barrel that is pushed into the subsurface for collecting continuous core samples of unconsolidated materials at depth. The Macro-Core soil samples are collected in a 4 to 5 foot long Teflon, polyvinyl chloride (PVC), or polyethylene terephthalate glycol (PETG) liner; the samples can be obtained by splitting the liner or capped to it to preserve the samples for future analysis.
- On underground storage tank or contaminated soil excavation sites, a backhoe bucket is commonly used for collecting soil for samples. When a trench or excavation is deeper than four feet, the bucket of the backhoe or excavator will be used to collect soil, so that personnel do not climb into an unprotected hole.
- Power hand augers are commonly used to aid in the collection of subsurface soil samples at depths where hand augering is impractical. This equipment is a sampling aid, and not a sampling device; the typical lower depth range available with these devices is 20 to 25 feet. The power auger is used to advance a hole to the required sampling depth, at which point a hand auger is usually used to collect the sample.
- Split-spoon sampling provides for the collection and extraction of undisturbed soil cores of 18 or 24 inches in length. A series of consecutive cores may be extracted to

give a complete soil column profile, or an auger may be used to drill down to the desired depth for sampling. The split spoon is then driven to the sampling depth through the bottom of the augered hole, and the core is extracted. When used in conjunction with drilling, split-spoon samplers are usually driven either inside a hollow-stem auger or inside an open borehole after the rotary or cable tool drilling equipment has been temporarily removed.

- When split spoon or Macro-Core sampling is performed to gain geologic information, sampling will be performed in accordance with SOP BERS-06 Borehole Logging.
- Continuous split-spoon samplers may be used to obtain five-foot-long, continuous samples, approximately 3 to 5 inches in diameter. These devices are placed inside a five-foot section of hollow-stem auger and advanced with the auger during drilling. As the auger advances, the central core of soil moves into the sampler.
- Cone Penetrometer Rigs use a standard split spoon that is modified with a releasable tip to keep the spoon closed during the sampling push. Upon arrival at the desired depth, the tip can be remotely released and the push continued. During the subsequent push, the released tip floats freely up the inside of the sample barrel as the soil core displaces it. Split-spoon soil samples, therefore can be collected without drilling by simply pushing the device to the desired depth. This technique is particularly beneficial at highly contaminated sites, because cuttings are not produced as with drill rigs. This results in limited investigation-derived waste (IDW) and minimal exposure to sampling personnel.

### ***Sampling using a Hand Drill with an Auger Attachment***

1. Attach the auger bit to a drill-rod extension, and attach the “T” handle to the drill rod.
2. Clear the area to be sampled of any surface debris (e.g., twigs, rocks, and litter). It is generally advisable to remove the first three to six inches of surface soil.
3. Begin augering, periodically removing the auger from the hole and depositing accumulated soils onto a plastic sheet spread near the hole.
4. After reaching the desired depth, slowly and carefully remove the auger from the boring.
5. Remove auger tip from drill rods and replace with a pre-cleaned, thin-wall tube sampler. Install the proper cutting tip.
6. Carefully lower the tube sampler down the borehole. Gradually force the tube sampler into the soil. Take care to avoid scraping the borehole sides. Avoid hammering the drill rods to facilitate coring as the vibrations may cause the boring walls to collapse.
7. Remove the tube sampler and unscrew the drill rods.
8. Remove the cutting tip and the core from the device.
9. Discard approximately 1 inch off the top of the core. Place the remaining core into a labeled sample container without mixing.

10. Collect samples following procedures described in the General Soil Sampling Procedures Section.
11. If another sample is to be collected in the same hole, but at a greater depth, reattach the auger bit to the drill and assembly and follow steps 3 through 10, making sure to decontaminate the auger and tube sampler between samples.
12. Abandon the hole according to applicable state regulations and corporate procedures.

#### ***Sampling using a Geoprobe with a Macro-Core Attachment***

1. Clear the area to be sampled of any surface debris (e.g., twigs, rocks, and litter). It is generally advisable to remove the first three to six inches of surface soil.
2. Begin hammering the Geoprobe.
3. After hammering the depth of the Macro-Core (either 4 or 5 feet in length), slowly and carefully remove the Macro-Core from the hammer.
4. Open the Macro-Core tubing using a two-razor tool designed for the Macro-Core.
5. Use a pre-cleaned stainless steel spoon or knife to obtain soil from the core at selected locations, based on PID field screening.
6. Collect samples following procedures described in the General Soil Sampling Procedures Section. The Macro-Core is not reusable. Remove any soil on the core material, place the used core in a plastic trash bag (with as many used cores as will fit), tie the ends of the plastic bag, and dispose of it in a trash receptacle.
7. Abandon the hole according to applicable state regulations and corporate procedures.

#### ***Sampling with a Hand Auger***

1. Insert the hand auger into the material to be sampled at a 0° to 45° angle from the horizon.
2. Rotate the auger once or twice to cut a core of material.
3. Slowly withdraw the auger, with the slot facing upward.
4. Collect samples following the procedures described in the General Soil Sampling Procedures Section.

#### ***Sampling with a Split Spoon***

1. Assemble the sampler by aligning both sides of barrel, then screw the drive shoe on the bottom and the headpiece on top.
2. Place the sampler perpendicular to the material sampled.
3. Using a well ring, drive the tube. Do not drive the tube past the bottom of the head piece, or the sample may be compressed.

4. Record the length of the tube used to penetrate the material being sampled, and the number of blows required to obtain this depth in the site logbook or on field data sheets.
5. Withdraw the sampler and open by unscrewing the bit and head, and splitting the barrel. Record the amount of recovery and soil type on the boring log. If a split sample is required, use a clean stainless steel knife to divide the tube contents in half, lengthwise.
6. Without disturbing the core, collect samples following the procedures described in the General Soil Sampling Procedures Section.

### ***Sampling from a Backhoe***

1. If backhoe buckets are not cleaned in between sample locations, collect samples from material in the center of the bucket.
2. Prior to collecting samples from soil in the backhoe bucket, dress the surface with a stainless steel shovel, spatula, knife, or spoon, to remove at least six inches of surface layer of soil, which may have been smeared across the trench wall as the bucket passed.
3. Be aware of “sluff” material in the bucket that is not representative of the specified sample depth.
4. Collect samples following procedures described in the General Soil Sampling Procedures Section.

### **General Soil Sampling Procedures:**

1. If the QAPP requires field screening for VOCs using a PID, follow the procedures described in the Field Screening Section.
2. Collect samples in appropriate containers in order of volatility, with the most volatile samples collected first. Containers should be either pre-labeled or labeled immediately after sample collection. Follow the procedures for collecting volatile samples described in the following section.
3. For non-VOC samples, place the material into the appropriate container.
4. If a composite non-VOC sample is required, place the material from the designated sampling intervals or locations into a mixing bowl, mix thoroughly, and collect the sample from the mixture into the appropriate container.
5. If non-VOC duplicate, split, duplicate, or other quality assurance/quality control (QA/QC) samples are required, collect twice the routine amount of sample material, mix thoroughly, and fill two identical sets of sample containers.
6. Fill sample containers to the top with measures taken to prevent soil from remaining in the lid threads prior to being sealed.
7. After sample containers are filled, immediately seal them, chill them, and process them for shipment to the laboratory.

## **Volatile Sample Collection – Sample Collection for Methanol or other Preservative Extraction**

### **General procedures for all volatile sample collection:**

- Soil samples for volatile analysis can be collected using any of the sampling methods described above.
- When collecting soil for volatile sample analysis, always submit a separate non-preserved sample for moisture analysis/dry weight calculation, unless already submitting non-volatile samples from the same location.
- Never composite VOC samples.
- If VOC duplicate, split, or other QA/QC samples are required, collect and containerize samples that are co-located, not composited.
- If VOC samples are required, transfer the sample into a labeled sample container with a stainless steel laboratory spoon, or equivalent, and secure the cap tightly.
- Avoid placing pebbles or other large particles into the sample. To the extent practical, the sample should consist of sand, silt, or clay, with care to avoid rocks or pebbles.
- Ensure that the threads on the sample container and cap are free of soil particles. Wipe with a clean brush or paper towel if needed. The sample container should be open for the shortest time possible to prevent evaporation of the methanol and surrogate solution.
- After soil is placed in methanol or other preservative, it should be gently agitated or swirled so that the soil is immersed in the preservative. Do not shake the sample, as it may cause undue volatilization.

The different methods of collecting volatile samples with field extraction, using methanol or another preservative, are described in general below. Refer to the project QAPP for site-specific information on specific soil and methanol volumes required for the appropriate analytical method:

### **Measuring 10 grams of soil into a VOA vial containing methanol:**

1. “Zero” one 40-milliliter volatile organic analyte (VOA) vial containing 10 milliliters of methanol on a small scale.
2. Use a disposable scoop to collect soil.
3. Very gently, transfer the soil into the vial until 10 grams of soil is weighed. Try not to let any soil drop outside the sample container onto the scale. Immediately cap the vial.
4. Ensure that the methanol does not splash. If methanol splashes or spills from the sample container, discard the container and re-sample.
5. Record the tare weight onto the sample sheet or label.

6. Repeat the process for the second VOA vial containing methanol.
7. Place the samples in a protective sleeve and store on ice until delivery to the laboratory.

Using a sampling coring device to collect soil for VOC analysis:

1. Coring devices (for example, En Core<sup>®</sup> or Terracore<sup>®</sup>) are disposable, and are not to be reused after each sample.
2. Push the core sampler into freshly exposed soil until the sample chamber is filled. Most of these devices deliver approximately 5 grams of soil.
3. Once the core is filled with soil, retrieve the coring device from the soil.
4. Wipe all soil from outside of the sampler. The soil plug should be flush with the mouth of the sampler.
5. If the QAPP requires using a preservative (for example methanol or sodium bisulfate), use the following preservation procedure:
  - a. Place the mouth of the sampler into a pre-tared VOA vial containing the appropriate preservative, and extrude the sample by pushing the plunger down. Immediately cap the VOA vial.
  - b. Place the labeled sample in protective padding and on ice.
6. If the QAPP requires freezing the samples unpreserved, use the following procedure:
  - a. Place the mouth of the sampler into a pre-tared VOA vial containing exactly 5 milliliters of deionized water, and extrude the sample by pushing the plunger down.
  - b. Cap the VOA vial and be sure the soil is below the water level. Gently swirl the vial.
  - c. Repeat the process to collect a second soil vial.
  - d. Immediately place the labeled sample in protective padding and on ice.
  - e. As soon as practical, freeze sample in a freezer or by placing in a cooler containing dry ice.
  - f. When freezing the soil vials, it is recommended that the vials be placed at a 45° angle to reduce the likelihood of vial breakage due to freezing.
7. If the QAPP requires submitting unpreserved, unfrozen samples that were collected using an EnCore device, use the following procedure:
  - a. Immediately place the cap on the open end of the core. Place the capped core inside the foil sample bag. Make sure that the sample bag is labeled.
  - b. Place the sample bag on ice for shipment to the laboratory for analysis within 48 hours.



## **Quality Control:**

The following procedures apply:

- Samples will be packaged, handled, and shipped in accordance with SOP BERS-03 *Sample Management Procedures*.
- Equipment will be operated and used in accordance with the manufacturer's instructions, unless otherwise specified in the site QAPP.
- Equipment examination activities should occur prior to field deployment, and they should be documented.
- An equipment rinsate blank is generally required per matrix, and for each sampling event, to evaluate the potential of cross contamination from sampling equipment. Equipment rinsate blanks will be collected by pouring analyte-free water over the decontaminated sampling equipment.
- Depending on the needs of the project, a field blank may be required per matrix and for each sampling event to evaluate whether contaminants have been introduced into the samples during the sampling process. Field blank samples will be obtained by pouring analyte-free water into a sampling container at the sampling point.

## **Interferences and Potential Problems:**

There are two primary problem areas associated with soil sampling: cross-contamination and improper sample collection.

Cross-contamination can be eliminated or minimized through the use of dedicated sampling equipment. If this is not possible or practical, field personnel will decontaminate sampling equipment as described in the site Sampling and Analysis Plan (SAP). Improper techniques may include using contaminated equipment, disturbing the matrix, compacting the sample, and inadequate homogenization of the samples, any of which can produce non-representative samples.

To safeguard against collecting non-representative soil samples, the following guidelines and techniques should be adhered to during sampling:

- Samples for VOC analysis should be collected before other samples are collected, and should be transferred immediately from the sampling device into the sample container to reduce volatilization. Step-by-step instructions for field extraction and preservation with methanol are described above.
- Anytime a vertical or near vertical surface, such as that which is achieved when shovels or backhoes are used for subsurface sampling, the surface should be dressed to remove the outer smear zone. This is necessary to minimize the effects of cross contamination due to smearing of materials from other levels.

- It is extremely important that soil samples intended for non-VOC analyses be mixed as thoroughly as possible to ensure that each sample is representative of the material sampled. The most common method of mixing is referred to as quartering. Where required by the QAPP, quartering will be performed as follows:
  - a. Divide the material in the sample pan into quarters and mix each quarter individually.
  - b. Mix two quarters to form halves.
  - c. Mix the two halves to form a homogenous matrix.
  - d. Repeat this procedure until the sample is adequately mixed.
  - e. If round bowls are used for sample mixing, stir the material in a circular fashion, reversing direction, and occasionally turning the material over.
- One trip blank per cooler is generally required when submitting samples for VOC analysis. Trip blanks are prepared and sealed by the laboratory. They are transported to the field and returned, unopened, to the laboratory in the same cooler as the samples collected for VOC analysis.
- Methanol blanks may also be required when soil samples designated for VOC analysis are preserved with methanol.
- Blanks will be collected at the frequency and locations specified in the site QAPP. Blanks will be analyzed for the same target analytes as the associated field samples. Each blank will be assigned a unique sample number, and submitted blind to the laboratory.

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## GROUNDWATER SAMPLING

## STANDARD OPERATING PROCEDURE BERS-02

## Record of Changes

[illegible]



## GROUNDWATER SAMPLING

### STANDARD OPERATING PROCEDURE

**Summary:** Groundwater samples are usually obtained from either temporarily or permanently installed groundwater monitoring wells. In order to obtain a representative groundwater sample, the stagnant water in the well casing and the water immediately adjacent to the well are purged before sample collection. Depending on the needs of the project, purging can be performed either by traditional methods (purging several full well volumes), or by the low stress/low flow method. Once purging is complete, samples are collected using a sampling device that does not affect the integrity or representativeness of the sample.

**Health and Safety:** Sampling activity should only be conducted in accordance with an approved Site Health and Safety Plan. Electric generators must be grounded to prevent possible electrical shock.

**Interferences and Potential Problems:** The primary problems associated with groundwater sampling are the collection of non-representative samples, and sample contamination from equipment or the environment. These can be eliminated or minimized through implementation of strict well purging and sample collection and handling procedures, and by the use of qualified personnel.

To safeguard against collecting non-representative stagnant water, the following guidelines and techniques should be adhered to during sampling:

- Monitoring wells should be pumped or bailed prior to sampling. This should be done in a manner that minimizes alterations to the water chemistry.
- The well should be sampled as soon as possible after purging and stabilization of indicator field parameters.
- Analytical parameters typically dictate whether the sample should be collected through the purging device or through separate sampling equipment.
- Portions of water that have been tested with a field meter probe will not be collected for chemical analysis.
- Excessive pre-pumping of the well should be avoided.

**Personnel Qualifications:** Sampling personnel will be trained and certified as hazardous site workers per Title 29 Code of Federal Regulations, Part 1910.120e [29 CFR 1910.120(e)]. If applicable, additional qualification requirements will be specified by the Bristol Quality Control Manager prior to any on-site sampling activity.

Equipment and Materials: Prior to deployment in the field, the requisite sampling equipment and materials will be identified, secured, and inspected for signs of damage or potential contamination.

- Ideally, purging and sample withdrawal equipment should be completely inert, economical, easily cleaned, reusable, able to operate at remote sites in the absence of power resources, and capable of delivering variable rates for sample collection. Adjustable rate, submersible and peristaltic pumps are preferred. Peristaltic pumps are only effective if groundwater depths are approximately 25 feet below the ground surface or shallower. When sampling for volatile contaminants, a pump that minimizes or eliminates volatilization should be selected. The use of inertial pumps is discouraged because of their tendency to cause greater disturbance during purging and sampling.
- Sampling and purging equipment (e.g., bailers, bladders, pumps, and tubing) should be made from stainless steel, Teflon<sup>®</sup>, polypropylene, or glass.
- The use of 1/4 or 3/8-inch inner diameter tubing is preferred. Clean, pharmaceutical grade tubing should be used in drawing and sampling groundwater. Water level measuring devices should be capable of measuring to 0.01-foot accuracy.
- In addition to groundwater sampling equipment, sampling support equipment may include water level indicators, depth sounder, water quality meter (such as YSI), keys for well caps, organic vapor screening device (such as photoionization detector [PID]), plastic sheeting, tubing, pre-cleaned sample containers, sample preservatives, decontamination supplies and equipment, safety equipment, logbooks, field forms, camera, chain- of-custody forms and seals, coolers and ice packs, and labeling, packaging, and shipping supplies. Sample containers will be of the type and size specified in the governing Quality Assurance Project Plans (QAPPs).

**Field Preparation:** Perform the following steps before any purging or sampling activities:

1. Pre-label and ready all the required sample containers.
2. To the extent known, plan to sample wells in order of increasing contamination.
3. Check the well for security damage or evidence of tampering, and record observations.
4. Record location, time of day, and date in field notebook.
5. Remove locking well cap and well casing cap.
6. Screen well headspace with a PID or equivalent, to determine the presence or absence of volatile organic compounds. Record instrument readings in the field logbook or field form.
7. Lower a water-level measuring device into the well until water surface is encountered and the instrument alarms.

8. Measure distance from water surface to reference measuring point on well casing or protective barrier post, and record in the field logbook or on the field form. If there is no reference point, measure from the top of the steel casing, top of PVC riser pipe, from ground surface, or some other position on the wellhead, and note in the field logbook or field form.
9. Measure the total depth of the well and record in the field logbook or field form. Measure well depth either the day before sampling or after all sampling in that well has been completed. Take care to minimize disturbance of the water column.
10. Calculate the volume of water in the well using the following calculations and data reduction:

Well volume:  $V = 0.041d^2h$

V = volume of one well casing of water in *gallons*

d = inner diameter of the well casing in *inches*

h = total height of the water column in *feet*

Based on this equation, one well volume can be calculated simply by multiplying the height of the water column in feet by the appropriate conversion factor, which is based on the casing diameter as follows:

|                   |        |        |        |        |        |
|-------------------|--------|--------|--------|--------|--------|
| Diameter          | 2-inch | 3-inch | 4-inch | 5-inch | 6-inch |
| Volume (gal/ft.): | 0.1632 | 0.3672 | 0.6528 | 1.02   | 1.4688 |

11. Select the appropriate purging and sampling equipment based on requirements in the site-specific QAPP.

**Purging:** To ensure that a representative groundwater sample is collected, a well is typically purged prior to sample collection. Well purging is accomplished either by using low-flow procedures or removing a prescribed volume of water from the well (usually a minimum of three to five well volumes). During both purging methods, water quality parameters should be monitored for stabilization.

Purging may be performed by using bailers or pumping mechanisms. In general, a pump is preferred over a bailer for purging and sampling because it will not stress the well like dropping a bailer into the well. If using a pump, select a low removal rate in order to not stress the well. Tubing should remain filled with water, so as to minimize possible changes in water chemistry upon contact with the atmosphere.

If possible, avoid purging wells to dryness by slowing the purge rate. If the well has a poor recharge rate and is purged dry, sample the well once the water level has recovered sufficiently to collect the appropriate volumes for all required analyses. Record in the field logbook or on the field form that samples were collected, even though water quality parameters did not stabilize or the required volume of water was not removed.

If water quality parameters have not stabilized after 1 hour of purging, options include continued purging until stabilization is achieved, or collecting samples although stabilization has not been achieved. Record all actions taken in the field logbook or field form.

Once the purging requirements have been met, the groundwater sample can be collected. Collect and dispose of purge water and solid investigation-derived waste (IDW) as prescribed in the site-specific QAPP.

These procedures are used for sampling events that require purging prior to sampling. For some projects, sampling may be performed without purging the well first. Refer to the non-purge sampling procedures.

#### *Low-flow purging*

For low-flow purging and sampling, the Region 1 U.S. EPA Low Flow Guidance Document [*Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells*, July 30, 1996, Revision 2] will be followed, and is summarized below.

1. After the water level and total well depth have been measured, lower the submersible pump or tubing (Teflon, polyethylene, or other approved material) for peristaltic pump slowly (to minimize disturbance) into the well to the middle of the submerged, screened interval of the well, or appropriate depth based on site-specific conditions. Placing the pump or tubing in this manner will reduce the risk of drawing down the water table to below the pump intake, thus preventing the introduction of air into the sample tubing.
2. Before starting the pump, measure the water level and record it on the Groundwater Low Flow Purging Form.
3. Start the pump at its lowest speed setting and slowly increase the speed until discharge occurs. Check water level. Adjust pump speed until there is little or no water level drawdown (less than 0.3 feet). If the minimal drawdown that can be achieved exceeds 0.3 feet, but remains stable, continue purging until indicator field parameters stabilize (described in Number 5, below).
4. Monitor and record water level and pumping rate every 3 to 5 minutes during purging. If a flow rate meter is present, record the pumping rate every 3 to 5 minutes as well. Record any pumping rate adjustments (both time and flow rate). Pumping rates should, as needed, be reduced to the minimum capabilities of the pump to ensure stabilization of indicator parameters. Adjustments are best made in the first 15 minutes of pumping. The final purge volume must be greater than the stabilized drawdown, plus the extraction tubing volume.
5. Monitor indicator field parameters every 3 to 5 minutes during purging, with a calibrated combination type meter (i.e., YSI, etc.). The following field parameters will be monitored: turbidity, temperature, specific conductance, pH, oxidation-

reduction potential (ORP), and dissolved oxygen (DO). All measurements, except turbidity, must be obtained using a flow-through cell. Transparent flow-through cells are preferred. This allows the field personnel to watch particulate buildup within the cell. If the cell needs to be cleaned during purging, continue pumping and disconnect the cell for cleaning. Then reconnect and continue monitoring.

6. Groundwater samples can be collected after the field parameters stabilize within the following limits:
  - Turbidity: +/- 10% for values greater than 1 nephelometric turbidity units (NTUs)
  - DO: +/- 10 %. Note: DO may not stabilize unless using a flow-thru cell. If not using a flow-thru cell, disregard this parameter for the purpose of establishing stability
  - Specific conductance: +/- 3%
  - Temperature: +/- 3%
  - pH: +/- 0.1 pH units
  - ORP: +/- 10 millivolts

Purging is considered complete and sampling may begin when all of the above indicator field parameters have stabilized. Do not change the flow rate of the pump prior to sampling. Remove the flow through cell prior to collecting the groundwater samples, and collect directly from the pump discharge.

#### *General well purging – removing specified volume of water*

During general well purging, a specified minimum volume of water (usually three to five well casing volumes) should be purged prior to sampling. Water temperature, pH, turbidity, DO, ORP, and specific conductance should be periodically measured during purging using a calibrated combination type meter (i.e., YSI, etc.). These parameters should be measured and recorded approximately every three to five minutes, or after each well volume is removed. The sample can be collected after the required volume of water has been purged and the parameters have stabilized within the limits described above in Number 6 of the low-flow purging section.

#### *Purging Methods*

*Pumping mechanisms – peristaltic pumps, submersible pumps, non-contact gas bladder pumps, and suction pumps, etc.*

1. Assemble the pumping unit. For more information on pump assembly and operation, refer to the specific user's manual for the type of pump used.
2. Lower the tubing (peristaltic pump) or pump/tubing assembly (submersible pumps)



into the well to the midpoint of the zone to be sampled. If possible, keep the tubing or pump intake at least 2 feet above the bottom of the well, to minimize mobilization of particulates present in the bottom of the well.

3. Attach a water quality meter to the outlet tubing to monitor water quality parameters.
4. If required, attach a flow meter to the outlet tubing to measure the volume and rate of water purged.
5. Attach the power supply (typically a battery, generator, etc.). Use a ground fault circuit interrupter (GFCI), or ground the generator to avoid electric shock.
6. Start the pump at its lowest speed setting and slowly increase the speed until discharge occurs. Adjust the pump speed until there is little or no water level drawdown (less than 0.3 feet). If the minimal drawdown that can be achieved exceeds 0.3 feet, but remains stable, continue purging until indicator field parameters stabilize.
7. During purging, monitor water quality parameters and water level drawdown.
8. After water parameters have stabilized, disconnect the water quality meter and flow meter, then collect sample.

#### *Bailer purging*

1. Attach the line to the bailer and slowly lower until completely submerged, be careful not to drop the bailer to the water, which would cause turbulence and the possible loss of volatile contaminants.
2. Pull bailer out, while ensuring that the line either falls onto a clean area of the plastic sheeting or that it never touches the ground.
3. Empty the bailer into a pail of known volume (for example, a five-gallon bucket, preferably graduated). Use the volume of the pail to estimate the amount of water removed.
4. During purging, monitor water quality parameters.
5. Remove the required amount of water.
6. If water quality parameters have stabilized, the sample can be collected. If parameters have not stabilized, continue purging until stabilization has been achieved, or collect sample if directed to do so by the project manager.

**Sampling:** Sampling may be accomplished using pumping mechanisms or bailers. Care must be exercised during the use of bailers because of their tendency to disturb sediment, leading to increased turbidity.

*General procedures*

1. If using a pumping mechanism, do not change the flow rate maintained during purging.
2. Remove the water quality and flow rate meters, if used.
3. If using a pumping mechanism, collect non-filtered samples directly from the outlet tubing into the sample bottle. For filtered samples, connect the pump outlet tubing directly to the filter unit. The pump pressure should remain decreased so that the pressure buildup on the filter does not blow out the pump bladder, or displace the filter.
4. For certain projects, sampling may be performed without purging the well first, typically using a bailer. It is preferable to record the water quality parameters (turbidity, DO, specific conductance, temperature, pH, and ORP) before the sample is collected. Non-purge sampling will be performed in accordance with the steps below.
5. If using a bailer, lower the bailer slowly and gently into the well, taking care not shake the casing sides or to splash the bailer into the water. Stop lowering at a point adjacent to the screen. Allow the bailer to fill and then slowly and gently retrieve the bailer from the well, avoiding contact with the casing, so as not to knock flakes of rust or other foreign materials into the bailer. If the bailer comes with a Bottom Emptying Device (BED), place the BED into the bottom of the bailer. Fill the sample containers from the BED. A specific BED for volatile samples is recommended because it reduces the outflow to a very low laminar rate. This device is typically purchased separately from the bailers.
6. Collect samples in appropriate containers in order of volatility, with the most volatile samples collected first. Containers should be either pre-labeled or labeled immediately after sample collection. For collecting volatile samples using the zero-headspace procedure, follow procedures specified at the end of this section.
7. Fill containers slowly (avoid turbulence).
8. Filter and preserve samples as specified in the site-specific QAPP.
9. If duplicate samples, split samples, or other quality assurance/quality control (QA/QC) samples are required, collect them at the same time as the primary sample.
10. Cap sample containers tightly and place into a sample cooler. Samples must be chilled and maintained at a temperature of 4 degrees Celsius. Do not allow samples to freeze.
11. Replace the well cap.
12. Log all samples in the field notebook or on field forms.
13. Package samples and complete requisite paperwork.
14. Dispose of all liquid and solid IDW in accordance with project planning documents.

*Volatile sampling using zero-headspace procedure*

1. Open the sample vial, set cap in clean place, and fill the vial just to overflowing. Do not rinse the vial or allow excessive overflowing. There should be a meniscus on the top of the filled vial.
2. Check that the cap has not been contaminated and carefully cap the vial. Slide the cap directly over the top and screw down firmly. Do not over tighten because the cap may break.
3. Invert the vial and tap gently. It is imperative that no air is entrapped in the sample vial. If an air bubble appears that is smaller than approximately 1.0 millimeter, the sample is still viable. If the bubble(s) are larger, discard the sample and begin again.
4. Place the vial in a protective foam sleeve, and then place into the cooler.

**Quality Control:** The following procedures apply:

- Samples will be packaged, handled, and shipped as prescribed in BERS-03 *Sample Management Standard Operating Procedure*.
- Equipment will be operated and used in accordance with the manufacturer's instructions, unless otherwise specified in the site-specific QAPP.
- Equipment examination activities should occur prior to field deployment, and they should be documented. It is especially important to check that the correct number and type of sample bottles are being sent/taken to the field prior to starting the field activities.
- Depending on the needs of the project, if using non-disposable equipment, collect an equipment rinsate blank to evaluate the potential for cross contamination from the purging or sampling equipment. Collect equipment rinsate blanks by pouring analyte-free water over the decontaminated sampling equipment.
- Depending on the needs of the project, a field blank may be required per matrix and for each sampling event to evaluate whether contaminants have been introduced into the samples during the sampling process. Field blank samples will be obtained by pouring laboratory-grade, certified organic-free water (for organics) or deionized water (for metals) into a sampling container at the sampling point.
- One trip blank per cooler is required when submitting samples for volatile organic analysis. Trip blanks for water and soil samples are prepared and sealed by the laboratory. They are transported to the field and returned, unopened, to the laboratory in the same cooler as the samples collected for volatile organic compound (VOC) analysis.
- Blanks will be collected at the frequency and locations specified in the site-specific QAPP. Blanks are analyzed for the same target analytes as the associated field samples. Each blank receives a unique sample number and is submitted blind to the laboratory.



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## SAMPLE MANAGEMENT

## STANDARD OPERATING PROCEDURE BERS-03

## Record of Changes

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## SAMPLE MANAGEMENT

### STANDARD OPERATING PROCEDURE

**Method Summary:** To ensure the quality and integrity of analytical data, samples will be managed in accordance with rigorous sample handling, shipping, and custody protocols at all times. Pertinent protocols will be determined prior to initiation of field sampling activity and will apply to sampling, transport, and analysis activities.

**Health and Safety:** Sampling activity should only be conducted in accordance with an approved Site Health and Safety Plan.

**Interferences and Potential Problems:** Improper sample management may result in a number of problems, including, but not limited to:

- Inability to collect samples during the field event due to lack of appropriate sample containers and/or preservatives.
- Contamination and/or loss of samples or sample constituents through improper storage and handling, tampering, or breakage.
- Inability to validate resulting data.
- Development of erroneous conclusions regarding site contamination based on inaccurate data and/or problems correlating data and sample locations at the site.
- Mishandling of residual sample material following analysis.

**Personnel Qualifications:** Sample management personnel will be trained and certified as hazardous site workers per Title 29 Code of Federal Regulations, Part 1910.120(e) [29 CFR 1910.120(e)] and trained in applicable DOT sample shipping regulations of 49 CFR Part 172, Subpart H. If applicable, additional qualification requirements will be specified in the site-specific Quality Assurance Project Plan (QAPP) and met by designated personnel.

**Equipment and Materials:** Equipment selection will be based on the objectives of the sampling program and the analytes of concern. Prior to deployment in the field, the requisite sampling equipment and materials will be identified, secured, and inspected for signs of damage or potential contamination.

**Sample Identification and Labeling:** Sample identification and labeling protocols will follow the procedures specified in the governing program QAPP.

Each collected sample will be assigned a unique sample identification number. The designated sample number will be included on the sample label and referenced on associated sample tags, field logbooks, chain-of-custody forms, analysis request forms, and all data reports related to the samples.

To prevent misidentification of samples, the field team will affix legible labels to each sample container. The labels will be sufficiently durable, and an indelible pen will be used to record data on the labels, so that sample identification information remains legible even when wet. Markers should never be used for sample labeling, as they can be a source of volatile compounds and potential contamination of the sample. Additional labeling requirements will be presented in the site-specific QAPP.

Information that is generally included on the container label and/or sample tag includes:

- Sample identification number;
- Sample collector's name or initials;
- Date and time of sample collection;
- Chemical/physical preservatives used;
- Type of sample (composite, grab, filtered); and
- Analytical parameters requested

**Sample Containers and Coolers:** Sample containers will be selected, prepared, cleaned, and controlled in accordance with EPA Office of Solid Waste and Emergency Response (OSWER) Directive #9240.0-05A *Specifications and Guidance for Contaminant-Free Sample Containers* (EPA 540/R-93/05 1, December 1992), and as specified in the governing program QAPP. In advance of each sampling event, the subcontract laboratory should prepare a complete set of precleaned sample containers.

Prior to field activity, field personnel will implement the following steps:

1. Check all sample containers against the specifications of the site-specific QAPP. Ensure that the sample containers and caps are in good condition and free of obvious contamination, constructed of the appropriate material (i.e., plastic or glass), contain appropriate preservative solutions, and will hold sufficient volume for planned analyses, if specified.
2. Verify that sample identification labels are properly affixed to each container.
3. Verify that an adequate quantity of each type and volume of sample container is available for the anticipated environmental and quality control samples. Verify that extra containers are readily available to field staff as contingency for damaged or potentially contaminated containers, and for collecting samples of opportunity.
4. Ensure that containers and coolers are stored in clean areas to prevent exposure to fuels, solvents, and other potential contaminants.

**Sample Collection:** Field personnel will collect samples as prescribed in the governing QAPP. Samples should be transferred in the field from the sampling equipment directly into

a container that has been specifically prepared for that sample (based on the analytes of concern, preservation requirements, and the type of analysis to be performed).

To minimize the potential for cross-contamination and loss of sample constituents, sample fractions should be collected and containerized in the order of volatilization sensitivity of the analytes of interest. The following sample collection order is recommended:

- Volatile organic compounds (VOCs)
- Purgeable organic carbon
- Purgeable organic halogens
- Total organic halogens
- Total organic carbon
- Extractable organic compounds
- Metals
- Phenols
- Cyanide
- Sulfate and chloride
- Turbidity
- Nitrate and ammonia
- Radionuclides
- Ignitability
- Corrosivity
- Reactivity

As the samples are being collected, or immediately thereafter, the field sampling team will document the date and time of sample collection, pertinent field information (e.g., sampling depth), and the identity of sampling personnel, on each container label. Additional detail on the sampling event may be documented in the site logbook as appropriate.

**Sample Custody:** BERS will ensure the integrity and security of all samples under their control, using a stringent chain-of-custody protocol. This will be supplemented as needed to meet all work assignment requirements.

During the sampling event, field personnel will prepare a chain-of-custody form documenting each sample collected as follows:

- Sample numbers, date and time of collection, sampling location, name of the person who collected the samples, preservatives used, and the analyses requested.
- Document each sample transfer on the custody sheet. Ensure that this form remains with the samples until they arrive at, and are processed by, the laboratory.
- When samples are relinquished to a commercial carrier for transport to the laboratory, sign the chain-of-custody form under “Relinquished By,” enter the name of the carrier organization under “Received By,” and document the date and time of transfer. Upon receipt of the samples, the laboratory sample custodian will similarly sign and date the chain-of-custody form.

**Under no circumstance is there to be a break in custody.**

**Sample Packaging:** Unless otherwise specified in the site-specific QAPP, field personnel will implement the following steps when packaging environmental samples for shipment:

- Tighten all sample lids. Verify that all containers are labeled and intact. Verify that all container labels are secure, legible, and complete.
- Bag samples individually in appropriate-sized plastic bags (e.g., Ziploc®) and seal. Up to 3 VOC vials may be packed together in container bags.
- Secure and tape the drain plug on the cooler with fiber or duct tape.
- Spread inert packing material (rubber foam, air pillows, or “bubble” wrap) in the bottom of the bag inside the cooler and place sample bags on top of the packing material.
- Include a temperature blank (a small container filled with water) to be used by the laboratory to determine the internal temperature of the cooler upon receipt at the laboratory.
- Place ice packs (e.g., blue ice) into cooler. If ice packs are unavailable, place ice into doubled heavy-duty polyethylene bags and seal with tape. Put double-bagged ice on top of, and in between, samples. Fill in remaining space with packing material.
- Place the chain-of-custody record into a plastic sealable bag (e.g., Ziploc), seal the bag, and tape it to the inside of the cooler lid.
- Close the cooler and tape the top of the cooler shut. Affix custody seals to the top and sides of the cooler, such that the cooler cannot be opened without breaking at least one seal.
- Mark the cooler with “This End Up” and arrows to indicate the proper upward position.
- Tape a label containing the name and address of the destination to the outside of the cooler.



**Sample Scheduling, Delivery, and Holding Times:** In work assignments where analytical services are procured from a subcontractor laboratory, the laboratory will be required to designate a point of contact (POC) for both normal business hours, and for emergency situations during off-hours. In addition, the laboratory will be required to designate a sample custodian, who will be notified by the BERS field sampling supervisor each time samples are shipped.

Unless otherwise approved, samples will be delivered to, and received by, the laboratory within 24 hours of collection.

Sample holding time tracking begins with the collection of samples, and continues until the analysis is complete. The site-specific QAPP will specify holding time requirements for each analyte of interest to the project.

**Quality Control:** No additional QC procedures apply.

**Data Management and Records Management:** Sampling records will be generated and maintained as prescribed in this procedure and the governing QA plans. Sampling data will be documented on field data sheets or in the logbooks.

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## FIELD MEASUREMENT AND TEST EQUIPMENT

## STANDARD OPERATING PROCEDURE BERS-04

## Record of Changes

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## FIELD MEASUREMENT AND TEST EQUIPMENT

### STANDARD OPERATING PROCEDURE

**Summary:** Various types of instruments are used to measure the physical and chemical characteristics of a sample in the field. In general, field measurement and test equipment (M&TE) are maintained and operated according to the manufacturer's instructions specific to each instrument. Field M&TE are inspected for function and damage on a regular basis and prior to each use. All findings are recorded in the appropriate logbook. Field M&TE are calibrated in accordance with the manufacturer's specifications. Calibrations are checked on a regular basis and prior to and after use in the field. When daily calibrations are required, calibrations and/or checks are performed at the beginning and end of the day, and the results are recorded in the field logbook. When daily calibrations are not required during field use, checks against appropriate standards are performed.

**Health and Safety:** Field activities will only be conducted in accordance with an approved Site Health and Safety Plan.

**Interferences and Potential Problems:** When multiple measurements are taken from the same sample material, the order in which the measurements are made becomes very important. Conductivity may be affected by temperature of the measured solution; therefore, temperature of the sample should be read first, so that appropriate adjustments can be made in accordance with the manufacturer's instructions.

**Personnel Qualifications:** Field personnel will be trained and certified as hazardous site workers per Title 29 Code of Federal Regulations, Part 1910.120(e) [29 CFR 1910.120(e)]. If applicable, additional qualification requirements will be specified in the site Quality Assurance Project Plan (QAPP).

**Equipment and Materials:** Prior to deployment in the field, the appropriate equipment and materials will be identified, secured, and inspected for signs of damage or potential contamination. Manufacturer's instructions and specifications for each instrument used will be maintained in the project files. Materials used for calibration of instrumentation, such as standard solutions, must be traceable to relevant, recognized performance standards.

**Planning Considerations:** Procedures used for the maintenance and use of field equipment, including those performed by subcontractors and suppliers, will be outlined preceding field activities and in accordance with the procedures outlined in this SOP. Equipment must be inspected prior to use in the field for damage and function. Calibration and maintenance of field equipment will be performed according the manufacturer's instructions for that particular instrument. The required frequency of calibration varies between instruments. While some instrumentation must be calibrated only annually or semi-annually, other instrumentation must be calibrated daily during use in the field. Instrumentation that does not require field calibration usually requires a check against a standard. Attention should be paid

to specific requirements for each instrument used in the field, and it is important to remember that the requirements for each instrument may differ.

**Instructions for the Maintenance and Use of Field Equipment:** Refer to the following sections for instructions on the proper calibration, maintenance, and use of field instrumentation used to measure physical/chemical properties of sample material:

**Multi-parameter Water Quality Meter:** Many water quality meters are capable of measuring several parameters, such as temperature, conductivity, pH, dissolved oxygen (DO), and oxygen reduction potential (ORP). The following sections provide general instructions for calibrating each parameter. The field personnel will adhere to the calibration instructions for the each instrument used.

## **Temperature**

Temperature, defined as a measure of hotness or coldness on a defined scale, is measured using a thermometer. Three types of thermometers are commercially available: digital (thermocouple) thermistor; glass bulb, mercury-filled thermometer; and bi-metal strip dial indicator thermometer.

### *Calibration*

Thermometers will be calibrated in accordance with the manufacturer's instructions or calibrated semi-annually against a National Institute of Standards and Technology (NIST)-certified thermometer. Thermistors should be checked against a mercury bulb thermometer in water prior to use, and should agree within  $\pm 0.5^\circ$  degree Celsius ( $^\circ\text{C}$ ).

### *Maintenance*

All thermometers should be inspected regularly and prior to use for leaks, cracks, and function.

### *Use*

Measurements should be made in situ, when possible. To measure the temperature of sample material, perform the following steps:

1. Clean the probe with deionized water, and immerse into the sample.
2. Swirl the thermometer in the sample.
3. Allow the thermometer to equilibrate with the sample.
4. Suspend the thermometer away from the sides and bottom to observe the reading.
5. In a logbook, record the reading to the nearest  $0.5^\circ \text{C}$ .
6. Report results to the nearest  $0.5^\circ \text{C}$ .

**Conductivity:** Conductivity, the quality or power of conducting or transmitting, is typically measured using the Wheatstone bridge meter. Conductivity is measured in millisiemens per centimeter (mS/cm) at 25° C. While the sample temperature may be lower, nearly all conductivity meters will convert specific conductance (which is not corrected for temperature) to conductivity.

### *Calibration*

Conductivity will be calibrated in accordance with the manufacturer's instructions. During use in the field, checks against a one-point standard will be performed to ensure the accuracy of the meter, and results will be recorded in a field logbook. The following steps will be implemented both before and after use of the meter to measure the conductivity of sample material in the field:

1. Check and record the temperature of the standard solutions.
2. Rinse the probe with analyte-free water before immersing it in the standards solution.
3. Turn the probe on, immerse it in the standard solution, and record the results.
4. If the meter is not accurate to within  $\pm 10\%$  of the standards, correct the problem before proceeding.

### *Maintenance*

All conductivity meters should be inspected regularly and prior to use for damage and function. Conductivity sensors may become fouled with minerals or other materials, and may require cleaning in the field. Cleaning is accomplished by passing a nylon brush along the sensor surface in a light scrubbing motion, until a metallic shine appears on the sensor. Follow up the cleaning with a fresh or deionized water rinse. DO NOT use a metal brush to clean the sensor surface.

### *Use*

1. Collect the sample and record its temperature.
2. Correct the instrument's temperature adjustment to the temperature of the sample (if necessary).
3. Immerse the probe in the sample. Keep the probe away from the sides and bottom of the container, and ensure that the sensor is in full contact with the sample.
4. Record the results in a logbook.
5. Rinse the probe.
6. Report results to the nearest ten units for readings below 1,000 mS/cm at 25° C and the nearest one hundred units for readings above 1000 mS/cm at 25° C.

**Hydrogen Ion Concentration (pH):** The pH of a solution is defined as the negative logarithm of the effective hydrogen ion concentration in gram equivalents per liter. The pH is used to measure acidity and alkalinity on a scale ranging from 0 to 14, with 7 representing neutrality. Orion and YSI Water Quality Monitoring System meters are examples of commercially available meters used to measure the pH of liquid-state material.

### *Calibration*

Any pH meter will be calibrated in accordance with the manufacturer's instructions. During use in the field, a two-point or three-point standard will be used to ensure the accuracy of the meter. Results will be recorded in a field logbook. The expected pH of the sample to be collected, estimated from either historical data or by using four-color pH paper, should fall between the two buffering points. Both prior to and after use in the field, the following procedures should be followed as a minimum:

1. Remove the meter from storage and allow it to equilibrate to ambient temperature.
2. Select either pH 4 and pH 7, or pH 7 and pH 10, as the appropriate standard solutions as described above.
3. Use a thermometer to determine the temperature of the buffering solutions, and record the temperature.
4. Rinse the probe with analyte-free water, and immerse it into the pH 7 buffer and set the meter to 7. If the solution temperature is not at 25°C, a table with corrected pH values can be found on the calibration solution bottle or in the operations manual.
5. Rinse the probe with analyte-free water and immerse it into the second buffer, and record the reading.
6. Rinse and store the probe in a container filled with analyte-free water.

### *Maintenance*

All pH meters should be inspected for damage and function regularly and prior to use. During use, periodically check the calibration of the meter by rinsing it with analyte-free water and immersing it into the pH 7 buffer solution.

### *Use*

Follow these steps when measuring the pH of a sample:

1. If measuring temperature, record temperature prior to measuring pH.
2. Immerse the probe in the sample, keeping it away from the sides and bottom of the container. Allow the probe to equilibrate with the sample material.
3. With the probe suspended away from the container surface, record the pH.
4. Rinse the probe with analyte-free water and store in a container filled with analyte-free

water until the next sample is ready.

5. Record results to the nearest 0.1 Standard Unit (SU).

### *Storage*

After use, rinse the unit with fresh water or Alconox<sup>®</sup>, followed by fresh water, at contaminated sites. Leave a small amount (20mL) of pH 4 solution in the storage cup before sealing the unit in order to keep the pH sensor moist during storage.

**Dissolved Oxygen (DO):** The membrane/electrode (ME) is the most commonly used instrument for measuring the dissolved oxygen present in a sample.

### *Calibration*

Calibrate the DO probe according to the manufacturer's instructions, either in air-saturated water, or in a water-saturated air environment.

### *Maintenance*

The DO probe should be inspected regularly and prior to use for damage and function. The membrane of the DO meter should be inspected for air bubbles, holes, and dryness. If the membrane is dry, replace and soak it in analyte-free water prior to calibration of the meter. If the metallic sensor is discolored, or does not appear shiny, use the fine-grit sandpaper (supplied with the DO sensor replacement kit) and buff the metal surface in a circular pattern until the surface shines. Rinse the sensor with deionized water before installing a new membrane.

### *Use*

When measuring DO in situ with a field probe, follow these steps:

1. Allow the DO reading to stabilize.
2. Read the dial to the nearest 0.1 mg/L, and record the measurement.

**Oxygen Reduction Potential (ORP):** ORP, also known as redox potential, is the tendency of a chemical species to acquire electrons and thereby be reduced. Each species has its own intrinsic reduction potential; the more positive the potential, the greater the species' affinity for electrons and tendency to be reduced.

### *Calibration*

Calibrate the ORP probe according to the manufacturer's instructions in a standardized calibration solution. The ORP is affected by temperature. Refer to the calibration solution or operations manual to correct for temperature during calibration.



### *Maintenance*

The ORP probe should be inspected regularly and prior to use for damage and function.

### *Use*

When measuring ORP in situ with a field probe, follow these steps:

1. Immerse the probe in the sample, keeping it away from the sides and bottom of the container. Allow the probe to equilibrate with the sample material.
2. With the probe suspended away from the container surface, record the ORP to the nearest 1.0 millivolt.
3. Rinse the probe with analyte-free water and store in a container filled with analyte-free water until the next sample is ready. Do not store the unit in deionized water.

**Turbidity Meter:** A nephelometer/turbidimeter is used to measure the turbidity of a liquid sample by determining how much light can pass through it. The Hach® Turbidimeter is the most commonly used commercially available meter for measuring the turbidity of a sample. Turbidity is measured in nephelometric turbidity units (NTUs).

### *Calibration*

Calibration of turbidity meters will be performed in accordance with manufacturer's instructions. Any turbidity meter must be calibrated at both the beginning and end of the day during use in the field, and results will be recorded in a field logbook. The following procedures will be used to calibrate a turbidity meter in the field:

1. Turn the meter "ON" and allow 2 minutes for the lamp to stabilize.
2. Rinse the sample cell with organic-free or deionized water.
3. To "zero" the calibration, fill the cell to the fill line with organic-free or deionized water and then cap the cell.
4. Use lens paper to wipe off excess water and streaks from the outside of the cell.
5. Open the cover and insert the cell (arrow to the front) into the unit and close the cover.
6. Press "Blank" and wait for the "light bulb" icon to go off. Record the reading.
7. Hach turbidity meters require calibration with known standards. Refer to the operations manual for information on calibrating the meter.
8. Using the Gelex Turbidity Standards, repeat steps 4, 5, and 6. Record all findings.

### *Maintenance*

Turbidity meters should be inspected regularly and prior to use for damage and function. During use, periodic checks should be performed using the standards to ensure continued proper calibration of the instrument. If error codes appear on the unit display, refer to the owner's manual to resolve the error.

### *Use*

Follow these steps to measure the turbidity of a sample:

1. Pour sample material into the cell to the fill line and replace the cap on the cell.
2. Wipe excess water and any streaks from the outside of the cell with lens paper.
3. Place the cell inside the measurement chamber with the arrow towards the front and close the cover.
4. Press "READ" and wait for the "light bulb" icon to turn off
5. Record the reading.
6. Empty the cell and rinse with organic or analyte-free water.

**Quality Control:** The following procedures apply:

- Equipment will be operated and used in accordance with the manufacturer's instructions, unless otherwise specified in the site-specific work plan or its equivalent.
- Equipment examination activities will occur prior to field deployment, and they should be documented.

**Calculations and Data Reduction:** Does not apply.

**Data Management and Records Management:** Equipment calibration and maintenance records will be generated and maintained as prescribed in the governing QAPPs.

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## EQUIPMENT DECONTAMINATION STANDARD OPERATING PROCEDURE

**Summary:** Disposable tools and equipment should be used when possible. However, where non-disposable items are used, appropriate decontamination will be accomplished according to the type of equipment being used and the type of samples being collected. In general, field equipment will be decontaminated by means of the following steps:

1. Perform non-phosphate detergent and tap water wash, using a brush if necessary.
2. Perform tap-water rinse.

When sampling for trace organic compounds, the following step will be added:

3. Perform deionized/distilled water rinse.

**Health and Safety:** Field activities should only be conducted in accordance with an approved Site Health and Safety Plan. Decontamination hazards and precautions include the following:

- Hazardous substances may be incompatible with decontamination materials. For example, the decontamination solution may react with contaminants to produce heat, explosion, or toxic products. Also, vapors from decontamination solutions may pose a direct health hazard to workers by inhalation, contact, fire, or explosion. The Site Health and Safety Plan will provide procedures and identify responsibilities to ensure that incompatible materials are identified and segregated from each other.
- The Site Health and Safety Plan will specify the use of personal protective equipment (PPE) that is appropriate for both the contaminants of concern and the decontamination chemicals used. The PPE selection will take into account that decontamination materials may degrade protective clothing or equipment, and that some solvents can permeate protective clothing.
- Solvent rinsing operations will be performed in well-ventilated areas.
- Investigation-derived waste (IDW) generated from decontamination activities will be managed as prescribed in SOP BERS-09: *IDW Management*.
- Material Safety Data Sheets (MSDS) will be kept with all decontamination solvents or solutions as required by the Hazard Communication Standard.
- Phosphate-containing detergents will not be used in jurisdictions where they are banned.

**Interferences and Potential Problems:** Potential problems related to equipment decontamination can be eliminated by the use of appropriate materials, reagents, and techniques.

- The use of distilled and/or deionized water commonly available from commercial vendors may be acceptable for decontamination of sampling equipment.

- The use of an untreated potable water supply is not an acceptable substitute for tap water. Tap water may be used from any municipal or industrial water treatment system.
- If acids or solvents are utilized in decontamination, they raise health and safety and waste disposal concerns.
- Washing complex and sophisticated sampling equipment with acids or solvents can damage the equipment.
- If not used immediately, cleaned equipment will be stored to prevent recontamination.
- PVC and plastic items will not be rinsed with solvents.

**Personnel Qualifications:** Field personnel will be trained and certified as hazardous site workers per Title 29 Code of Federal Regulations, Part 1910.120(e) [29 CFR 1910.120(e)]. If applicable, additional qualification requirements will be specified in the site Quality Assurance Project Plan (QAPP).

**Equipment Requirements:** Prior to deployment in the field, the requisite sampling equipment and materials will be identified, secured, and inspected for signs of damage or potential contamination. Decontamination equipment, materials, and supplies are generally selected based on availability. Other considerations include the ease of decontaminating or disposing of the equipment.

The following standard materials and equipment are recommended for decontamination activities:

- Non-phosphate detergent.
- Tap water.
- Distilled/deionized water
- Pesticide grade solvent
- Long- and short-handled brushes
- Bottle brushes
- Drop cloth/plastic sheeting
- Paper towels
- Plastic or galvanized tubs or buckets
- Pressurized sprayers (H<sub>2</sub>O)
- Solvent sprayer with Teflon nozzle
- Aluminum foil
- Plastic sheeting

- PPE
- Trash bags
- Trash containers
- 55-gallon drums
- Metal/plastic buckets/containers for storage and disposal of decontamination solutions.

The appropriate materials and equipment will be selected as needed on a site-specific basis.

**Planning Considerations:** Equipment decontamination activities, including those performed by subcontractors and suppliers, will be planned in advance of field activities and in consultation with program health and safety personnel.

**Decontamination:** Depending on the nature of the work, field equipment requiring decontamination may include heavy equipment, downhole equipment, sampling equipment, and groundwater pumping equipment.

**Heavy Equipment Decontamination:** Heavy equipment includes the drilling rig and backhoe. Field personnel will implement the following steps to decontaminate heavy equipment:

1. Set up a decontamination pad that is large enough to fully contain the equipment to be cleaned. Use one or more layers of heavy plastic sheeting to cover the ground surface.
2. Spray areas of the equipment that may have been exposed to contaminated soils using steam or high-pressure sprayer and detergent. Be sure to spray down all surfaces, including the rear area of the undercarriage.
3. Rinse the equipment with potable water.
4. Remove equipment from the decontamination pad and allow to air dry.

**Downhole Equipment Decontamination:** Downhole equipment includes hollow-stem augers and drill pipes. Well casings and screens will be decontaminated as described under “Sampling Equipment”. Field personnel will implement the following steps to decontaminate downhole equipment:

1. Set up a centralized decontamination area, if possible. This area should be set up to contain contaminated rinse waters, and to minimize the spread of airborne spray.
2. Set up a “clean” area upwind of the decontamination area to receive cleaned equipment for air drying. At minimum, clean plastic sheeting must be used to cover the ground, tables, or other surfaces where decontaminated equipment is to be placed.
3. Wearing the required PPE, use a high-pressure sprayer or steam unit and detergent to clean the contaminated equipment. Aim downward to avoid spraying outside the decontamination area. Be sure to spray inside corners and gaps. If necessary, use a brush to dislodge dirt or debris.

4. Rinse the equipment using potable water.
5. Remove the equipment from the decontamination area and place in the clean area to air dry.
6. Cover the equipment to prevent contamination if the equipment is not used immediately.
7. Collect all contaminated waters, plastic sheeting, and disposable gloves, boots, and clothing in the designated containers. Receptacles containing contaminated items must be properly labeled for disposal. Containerize liquids and solids separately.

**Sampling Equipment Decontamination:** Sampling equipment includes split spoon samplers, spatulas, compositing bowls, and other utensils that come into direct contact with samples.

Field personnel will collect disposable sampling equipment in the designated containers and dispose of them as prescribed in the Site Health and Safety Plan and SOP BERS-09: *IDW Management*. Field personnel will implement the following steps to decontaminate non-disposable equipment:

1. Set up a decontamination line on plastic sheeting. The decontamination line should progress from dirty to clean, and end with an area for drying decontaminated equipment. At minimum, use clean, plastic sheeting to cover the ground, tables, or other surfaces on which decontaminated equipment will be placed. Set up a containment system for collecting wash/rinse waste.
2. Wash the item thoroughly in a bucket of soapy water. Use a stiff-bristle brush to dislodge dirt or debris. Before washing, disassemble items that might trap contaminants internally. Do not re-assemble until decontamination is complete.
3. Rinse the item in potable water. Rinse water should be replaced as needed, generally when cloudy.
4. Allow to air dry.
5. Collect all contaminated waters, plastic sheeting, and disposable gloves, boots, and clothing in the designated containers. Receptacles containing contaminated items must be properly labeled for disposal. Liquids and solids must be drummed separately.

**Groundwater Sampling Pumping Equipment Decontamination:** Field personnel will implement the following steps to decontaminate sampling pumps:

1. Set up a decontamination area and a separate clean storage area using plastic sheeting to cover the ground, tables, and other porous surfaces where decontaminated equipment will be placed. Set up three clean containers of the appropriate size and shape for immersing the pump assembly. Fill the first container with dilute, non-foaming soapy water, and the second with potable water. Use the third container for waste discharge.



2. If decontaminating an electric submersible pump (e.g., Grundfos® Redi-Flo), remove the bottom screw plug to flush the cooling water. Replace this water with deionized water after the decontamination process is complete.
3. Set up the pump assembly in the same configuration as used for sampling. Submerge pump intake and all downhole wetted parts (tubing, piping, and foot valve) in the soapy water container. Place the discharge outlet in the waste container above the level of wastewater. Pump soapy water through the pump assembly until it discharges to the waste container.
4. Move the pump assembly to the rinse water container while leaving discharge outlet in the waste container. Ensure that all downhole wetted parts are immersed in the potable water rinse. Pump potable water through the pump assembly until it runs clear.
5. Pump a sufficient amount of analyte-free water through the hose to flush out the tap water, then purge with the pump in reverse mode. Rinse the outside of the pump using analyte-free water. Decontaminate the discharge outlet by hand following the steps for decontamination of sampling equipment.
6. Remove the decontaminated pump assembly to the clean area and allow to air-dry.
7. Cover intake and outtake orifices with aluminum foil to prevent the entry of airborne contaminants or particles.
8. Place pump in clean plastic bag.

**Quality Control:** The following procedures apply:

- Equipment will be operated and used in accordance with the manufacturer's instructions, unless otherwise specified in the site-specific work plan or its equivalent.
- Equipment examination activities should occur prior to field deployment, and should be documented.
- After decontamination activities, the field personnel should make a record of the equipment type, date, time, and method of decontamination in the field logbook.
- If sampling equipment requires the use of plastic tubing, dispose of it as contaminated. Replace with clean tubing before conducting additional sampling.

**Calculations and Data Reduction:** Does not apply.

**Data Management and Records Management:** Generate and maintain decontamination records as prescribed in the governing QAPPs.

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**BRISTOL ENVIRONMENTAL  
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## INVESTIGATION-DERIVED WASTE (IDW) MANAGEMENT

## STANDARD OPERATING PROCEDURE BERS-09

## Record of Changes

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## IDW MANAGEMENT

### STANDARD OPERATING PROCEDURE

**Summary:** Investigation-derived waste (IDW) includes any material discarded after use during a field investigation at a hazardous waste site, and it includes personal protective equipment (PPE), disposable equipment, such as sampling equipment, drilling mud, soil cuttings, purge, or well-development water. IDW is classified as either hazardous or nonhazardous, depending on the properties of the waste. Whenever feasible, all IDW will be disposed of on site at active facilities.

If IDW is suspected to be hazardous, the material will be tested for proper classification. If the test determines the material to indeed be hazardous, it will be stored on site no longer than 90 days and then disposed of at a permitted treatment or disposal facility. Alternatively, it will be placed in the facility's waste treatment system, if appropriate. Whenever possible, nonhazardous IDW will be disposed of in the facility's Dumpster, waste treatment system, or on the ground in or near the source area, as appropriate. If on-site disposal is not feasible, nonhazardous IDW will be disposed of in a Dumpster or landfill.

**Health and Safety:** Field activities should only be conducted in accordance with an approved Site Health and Safety Plan.

**Interferences and Potential Problems:** Care should be taken to ensure segregation of hazardous IDW from nonhazardous materials. The volume of spent solvent generated from field equipment decontamination procedures should be kept to a minimum, by applying only the minimum amount of solvent necessary and capturing it separately from the wash water. All hazardous waste will be containerized. Project planning will address procedures and responsibilities for the proper handling and disposal of project IDW.

**Personnel Qualifications:** Field personnel will be trained and certified as hazardous site workers per Title 29 Code of Federal Regulations, Part 1910.120(e) [29 CFR 19 10.120(e)]. If applicable, additional qualification requirements will be specified in the site Quality Assurance Project Plan (QAPP) and will be met.

**Equipment and Materials:** Prior to deployment in the field, the materials necessary for the management of IDW wastes in the field, such as 55-gallon drums and 5-gallon buckets, will be identified and secured.

Types of IDW: Materials which may become IDW include, but are not limited to, the following:

- PPE, including disposable coveralls, gloves, booties, respirator canisters, splash suits, etc.

- Disposable equipment, including plastic ground and equipment covers, aluminum foil, conduit pipe, composite liquid waste samplers, tubing, and broken or unused sample containers, sample container boxes, or tape, etc.
- Soil cuttings from drilling or hand augering activities.
- Drilling mud or water used for water rotary drilling.
- Groundwater obtained through well development or well purging.
- Cleaning fluids, such as spent solvents and wash water.

**Management of Hazardous IDW:** The site QAPP will specify disposal practices for hazardous or suspected hazardous IDW. If appropriate, these wastes will be disposed of on site by placement into the facility's waste treatment system, or they will be disposed of in the source area from which they originated, if doing so does not endanger human health or the environment. If on-site disposal is not possible, appropriate tests will be performed to characterize the waste for proper disposal. If the wastes are determined to be hazardous, they will be properly contained and labeled, and then stored on site for a maximum of ninety days before they are manifested and shipped to a permitted treatment or disposal facility.

The generation of hazardous IDW will be kept to a minimum. Nonhazardous materials will be segregated from hazardous materials to prevent cross-contamination. The most commonly produced type of IDW will probably be spent solvent from decontamination procedures and purged groundwater. Segregating the solvent from the wash water during equipment decontamination procedures will minimize the volume of spent solvent IDW generated during field activities.

Field personnel will implement the following procedures when managing hazardous IDW from specific practices:

- Disposable PPE – Containerize in 5-gallon bucket with tight-fitting lid. Identify and leave on site with permission of site operator. Otherwise, arrange for proper off-site disposal.
- Reusable PPE – Decontaminate following procedures described in the SOP BERS-05: *Equipment Decontamination*. Otherwise, follow procedures for disposable PPE.
- Spent Solvents – Containerize in original containers with contents clearly identified. Leave on site with permission of site operator.
- Soil Cuttings – Containerize in 55-gallon drum with a tight-fitting lid. Identify and leave onsite with permission of site operator.
- Groundwater – Containerize in 55-gallon drum with a tight-fitting lid. Identify and leave on site with permission of site operator. Otherwise, arrange for testing and proper off-site disposal.

- Decontamination Water – Containerize in 55-gallon drum with a tight-fitting lid. Identify and leave on site with permission of site operator. Otherwise, arrange for testing and proper off-site disposal.
- Disposable Equipment – Containerize in 55-gallon drum or 5-gallon bucket with a tight-fitting lid. Identify and leave on site with permission of site operator. Otherwise, arrange for testing and proper off-site disposal.

**Management of Nonhazardous IDW:** The site QAPP will specify disposal practices for nonhazardous IDW. If the waste site is active, permission will be sought from the site operator for on-site disposal of nonhazardous PPE, disposable equipment, and/or paper/cardboard wastes in the facility's Dumpsters. If on-site disposal is not feasible, the materials will be taken to a nearby permitted landfill.

If the facility is active, permission will be sought to place nonhazardous IDW, including drill cuttings, purge or well-development water, decontamination wash water, and drilling mud, etc., in the facility's waste treatment system. When appropriate, nonhazardous drill cuttings will be spread around the borehole, or, if they were removed for a temporary well, they will be placed back into the borehole. Otherwise, cuttings, purge water, and development water will be placed in a pit in or near the source area. Nonhazardous monitoring well purge or development water may also be poured onto the ground downgradient of the monitoring well. Purge water from functioning private potable wells will be discharged directly onto the ground surface. If on-site disposal is not feasible, these items will be placed into a unit with an environmental permit, such as a landfill or sanitary sewer. These types of materials will not be placed in Dumpsters.

Field personnel will implement the following procedures when managing nonhazardous IDW from specific practices:

- Disposable PPE – Place waste in double bag, and place in site Dumpster, with permission of site operator. Otherwise arrange for testing and disposal.
- Reusable PPE - Decontaminate following procedures described in the SOP BERS-05: *Equipment Decontamination*.
- Soil Cuttings – Containerize in 55-gallon drum with a tight-fitting lid. Identify and leave on site with permission of site operator. Otherwise, arrange for testing and disposal.
- Groundwater – Containerize in 55-gallon drum with a tight-fitting lid. Identify and leave on site with permission of site operator. Otherwise, arrange for testing and disposal.
- Decontamination Water – Containerize in 55-gallon drum with a tight-fitting lid. Identify and leave on site with permission of site operator. Otherwise, arrange for testing and disposal.
- Disposable Equipment – Containerize in 55-gallon drum or 5-gallon bucket with tight-fitting lid. Identify and leave on site with permission of site operator. Otherwise, arrange for testing and disposal.

- Trash – Place waste in double bag, and place in site Dumpster with permission of site operator. Otherwise, arrange for proper disposal.

**Quality Control:** The following procedures apply:

- Proper handling and disposal activities will be planned prior to commencement of field activities. All planning decisions will be documented in the site QAPP.
- IDW will be handled, stored, and disposed of in accordance with the site QAPP and relevant facility plans.

**Calculations and Data Reduction:** N/A

**Data Management and Records Management:** Records concerning the management of IDW will be generated and maintained as prescribed in the governing QA plans.



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## FIELD DOCUMENTATION

## STANDARD OPERATING PROCEDURE BERS-11

## Record of Changes

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## FIELD DOCUMENTATION

### STANDARD OPERATING PROCEDURE

**Method Summary:** To ensure the quality and integrity of field and analytical data, field activities will be documented in the project field notebook. In the event that more than one person is working on the site and performing different activities, more than one field notebook will be designated for the site. When the field notebook is filled, a new notebook will be started. Pertinent protocols for documenting field activities are provided below.

**Notebook Cover:** The cover of each field notebook will contain the following information:

- Job title
- Job number
- Name of company
- Name of personnel in charge of notebook
- Date of field activities covered in the notebook.

**First Page of Each Day:** The following information must be provided in the beginning of each day of work:

- Job title
- Names of all personnel on site
- Weather conditions
- Location, if multiple sites
- Health and Safety meeting notes.

**Each Page of Notebook:** The following information must be provided on each page of the field notebook:

- Date
- Initials or signature of person taking notes (bottom of page)
- Location, if you have changed during the day
- Page number, if not on the notebook.

### **Required General Information for Field Notebooks:**

- Do not erase mistakes/errors – draw a line through the deletion and initial it.
- Do not leave pages blank. If a page is skipped, draw a diagonal line across the page and initial the line.
- Record persons arriving and leaving site (guests to site, clients, regulatory agency personnel).
- Record health and safety issues that arise (close calls or accidents should also be documented on required forms).
- Note photographs taken and direction in which photograph was taken.
- Take an overview photograph of site before digging/drilling, etc.
- Include a photograph of the site after it is restored (if applicable).

### **Required Documentation for Sample Collection Activities:**

- Instrument name;
- Calibration record (when, by whom, results, gas type);
- Sampling location map with North arrow (field-screening and analytical samples);
- Sample ID, with description of soil material;
- Duplicate information;
- Sample time, each sample;
- Sample depth;
- List what analyses sample will be analyzed for;
- Field-screening measurements;
- Type of machinery used if not already recorded on field forms (Macro-Core sampler, split spoon, pumps, sampling meters);
- If Global Positioning System (GPS) is used, make note of where it was used;
- Delivery or pick-up information (airway bill #, Fed Ex tracking #, Fed Ex pick up information).

### **Required Documentation for Underground Storage Tank (UST)/Aboveground Storage Tank (AST) Removal Activities:**

- UST or AST dimensions;
- Dimensions of tank excavations, depth to groundwater, and depth of excavation;

- Footage of fuel piping (how many feet from dispenser to tanks);
- Where vent lines, fill ports, dispensers and pipe runs are located;
- Location of piping joints;
- Amount of sludge/water removed from tanks prior to decommissioning;
- Amount of contaminated soil/media (cubic yards of stockpiles);
- Amount of contaminated soil or debris hauled from site (number of truckloads);
- Amount of clean fill brought to the site;
- Type of machinery used.

**Required Documentation for Monitoring Well/Soil Boring Activities (This list does not include the documentation that will be provided on a boring log and groundwater sample collection form.):**

- Always collect swing-tie measurements to monitoring wells (even if you have a GPS);
- If drillers add water during well installation, note how much was added;
- Well screen slot size;
- Well filter sand pack size;
- Depth of top and bottom of well screen;
- Total depth of well;
- Amount of well construction materials used for each well (e.g., bags of silica sand, concrete, amount of screened casing, and amount of blank casing);
- Location of sand filter pack, bentonite seal, and grout used;
- Amount of water removed during development (unless you are using a well development form);
- Drill rig type;
- Changes in level of the water table/ aquifer.

**Interferences and Potential Problems:** Improper documentation of field activities may result in a number of problems, including, but not limited to:

- Inability to find sample collection locations that is needed for maps or finding areas for further assessment/excavation;
- Inability to create an as-built map;
- Inability to legally support data due to poor documentation;

- Development of erroneous conclusions regarding site contamination based on inaccurate data and/or problems correlating data and sample locations at the site;
- Difficulty in writing thorough reports due to poor documentation.



**BRISTOL ENVIRONMENTAL  
REMEDiation SERVICES, LLC**

**TRIMBLE GEOXH<sup>®</sup> GLOBAL POSITIONING SYSTEMS**

## STANDARD OPERATING PROCEDURE BERS-17

## Record of Changes

[illegible]



## TRIMBLE GEOXH® GLOBAL POSITIONING SYSTEMS STANDARD OPERATING PROCEDURE

**Summary:** The Global Positioning System (GPS) is a satellite-based navigation system consisting of satellites placed into a precise orbit around Earth. GPS receivers/units provide the means to communicate with the orbiting satellites in order to determine one's position through triangulation. GPS satellites are continuously transmitting signals which take time to travel to space and arrive at a GPS unit. A GPS unit compares the time a signal was transmitted by the satellite to the time it was received by the unit and determines a distance between the satellite and the GPS unit. By locking on to multiple satellite signals, the unit can determine its 3-dimensional location (latitude, longitude, and altitude). Additional information regarding the principles behind GPS technology can be found at the following website: <http://www.trimble.com/gps/index.shtml>.

Although there are a variety of different GPS units at the company's disposal, this Standard Operating Procedure (SOP) will focus on the Trimble GeoXH®. Bristol Environmental Remediation Services, LLC (Bristol) primarily utilizes Trimble GeoXH units for the purpose of capturing positional data on a variety of features including environmental sample locations, excavation boundaries, general site locations/boundaries, natural or anthropogenic site features (e.g. shorelines, building corners, monuments, outcrops, etc.), and any other features deemed necessary by the Bristol team, its subcontractors and/or clients. Resulting data are often used in Geographic Information System (GIS) software for digital mapping purposes. In some instances, Bristol will utilize Trimble GeoXH units for navigational purposes.

**Health and Safety:** GPS activities should be conducted in accordance with an approved Site Health and Safety Plan.

**Personnel Qualifications:** GPS personnel will have knowledge on how to properly operate the Trimble GeoXH data logger and all necessary software required for the successful capture of GPS positions. Two pieces of software, in particular TerraSync™ and GPS Pathfinder® Office, are utilized for the successful collection, subsequent download and processing of GPS data, the manuals for which can be obtained on Bristol's network in the following directory: O:\Common\BERS EQUIPMENT\Equipment Manuals.

**Pre-project Planning:** A Bristol Project Manager (PM) or field team leader should consult a member of the GIS department regarding requisition of the Trimble GeoXH unit. At this point, GPS project objectives can be determined and the GIS department can setup the unit as necessary to most suitably achieve those objectives. It is recommended that during this stage, the PM or field team leader request a customized data dictionary. A data dictionary is an electronic field form used to control the collection of features and attributes. The data dictionary contains a list of features that will be collected in the field as well as the attribute data associated with each feature. It can be structured to fit the needs of any project in order to streamline the data collection process and ensure data integrity. For example, Spatial Data Standards for

Facilities, Infrastructure and Environment (SDSFIE) compliant data can be established in a data dictionary prior to field work, thus minimizing time spent processing the data following collection.

It is very important during the planning stages to ensure that the appropriate datum and projection are set in the field software. This should remain consistent between projects, but it is recommended that GIS personnel double check the coordinate system setup in the Terrasync software. In most cases data will be collected in the World Geodetic System dating from 1984 (WGS 84) with geographic coordinates expressed in latitude and longitude. Although the unit can be setup to display/collect in different coordinate systems, using this standard should help eliminate error and confusion.

**Post-Processing** – Following the completion of field activities and GPS collection, the data must be post-processed by Bristol's GIS personnel in order to achieve the highest possible accuracy. The unit should be returned to the GIS department for the completion of post-processing. Post-processing will be performed using GPS Pathfinder Office software. Data collected with the Trimble GeoXH unit can be manipulated and exported to a variety of formats via GPS Pathfinder Office software.

**Equipment and Materials:** Prior to deployment in the field, the GeoXH unit, ancillary equipment and materials will be identified, secured, and inspected for signs of damage. The unit should be inspected to ensure that the appropriate software is installed and functioning properly. Equipment and materials include:

- **Trimble GeoXH** - The Trimble GeoXH unit should be fully charged and all appropriate software should be installed prior to field deployment.
- **Secure Digital (SD) Flash Memory Card** – Bristol currently maintains a 16 Gigabyte (GB) SD card for storing GPS or project related data (i.e. aerial imagery, background files, reference files, etc.)
- **Cradle/Dock** – The GPS unit requires a docking station/cradle in order to charge the battery and to transfer data to the computer. This is included in the unit's carrying case.
- **Universal Serial Bus (USB) Cable** – One end of the USB cable plugs into the cradle while the other end plugs into the computer. This cable is used to transfer data from the unit to the computer and should be included with the unit in the carrying case. The Trimble GeoXH unit must be docked in the cradle in order to transfer data to the field or office computer.
- **Power Cord** – The power cable plugs into an electrical outlet and supplies power to the cradle. When the unit is docked in the cradle while the power supply is plugged in, the battery will charge.
- **User Guides and Manuals** – User manuals for Terrasync and GPS Pathfinder Office reside on the Bristol network in the following directory: O:\Common\BERS EQUIPMENT\Equipment Manuals. The user guide for the series of units into which the

Trimble GeoXH falls can be found online at the following Trimble website: [http://trl.trimble.com/docushare/dsweb/Get/Document-414964/GeoExpl2008\\_100C\\_%20UserGde\\_ENG.pdf](http://trl.trimble.com/docushare/dsweb/Get/Document-414964/GeoExpl2008_100C_%20UserGde_ENG.pdf). This document can also be found alongside the software manuals located on Bristol's network in the equipment manuals' directory. Manuals can be viewed electronically or printed at the field personnel's convenience.

- **Carrying Case** – The Trimble GeoXH units are housed in hard-cover cases. Within the case will reside all of the above listed equipment.

### **Battery Charging**

The batteries should be charged the day prior to field deployment and each night following a day's use. Charge the battery by docking the GPS unit in the cradle, plugging the power cord into an electrical outlet and attaching the power chord to the cradle. For additional information consult the Geoexplorer 2008 Series Quick Start Guide located at Trimble's website: [http://trl.trimble.com/docushare/dsweb/Get/Document-414960/GeoExplorer\\_2008\\_QSG\\_ENG\\_Ltr.pdf](http://trl.trimble.com/docushare/dsweb/Get/Document-414960/GeoExplorer_2008_QSG_ENG_Ltr.pdf). Or consult the GeoExplorer 2008 series User Guide located at Trimble's website: [http://trl.trimble.com/docushare/dsweb/Get/Document-414964/GeoExpl2008\\_100C\\_%20UserGde\\_ENG.pdf](http://trl.trimble.com/docushare/dsweb/Get/Document-414964/GeoExpl2008_100C_%20UserGde_ENG.pdf). These documents are also located on Bristol's network in the following directory: O:\Common\BERS EQUIPMENT\Equipment Manuals.

### **Troubleshooting**

For troubleshooting issues, please consult Bristol's GIS department or refer to Section D of the Terrasync software Getting Started Guide. This document is located on Bristol's network in the following directory: O:\Common\BERS EQUIPMENT\Equipment Manuals\TerraSyncGettingStartedGuide.pdf.

### **Maintenance**

The Trimble GeoXH is designed to withstand the elements. It has an operating temperature that falls between -4 degrees Fahrenheit (°F) and 140 °F. The casing is dust-proof, shock resistant to 4 feet, and resistant to heavy wind-driven rain. Bristol will maintain a screen protector on the color liquid crystal display (LCD) touch screen to protect from scratches and other damage. The units will be stored within foam-lined, hard plastic cases when not in use.

### **Accessories**

The Trimble GeoXH is equipped to handle a range of optional accessories such as laser range finders and external antennae. All accessories will be connected according to manufacturer's instruction/recommendations.



(Intentionally blank)

## **APPENDIX H**

### ADEC Laboratory Data Review Checklist

## Laboratory Data Review Checklist

|                   |  |                           |  |
|-------------------|--|---------------------------|--|
| Completed by:     |  |                           |  |
| Title:            |  | Date:                     |  |
| CS Report Name:   |  | Report Date:              |  |
| Consultant Firm:  |  |                           |  |
| Laboratory Name:  |  | Laboratory Report Number: |  |
| ADEC File Number: |  | ADEC RecKey Number:       |  |

### 1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

☐ Yes    ☐ No    ☐ NA (Please explain.)    Comments:

|  |
|--|
|  |
|--|

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

☐ Yes    ☐ No    ☐ NA (Please explain)    Comments:

|  |
|--|
|  |
|--|

### 2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?

☐ Yes    ☐ No    ☐ NA (Please explain)    Comments:

|  |
|--|
|  |
|--|

b. Correct analyses requested?

☐ Yes    ☐ No    ☐ NA (Please explain)    Comments:

|  |
|--|
|  |
|--|

### 3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} \text{C}$ )?

☐ Yes    ☐ No    ☐ NA (Please explain)    Comments:

|  |
|--|
|  |
|--|

b. Sample preservation acceptable - acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

d. If there were any discrepancies, were they documented? - For example, incorrect sample containers/preservation, sample temperature outside of acceptance range, insufficient or missing samples, etc.?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

e. Data quality or usability affected? (Please explain)

Comments:

#### 4. Case Narrative

a. Present and understandable?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

b. Discrepancies, errors or QC failures identified by the lab?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

c. Were all corrective actions documented?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

## 5. Samples Results

a. Correct analyses performed/reported as requested on COC?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

b. All applicable holding times met?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

c. All soils reported on a dry weight basis?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

e. Data quality or usability affected? (Please explain)

Comments:

## 6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

ii. All method blank results less than PQL?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

iii. If above PQL, what samples are affected?

Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes      ☐ No      ☐ NA (Please explain)      Comments:

v. Data quality or usability affected? (Please explain)

Comments:

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics - One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☐ Yes      ☐ No      ☐ NA (Please explain)      Comments:

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes      ☐ No      ☐ NA (Please explain)      Comments:

iii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☐ Yes      ☐ No      ☐ NA (Please explain)      Comments:

iv. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☐ Yes      ☐ No      ☐ NA (Please explain)      Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined?

☐ Yes      ☐ No      ☐ NA (Please explain)      Comments:

vii. Data quality or usability affected? (Please explain)

Comments:

c. Surrogates - Organics Only

i. Are surrogate recoveries reported for organic analyses - field, QC and laboratory samples?

☐ Yes      ☐ No      ☐ NA (Please explain)      Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☐ Yes      ☐ No      ☐ NA (Please explain)      Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☐ Yes      ☐ No      ☐ NA (Please explain)      Comments:

iv. Data quality or usability affected? (Use the comment box to explain.).

Comments:

d. Trip Blank - Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☐ Yes      ☐ No      ☐ NA (Please explain.)      Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes      ☐ No      ☐ NA (Please explain.)      Comments:

iii. All results less than PQL?

☐ Yes    ☐ No    ☐ NA (Please explain.)

Comments:

iv. If above PQL, what samples are affected?

Comments:

v. Data quality or usability affected? (Please explain.)

Comments:

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☐ Yes    ☐ No    ☐ NA (Please explain)

Comments:

ii. Submitted blind to lab?

☐ Yes    ☐ No    ☐ NA (Please explain.)

Comments:

iii. Precision - All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \frac{\text{Absolute Value of: } (R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration

$R_2$  = Field Duplicate Concentration

☐ Yes    ☐ No    ☐ NA (Please explain)

Comments:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

☐ Yes    ☐ No    ☐ NA (Please explain)

Comments:



f. Decontamination or Equipment Blank (if applicable)

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

i. All results less than PQL?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments:

ii. If above PQL, what samples are affected?

Comments:

iii. Data quality or usability affected? (Please explain.)

Comments:

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

☐ Yes      ☐ No      ☐ NA (Please explain)

Comments: