Prepared for:
HRP Potomac, LLC
Boston, Massachusetts

Prepared By:
Ramboll Americas Engineering Services, Inc.
Arlington, Virginia

Date:
February 2024

Project Number:
1690022371_008_Conv

HEALTH AND SAFETY PLAN

1400 NORTH ROYAL STREET, ALEXANDRIA, VIRGINIA

Table 1A: Emergency Response Telephone Roster		
	Office	**Cell**
PROJECT TEAM		
Ramboll		
Project Director: Sarah Stoneking	703-516-2407	703-587-4356
Project Manager: Greg Grose	703-516-2479	703-895-6244
Designated Site Supervisor: Lucas Cherry		703-939-1506
Designated Site Supervisor: Leah Wise		607-661-2124
Designated Site Supervisor: McNeill Bauer		703-307-3087
Health, Safety & Security Coordinator: Greg Grose	703-516-2479	703-895-6244
Corporate HS&S Director: Mark Watka	312-927-1140	
Contractors		
Company: Blood Hound Contact: Elliot	800-825-9283	
Company: Eichelbergers Contact: Dwayne Kocher	717-691-6062	717-649-0206
Company: GPRS Contact: Aaron Brown	419-767-2528	
Company: Long Fence Contact: David Eback	703-471-0960	540-327-5724
Company: Cascade Contact: Nicholas King	732-296-6620	732-403-4306
Company: Eurofins Test America Contact: Marrissa Williams	717-556-7246	
Company: PMI Contact: Larry Hockman	703-434-2676	804-824-8919
Company: Capitol Environmental Contact: Sandy Haynick	434-327-2688	
Client/Security		
Client Contact: Laura Pasquine		207-356-7468
Client Contact: Julianna Connelly		617-240-8695
Site Contact: George [Crockett Facility Services]		301-852-4752
EMERGENCY RESPONSE AGENCIES		
Hospital	911	
Emergency Fire	911	
Emergency Police	911	
Health Department	911	
OTHER EMERGENCY ASSISTANCE		
National Response Center (oil and chemical spills)	800-424-8802	
Poison Control Center	800-222-1222	

Table 1A: Emergency Response Telephone Roster		
	Office	**Cell**
Federal Emergency Management Agency	202-646-2500	
NON-EMERGENCY PHONE NUMBERS		
Police: Alexandria City PD	703-746-4444	
Occupational Clinic: [WorkCare in US]	888-449-7787	
Fire Department: Alexandria Fire Station 204	703-746-5200	
Hospital: Inova Alexandria Hospital	703-504-3000	

Table 1B: Emergency Services Instructions

For Emergency Medical Incidents, Emergency Fire Response, or Hazardous Materials Incidents

Emergency Telephone Numbers:

- Hospital: 911
- Police: 911
- Fire Department: 911
- Site Security/Client: Joseph Jeray, 978-729-3209

1. Remember to speak SLOWLY and CLEARLY. Do NOT hang up first: let the dispatcher conclude the call.
2. Provide the following information:
   a. Location: 1400 North Royal Street, Alexandria, VA
   b. Your name and phone number
3. Describe nature of Incident:
   a. Emergency Medical Incident
      - How many victims
      - Type of incident-physical injury, etc.
      - Assessment of victims' condition if known (whether victim is conscious/unconscious, breathing/not breathing, pulse/no pulse, nature of injuries, first aid measures used, etc.)
      - Where incident occurred
   b. Fire:
      - Location of Fire
   c. Hazardous Materials Incident:
      - This is a hazardous materials incident requiring dispatch of HAZMAT unit
      - Type of incident (fire, explosion, spill, etc.)
      - Type of material (specific chemicals or general description)
      - Whether there is also a Medical Emergency
4. Give your location at the Site.

Note: Security, Site Supervisor or designee must meet the emergency personnel at the staging area to brief them on the situation.

ROUTE DESCRIPTION AND MAP TO HOSPITAL

Hospital Information:

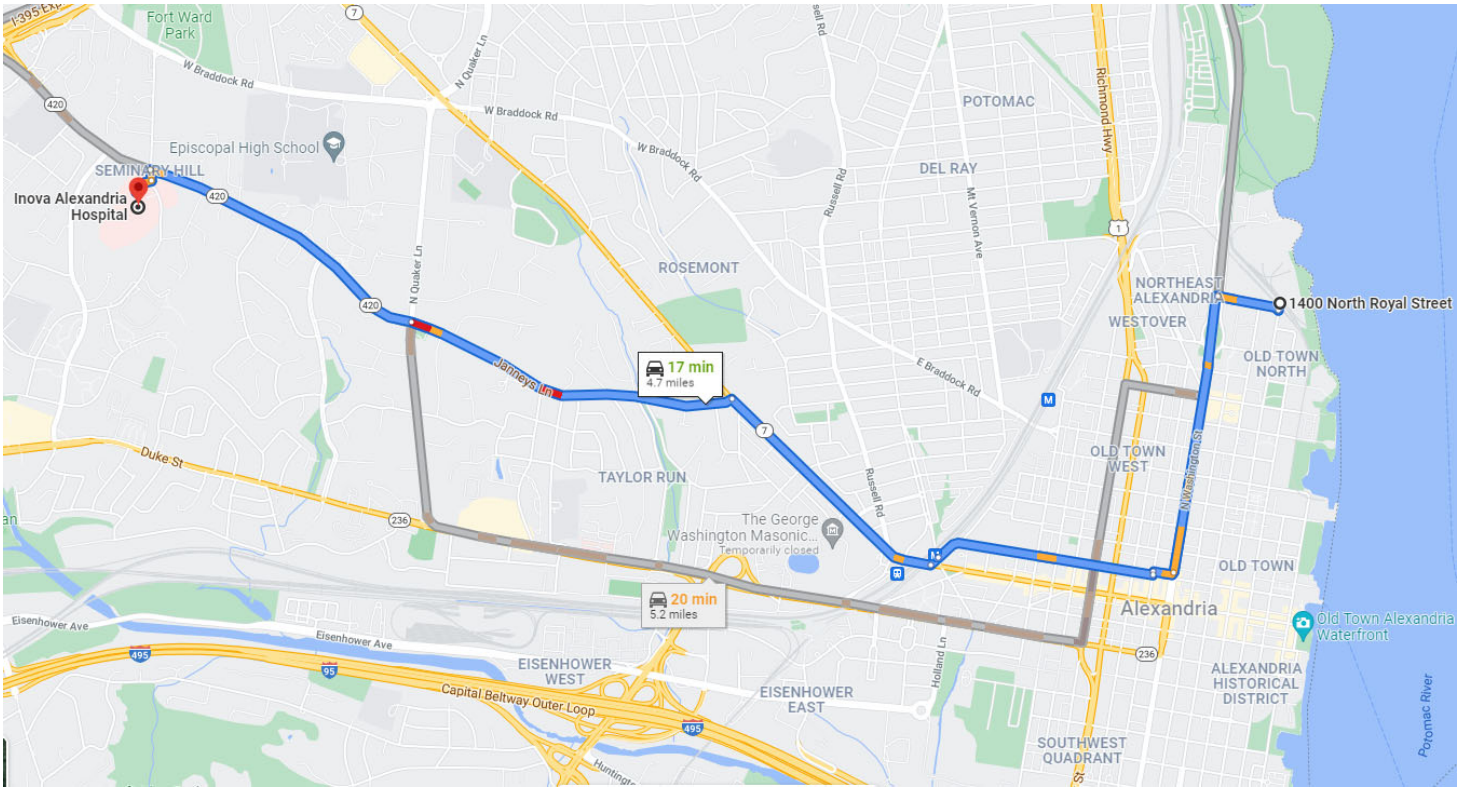
Hospital Name: *Inova Alexandria Hospital*

Hospital Address: *4320 Seminary Road, Alexandria, VA 22304*

Hospital Phone Number: *703-504-3000*

Directions to Area Hospital:

- Head south on N Royal St towards Mt Vernon Trail (115 ft)
- Turn left onto Bashford Lane (0.2 mi)
- Turn left onto George Washington Memorial Pkwy (0.9 mi)
- Turn right onto Cameron St (351 ft)
- Turn left onto N Columbus St (52 ft)
- Turn right onto Cameron St (0.7 mi)
- Continue straight 171 ft then turn right onto King St (0.8 mi)
- Turn left onto Janneys Ln (1.0 mi)
- Continue straight onto Seminary Road (0.9 mi)
- Turn left onto N Howard St (177 ft) then turn right (246 ft)
- Take a slight right and the destination is on the right (92 ft)



SITE EMERGENCY EVACUATION ROUTE AND MAP

Rally Point(s):

Location #1: Southern driveway/main entrance to the property. Corner of Bashford Ln and N Royal St.

Location #2 (alternate): Western side of the northwestern parking lot nearest to the rail line/tree line at the edge of the property.

CONTENTS

TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
BBP	Bloodborne Pathogen
C	Ceiling Limit
CPR	cardiopulmonary resuscitation
dBA	Decibels on the "A" weighted scale
EMR	Experience Modification Rate
ERP	Emergency Response Plan
GFCI	Ground fault circuit interrupter
H	High
HA	Hazard Assessment
HASP	Health and Safety Plan
HSIR	Health and Safety Incident Report
HSSC	Health, Safety & Security Coordinator
IDLH	Immediately Dangerous to Life and Health
LOTO	Lockout/Tagout
L	Low
M	Moderate
SDS	Safety Data Sheet
Mg/m^3	milligrams per cubic meter
NA	Not Anticipated
NE	Not Established
NIOSH	National Institute for Occupational Safety and Health
PC	Program Coordinator
PELs	Permissible Exposure Limits
PD	Project Director
PM	Project Manager
PPE	Employee Protective Equipment
PPM	Parts Per Million
SC	Site Coordinator
SPI	Standard Practice Instruction
SSC	Subsurface Clearance
STEL	Short Term Exposure Limits
T & C	Terms and Conditions
TWA	Time Weighted Average

HEALTH & SAFETY PLAN REVIEW AND APPROVAL

By signing below, it is acknowledged that this health and safety plan (HASP) identifies the activities that are anticipated to be performed in the field by Ramboll personnel. In addition, this HASP identifies the personal protective and monitoring equipment that may be necessary for the planned project activities. Signatories assure that the required equipment will be available for use. It is also understood that the provisions of this HASP will be updated if there is a change of a task and/or the addition of tasks, and future revisions will be approved by the individuals listed below or their designee.

Sarah Stoneking Project Director	Signature	Date
Greg Grose Project Manager	Signature	Date
Lucas Cherry Designated Site Supervisor	Signature	Date
Leah Wise Designated Site Supervisor	Signature	Date
Cynthia Ting Designated HASP Preparer	Signature	Date
Greg Grose Designated HASP Reviewer	Signature	Date

This form MUST be signed prior to starting the on-site work. In addition, a copy of this form should be returned to the office Health and Safety Coordinator prior to leaving for the field. After completion of the project, the original signed HASP must be retained in the project file.

Author's Initials: CJT File Name: HRP_PRGS_HASP_August2023.docx

1. INTRODUCTION

This purpose of this health and safety plan (HASP) is to inform all Ramboll employees of known or reasonably anticipated potential hazards and safety concerns at this site. All employees participating in field activities must be trained in the general and specific hazards unique to the job they are performing and, if applicable, meet recommended medical examination and/or training requirements. All Ramboll employees shall follow the guidelines, rules, and procedures contained in this site-specific HASP. Ramboll employees shall contact the Project Manager (PM) if unexpected conditions are encountered at the site, including but not limited to new processes; changes in operation, products, services; additional or changes in the chemicals of concern; and/or unsafe conditions are encountered which were not previously addressed in this HASP.

For purposes of this HASP, subcontractors refer to those retained directly or indirectly by Ramboll, and contractors refer to all other entities working on site. Each contractor, subcontractor, and visitor shall be expected to review and understand the hazards, risks, and control methods (including emergency procedures) as outlined in this HASP and sign off on the HASP. This can be accomplished either during the project planning stage or during the first safety briefing on site. However, contractors and subcontractors will be required to prepare their own HASP to address site safety and work hazards associated with their proposed site activities prior to mobilization to the site. In addition, each subcontractor will be required to provide Ramboll with their site-specific HASP and communicate the types of hazards and control methods associated with their activities to Ramboll during the first safety briefing on site and as conditions change. Relevant Contractor information regarding the identification of hazards and appropriate control strategies for the hazards of their job tasks should also be presented, and a site-specific HASP should be available for review by all parties. Each contractor or subcontractor must assume direct responsibility for its own employees' health and safety.

Copies of the HASPs will be kept on site for review and reference during all site activities. Upon completion of the project, the finalized and signed copy of the HASP will be placed in the project file.

When retaining and working with subcontractors, the following minimum requirements shall be met:

- A properly executed Contractor/Subcontractor Terms and Conditions (T&C) agreement with Ramboll in place prior to commencing work on-site;
- Insurance policies and limits are acceptable to Ramboll and all applicable Insurance Certificates are properly executed (i.e., Ramboll being named as additionally insured under such policies, including Professional and Pollution Liability, if applicable. This will also include adding Ramboll's CLIENT as being named as an insured party under the same policies);
- The roles and responsibilities of the subcontractor have been established, including the naming of the Health and Safety point of contact (these should be clearly indicated in the applicable subcontractor HASP);

In addition, the following requirements shall be met as applicable per client requirements:

- Submission of illness and injury logs indicating a favorable total incident rate (i.e., for the previous calendar year: the total incident rate is calculated by the total number of cases X 200,000 divided by the total hours worked by all employees of the subcontractor). This should be equal to or less than the industry average (i.e., for remediation services listed under the North American Industry Classification System (NAICS) 562 the total incident rate must be equal or below 3.8); and
- A favorable Experience Modification Rate (EMR) (i.e., a rate equal to or less than 1.0) or an explanation of why the company does not qualify for an EMR from their insurance company.

1.1 Site Description

The Site consists of approximately 22.59 acres of land located within the City of Alexandria, Virginia. an adjacent 2.78-acre switch yard is considered separate and is not part of the Site. The Site is located at 1400 North Royal Street in Alexandria, Virginia at the intersection of Bashford Lane and North Royal Street and is bounded by an inactive Norfolk Southern Railroad spur followed by residential and commercial development to the south, East Abingdon Drive and the George Washington Memorial Parkway to the west, Slaters Lane and a condominium building to the north, and the National Park Service's Mount Vernon Trail followed by the Potomac River to the east.

The site is currently developed with structures associated with the former Potomac River Generating Station (PRGS) which include a Main Power Plant Building, Administration/Laboratory Building, Accelerator Building, Chlorine Storage Building, Open Bay Area, Fly Ash Silos, Clarifier/Clarifier Building, Breaker House, Gate House, Coal Car Dumper, Bulldozer Shed, and multiple ASTs; the Main Power Plant and Administration/Laboratory Buildings are currently unsafe for entry.

1.2 Site History

The Site was developed as a power-generating facility in the 1940s. Prior to the generation station, the Site was mostly vacant but was occupied circa the 1920s to 1940s at the northern end by the Potomac River Clay Work and at the southern end by American Chlorophyll Company and Green Colors Manufacturing. From the 1940s to 2000, the generating station was operated by the Potomac Electric Power Company (Pepco). In 2000, the generating station was acquired (with ground lease) by an entity, which through mergers and other transactions, became GenOn Holdings, LLC (GenOn), while Pepco maintained ownership of the land. The Site ceased operations in October 2012. HRP acquired the PRGS Site and its generating facilities from Pepco and GenOn in the fall of 2020 and plans to redevelop the property as mixed-used development.

The site is currently improved with a multi-story industrial power plant building constructed with a basement (Main Plant Building); a covered utility corridor historically referred to as the "Precipitator Area"); and five coal-fired steam boilers and turbine generators (Units 1 to 5). Supporting features include the air emissions equipment, former (unlined) coal pile area, a clay-lined sediment basin, rail yard, water treatment facilities, one bottom ash and two fly ash silos, administration offices and analytical laboratory, and storage facilities and ancillary buildings, which include maintenance areas. The areas located west and south of the Main Plant Building are improved with asphalt parking lots.

1.3 Historical Documents

- Virginia Department of Environmental Quality (VDEQ). 2013. Confirmed Petroleum Release Report. April.
- URS Corporation. 2013. UST Closure Report. April.
- URS Corporation. 2013. Site Characterization Report. June.
- VDEQ. 2013. SCR Addendum Request. July.
- District of Columbia (DC) Department of Energy and Environment (DOEE). 2014. Compliance Directive. June.
- Groundwater and Environmental Services, Inc. and Geosyntec. 2014. Corrective Action Plan. September.
- Groundwater and Environmental Services, Inc. and Geosyntec. 2014. Corrective Action Plan – Part II. December.

- VDEQ. 2015. DEQ Petroleum Program: Public Meeting Agenda. February.
- US Department of the Interior National Parks Service. 2015. Re: Potomac River Generating Statoin – Corrective Action Plan. February.
- VDEQ. 2015. Internal CAP Memorandum. March.
- Groundwater and Environmental Services, Inc. and Geosyntec. 2015. Summary of Comments Received on Petroleum Program Corrective Action Plan. March.
- VDEQ. 2015. Corrective Action Plan Approval. March.
- DCDOEE. 2016. Additional Characterization of Shoreline Report and Groundwater Monitoring. August.
- DCDOEE. 2017. Groundwater Monitoring Status Report – Fourth Quarter 2016. February.
- DC DOEE. 2018. Groundwater Monitoring Status Report – Second Semi-annual 2017. May.
- Weaver Consultants Group. 2020. Phase I Environmental Site Assessment. August.
- Geosyntec. 2020. Groundwater Monitoring Status Report – Third Quarter 2020. October.
- Groundwater and Environmental Services, Inc. 2020. Third Quarter 2020 Implementation Monitoring Report. October.
- Geosyntec. 2021. Groundwater Monitoring Status Report – Fourth Quarter 2020. January.
- Geosyntec. 2021. Site Characterization Work Plan. May.
- Geosyntec. 2021. Groundwater Monitoring Status Report – First Quarter 2021. May.
- Ramboll. 2021. Corrective Action Plan Addendum. August.
- Ramboll. 2022. 2021 Annual CAP Implementation Monitoring Report. February.
- Ramboll. 2022. Preliminary Site Characterization Report. March.

1.4 Scope and Applicability

Ramboll Americas Engineering Services, Inc. (Ramboll) has been retained to conduct and/or manage certain activities at the site. **This HASP addresses activities <u>currently</u> being conducted at the site. Addendums will be added to this HASP to address activities at the site as they develop in the future.**

Ramboll views the implementation of a site-specific HASP as a critical management tool necessary to the safety, health, and well-being of site employees and the community. Site operations will be performed in such a manner as to minimize the possibility of serious injury or accidents to site employees, fire, explosion, or any unplanned or sudden release of contaminants into the environment that could adversely affect local receptors. This HASP is intended to be in compliance with all applicable regional, state, federal and local regulations and is consistent with Ramboll's commitment to the health and safety of its employees, contractors on the site, and the surrounding community.

The HASP identifies potential hazards associated with the activities being conducted during field activities at the site, establishes the minimum procedural and equipment requirements to protect on-site employees from potential hazards, and requires that on-site activities are conducted in a manner consistent with both accepted professional practice and applicable regulations. It also describes measures to minimize accidents and injuries that may occur during normal daily activities or during adverse conditions.

The HASP is based upon the currently available information regarding the site. Operating conditions could potentially change as the work progresses, requiring some modification of the HASP. Any permanent modifications to the HASP, including changes necessary to correct any potential health and safety issues at the site will be made only with permission by those individuals listed in Section 1 of this HASP. Approved changes will be added to the HASP either as a HASP Revision (i.e., a new updated HASP is generated) or as a HASP Addendum (i.e., a document detailing changes or additions to safety protocols and referencing the HASP). When a HASP Addendum is in use, both the HASP and the Addendum must be reviewed and understood by all employees involved, and both must be present at the site during our work.

Applicability of this HASP extends to all employees and visitors to the site. However, Ramboll's subcontractors are ultimately responsible for the health and safety of their employees and representatives and are required to furnish their own HASP. All employees and visitors entering on-site active fieldwork areas are responsible for reading and complying with the HASP and must sign an agreement to comply with the requirements of the HASP.

1.5 Specific Work Activities

The principal features of the field activities currently underway or planned for the immediate future include the following work activities or tasks:

- Task 1 – Transportation to and from Site
- Task 2 – Site Reconnaissance and Safety Inspection (building exterior only)
- Task 3 – Subsurface Utility Clearance
- Task 4 – Surface Soil Sampling, Soil Boring Installation and Sampling
- Task 5 – Installation and Development of Monitoring Wells and Collection of Groundwater Samples
- Task 6 – Well Gauging and Slug Testing
- Task 7 – Outfall Inspections
- Task 8 – Site Survey
- Task 9 – Gauging of Monitoring Wells within the Boiler Room
- Task 10 – Installation of Hand Auger Soil Borings and Vacuum Excavation Transects

Each of these Tasks are further described as follows:

Task 1 – Transportation to and from the site

This task includes driving to and from the site daily. A vehicle inspection should be performed by walking around and making visual observations for apparent damage prior to driving. Cell phones should not be used while driving.

Task 2 – Site Reconnaissance and Safety Inspection

Ramboll will conduct a site reconnaissance visit with the Client prior to the commencement of field investigation activities. A visual inspection of the physical condition of the site will be performed to document indications of subsurface utilities and to evaluate access or other logistical constraints.

Task 3 – Subsurface Utility Clearance

Prior to conducting invasive work, Ramboll will review available utility drawings and request a subsurface public utility mark-out from the Virginia 811 Call-Before-You-Dig service. Ramboll will also retain the services of a private subsurface utility locator to check individual boring locations for potential subsurface conflicts, confirm subsurface utility locations, and verify the locations of USTs. Proposed sample locations will be adjusted to avoid marked utilities or other obstructions. At a minimum, the private subsurface locator will be equipped with conventional ground penetrating radar (GPR), concrete-scanning GPR, and electromagnetic induction (EMI) methods. Ramboll will also be prepared with a low-impact air knife and vacuum excavator to expose suspect pipes where proximal soil borings may be placed. As necessary, Ramboll may also utilize a remote downhole camera to assist with tracing subsurface piping.

Task 4 – Surface Soil Sampling, Soil Boring Installation and Sampling

Surface soil samples will be collected using a hand trowel. Soil borings will be advanced using direct push drilling methods. Soil cores will be screened on-site and soil samples collected for laboratory analysis. If borings are located on concrete, the concrete may be cored by the drilling contractor prior to drilling. Soil samples will be collected in accordance with the approved scope of work. Samples will be collected into laboratory-provided containers, labeled, packaged on ice, and shipped under chain-of-custody procedures to a qualified analytical laboratory for analysis. Following collection of soil samples, select borings will be converted into permanent groundwater monitoring wells; borings that are not converted into monitoring wells will be abandoned by filling the borehole with drill cuttings and patching the surface with appropriate material to match the surrounding area.

Task 5 – Installation and Development of Monitoring Wells and Collection of Groundwater Samples

Monitoring wells will be installed using hollow-stem auger drilling methods in conjunction with standard monitoring well installation methods outlined in the approved scope of work. Following installation, the monitoring wells will be surged with a surge block and developed by removing water with a pump until the conditions set forth in the work plan are met. Groundwater samples will be collected from the monitoring wells using low-flow sampling methods. Samples will be collected into laboratory-provided containers, labeled, packaged on ice, and shipped under chain-of-custody procedures to a qualified analytical laboratory for analysis.

Task 6 – Well Gauging and Slug Testing

Prior to and following sample collection, Ramboll will use an electronic oil-water interface probe to gauge the depth to water (and depth to free product, if present) below top of casing in each monitoring well to the nearest 0.01 foot. Well gauging will be performed approximately 48 hours after installation and development are complete, and again following sample completion at all wells.

Ramboll will also conduct two to three rising head and falling-head slug tests on selected monitoring wells to calculate hydraulic conductivity for use, along with gradient and soil properties, to estimate hydraulic conductivity within the saturated zone at the site.

Task 7 – Outfall Inspections

Existing drainage lines and outfalls may be inspected for pipe integrity, if feasible. To the extent possible, Ramboll will collect organic vapor readings at accessible pipe inlets and will make visual observations of outfalls to look for evidence of releases.

Task 8 – Site Survey

Ramboll will retain the services of a surveying contractor to establish the elevations of the top of the PVC well casing and ground surface at each newly installed groundwater monitoring well and/or soil boring to the nearest 0.01 foot, referencing the North American Vertical Datum 1988 (NAVD88). The survey and gauging data will be used to confirm the local shallow groundwater flow direction and approximate gradient.

Task 9 – Gauging of Monitoring Wells within the Boiler Room

Ramboll will gauge monitoring wells located within the Boiler Room Building (i.e., MW-109, MW-10S, MW-110, MW-110S, MW-111, MW-112, MW-112S, MW-113, and MW-114) using an electronic oil-water interface probe to record any measurable free product. Access to the Boiler Room requires elevated PPE (see below) and use of flood lights.

Task 10 – Installation of Hand Auger Soil Borings and Vacuum Excavation Transects

Ramboll will use a combination of vacuum excavation and hand auger borings to further evaluate soils in areas of the site that are not accessible to the drilling equipment including along the piping for Outfall 009 and adjacent the screen and pump house. At these locations, Ramboll will collect soils for field screening and visual observation using a combination of hand auger soil borings and vacuum excavated trenches running perpendicular to the Outfall 009 piping. At these locations, Ramboll will make visual observations of soil for indications of residual LNAPL, screen soils for the presence of volatile organic vapors, and may additionally screen soil samples in the field for the presence of petroleum using OIL-IN-SOIL™ shake tests.

This HASP will be updated periodically to include new tasks not currently discussed herein.

1.6 Applicable Standards

The methods and procedures prescribed in this HASP are intended to conform to established professional practices and applicable federal, state, and local occupational safety and health protection standards based on information that is currently available. Regulations serving as the technical compliance basis for this document may include but are not limited to the following:

- US Department of Labor, *Occupational Safety and Health Standards for Construction* (29 CFR 1926).
  - *Hazardous Waste Operations and Emergency Response* (29 CFR 1926.65)
  - *Hearing Protection* (29 CFR 1926.101 and 29 CFR 1926.52)
  - *Eye and Face Protection* (29 CFR 1926.102)
  - *Respiratory Protection* (29 CFR 1926.103)
  - *Working Over or Near Water* (29 CFR 1926.106)
  - *Material Handling Equipment* (29 CFR 1926.602)
    - US Department of Labor, *OSHA Standards for General Industry* (29 CFR 1910).
  - *Hazardous Waste Operations and Emergency Response* (29 CFR 1910.120)
  - *PPE General Requirements* (29 CFR 1910.132)

  - *Eye and Face Protection* (29 CFR 1910.133)
  - *Respiratory Protection* (29 CFR 1910.134)
  - *Head Protection* (29 CFR 1910.135)
  - *Foot Protection* (29 CFR 1910.136)
  - *Hand Protection* (29 CFR 1910.138)
  - *Medical Services and First Aid* (29 CFR 1910.151)
  - *Portable Fire Extinguishers* (29 CFR 1910.157)
  - *Hazard Communication Standard* (29 CFR 1910.1200)
  - *Control of Hazardous Energy (LOTO)* (29 CFR 1910.147)
- US Department of Labor, Recording and Reporting Occupational Injuries and Illnesses, (29 CFR 1904).

The following technical documents may have been utilized as references in the preparation of this HASP. However, the citation of these technical documents does not imply compliance with all aspects of these documents. The purpose of these citations is to aid in the interpretation of conflicting issues that may arise during the performance of site activities. The following technical documents may include but are not limited to:

- National Institute for Occupational Safety & Health (NIOSH)/OSHA/United States Coast Guard (USCG)/ United States Environmental Protection Agency (USEPA), Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, (October, 1985).
- US Department of Health and Human Services (DHHS), NIOSH Sampling and Analytical Methods, DHHS (NIOSH) Publication 84-100.
- American National Standards Institute (ANSI), Emergency Eyewash and Shower Equipment, Z358.1 (1981).
- ANSI, Protective Footwear, Z41.1 (1983).
- ANSI, Practice for Occupational and Educational Eye and Face Protection, Z87.1 (1979).
- ANSI, Protective Headgear for Industrial Workers-Requirements, Z89.1 (1986).

2. IDENTIFICATION OF KEY EMPLOYEES

An efficient on-site operation requires that all key employees be identified and that their roles and responsibilities be clearly defined. Below is a discussion of the management structure for this project.

2.1 Project Organization

Ramboll serves as the Project Coordinator for the site. Ramboll is responsible for overseeing activities conducted by Ramboll employees and Ramboll's subcontractors at the site. Ramboll also is responsible for oversight of compliance with this HASP in the field by Ramboll employees. Ramboll subcontractors may plan, manage, and carry out activities at the site, including environmental investigation and remediation tasks, and will provide their own health and safety officers and HASP. As part of Ramboll's role as Site Coordinator, Ramboll will ensure that all subcontractors and site workers are aware of the Ramboll HASP and its requirements.

2.2 Ramboll Employees

Assigned functions of key Ramboll project team members and subcontractors are described in Tables 2 and 3, respectively, located at the end of this section. The applicable responsibilities for these individuals are as follows.

2.2.1 Project Director/Project Manager

Responsibilities include overall coordination and oversight of on-site activities and other field-based activities. The Project Director (PD) and the Project Manager (PM) have overall accountability and responsibility for the safety of operations and the health and safety of all employees and for monitoring the work effort, schedule, costs, communication, and will ensure that the activities of all site employees comply with the approved work plans and will recommend or provide disciplinary action, as appropriate, if non-compliances occur. The PD and PM are also responsible for implementation of any directives from the Corporate Health Safety and Security (HSS) Director.

These individuals will also provide the focal point for communications between the regulatory authorities; state and local community, on-site contractors, and project staff. This liaison activity will provide a clear line of communication between all parties to minimize the chance for misconceptions concerning any aspect of the project.

Any and all recommended revisions or changes in the HASP will be reviewed by the PD, PM and Project Health, Safety & Security Coordinator (HSSC). Any potential changes to the HASP template language, our standard field protocols, responsibilities, or training requirements are subject to final approval by the Corporate HSS Director.

2.2.2 Corporate Health, Safety & Security Director

The Ramboll Corporate HSS Director will oversee all issues related to health and safety and will have final approval authority for any potential changes to the HASP template language, our standard field protocols, responsibilities, or training requirements.

2.2.3 Project Health, Safety & Security Coordinator

The Project HSSC, along with the Corporate HSS Director are resources for the development of the site-specific hazard assessments and control mechanisms. The HSSC is also responsible for implementation of any directives from the Corporate HSS Director/HSS Department. For any potential changes to the HASP template language, our standard field protocols, responsibilities, or training requirements, the Project HSSC should be consulted and the Corporate HSS Director will have final approval authority. The Corporate HSS Director or their designee will make all final decisions

regarding questions on hazard assessments, selected control mechanisms, policy variances, or other aspects of the HASP.

2.2.4 Designated Site Supervisor

The Ramboll Designated Site Supervisor is responsible for overseeing day-to-day site activities performed by Ramboll and its subcontractors. The principal responsibility of the designated Ramboll Site Supervisor will be to coordinate and document all on-site work necessary to fulfill approved work plans. The Ramboll Site Supervisor typically also functions as the Site Health and Safety Officer (SHSO). The Ramboll Site Supervisor and Project HSSC may be the same individual.

The Ramboll Site Supervisor reports to the PM, HSSC, and PD and is also responsible for implementation of any directives from the Corporate HSS Director/HSS Department. The Site Supervisor is responsible for ensuring compliance with all aspects of the HASP which include, but are not limited to, safe work practices, site access controls, work safety zones, proper personal protective equipment (PPE), review planned site activities, implement safety procedures necessary to complete work safely, perform daily safety briefings, assist in on-site emergencies, and act as technical liaison to regulatory agency personnel. The Site Supervisor will report all site-related injuries to the PD, PM, Project HSSC and/or Corporate HSS Director, and to any other necessary authorities. The Site Supervisor will ensure that all site employees understand their respective emergency response duties. In the instance of any emergency or non-emergency incidents concerning site employees, the Site Supervisor will be contacted and will be responsible for communicating any information regarding site safety conditions to rescue or emergency personnel. The Site Supervisor will ensure that all activities at the site comply with the approved HASP.

Any person working on-site has the authority to **stop work** if any operation threatens the health and safety of on-site workers or the surrounding community. In the event that such a situation occurs, the Site Supervisor shall be notified immediately. Ramboll's Site Supervisor will update the Ramboll PD, PM, HSSC, and Corporate HSS Department on all project-related health and safety issues as they arise.

The Site Supervisor will be certified in first aid and cardiopulmonary resuscitation (CPR) by the American Red Cross, or equivalent. The Site Supervisor will also be HAZWOPER trained for site work in accordance with applicable regulations and participate in a medical surveillance program.

In the event of an emergency, the Ramboll Site Supervisor will also function as the Site Emergency Response Coordinator and will implement, and coordinate emergency response procedures described in this HASP.

2.2.5 Other Employees

All other Ramboll employees will be certified in first aid and CPR by the American Red Cross, or equivalent and will also be HAZWOPER trained for site work in accordance with applicable regulations and participate in a medical surveillance program – or the equivalent training and certifications required specific to the region or country where the work is being performed.

Ramboll's subcontractors, if needed, shall prepare their own company HASP which shall specifically govern the work performed by its employees. The contractor's HASP shall be in conformance with Ramboll's HASP. Subcontractors performing on-site operations subject to HAZWOPER requirements should be asked to provide a Health and Safety Contact who will assist Ramboll's PM and/or Site Supervisor. The subcontractor HS Contact may be their project manager or another individual with knowledge of the subcontractor's HS program. The HS Contact should confirm that their employees

have received appropriate health and safety training and are participating in a medical surveillance program.

Any person working on-site, including subcontractors, has the authority and the responsibility to **stop work** if any operation threatens the health and safety of on-site workers or the surrounding community. In the event that such a situation occurs, the Site Supervisor shall be notified immediately.

Table 2: Ramboll Employees Contact Information

Employees Telephone Roster			
Company/Title	**Employee**	**Office**	**Cell**
Ramboll Project Director	Sarah Stoneking	703-516-2407	703-587-4356
Ramboll Project Manager	Greg Grose	703-516-2479	703-895-6244
Ramboll Corporate Health, Safety & Security Director	Mark Watka	312-927-1140	[redacted]
Ramboll Project Health, Safety & Security Coordinator	Greg Grose	703-516-2479	703-895-6244
Ramboll Designated Site Supervisor	Sarah Ostertag	703-516-2383	530-613-4587
Ramboll Designated Site Supervisor	Lucas Cherry	[redacted]	703-939-1506
Ramboll Designated Site Supervisor	Leah Wise		607-661-2124
Client Contact	Joseph Jeray		978-729-3209
Site Contact	Mike [Crockett Facility Services]		301-892-0548

Table 3: Contractor/Subcontractor Contact Information

Contractor/Subcontractor Telephone Roster			
Company/Title	**Employee**	**Office**	**Cell**
Cascade / Drilling and Vacuum Excavator	Nicholas King	737-296-6620	732-403-4306
GPRS / Private Utility Locator	Aaron Brown	419-767-2528	[redacted]
Eurofins Test America / Lab	Marrissa Williams	717-556-7246	
Long Fence / Fencing	David Eback	703-471-0960	540-327-5724
PMI / Surveor	Larry Hockman	703-434-2676	804-824-8919
Capitol Environmental / Waste Transporter	Sandy Haynick	434-327-2688	[redacted]

3. COMMUNITY SAFETY PROVISIONS

This HASP will be updated periodically to include new tasks not currently discussed herein. Throughout execution of site work, the following provisions for protection of the surrounding community will be taken, as appropriate.

3.1 Visual and Physical Barricades

Visual and physical barricades will be used to clearly mark and define work areas and to prevent unauthorized access.

- The site is currently fenced and gated to prevent trespassing by non-team members. Site fencing shall be maintained throughout the duration of work. During on-going work, the gate to the site shall be maintained in a locked and closed position whenever possible. During the conduct of activities that necessitate an open gate, the gate will be attended by an individual to prevent intentional or unintentional trespassing by community members. In the event that site work requires breaching the perimeter fence, the open portion of fenceline shall be attended by one or more site personnel until such time that the fencing is repaired.

  If simultaneous operations are being conducted by multiple work crews at the site, additional internal barricades and/or visual barriers may be utilized to warn site workers of on-site hazards such as open excavations or trenches, or ongoing demolition activities.

  Where and when appropriate, the dust screen will be maintained on the interior of the permeter chain link fence to limit the potential for dust migration beyond the site boundaries.

- Signage – Appropriate warning signs will be posted during high risk activities such as demolition. Such signage shall be posted on all accessible sides of the planned work and the work area shall be clearly delineated with visual or physical barriers as indicated above. Signs shall be OSHA-type "No Entry" signs, weather-resistant and approximately 10"x14" in size or larger.

- Restricted Access - Only personnel necessary to conduct the scheduled construction and/or remediation activities will be allowed to enter work zones during remediation activities.

3.2 Traffic Control

- Planned work activities will necessitate the movement of trucks and/or other heavy equipment on and off the site via the site entrance. Flaggers and/or spotters will be utilized when large vehicles are leaving the site to ensure protection of pedestrians and to control traffic, if necessary to allow for safe exit of work vehicles.
- Trucks carrying wastes or debris will cover loads prior to exiting the site and wheels will be cleared of debris. Inspections shall be conducted at the work site entry/exit several times per day to ensure that gravel, dirt or other debris is not being tracked from the site. If soil, gravel or other debris is observed in the roadway during inspections, work crews will sweep the debris from the roadway back onto the site and shall revisit controls ,as appropriate.
- Should future work necessitate temporary road or lane closures, or work within or use of the adjacent public rights of way, appropriate permits or approvals will be obtained from the City of Alexandria Transportation and Environmental Services and such work will be

conducted in a manner that complies with permit requirements. Such work activities will also be conducted in accordance with V Virginia Department of Transportation (VDOT) requirements and the VDOT Work Area Protection Manual. A permit will be obtained from VDOT for work within rights-of-way, and work activities will be completed in accordance with the approved traffic control pan. If closures, detours or barricades will remain in place overnight, reflective signage will be required.

- During work activities requiring increased traffic (eg., removal of demolition debris or soil excavation), truck traffic shall follow approved truck routes. Trucks will be directed to a staging area and will be called to the site on an as needed basis to avoid the staging of trucks within the roadway. To limit emissions, trucks will not idle their engines during staging or while loading or off-loading materials on-site.

3.3 Dust

- Vehicular speeds will be limited to no greater than 10 miles per hour (mph) over unpaved areas of the site to limit the potential for generation of dust.
- Stockpiled soils or demolition debris will be covered when materials are not actively being loaded onto or removed from the stockpile.
- Dust montoring will be conducted during demolition and construction activities in accordance with a Perimeter Dust Monitoring Plan. Realtime monitors will alert site personnel in the event that dust action levels are exceeded. In the case of action level exceedances, additional mititgation measures will be implemented and may include temporary work stoppages or application of a water spray to suppress dust generation.

3.4 Noise

- Construction activity shall occur within approved work hours set forth under the City of Alexandria noise ordinance (i.e., Monday – Friday: 7:00 AM to 6:00 PM, Saturday: 9:00 AM to 6:00 PM. Pile driving is limited to the hours of 9 AM to 6 PM Monday through Friday and 10:00 AM to 4 PM on Saturdays unless authorization is provided by the City Manager to conduct such activity outside of the designated hours. Construction activities shall not be conducted on New Year’s Day, Memorial Day, Independence Day, Thanksgiving Day or Christmas Day.

4. HAZARD EVALUATION

The Project Hazard Analysis below identifies the hazards reasonably anticipated to be encountered by the on-site project team based on the tasks presented in Section 2.5.

Table 4: Project Hazard Analysis		
Chemical Hazards Present: ☐ None	☒ Flammable/combustible ☐ Compressed gas ☐ Explosive ☐ Organic peroxide ☒ Oxidizer ☐ Water reactive ☐ Unstable reactive ☒ Dust/Fumes/Particulates	☒ Corrosive ☒ Toxic ☐ Highly Toxic ☒ Irritant ☐ Sensitizer ☒ Carcinogen ☐ Mutagen ☐ Other:
Site Hazards Present: ☐ None	☒ Heat ☒ Cold ☒ Severe weather ☒ Walking/working surfaces ☒ Noise ☐ Unexploded ordinances ☐ Close/abandoned mines ☐ Operational facility (traffic/docks/loading) ☐ Other:	☐ Ionizing radiation ☐ Non-ionizing radiation ☐ Confined spaces ☒ Live electrical equipment ☒ Poor lighting ☒ Overhead hazards ☐ Work near railroads ☒ Traffic mgmt. (vehicle, pedestrian interference)
Task Hazards Present: ☐ None	☒ Heavy machinery/drill rigs ☒ Trenching/excavation ☒ Vehicle use ☒ Work near/on water ☐ Elevated heights (<6 feet) ☐ Elevated heights (>6 feet) ☒ Overhead/underground utilities ☒ Power hand tools ☒ Electrically powered equipment	☒ Cutting devices/tools ☐ Lifting operations (cranes, rigging) ☐ LO/TO (electrical, pressure) ☒ Drums, cylinders, containers ☒ Material handling, ergonomics ☐ SIMOPs (Simultaneous operations) ☐ Other:
Biological Hazards Present: ☐ None	☐ Animal/human fluid, blood, tissue ☒ Poisonous/irritating plants ☒ Ticks, mosquitos	☐ Contaminated needles ☐ Live bacterial cultures ☒ Insects/rodents/snakes ☐ Other:

Table 4: Project Hazard Analysis		
Safety/Security: ☐ None	☐ Security issue ☒ Isolated area ☐ Employees working alone ☐ Seasonal hunting	☒ Employees working early/late ☐ Potentially dangerous wildlife ☐ Guard/stray dogs ☐ No/limited cell phone service ☐ Other:

4.1 Chemical Hazards

4.1.1 Specific Chemicals of Concern

The chemicals listed in the table below includes the identification of chemical contaminants known and/or suspected of being present on-site, the affected media, known concentrations (if applicable), the Permissible Exposure Limit (PEL) or Threshold Limit Value (TLV), and the Action Level (i.e., 50% of the PEL/TLV). This information will be inserted into Table 5 below. In addition, Appendix A contains specific hazardous property information for commonly encountered chemicals although a Safety Data Sheet (SDS) (or equivalent) will also be included in Appendix A.

Table 5: Chemicals of Concern

☐ **NA - No** Known or Anticipated Chemicals of Concern

Chemical	Environmental Media [1]	Highest Measured Concentration	PEL/TLV [2]
Total Petroleum Hydrocarbons (TPH) – Various [diesel, kerosene, lube oil	SO, GW	TPH-GRO: 1,280 ug/L [GW]; 320 mg/kg [SO] TPH-DRO: 2,330,000 ug/L [GW]; 92,180 mg/kg [SO] TPH-ORO: 1,170 ug/L [GW]; 111 mg/kg [SO]	TLV: 100 mg/m^3
Coal and Ash	SO, GW	N/A	2.4 mg/m^3; 0.1 mg/m^3
Polychlorinated biphenyls (PCBs)	SO, GW	3.06 ppm [SO as gravel from transformer pits]	0.5 mg/m^3; 0.5 mg/m^3
Chlorine	SO, GW	N/A	1 ppm; 0.5 ppm
Aluminum Sulfate	SO, GW	N/A	5 mg/m3; 1 mg / m^3
Antifreeze [typically ethylene or propylene glycol]	SO, GW	N/A	N/A; N/A
Hydrazine	SO, GW	2.0 ug/L [GW]	1 ppm; 0.1 ppm
Ammonia	SO, GW	N/A	50 ppm; 25 ppm
Benzene	GW	41 ug/L [GW]	1 ppm; 0.5 ppm
Toluene	GW	8.66 ug/L [GW]	200 ppm; 20 ppm
Ethylbenzene	GW	62.8 ug/L [GW]	100 ppm; 20 ppm
Xylenes	GW	66 ug/L [GW]	100 ppm; 100 ppm

Table 5: Chemicals of Concern

☐ **NA - No** Known or Anticipated Chemicals of Concern

Chemical	Environmental Media [1]	Highest Measured Concentration	PEL/TLV [2]
Napthalene	GW	263 ug/L [GW]	10 ppm; 2 ppm
Methyl-tert butyl ether (MTBE)	GW	1.55 ug/L [GW]	N/A; 40 ppm
Oil and Grease	GW	23,100 ug/L [GW]	N/A; N/A

Notes:

[1] Codes for environmental media: **SL**=Sludge; **GW**=Ground Water; **SW**=Surface Water; **LW**=Liquid Waste; **SO**=Soil; **A**=Air; **OTH**= Other (Specify)

[2] PEL: Permissible Exposure Limit / TLV: Threshold Limit Value, use appropriate PEL which would be country or state specific or if one is not available may be from a recognized source.

mg/m³: milligrams per cubic meter

mg/kg: milligrams per kilograms

ppm: Parts per million

%: Minimum percent allowed for personal entry into a space

4.1.2 Chemical Products Used on Site

Table 5B lists the anticipated chemicals that will be brought, used, and/or stored on site by Ramboll.

Field employees will take caution when handling chemicals (e.g., sample bottles with preservatives, calibration gasses and solutions). Prior to handling preserved sample jars/bottles, the field team will review the corresponding SDS (see Appendix A) and don the appropriate PPE as listed in the SDS and noted in Tables 9 and 10 below. Field employees will take care when handling the preserved sample jars/bottles so as not to spill the preservatives on themselves or the ground. If sample bottles are broken upon arrival at the site, the field team may don appropriate PPE and disposed of the broken bottles only if there is a safe means to do so. If feasible, field employees should avoid handling broken glass containing chemical preservatives. Return coolers that contain broken bottles to the laboratory for disposal.

Table 5B: **List of Commonly Used Chemical Preservatives**					
Sample Preservative	**Approx. Volume**		**Sample Preservative**	**Approx. Volume**	
☐ Ascorbic acid		mL	☐ Sodium bisulfate		mL
☐ Ethylenediamine (EDA)		mL	☒ Sodium hydroxide (NaOH)	10	mL
☒ Hydrochloric acid (HCl)	10	mL	☐ Sodium thiosulfate ($Na_2S_2O_3$)		mL
☐ Methanol		mL	☐ Sulfuric acid (H_2SO_4)		mL
☒ Nitric acid	10	mL	☐ Zinc acetate		mL
☐ Other:		mL	☐ Other:		mL
Calibration Gas	**Approx. Volume**		**Calibration Gas**	**Approx. Volume**	
☒ Isobutylene (100 ppmV)	34	L	☐ Isobutylene (500 ppmV)		L
☒ Other: Sudan IV dye	de minimus	L	☐ Other:		L
Calibration Solution	**Approx. Volume**		**Calibration Solution**	**Approx. Volume**	
☒ pH 4	500	mL	☐ Zobell		mL
☒ pH 7	500	mL			mL
☒ pH 10	500	mL			mL

5. HAZARD CONTROLS

To conduct a Task in the safest possible manner, the hazard(s) associated with a Task need to be identified so that appropriate hazard control(s) can be implemented and used by employees conducting these Task(s). This process is called a "Job Hazard Analysis (JHA) or "Job Safety Analysis" (JSA). To aid in the JHA/JSA process, the associated Task(s) (as outlined in Section 1.3) are correlated against the anticipated hazards. A "Relative Hazard/Risk Rating" is also provided to identify which hazards pose the greatest risk to employees but more importantly, what hazard controls should be implemented.

Table 6: Summary of Hazards

Task Number(s)	Hazards	Relative Hazard /Risk Rating*	Hazard Controls Appendix and/or HASP Section
3, 4, 5, 6, 9, 10	Chemical Hazards	NA ☐ Low ☐ Medium ☒ High ☐	B1 Chemical
3, 4, 5, 6, 9	Dust/Fumes/Particulates	NA ☐ Low ☐ Medium ☒ High ☒	B2 Dust/Particulates/Fumes
3, 4, 5, 6	Job Zone Control	NA ☐ Low ☐ Medium ☒ High ☐	B3 Job Zone Control
2, 3, 4, 5, 6, 7, 8, 9, 10	Heat	NA ☐ Low ☒ Medium ☐ High ☐	B4 Heat
3, 4, 5, 6, 7, 8, 9, 10	Cold	NA ☐ Low ☒ Medium ☐ High ☐	B5 Cold
2, 3, 4, 5, 6, 7, 8, 9, 10	Severe Weather	NA ☐ Low ☒ Medium ☐ High ☐	B6 Severe Weather
3, 4, 5, 6, 7, 8, 9, 10	Walking/Working Surfaces	NA ☐ Low ☐ Medium ☒ High ☒	B7 Safe Walking Surfaces and Work Areas
3, 4, 5	Noise	NA ☐ Low ☐ Medium ☒ High ☒	B8 Noise
N/A	Unexploded Ordinances	NA ☒ Low ☐ Medium ☐ High ☐	B9 Unexploded Ordinances
N/A	Closed/Abandoned Mines	NA ☒ Low ☐ Medium ☐ High ☐	B10 Closed/Abandoned Mines
N/A	Operational Facility (Traffic/Docks/Loading)	NA ☒ Low ☐ Medium ☐ High ☐	B11 Operational Facility
N/A	Ionizing Radiation	NA ☒ Low ☐ Medium ☐ High ☐	B12 Radiation
N/A	Non-ionizing Radiation	NA ☒ Low ☐ Medium ☐ High ☐	B12 Radiation
N/A	Confined Spaces	NA ☒ Low ☐ Medium ☐ High ☐	B13 Confined Spaces
N/A	Live Electrical Equipment	NA ☒ Low ☐ Medium ☐ High ☐	B14 Live Electrical Equipment
9	Poor Lighting	NA ☐ Low ☒ Medium ☐ High ☐	B7 Safe Walking Surfaces and Work Areas
3, 4, 5, 6, 7, 8, 9, 10	Overhead Hazards	NA ☐ Low ☐ Medium ☒ High ☐	B15 Overhead Hazards
	Work Near Railroads	NA ☒ Low ☐ Medium ☐ High ☐	B16 Work Near Railroads

Table 6: Summary of Hazards

Task Number(s)	Hazards	Relative Hazard /Risk Rating*	Hazard Controls Appendix and/or HASP Section
N/A	Traffic Management (Vehicle, pedestrian interference)	NA ☐ Low ☒ Medium ☐ High ☐	B17 Traffic Management
4, 5	Heavy machinery/drill rigs	NA ☐ Low ☐ Medium ☐ High ☒	B18 Heavy Machinery/Drill Rigs
N/A	Trenching/Excavation	NA ☐ Low ☐ Medium ☒ High ☐	B19 Trenching/Excavation
1, 2, 3, 4, 5, 6, 7, 8, 9, 10	Vehicle use	NA ☐ Low ☐ Medium ☒ High ☐	B20 Vehicle Use
7	Work near/on water	NA ☐ Low ☐ Medium ☒ High ☐	B21 Work Near/On Water
N/A	Elevated heights (<4ft)	NA ☒ Low ☐ Medium ☐ High ☐	B22 Working from Heights (<4 feet)
N/A	Elevated heights (>4ft)	NA ☒ Low ☐ Medium ☐ High ☐	B23 Working from Heights (>4 feet)
3, 4, 5, 6, 7, 8, 9, 10	Overhead/underground utilities	NA ☐ Low ☐ Medium ☐ High ☒	B24 Overhead/Underground Utilities
4	Powered hand tools	NA ☐ Low ☒ Medium ☐ High ☐	B25 Electrically Powered Equipment and Tools
4, 9	Electrically powered equipment	NA ☐ Low ☒ Medium ☐ High ☐	B25 Electrically Powered Equipment and Tools
4, 5	Cutting devices/tools	NA ☐ Low ☒ Medium ☐ High ☐	B26 Cutting Devices/Tools
N/A	Lifting operations (cranes, rigging)	NA ☒ Low ☐ Medium ☐ High ☐	B27 Lifting operations (cranes, rigging)
N/A	LO/TO (electrical, pressure)	NA ☒ Low ☐ Medium ☐ High ☐	B28 Lock Out/Tag Out (LO/TO) (electrical/pressure)
4, 5, 6, 10	Drums, cylinders, containers	NA ☐ Low ☒ Medium ☐ High ☐	B1 Chemical
1, 2, 3, 4, 5, 6, 7, 8, 9, 10	Material handling, ergonomics	NA ☐ Low ☐ Medium ☒ High ☐	B29 Material Handling/Ergonomics
10	SIMOPS (Simultaneous Operations)	NA ☐ Low ☐ Medium ☒ High ☒	B30 SIMOPS
N/A	Animal/human fluid/blood/tissue	NA ☒ Low ☐ Medium ☐ High ☐	B31 Bloodborne Pathogens
2, 3, 4, 5, 6, 7, 8, 10	Poisonous/irritating plants	NA ☐ Low ☒ Medium ☐ High ☐	B32 Plants and Animals
N/A	Contaminated needles	NA ☒ Low ☐ Medium ☐ High ☐	B31 Bloodborne Pathogens
N/A	Live bacterial cultures	NA ☒ Low ☐ Medium ☐ High ☐	B31 Bloodborne Pathogens

Table 6: Summary of Hazards

Task Number(s)	Hazards	Relative Hazard /Risk Rating*	Hazard Controls Appendix and/or HASP Section
2, 3, 4, 5, 6, 7, 8, 9, 10	Insects/rodents/snakes	NA ☐ Low ☒ Medium ☐ High ☐	B32 Plants and Animals
2, 3, 4, 5, 6, 7, 8, 10	Ticks, mosquitos	NA ☐ Low ☒ Medium ☐ High ☐	B32 Poisonous Plants, Animals, and Insects
N/A	Security issues	NA ☒ Low ☐ Medium ☐ High ☐	B33 Job Safety
2, 3, 4, 5, 6, 7, 8, 9, 10	Isolated area	NA ☐ Low ☒ Medium ☐ High ☐	B34 Personal Safety
N/A	Employees working alone	NA ☒ Low ☐ Medium ☐ High ☐	B35 Working Alone
N/A	Seasonal hunting	NA ☒ Low ☐ Medium ☐ High ☐	B36 Seasonal Hunting and Dangerous Wildlife
1, 2, 3, 4, 5, 6, 7, 8, 9, 10	Employees working early/late	NA ☐ Low ☒ Medium ☐ High ☐	B34 Personal Safety
N/A	Potentially dangerous wildlife	NA ☒ Low ☐ Medium ☐ High ☐	B36 Seasonal Hunting and Dangerous Wildlife
N/A	Guard/stray dogs	NA ☒ Low ☐ Medium ☐ High ☐	B33 Job Safety
N/A	No/limited cell phone service	NA ☒ Low ☐ Medium ☐ High ☐	B34 Personal Safety B35 Working Alone

Note:

A single hazard may be listed under several Tasks. In this case, use the highest Severity ranking of the tasks evaluated as the overall ranking.

***Relative Hazard/Risk Rating**

When evaluating a Task against a specific hazard, the evaluator should:

1. **Determine how frequently you will be conducting the Task and generally be exposed to the Hazard while on-site;**
2. **Determine the duration (i.e., the amount of time) you will spend conducting the Task; and**
3. **Determine the Severity that the Task/Hazard may cause using Table 7. When assessing the severity, assume the hypothetical injury was a result of the task being conducted improperly and that PPE was not being worn:**
   - **Minimal Severity** would require first aid, and/or the property/equipment damage is limited to minor wear and tear, scratches, dents (still functional);
   - **Moderate Severity** requires professional medical attention, and/or the property/equipment damage necessitates repair but not replacement; and
   - **High Severity** requires immediate medical attention/life threatening and/or the property/equipment damage is significant and requires replacement.

Table 7: *Relative Risk Rating Decision Table				
The Hazard…	**Has No Severity**	**Has Minimal Severity**	**Has Moderate Severity**	**Has High Severity**
Is Not Present (i.e., 0% of your on-site time does not expose you to this Hazard)	NA	NA	NA	NA
Is Rarely Present (i.e., <25% of your on-site time exposes you to this Hazard)	NA	LOW	LOW	MED
Is Sometimes Present (i.e., 25%-<50% of your time exposes you to this Hazard)	NA	LOW	MED	HIGH
Is Frequently to Constantly Present (i.e., 50% to 100% of your time exposes you to this Hazard)	NA	MED	HIGH	HIGH

5.1 General Site Safety

All activities will be conducted in a manner that minimizes hazards and employee exposures to such hazards. The following are some general safety rules that must be followed while on site:

- All employees who perform on site operations with the potential for exposure to hazardous substances are required to meet employee training requirements and medical surveillance criteria, which are described in this site health and safety plan.
- All hazardous substances and contaminated soils, liquids, and other residues shall be handled, transported, labeled, and disposed of in accordance with accepted material handling procedures.
- Employees will wear personal protective equipment as required.
- All work on site, will be planned and supervised by the appropriate employees to prevent injuries.
- All injuries, accidents, unsafe acts/conditions, and near misses will be reported. Property damage and loss including, but not limited to vehicles and equipment, will also be reported.
- Supervisors will ensure that their employees observe and obey all safety rules and regulations required for the safe conduct of work.
- Alcoholic beverages and illegal drugs will not be allowed on-site. Possession of either will be grounds for disciplinary actions.
- No employee will be assigned to a task without first having been instructed on proper methods of carrying out the task.
- All posted safety signs will be obeyed.
- Space around on-site emergency and fire-fighting equipment will be kept clear.
- All trash and discarded materials will be staged in an orderly fashion and regularly removed from the site.
- Approval to perform work operations alone must be preapproved by the site PD/PM and a communication plan must be established.

- Smoking, eating, drinking, and chewing gum or tobacco will not be permitted within the work zones and will follow applicable decontamination procedures prior to eating, drinking, and/or smoking.
- Employees should keep track of weather conditions and wind direction to the extent they could affect potential exposure.
- Employees should be alert to any abnormal behavior on the part of other workers that might indicate distress, disorientation, or other ill effects.
- Employees should never ignore symptoms that could indicate potential exposure to chemical contaminants. These should be immediately reported to their supervisor or the Site Health and Safety Officer.
- Visible indicators of potentially immediate danger to life and health (IDLH) conditions include:
    1. Large containers and tanks that must be entered.
    2. Enclosed spaces such as buildings or trenches that must be entered.
    3. Potentially explosive or flammable situations (indicated by bulging drums, effervescence, gas generation, or instrument readings).
    4. Extremely hazardous materials (such as cyanide, phosgene, or radiation sources).
    5. Visible vapor clouds.
    6. Areas where biological indicators such as dead animals or vegetation are located.

5.2 Specific SSC Requirements

The hazards posed by the presence of underground and overhead services are significant. Where there is a requirement for ground penetrating activity, the work shall be thoroughly vetted prior to commencing subsurface work. No intrusive work is to be conducted until the hazards associated with the possible presence of underground and overhead services have been properly identified, and safe locations for intrusion marked and agreed upon. This applies to any intrusive site work (i.e., any work that will involve the disturbance or penetration of the ground or manmade surface by mechanical or manual means, INCLUDING: trial pit excavations, borehole excavations (shell and auger, rotary, hydraulic, percussive), gas spiking, manual excavations, hand digging, intrusion into vertical, indoor, or below ground surfaces, and/or any other on-site activity where disturbance of the ground surface is required). If conducting intrusive activities, the following tasks must be completed **and documented** prior to initiating ground disturbance activities (each is summarized below):

5.2.1 Historical Site Information Review

Obtain the most recent as-built drawings and/or site plans (including underground storage tank (UST), product and vent lines), as available. Consider requesting any other site plot plans, surveys, photographs, and information that might be instructive from the client or other sources. Site information reviewed shall be specified in Table 8 SSC Actions (below).

5.2.2 Plot Plan

Develop a plot plan that accurately reflects all available information and site conditions as accurately as possible, including the number of facilities/pipelines or utilities, locations and alignments. The plot plan shall be updated as SSC activities commence to properly capture site-conditions or visual indicators. Intrusive activities shall not proceed without an updated plot plan or drawing.

5.2.3 Pre-Marking Ground Disturbance Locations

Whenever feasible, ground disturbance locations and/or areas shall be pre-marked using white stakes, white paint or white flags (or black in cases where snow is on the ground) prior to the public and/or private utility mark-outs. Pre-marking provides the line locators with visual boundaries as guidance in clearing locations and placing marks.

5.2.4 Line Location Services

In areas where public and private resources are available, **Ramboll will contact both public and private utility locate services for any project that involves intrusive activities.** To give line operators enough time to respond to a request to locate, a minimum of 72 business hours is required prior to the planned start of work. If the driller/excavator retains these services, Ramboll will conduct a follow-up to confirm utility locate information.

Meet directly with the private locator and provide them with location plans, if possible. If an on-site meeting with the private locator is not possible, you MUST contact the private locator so that they understand the scope of the proposed subsurface work and the extent of their activities.

5.2.5 Site Walkover-Visual Indicators

The Designated Person MUST conduct site walk-over and complete the SSC Field Checklist (Appendix C) for all projects that involve ground disturbance. The site walk-over and visual inspection is most effective when completed during locating activities, but, at a minimum, must be completed PRIOR to ground disturbance. The main intent of the SSC Field Checklist is to identify above ground indicators of potential underground utilities. It will also be used to confirm that common utilities have been accounted for, located and verified. Any potential underground utilities should be marked on a site plot plan and the site walkover should be documented utilizing Ramboll's Subsurface Clearance Field Checklist.

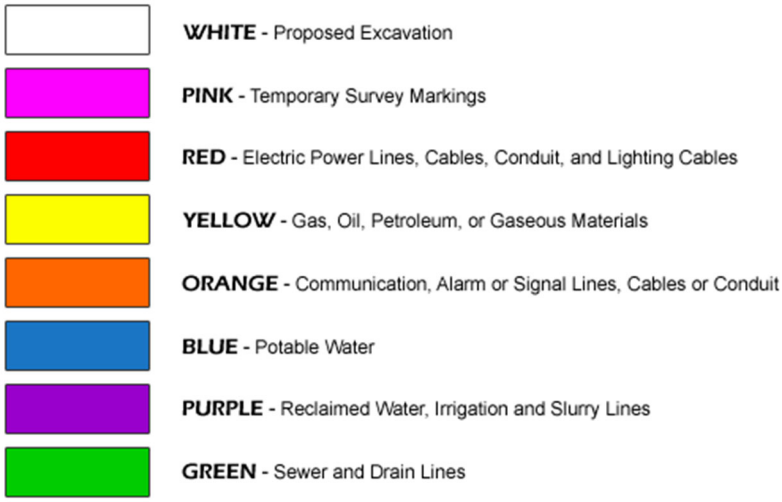
5.2.6 Utility Mark-Out

All known pipelines and utilities, as noted on the plot plan, pipeline map or drawing, that pass within the search zone must be located, identified and marked to indicate location and alignment.

A qualified and competent line locator shall conduct line-locating practices utilizing available pipeline maps or plot plans for all areas within the search zone. Direct connection (clamping on) to all possible nearby underground services should be undertaken whenever possible to increase the success rate/reliability in locating. **The specific ground penetration location must be cleared to the edge of the critical zone** (5 feet or 1.5m area surrounding intrusive locations/areas in every direction) using a search and sweep method to verify maximum detection capabilities.

If anticipated services are not identified or located, drilling or ground disturbance will not occur until the service is visually identified.

Commonly used utility mark out colors and identifiers are listed below:



Upon completion of their work (whether you are on-site or not), the private locator MUST contact you to present their results. In addition to providing you with an overall summary of their work, they must also inform you of any unique circumstance(s) which limited their ability in locating the potential presence of underground utilities (e.g., the existence of overhead electrical lines); if they encountered any abnormalities (e.g., concrete surfaces with reinforced rebar); and/or any other condition which may have diminished the validity of their results and efforts.

Where doubt exists over the location of a service, request a site visit from the appropriate utility provider or abandon locations in the immediate area and contact the PM and/or PD.

5.2.7 Clearance of Ground Disturbance Locations & Critical Zones

After anticipated utilities have been located and marked, use the available information along with regulatory requirements and project objectives to select final ground disturbance locations.

Each specific ground penetration location must be cleared to the edge of the critical zone (5 feet or 1.5m area surrounding intrusive locations/areas in every direction) using a search and sweep method to verify maximum detection capabilities. Ensure that all detected services and those featured on location plans are outside of the critical zone of EACH location where intrusive work will occur, using a sweep and search method.

The critical zone considers minimum tolerance distances from facility lines (which vary by location) and uncertainties introduced by on-site conditions, human factors, and equipment. **No intrusive activities shall take place if utilities or visual indicators are present within the critical zone**. When known utilities or visual indicators intersect critical zones, the boring and/or excavation location criteria should be reevaluated by the Designated Person and PM, and if possible, moved to an alternate location. Alternate locations, whether used due to nearby utilities or borehole refusal, must also be cleared to the same standards as the original locations.

If work is required to be conducted in a critical zone containing a marked utility or visual indicator, approval MUST be obtained from the PD, PM and HSS Director, or their designee, prior to ground penetrating activities.

5.2.8 Overhead Lines

Ensure that any ground penetrating activities are located a minimum of 28 feet (9m) horizontally from any overhead electric cable supported wooden poles, or 50 feet (15m) horizontally in the case of those supported on metal poles/towers. Where this cannot be achieved, contact relevant electricity provider for guidance as well as the PD/PM and Director HSS, or their designee.

5.3 SSC Summary

If the tasks presented in this HASP involve ground penetrating work, Table 8 and the specific procedures outlined in section 4 are applicable and must be followed. Table 8 summarizes the steps required to be completed, including justification of any exceptions. This table must be completed in its entirety prior to conducting subsurface work. If certain requirements are not applicable, describe reason for exemption.

The SSC Project Checklist (Table 8) is to be completed by the HASP preparer and used as a guideline for the activities that must be planned for SSC project work. Planned and proposed dates and activities should be included by the HASP preparer, and information updated as it become available. If field practices differentiate from plans proposed and documented on the SSC Project Planning Checklist (like walkover dates or historical documents reviewed), it is the Designated Person’s responsibility to update the project-specific HASP and SSC Project Planning Checklist to reflect these changes. Any deviations from these requirements must be documented and approved prior to the commencement of ground disturbance activities.

Table 8: Pre-Project Planning Checklist

Subsurface Clearance (SSC) Pre-Project Planning Worksheet
Document the steps that must be followed and justify any exceptions.
This checklist MUST be completed in its entirety.

SSC Requirements	Yes	No	N/A	Comments
Clearance Site Supervisor: Sarah Ostertag Contact: 530-613-4587 SSC Area Expert: Sarah Stoneking (703-587-4356)	☒	☐	☐	Contact SSC expert if you are unable to meet minimum SSC requirements.
Identify a **Knowledgeable Site Representative**, as available Name: Click or tap here to enter text. Contact:	☐	☐	☒	Describe information exchanges and site utility documents gathered from the Knowledgeable Site Representative, as applicable, including request and receipt of site maps, built-as drawings, etc. Make plans to have them present during the Private Locate.
Gather applicable **Site Utility Information** Note: If no Site Utility information and/or no Knowledgeable Site Representative is provided consider additional controls such as soft digging.	☒	☐	☐	Reviewed provided CAD files including an Alta utility survey.
Create a Site-specific **Plot Plan**	☒	☐	☐	*Must depict all known utilities identified prior to intrusive work from review of aerial photos, site documents/maps/plans gathered and discussions with knowledgeable site person(s).*
Mark **Intrusive Locations**/**Areas** and **Alternate Locations** on the Plot Plan	☒	☐	☐	*All proposed Intrusive Locations must be marked on the Plot Plan prior to work beginning. ONLY Alternate locations/areas cleared using the SSC Program are permitted for continued drilling if refusal is meet on site.*
Private Locator responsible for Private Locate.	☒	☐	☐	Name of subcontractor: Blood Hound LLC; GPRS Contact information: 800-825-9283; 419-767-2528
Discuss SSC Site Investigation with **Private Locate**	☒	☐	☐	*Discuss with subcontractor, as applicable, and document the specific technology(s) that will be used to confirm Public Utilities, actively clear the site, and clear specific intrusive locations. Discuss specifics site details such as ground surface, soil conditions, known utilities and underground structures, and any site-specific features that may create interference.*
Assess **Public Utilities** Note: Either via One Call, 811, directly with utility owners or via a webservice - confirm the presence and absence of commonly expected services in the area. In some cases, the utility company may need to be contacted directly to request a utility locate. All commonly expected utilities must be marked or positively confirmed to be absent from our work area prior to intrusive work.	☐	☐	☐	List companies notified for public locate (for example): Electric: Dominion Energy, PEPCO Gas: Washington Gas Water: City of Alexandria, Virginia American Water Sewer: City of Alexandria Telephone: Comcast, Verizon Data: Comcast, Verizon Cable: Comcast, Verizon Other: Click or tap here to enter text. Who contacted Public Utilities: Lucas Cherry List One Call #: 811 List locate ticket #: Click or tap here to enter text. Expiration Date: Click or tap here to enter text. Renewal by Date: Click or tap here to enter text.

Proposed date for SSC site locate and participants (Clearance Site Supervisor must participate for the duration of the site locate)	☒	☐	☐	Date: Click or tap here to enter text. Participants: *Clearance Site Supervisor, private utility locator*

6. EMPLOYEE TRAINING REQUIREMENTS

All employees performing on-site operations with the potential for exposure to hazardous substances or health hazards will meet the employee training requirements in accordance with applicable regulations. The training policies and procedures will ensure that employees can recognize hazards, understand emergency response procedures, and have the knowledge necessary to enable them to perform their assigned jobs in a manner that ensures employee and public safety. Completion of appropriate health and safety training, as described below, and participation of medical surveillance will be required to gain access to on-site areas other than the Support Zone. Documentation of training includes initial 40-hour health and safety training, 8 hours of annual refresher training, 8 hours of supervisor training, supervised field experience, first aid training, and CPR certification.

6.1 Initial Training

A. Basic Health and Safety Training

A minimum of 24 hours of initial health and safety training off-site is required to obtain on-site access to areas other than the Support Zone. All employees engaged in or supervising activities in the Exclusion Zone (EZ) or Contamination Reduction Zone (CRZ) will have a minimum of 40 hours of initial health and safety training off-site, meeting the in accordance with applicable regulations.

B. Supervised Field Experience

All employees with 24 hours of initial health and safety training are also required to have a minimum of 1 day of field experience under the direct supervision of an experienced supervisor. Employees with 40 hours of initial health and safety training are required to have a minimum of 3 days of field experience under the direct supervision of an experienced supervisor.

C. Supervisor Training

All on-site managers and supervisors directly responsible for, or who supervise employees engaged in invasive site activities will have received the initial 40-hour health and safety training and at least 8 additional hours of specialized off-site training consistent with applicable regulations. This specialized training will include topics such as, but not limited to, regulatory compliance, management of on-site health and safety hazards and recognition of special employee training needs.

D. Health and Safety Officer Training

Health and safety officers will be trained to a level required by their job function and responsibility. This will include training in implementation of HASPs and compliance with applicable health and safety requirements.

E. First Aid and CPR Training

Ramboll employees will maintain first aid and CPR training as certified by the American Heart Association (or equivalent) to render first aid and CPR.

6.2 Refresher Training

All employees who have received 40 hours of initial health and safety training will receive 8 hours of refresher training annually, as specified in accordance with applicable regulations. Topics to be covered in this training program will include those specified in the initial 40-hour health and safety training and/or those specified in the supervisory training course, as well as a critique of incidents that could serve as training examples.

Project-specific refresher training will be provided when the project scope is changed and/or when the hazards change.

A. Site Safety Briefings

Site safety briefings will be conducted prior to the start of each work day or work shift to discuss health and safety issues, changes in work procedures, exposure incidents and other relevant information. Prior to each change in operations, the meetings will address PPE use and maintenance, physical safety hazards from machinery, protection from chemical hazards, decontamination procedures, protection from heat/cold stress and specific safety requirements associated with the new operations. During safety meetings, on-site employees qualified to perform first aid and CPR will be identified. All changes in the HASP will be reviewed during the morning safety briefing. A record of the meeting will be written daily and signed by all participants and included in section 13.0 of this HASP.

B. Visitor's Briefing

Visitors will not be permitted to enter areas other than the Support Zone unless documentation of training, as described above, is presented to the Ramboll site supervisor. All visitors will be provided with applicable site-specific information including but not limited to hazard recognition, employee hygiene and site safety rules, use of PPE, and emergency response procedures. Visitors requesting on-site access to areas other than the Support Zone will be required to review and sign off on the HASP to ensure understanding and compliance with the provisions in the HASP. All employees, contractors, and site visitors will receive information contained in this HASP and any site-specific hazard awareness prior to entry into the site, as applicable. The training will ensure that employees can recognize hazards, understand emergency response procedures, and have the knowledge necessary to enable them to perform their assigned jobs in a manner that ensures employee and public safety. All employees will be required to sign an attendance sheet (see section 13.0 in this HASP) verifying that they received and participated in a training briefing. Individuals refusing to sign the sheet will not be allowed to work on the site.

Compliance with Hazard Communication Standard is required for work at this site. Safety Data Sheets (SDSs) are part of Appendix A. Employees shall receive training for the identification of hazards associated with the materials in use and the safe use of these materials, as applicable. Any hazardous chemical products brought to the site (other than standard fuels) for use during field activities must be reviewed by the Site Supervisor. Contractors are responsible for having their own hazard communication program. Contractors will supply SDS documentation to the Site Supervisor for all products to be used on-site.

In addition, any employee who is or is expected to be directly involved with intrusive sampling of contaminated environmental media or other sampling activities that could reasonably lead to chemical exposure is subject to appropriate training and standards, including but not limited to 40-hour HAZWOPER (or equivalent) (and 8-hour refresher training), respiratory protection, first aid, and CPR training. This would include any employee that visits exclusion zones of hazardous waste sites or remediation sites.

6.3 Hazard Communication

The following procedures related to hazard communication are applicable to this site. All employees will be briefed on this program.

6.3.1 Container Labeling

All containers received on site will be inspected to ensure the following: (1) All containers will be clearly labeled as to the contents; (2) the appropriate hazard warnings will be noted; and (3) the name and address of the manufacturer will be listed.

All drums or bins to be shipped off the site will have a label affixed with the following information: (1) the identity of the waste generator, (2) the boring, well, or excavation identification and sample depth, (3) the waste matrix (e.g. soil, water, product), and (4) the date of waste generation.

6.3.2 Employee Training & Information

Prior to starting work, each employee will attend a health and safety orientation and will receive information and training on the following:

1. An overview of the requirements contained in the Hazard Communication Standard;
2. Hazardous chemicals present in their workplace operations;
3. Location and availability of a written hazard communication program;
4. How to read labels and review SDSs to obtain appropriate hazard information;
5. Locations of SDS files and the hazardous chemical inventory;
6. Physical and health effects of the hazardous chemicals;
7. Methods and observation techniques used to determine the presence or release of hazardous chemicals;
8. How to lessen or prevent exposure to these hazardous chemicals through usage of control/work practices and personal protective equipment; and
9. Emergency procedures to follow if they are exposed to these chemicals.

Ramboll employee(s) will inform subcontractor(s) of any hazardous chemicals brought on-site by Ramboll; and likewise, subcontractors shall inform Ramboll employees the same.

6.4 Disciplinary Actions

If employees do not follow the HSS safety rules and/or are conducting operations that are hazardous to themselves or their fellow workers, work should be stopped, and disciplinary actions will be implemented in accordance with Ramboll's policies. No person who disregards safety rules or who creates unsafe situations will be allowed to continue working in this manner, and such situations may result in dismissal of the individual(s) from the site pending further investigation.

6.5 HSS Event/Incident Reporting

Each contractor is responsible for maintaining injury and illness records in accordance with applicable regulations and supplying Ramboll with applicable records in a timely fashion upon request. With respect to health, safety and security events or incidents, the following types of events/incidents are to be reported:

- All employee injuries and illnesses that include first aid, doctor/hospital visits which may or may not involve restricted work and/or lost time;
- Environmental incidents and exposures, such as spills or other unplanned releases to the environment or nonconformance to operating procedures;
- All evacuations (false or real);
- Any Property damage including but not limited to Ramboll-owned, rented, or client-owned property; potential property damage also includes any observation, uncovering, or intersection or subsurface or overhead utilities;
- Any Property loss;

- Near misses, which could have resulted in an injury, accident, environmental impact or property damage;
- Public/third party liability incidents which may involve injury, illness or property damage due to the actions of any non-Ramboll employee arising out of, or in connection with the Firm's contracted scope of work, operations, products, or premises.

All the incident types outlined above MUST be communicated by the Ramboll Site Supervisor to the PD/PM, Project HSSC, and/or a Corporate HSS representative immediately following the incident, either in person or via phone, e-mail, or text messaging. The contacted person will then ensure that the other core project members are informed either in person or via phone, e-mail, or text messaging, regardless of time of day. As soon as possible after the event and no later than 72 hours after the event, the first page of the Incident/Event Investigation Report form will be completed by the Site Supervisor or his/her designee and sent the core project members (i.e., the PD/PM, Project HSSC, and Corporate HSS representative), for preliminary root cause analysis. The root cause analysis will not be deemed complete until input from all individuals involved in the event, applicable witnesses, and input from the core team has been obtained. Similarly, the implementation of any corrective/preventive actions will NOT be considered complete until input from the HSS Director (and others as necessary) has been obtained.

7. MEDICAL SURVEILLANCE AND RECORDKEEPING

The goals of the medical surveillance program are to monitor the health of potentially exposed employees using medical examinations and diagnostic laboratory testing, to provide medical care for occupational injury or illness, to keep accurate records for future reference and to ensure the selection of employees physically able to safely perform the work assigned. The medical surveillance program supports and monitors the effectiveness of the primary health and safety goal of controlling worker exposure to hazardous substances. Medical examinations will be performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine.

In general, all employees who may be exposed to hazardous substances above the permissible limits; who wear a respirator; or who are injured, become ill, or develop signs or symptoms due to possible overexposure to hazardous substances from hazardous waste operations must be medically monitored. Ramboll's requirement is for all employees to be subject to Medical Surveillance Program as well as any employee who may wear a respirator, regardless of the during of use.

Each employee enrolled in the Medical Surveillance Program will be subject to periodic medical exams, the frequency of which will vary depending on the extent and duration of exposure, the type of chemicals involved, and the individual employee's medical profile. These employees will receive a medical examination at least once per calendar year.

Documentation of current participation in a medical surveillance program and fitness for duty, including ability to wear respiratory protective equipment, will be necessary for all employees who work on-site in areas other than the Support Zone. However, all specific medical information and examination results obtained during administration of the medical surveillance program will be maintained by the examining physician as confidential.

7.1 Baseline Medical Examinations

The baseline medical examination serves two major purposes: (1) it determines the individual's fitness for duty, including the ability to work while wearing a respirator; and (2) it provides baseline data for comparison with future medical data. The baseline medical examination will include, at a minimum, the following:

1. Complete occupational and medical history;
2. Physical examination;
3. Blood count and chemistry profile;
4. Urinalysis with microscopic review;
5. Chest x-ray;
6. Pulmonary function tests;
7. Resting electrocardiogram (EKG); and
8. Cardiac stress test (at physician's discretion).

Certification of fitness for duty and ability to wear personal protective equipment must be provided to gain access to on-site areas other than the Support Zone. However, all specific medical information obtained during administration of the medical surveillance program will be maintained as confidential.

7.2 Periodic Medical Examinations

Each individual enrolled in the medical surveillance program will be subject to periodic medical surveillance examinations. In general, employees involved in field activities with a frequency of greater than 30 days per year will receive medical examinations at least annually. Periodic medical examinations should include the parameters included in the baseline examination, except for the chest x-ray and EKG, which are repeated after the baseline examination at the physician's discretion and with agreement of the individual.

7.3 Special Medical Examinations

Special medical examinations or consultations will be arranged for employees exposed in an emergency to hazardous substances at concentrations above the PELs without adequate protection. This will be done as soon as possible after the overexposure has been determined by the Site Supervisor, in consultation with the Corporate Health and Safety Director.

Special medical examinations shall also be arranged upon notification by the individual that he/she has developed signs or symptoms indicating a possible overexposure to hazardous substances, or if the examining physician determines that a more frequent medical examination is necessary.

7.4 Special Circumstances

Any individual who is on a medication that may interfere with the ability to perform his/her job function, or who may require special medical attention, must notify the Site Supervisor of these circumstances prior to commencing work at the site.

7.5 Health and Safety Records

Health and safety records for on-site Ramboll employees including but not limited to training, medical clearances, fit testing, and any monitoring will be kept on file by the Corporate Health and Safety Director and on-site by the Site Supervisor, as applicable. Sub-contractor and contractor health and safety records shall be maintained by the applicable sub-contractor and/or contractor and provided to the Site Supervisor, if requested. Ramboll Employee Training and Medical Records are maintained at Ramboll, 333 West Wacker Drive, Chicago, Illinois. **RECORDS WILL BE MAINTAINED ON-SITE AS NECESSARY** in accordance with applicable laws, client or agency requests.

8. PERSONAL PROTECTIVE EQUIPMENT

This section of the Site Health and Safety Plan is a reference of selection for different levels of PPE. The protective equipment will be selected based on the contaminant type(s), concentration(s) in air (if any), standing liquid (if any), or other applicable matrix, and the known route(s) of entry into the human body. In situations where the type of materials, their concentrations, or exposure potentials are unknown, a decision based on professional judgment regarding the assignment of personal protective equipment will be made by the HSSC.

8.1 Selection of PPE

The selected PPE should be able to resist degradation, penetration, and permeation by the contaminants present at the site. In selecting the appropriate protective material, the following should be considered: chemical resistance; tear and puncture resistance; flexibility; thermal stress; cleanability; and durability.

PPE will be selected, used and maintained in accordance with applicable regulations.

Levels of PPE

The four levels of PPE are Levels A, B, C, and D, with Level A providing the highest available level of respiratory, skin, and eye protection. A summary of the basic PPE ensemble for Levels A, B, C, and D is provided below. PPE selection for operations at the site will be tailored to address specific task conditions. If your project involves hazards requiring Level A or B PPE, additional planning and a HASP addendum will be required. Please contact the HSS Department for assistance.

Level A (High)

Level A PPE provides the maximum degree of respiratory, skin, and eye protection. Contact the HSS Department for additional requirements. A Level A PPE ensemble should include:

- Full-face piece self-contained breathing apparatus (SCBA) or full-face piece supplied air respirator with escape SCBA;
- Fully encapsulating, chemical-resistant suit, safety boots and inner gloves; and
- Hard hat (if overhead or bump hazards exist).

Level B (High)

Level B PPE provides the maximum level of respiratory protection. Since chemical-resistant clothing is not considered gas, vapor, or particulate tight, Level B PPE does not provide the maximum skin protection. However, a good quality, hooded, chemical-resistant one-piece garment with taped wrists and ankles provides a reasonable degree of protection against splashes of liquids and lower concentrations of chemicals in ambient air. It is the minimum level recommended for confined space entries and initial site entries until the hazards have been further identified. Contact the HSS Department for additional requirements. Level B PPE should be used when **any** one of the following criteria is met:

- The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection but less skin protection--this includes atmospheres with IDLH concentrations of specific substances that do not represent a severe skin hazard or atmospheres that do not meet the criteria for use of air-purifying respirators;
- Atmosphere contains less than 19.5% oxygen; or

- Presence of incompletely identified vapors or gases is indicated by air monitoring instruments but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the intact skin.

Level C (High)

Level C PPE provides the same level of skin protection as Level B PPE, but a lower level of respiratory protection. Air-purifying respirators can be used only if the substance has adequate warning properties; the individual passes a qualitative fit-test for the mask; an appropriate cartridge/canister is used, and its service limit concentration is not exceeded; and site operations are not likely to generate unknown compounds or excessive concentrations of already identified substances. Level C PPE can be used when **all** the following conditions are met:

- Oxygen concentrations are not less than 19.5%;
- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin;
- Types of air contaminants have been identified, concentrations measured, and a cartridge or canister is available that can remove the contaminant;
- Atmospheric contaminant concentrations do not exceed IDLH levels; and
- Job functions do not require self-contained breathing apparatus (SCBAs).

Modified Level D (Medium)

Modified Level D PPE provides minimal skin protection (i.e., hand/glove protection along with standard work clothes with optional coveralls) and no respiratory protection. Modified Level D PPE can be used when the following conditions are met:

- Atmosphere contains no known hazard;
- Oxygen concentrations are not less than 19.5%;
- Work functions include minimal contact with contaminated soil, water, groundwater and precludes splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Level D (Low)

Level D PPE provides no skin protection other than standard work clothes and no respiratory protection. Work functions are limited non-hazardous environments and preclude contact with media that may be potentially contaminated at hazardous levels for any type of chemical.

8.2 Respirator Fit Test

A respirator fit test will be conducted on all site employees who will perform work operations in areas other than the Support Zone. Prior to the initiation of any fit testing, employees must be certified as medically able to wear a respirator. The respirator fit test is conducted to ensure proper face piece-to-face seal. A secure fit is important with positive-pressure equipment and is essential to the safe functioning of negative-pressure equipment, such as most air-purifying respirators. Employees will receive instruction on proper wear and maintenance of the respirator.

Qualitative fit tests will be conducted annually in accordance with the ANSI Practices for Respiratory Protection, Z88.2-1989. In addition, a negative and positive fit check will be performed each time an employee dons the air-purifying respirator (APR). Documentation of annual respirator fit tests will be kept in the Support Zone.

8.2.1 Negative and Positive Fit Check

The negative and positive pressure fit check will be performed each time an employee dons the APR. The negative pressure fit check involves closing off the inlet openings to the APR cartridges by covering with the palms of the hands. If an inward leakage of air is detected, the APR should be checked for material defects and refitted or replaced with another APR.

The positive pressure fit check is performed by placing the palm of hand over the exhalation valve and gently exhaling for 10 seconds to create positive pressure inside the facepiece. If an outward air leak is detected, the APR should be readjusted. If after readjustment leakage still occurs, another APR should be used.

8.3 PPE Inspection Checklist and Maintenance

PPE inspections will be conducted upon receipt of PPE from the factory or distributor; when it is issued to workers; after use or training; and prior to maintenance. Periodic inspections of stored equipment will be conducted routinely, whenever a question arises concerning the appropriateness of the selected equipment, or when problems with similar equipment arise. At a minimum, PPE inspection should include the following:

A. Clothing

Before use:

1. Determine that the clothing material is correct for the specified task.
2. Visually inspect for:
   - Imperfect seams
   - On-uniform coatings
   - Tears
   - Malfunctioning Closures
3. Hold up to light and check for pinholes
4. Flex product:
   - Observe for cracks
   - Observe for other signs of shelf deterioration
5. If the product has been used previously, inspect inside and out for signs of chemical breakthrough or deterioration, such as:
   - Discoloration
   - Swelling
   - Stiffness
6. During the work task, periodically inspect for:
   - Evidence of chemical attack such as discoloration, swelling, stiffening, and softening. Keep in mind that chemical permeation can occur without any visible effects.
   - Closure failure
   - Tears

- Punctures
- Seam discontinuities

B. Gloves

Before use, pressurize glove to check for pinholes. Either blow into glove, then roll gauntlet towards fingers or inflate glove and hold under water. In either case, no air should escape.

C. Respirators

SCBA/supplied air/air-purifying:

1. Inspect SCBA/supplied air/air-purifying respirators before and after each use, at least monthly when in storage and during cleaning. Air-purifying respirators should be inspected before each use to be sure they have been adequately cleaned.
2. Check all connections for tightness, inspect air lines prior to each use for cracks, kinks, cuts, frays, and weak areas.
3. Check for proper setting and operation of regulators and valves (according to manufacturer's recommendations) and check operation of alarms.
4. Check material conditions for:
   - Signs of pliability
   - Signs of deterioration
   - Signs of distortion
5. Check face shields and lenses for:
   - Cracks
   - Crazing
   - Fogginess
6. Examine cartridges or canisters to ensure that:
   - They are the proper type for the intended use,
   - The expiration date has not passed, and
   - They have not been opened or used previously.

8.4 Task Specific PPE

This section of the Project Health and Safety Plan is used for the selection of the appropriate PPE. The protective equipment will be selected based on the contaminant type(s), concentration(s) in air (if any), standing liquid (if any), or other applicable matrix (e.g., soil, sludge, sediment, etc.) and the known route(s) of entry into the human body. Table 9 presents the general level of protection to be used for each task that is anticipated to be conducted on this Project.

Table 10 identifies the specific PPE items that are required or recommended to be used on this project. This includes identifying the specific type of hand and body protection (as applicable) for the chemicals that may be encounter while conducting the tasks outlined in this HASP.

Table 9: Task Specific Personal Protective Equipment							
Task Description as depicted in Section 2.5	**Level of Protection**						
	A (High)	**B (High)**	**C (High)**	**Mod D (Medium)**	**D (Low)**	**NA**
	Contact HSS Dept.					
Task 1 – Transportation to and from the Site	☐	☐	☐	☐	☐	☒
Task 2 – Site Reconnaissance and Safety Inspection	☐	☐	☐	☐	☒	☐
Task 3 – Subsurface Utility Clearance	☐	☐	☐	☐	☒	☐
Task 4 – Surface Soil Sampling, Soil Boing Installation and Sampling	☐	☐	☐	☐	☒	☐
Task 5 – Installation and Development of Monitoring Wells and Collection of Groundwater Samples	☐	☐	☐	☐	☒	☐
Task 6 – Well Gauging and Slug Testing	☐	☐	☐	☐	☒	☐
Task 7 – Outfall Inspections			☐	☐	☒	☐
Task 8 - Site Survey	☐	☐	☐	☐	☒	☐
Task 9 - Gauging of Monitoring Wells within the Boiler Room	☐	☐	☒	☐	☐	☐
Task 10 - Installation of Hand Auger Soil Borings and Vacuum Excavation Transects	☐	☐	☐	☐	☒	☐
Task 11 - TBD						

Key:

Level D (Low): Long sleeve shirt*; long pants*; hard hat; eye protection; hearing protection; and safety shoes.

Level D Modified (Medium): Level D protection plus protective coveralls, as required; and appropriate hand protection.

Level C (High): Level D (Modified) protection plus negative pressure respiratory protection with appropriate cartridges; chemical protective coveralls in lieu of general coveralls; use of inner and outer sets of hand protection.

Level B (High): Level C protection plus Pressure-demand supplied air respirator with escape bottle in lieu of negative pressure respirator; chemical resistant coveralls with hood; chemical resistant boots. Contact HSS for additional requirements.

Level A (High): Level B protection plus fully encapsulating (gas tight) chemically resistant suit. Contact HSS for additional requirements.

*Clothing made of natural fibers shall be worn when a shock or arc flash hazard exists.

Table 10: Personal Protective Equipment and Supplies

Equipment	Req	Rec	NA	Equipment	Req	Rec	NA
Steel-toe Boots	☒	☐	☐	SCBA	☐	☐	☒
Outer Disposable Boots	☐	☐	☒	Full-face Airline Resp.	☐	☐	☒
Long Sleeve Shirt and Pants	☐	☒	☐	Full Face Negative Pressure Resp.	☐	☐	☒
Flame Retardant Coveralls	☐	☐	☒	Half Face Negative Pressure Resp (N95 for Task 9 only)	☒	☐	☐
Tyvek Suit (Task 9 only)	☒	☐	☐	Powered Air Purifying Resp	☐	☐	☒
Poly-coated Tyvek / Saranex Suit	☐	☐	☒	First Aid Kit	☒	☐	☐
Fully Encapsulated Chemical Suit	☐	☐	☒	Fire Extinguisher	☒	☐	☐
Hearing Protection (while drilling)	☒	☐	☐	Mobile Phones	☒	☐	☐
Leather Gloves	☐	☐	☒	Walkie Talkies	☐	☒	☐
Outer Chemical Gloves (Type): Nitrile	☒	☐	☐	Water or Other Fluid Replenishment	☒	☐	☐
Inner Chemical Gloves (Type): Click or tap here to enter text.	☐	☐	☒	Eye Wash	☐	☒	☐
Hard Hat	☒	☐	☐	Sunscreen	☐	☒	☐
Safety Glasses with Side Shields	☒	☐	☐	Insect Repellent	☐	☒	☐
Vented (Splash proof) Goggles	☐	☐	☒	Other: PFD/Life Ring for Task 7	☒	☐	☐
				Other: Portable Battery-Operated Flood Light & Backup Pocket Flashlight for Task 9	☒	☐	☐

Key:

Req = Required

Rec = Recommended

NA = Not Applicable

9. AIR MONITORING/SAMPLING PROCEDURES

Air samples may be collected during the project to identify and quantify airborne contaminants to delineate areas where PPE may be needed; determine the level of PPE necessary; document on-site employees' exposures; assess the potential health effects of exposure; determine the need to implement engineering controls or evacuate the work zone or site; and determine the need for specific medical monitoring. Some commonly used devices include the following:

Combustible Gas Indicator (CGI)–Examples include O2 / LEL meter. A CGI measures the concentration of a combustible gas or vapor. Its accuracy is, in part, dependent upon on the difference between the calibration and sampling temperatures; oxygen-deficient atmospheres also affect accuracy; filament can be damaged by silicones, halides, and tetraethyl lead; and the sensitivity is a function of the difference in the chemical and physical properties between the calibration gas and the unknown.

Flame Ionization Detector (FID)–Examples include Organic Vapor Analyzers (OVA). Depending on mode, it may detect many organic gases and vapors. An FID will not detect inorganic gases and vapors; has reduced reliability in high humidity conditions; and should not be used when temperatures are below 40F (4.4C).

Ultraviolet (UV) Photo Ionization Detector (PID)–Examples include HNU; MiniRAE, and similar types. Detects several organic and some inorganic gases and vapors. A PID does not detect methane; does not detect a compound if the probe used has a lower energy than the compound’s ionization potential; does not readily ionize fully chlorinated materials; high humidity affects readings; low humidity affects operation; response is sensitive to dust or moisture on the lamp; and responses will fluctuate when gases are mixed. Some PIDs are available that when properly equipped, can specifically measure benzene concentrations.

Infrared Spectrophotometer (IR)–Examples include Miran. Measures concentrations of many gases and vapors in the air but designed to quantify one- or two- component mixtures. Not approved for use in hazardous conditions; must make repeated passes to achieve reliable results; and somewhat bulky/heavy.

Direct-Read Colorimetric Tubes–Examples include Drager. The compound reacts with the indicator chemical in the tube, producing a stain whose length is proportional to the compounds’ concentration. Results are affected by temperature, pressure, and humidity; many similar compounds interfere with results.

Personal Air Monitoring–Quantitative air sampling for nuisance dust, metals, organic and inorganic compounds. Samples are collected using personal air sampling pumps and the appropriate sampling media. All employee samples will be collected in the employees breathing zone over the duration of the work shift. The specific methods to be utilized for the collection of personal air samples will require the involvement of a Certified Industrial Hygienist (CIH) if this type of sampling will be conducted.

9.1 Using Monitoring Devices

Conducting an applicable task may necessitate using one or more monitoring devices as listed in Table 11, particularly if gases, vapors, explosion hazards and/or oxygen deficient atmosphere can occur or are expected. If a monitoring device will be utilized, the corresponding device letter should be placed in the column labeled “Monitoring Instrument Required” in Table 12. In addition, you MUST record the following information in the field log book if you are going to use a monitoring device:

1. Instrument name and serial number.

2. Date of calibration.
3. Frequency/duration of monitoring.
4. The monitoring results.
5. And the actions taken based on the results, even if "no actions are required to be taken"

Table 11: Monitoring Devices Available			
A	PID (10.6 eV)	**H**	Summa Canister
B	PID (11.7 eV)	**I**	Heat Stress Monitor
C	FID	**J**	Air Sampling:
D	OVA	**K**	Air Sampling:
E	CGI/LEL	**L**	Radiation Detector
F	Colorimetric Indicator Tubes	**M**	Gas Multimeter
G	Dust Monitoring	**N**	Other Device:

With respect to Table 11, also insert the task and the applicable Action Level in the appropriate box using 50% of the most restrictive (lowest) PEL or TLV as the Trigger. For example, if the most restrictive PEL for a particular VOC is 50 ppm, use 25 ppm as the "Trigger" value.

Table 12: Required Monitoring				
Required Monitoring **If monitoring is necessary to identify that a risk is at or above tolerable limits and/or is used in controlling a risk on site, document the task and the maximum allowable exposure or trigger, and the monitoring instrument required to be used.**	**Constituent**	**Task(s)**	**Trigger (action level)**	**Monitoring instrument required**
	Oxygen		19.5% to 23.5%	M
	Carbon Monoxide		25 ppm	M
	H_2S		5 ppm	M
	C_2S			
	CH_4		0.5% or 5000 ppm	M
	VOCs: Total (as benzene)	4, 5, 6, 7, 9	0.5 ppm	M
	Semi-VOCs:			
	Metals			
	Dusts	TBD	Per Dust Monitoring Plan	Per Dust Monitoring Plan
	Others: LEL			M
	Others:			

9.2 Action Level Guidance

In general, this HASP must address site-specific chemicals as noted in Tables 11 and 12. However, there are chemicals commonly encountered in the workplace that may not be a chemical targeted for sampling but nonetheless will have adverse health effects. These chemicals are listed in Table 13 below.

Table 13: Action Levels for Commonly Encountered Compounds

Compound	Action Level
VOC (Total)	0.5 ppm MAXIMUM
VOC (no compounds with PEL <10 ppm)	5 ppm MAXIMUM
CH_4	0.5% MAXIMUM or 5000 ppm
CO_2	0.25% OR 2500 ppm MAXIMUM
CO	25 ppm MAXIMUM
H_2S	5 ppm MAXIMUM
O_2	19% MINIMUM–23.5% MAXIMUM

9.2.1 Volatile Organic Compound

An action level for each chemical or group of chemicals should be based on 50% of the most restrictive (lowest) PEL or TLV. Absent analytical data that adequately represent the types and concentrations of VOCs at the site, the default VOC (Total) action level is 0.5 ppm. The action level may be revised based on prior analytical data if appropriate, and this decision should be made with input from the HSSC and HSS department.

If a sustained (i.e., 1-minute sampling period) total volatile organic compound (VOC) reading within the breathing zone as determined by a photo ionization detector (PID) is above the action level, site employees shall attempt to mitigate the situation through the use of engineering controls (i.e., move upwind, increase air circulation) as indicated in Table 14. If the action level still cannot be met, employees shall leave the area and contact the PM and HSSC for further instructions.

Table 14: Volatile Organic Compound

Instrument	Calibration Gas Standard	Frequency/ Duration of Air Monitoring	Action Level [1] Above Background (Breathing Zone)	Action
Photo ionization detector (PID) calibrated daily	100 ppm isobutylene	Every 5-10 minutes take a 1-minute reading.	> 5 ppm above background level	Introduce engineering controls (i.e., blower fans) (Level D) Evaluate controls (see below)
After Introduction of Engineering Controls				
PID calibrated daily	100 ppm isobutylene	Every 5-10 minutes take a 1-minute reading.	< 0.5 ppm (benzene PEL: 1 ppm)	Continue work (Level D)

Table 14: Volatile Organic Compound				
Instrument	**Calibration Gas Standard**	**Frequency/ Duration of Air Monitoring**	**Action Level [1] Above Background (Breathing Zone)**	**Action**
			0.5-5.0 ppm above background level	Don respirator (Level C); Contact HSSC to evaluate
			> 5.0 ppm above background level	Discontinue work (Level C)
Note: [1] Action Levels for "Known contaminants" should be based on 50% of the most restrictive Permissible Exposure Limit (PEL) or Threshold Limit Value (TLV).				

9.2.2 Combustible Gas Indicator (CGI)/Oxygen Meter

Table 15: Combustible Gas Indicator (CGI)/Oxygen Meter	
Meter Response	**Action/Respiratory Protection**
CGI response <10% LEL	Continue normal operations with regular, periodic monitoring
CGI response > 10% LEL	Discontinue operations; evacuate employees and prohibit entry; allow to vent until readings are <10%.
Oxygen level <19.5% or >23.5%	Retreat from work area; consult with PM and HSSC about upgrading to Level B respiratory protection, adding mechanical ventilation, or possible changes in work practices.

9.2.3 Odors

If strong odors are encountered or if employees develop headaches, dizziness or other potential exposure symptoms, the employees shall leave the work area to a well-ventilated area and contact the PM and HSSC for further instructions.

9.2.4 Dusts

The permissible (on-site) exposure levels for total and respirable dusts are 15 and 5 mg/m^3, respectively. In general, at these concentrations you will not be able to read the face of a wristwatch (with your arm extended) when the total dust concentration reaches 15 mg/m^3. Particles of dust in the respirable size range cannot be seen without the aid of a microscope but in aggregate, may be perceived as a haze. More importantly and with few exceptions, when dust is noticeable in the air, more respirable particles will exist than larger particles.

Typically, controlling dusty investigative activities using a water sprayer will control potential exposures. However, if dusty conditions exist that are not related to investigative/remedial activities (dry, uncovered soils with high winds), employees shall leave the area and contact the PM and HSSC for further instructions.

For sites and tasks with where dusts may contain harmful chemicals and there is a risk of exposure to dust-borne contamination, additional evaluation of potential exposure is necessary to evaluate action levels and PPE requirements. The HSS Department and/or HSSC can assist with this evaluation. To determine the likelihood of exposure from dusts, a theoretical "Total Dust" concentration in mg/m^3 can

be calculated to estimate the total dust concentration in which the concentration of the contaminant in the soil could equal and/or exceed its' established exposure limit (EL). This equation is as follows:

Total Dust (mg/m^3) = (10^6 mg/kg) (**EL** mg/m^3) / (Conc. of contaminant in soil mg /kg) (**SF**)

Where:

> **EL** = Exposure Limit of the contaminant of concern (e.g., its PEL or TLV in mg/m^3); and
>
> **SF** = Safety Factor, a number between one and ten. Used to account for the degree of confidence in the characterization data (a ten would represent a poor degree of confidence, for example only one soil sample was collected / analyzed to characterize the site).

The **SF** is based upon the following assumptions: 1) the concentration of the contaminant in the airborne dust is the same as its concentration in the sample matrix; 2) the soil data depicts a representative "worst-case" scenario; 3) the monitoring instrument used, accurately measures the ambient concentration of particulate matter in the air; and 4) a single contaminant of concern is present.

As an example, assume that Lead (with an EL of 0.05 mg/m^3) is the contaminant of concern and a soil concentration of 25,000 mg/kg has been identified. Depending on the SF used, the theoretical total dust concentration will range between 2 to 0.2 mg/m^3. This means that when the in-situ particulate monitoring device is registering a concentration within 2 to 0.2 mg/m^3 range, there is a high probability that this dust contains enough lead to equal and/or exceed the EL. Hence, the level of PPE used would be increased until engineering controls are determined to be effective as documented by personal monitoring.

A Perimeter Dust Monitoring Plan will be implemented during future demolition and construction activities.

10. CONFINED SPACE ENTRY

Ramboll's health and safety policy prohibits unauthorized entry into confined spaces. If entry into a confined space is required, prior to entering a confined space, Ramboll employees (or its subcontractor's employees) will need additional training. Without Confined Space training, entry into confined spaces is prohibited. In addition, entry authorization will only be given after Ramboll management has reviewed the nature of the confined space, the hazards present, and the measures needed to ensure safety. Under these circumstances, Ramboll will work with the host facility/client to determine training requirements, sampling requirements, written program requirements, and equipment needed to safely enter the confined space.

It is not anticipated that confined space entry will be required for this project and/or the tasks listed in this HASP. If confined space entry is required, this HASP will be revised accordingly and the Corporate HSS Department should be involved to ensure all applicable regulations will be met.

11. SPILL RESPONSE

If warranted, before any spill clean-up work is initiated at the site, applicable local, state, and/or Federal Emergency Response Authorities will be identified and contacted by either the Client Contact and/or a designated Ramboll employee.

11.1 Reporting and Initial Employee Safety

Upon discovery of a hazardous substance spill, employees are to:

- Immediately summon help by notifying the Project Manager and the Client Contact;
- Act to ensure the safety of nearby employees;
- Proceed to a safe location;
- If anyone is seriously injured, immediately contact emergency medical services; and
- Keep unauthorized employees out of the area.

11.2 Initial Spill Reaction

Factors that limit the employee's response at the site of a spill are:

- Level of training,
- Personal safety,
- Available personal protective equipment (PPE), and
- Knowledge of the substance.

Employees should limit their actions to shutting off equipment or pumps and closing valves if possible, feasible and safe to do so.

11.3 Spill Response Evaluation

The identity and hazards of the spilled material should be determined before decisions regarding spill containment and control are made. The Client contact and Project Manager should evaluate the hazards regarding the spill and decide whether project employees or external response organizations should conduct the cleanup.

The Project Manager must contact the Project Director and Corporate HSS Director to discuss the spill incident for further input on deciding how the cleanup can be conducted, including:

- Levels of PPE and safety procedures,
- Safety and work zones,
- All steps of the response activities,
- Most effective procedures or methods for cleanup,
- Means of containment,
- Leak of spill control, and
- Decontamination procedures (including Emergency decontamination).

12. DECONTAMINATION

12.1 Sampling and Construction Equipment Decontamination

Decontamination involves the orderly controlled removal of contaminants. All undedicated sampling equipment and sampling meters (if applicable) will be cleaned prior to and between each use. All on-site equipment will be decontaminated and allowed to air dry before leaving the site. Decontamination maybe accomplished using an approved cleaner, water, and steam. Subcontractors will be responsible for decontamination of their own equipment used during field operations, as well as disposal of the decontamination fluids. Decontamination fluids and soil cuttings will be temporarily stored in sealed and labeled 55-gallon drums, staged at a safe location which is mutually acceptable to Ramboll and the host facility, pending offsite disposal. The decontamination methods will be as follows:

- Scrub brushes/buckets with a solution of distilled water and a non-phosphate detergent such as Liquinox or Alconox; decontamination water will be disposed of in sealed and labeled 55-gallon drums.

12.2 Employee Decontamination

All site employees should minimize contact with contaminants. At a minimum, the gross removal of contaminants from PPE shall occur in a designated area. All disposable PPE will be disposed of in approved 55-gallon drums (including respirator cartridges). Non-disposal PPE must be decontaminated, particularly safety boots. Any PPE that cannot be decontaminated should be disposed of along with the waste generated from field operations. The drums will be sealed and labeled appropriately, stored at a single secure location on the site, and be disposed of appropriately off-site. Employees should wash their hands and face prior to departing from the site and prior to eating, drinking, smoking and/or applying cosmetics. The decontamination methods will be as follows:

Modified Level D (Medium) Employee Decontamination

Where activities are performed in modified Level D (Medium) PPE employees will perform decontamination using the following guidelines:

- Place tools, instruments, samples and trash at an appropriate location. The equipment drop area should be clean and dry and at a minimum, plastic bags should be available for trash. Waste PPE will not be placed in the same containers as general trash.
- Inspect equipment, samples, and if applicable, tools for signs of residual amounts of contamination or excessive soil buildup. If present, soils and contamination must be completely cleaned off equipment, samples, and tools prior to removal from the decontamination areas.
- Employees will visually check themselves for signs of excessive soils and possible contamination. If observed, soils and contamination will be completely removed before further decontamination is performed.
- Remove outer work gloves and place in an appropriate container specified for waste PPE.
- Remove outer Tyvek coveralls if used and place them in an appropriate container specified for waste PPE.
- Remove inner protective gloves and place them in an appropriate container specified for waste PPE.
- Remove inner protective gloves and place them in an appropriate container specified for waste PPE.
- Wash hands using soap and water (separate from other decontamination cleaners/solutions).

Level C (High) Employee Decontamination

Employees involved in activities that require the use of Level C PPE will observe the following decontamination guidelines:

- Place tools, instruments, samples and trash at an appropriate location. There areas should be clean and dry, and at a minimum contain plastic bags for trash. Waste PPE will not be placed in the same containers as general trash.
- Inspection equipment, samples and if applicable, tools for signs of residual amounts of contamination or excessive soil buildup. If present, soils and contamination must be completely cleaned off equipment, samples and tools prior removal from the decontamination areas. Employees will visually check themselves for signs of excessive soils and possible contamination. If observed, soils and contamination will be completely removed before further decontamination is performed.
- Untape wrists and ankles.
- Remove outer work gloves and place them in an appropriate container specified for waste PPE.
- Remove outer Tyvek coveralls and place them in an appropriate container specified for waste PPE.
- Wipe off and remove respirator mask (also goggles if worn).
- Remove inner protective gloves and place them in an appropriate container specified for waste PPE.
- Wash hands using soap and water (separate from other decontamination cleaners/solutions).

During emergencies, the need to quickly respond to an accident or injury must be weighed against the risk to the injured party from chemical exposure. It may be that the time lost decontaminating an individual may cause greater harm to the individual than from the potential for chemical exposure, particularly if the injury is life-threatening. In these instances, a non-injured person needs to inform responding emergency personnel of the potential for chemical contamination on the victim, specifically mentioning the type and expected concentrations.

12.3 Investigation-Derived Material Disposal

Investigation-derived materials will also be handled appropriately and will be temporarily stored in sealed and labeled 55-gallon drums, staged at a safe location which is mutually acceptable to Ramboll and the host facility, pending offsite disposal. The storage methods will be as follows:

1. Drill cuttings/well water: on-site in properly labeled drums
2. Decontamination solutions: on-site in properly labeled drums

13. EMERGENCY RESPONSE PLAN

The Emergency Response Plan (ERP) describes contingencies and emergency response procedures. The ERP defines the responsibilities of key employees in planning, prevention, and response to emergency situations, and identifies agency contacts and medical care procedures. The ERP addresses measures to prevent and respond to emergency situations, such as fire or explosion; spill or release of hazardous material; employee injury or illness; or other adverse events. General Emergency guidelines are as follows:

13.1 Stop Work Authority

All Ramboll employees have the authority and obligation to stop any task or operation where concerns and/or questions regarding the control of HSE risk exist, are not clearly established, or are not understood. Management is responsible for creating a culture where Stop Work Authority is exercised freely and without fear of retribution or intimidation.

When an unsafe condition is identified, a Stop Work intervention will be initiated and treated as a "near miss". As such, an incident report will be completed in accordance with Standard Practice Instruction 19 entitled "Incident Reporting" so that the unsafe condition can be documented, reviewed, and corrective actions and preventative measures be implemented as applicable.

These actions will be coordinated by the Site Supervisor, with support from the PM/PD/MP and the HSSC, and all affected employees will be notified of the Stop Work issue. No work will resume until all Stop Work issues and concerns have been adequately addressed. Most issues can be resolved in a timely manner at the job site, but occasionally additional investigation and corrective actions may be required. Work may resume when it is safe to do so.

13.2 Employee Involved in Emergency Response

Key employees involved in site emergency response include the PM, Site Supervisor, the Ramboll PD and contractor PMs. Clear lines of authority have been established for implementing emergency response procedures and for ensuring safety compliance. All emergencies and personal injuries will be immediately reported to Site Supervisor. The Site Supervisor will immediately report the incident to the PD/PM and Corporate Health and Safety Director.

13.3 Emergency Response Telephone Roster

The Emergency Response Telephone Roster consists of persons and organizations both on- and off-site who would be involved in the ERP. This roster, provided as Table 1A, will be kept in Ramboll site vehicle, a list of on-site employees who are trained in first aid and CPR will also be kept in the file. All site employees will be familiar with the Emergency Response Telephone Roster and will understand the proper chain of command. A listing of on- and off-site emergency contacts and key employees and their alternates will be posted in the site office.

13.4 Emergency Communications

The external communication system between on-site and off-site emergency response employees is necessary to report and coordinate emergency response. Where feasible, cell phone will be the primary means of external communication and will be used to notify off-site emergency response agencies and to request assistance. If cell phones may not be sufficient to provide a reliable means of emergency communication (for example, in areas without cellular reception, or if cell phones are not permitted on-site), other reliable methods of communication should be considered, and a Communication Plan should be developed.

13.5 Emergency Medical Care and Treatment

Every injury and exposure will be reported according to the procedures outlined in section 6.7 of this HASP, regardless of whether the incident appears to be serious or not, or whether any adverse health effects or symptoms are apparent after the exposure. Universal precautions to BBP shall be observed while administering first aid.

13.6 Life-Threatening Emergency Response

Incidents are possible that would result in emergencies beyond the on-site emergency response capabilities. In these situations, all work must be stopped, employees must be evacuated as necessary, and the appropriate emergency services contacted. Such incidents might include:

- Life-threatening injuries or injuries/exposures requiring medical treatment; and
- Fires progressing beyond incipient stage.

13.7 Evacuation Routes and Procedures

During site operations and in the event of an evacuation, a safe location (rally point) will be identified. As part of the site orientation, all on-site employees will be informed of the evacuation plan and rally points. For purposes of a safe and efficient means of vehicular egress, all vehicles will be backed into their designated parking location.

If evacuation is necessary, employees will determine wind direction. Whenever possible, evacuation should be in the direction perpendicular to the wind direction without passing through the plume or smoke cloud and/or spilled material, if applicable. Employees will report to their designated rally point. If a workers' evacuation to their primary rally point is hindered by emergency conditions, workers shall evacuate to the secondary rally Point. The Site Supervisor and/or designated back-up person will account for all site employees and notify first responders if any employees are unaccounted for, and report this information to the PM, PD, and HSSC. The Corporate HSS Department will also be notified if evacuations are necessary.

13.8 Training

All site employees will review the information in this HASP on the emergency response procedures, and the location and use of on-site emergency equipment, and will have received emergency response training. During the site orientation and/or site safety briefings, site employees will be trained in emergency response procedures, on-site communication systems and evacuation routes, as stated in this HASP. Visitors will be briefed on hazard recognition, safe work practices and basic emergency procedures by the Site Supervisor.

13.9 First Aid Procedures

If an employee is injured, general first aid will be administered. If safety concerns or hazardous conditions are still present (e.g., incipient fire, falling debris), the individual shall be moved to avoid further injury or risk. If an employee is injured in a contaminated area, general first aid will be administered and then the employee will be moved to the support zone for decontamination (if applicable), additional first aid, and preparation for transportation, giving due consideration to which risk will be greater; the spread of contamination or the health/safety of the individual.

First aid kits will be maintained on site at each project location. The type of first aid kit to be maintained will be for minor emergencies, such as cuts and skin abrasions. Where applicable, first aid supplies will be stored in a water proof container. The Site Supervisor or designated person will ensure that adequate first aid supplies (listed below) are maintained.

Minimum List of First Aid Supplies	
(1) First Aid Guide*	(6) Burn treatment applications
(1) Absorbent Compress >4”x8”	(4) 3”x3” Sterile gauze pads
(16) 1”x3” Adhesive bandages	(2) Pair medical exam gloves
(1) Adhesive tape 2.5yard roll	(1) Triangular bandage >40”x40”x56”
(10) Antiseptic treatment applications	(6) Antibiotic ointment applications
* Please see Appendix D First Aid Guidance, print, and store with ANSI approved First Aid kit on-site.	

Recommended List of First Aid Supplies	
Analgesic (oral, non-drowsy)	Eye covering >1/4” thick
Bandage compress >2”x2”	Eye/face wash
Breathing barrier, single use	Roller bandage >2”x4yards
Cold pack >4”x5”	Hand sanitizer

The contents of the first aid kits shall be checked before being sent out to each job and at least weekly on each job to ensure that expended items are replaced. Where the eyes or body of any employee may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be available for use.

13.10 Uncovering an Underground Service (Intact)

In the event of any damage or dislocation of any underground facility/pipeline or utility in connection with ground disturbance activity, work activities shall cease in the damaged facility. The Designated Person shall immediately call the applicable emergency phone number. Then, the affected utility and One Call service shall be notified, if applicable. The One Call service may be able to assist with contact numbers for notifying member companies in the event of any damage. NO ONE should attempt to repair, clamp or constrict the damaged utility.

ALWAYS ASSUME THAT ANY UNDERGROUND PIPE OR SUBSURFACE LINE IS LIVE!

- Stop Work; remove tools if safe to do so.
- Clear all persons from the scene.
- Call the emergency number.
- Contact the One Call/utility member for guidance, if applicable.
- Contact the PM and/or PD so they can contact the Client, MP, Director of HSS and HSSC.

13.11 Striking an Underground Electrical/Telecom Cable

- Stop work.
- Evacuate Ramboll employees from the immediate area to a safe distance as site conditions warrant, considering employees which may not be able to immediately evacuate (e.g., operator seats in excavators are normally electrically isolated, whereas other parts of the excavator may be energized).

- Call the emergency number.
- In the event of injuries provide first aid and summon medical assistance.
- Contact the One Call/utility member for guidance, if applicable.
- Contact the PM and/or PD so they can contact the Client, MP, Corporate HSS Director and HSSC.
- Do not allow anyone to enter the area until the electricity/utility provider has made the cable safe.

13.12 Striking a Pressurized Gas Pipeline

- Stop work, leave tools in-place but shut off any running equipment, including engines.
- Evacuate the immediate area to a safe distance as site conditions warrant.
- Ensure there are no sources of ignition in the area.
- Call the emergency number.
- Contact the pipeline owner and/or One Call, if applicable.
- Contact the PM and/or PD so they can contact the Client, MP, Corporate Director of HSS and HSSC.
- Do not re-enter the immediate area until safe to do so.

13.13 Striking a Pressurized Water Main

- Stop work, remove tools and confine jetting water if safe, necessary and appropriate to do so.
- Evacuate immediate area.
- Ensure that water flowing away is not creating potential hazards (e.g., electrical shorting, flooding, contaminant migration etc.) and where possible warn those likely to be affected.
- Call the emergency number.
- Contact the water utility and/or One Call, if applicable.
- Contact the PM and/or PD so they can contact the Client, MP, Corporate Director of HSS and HSSC.
- Do not re-enter the immediate area until safe to do so.

13.14 Follow-up Procedures

If a site employee is injured on site and immediate medical treatment beyond first aid is needed, the designated site supervisor is instructed to call 911 and/or the designated emergency phone number and then report the incident.

Any SSC work that results in an injury, illness, incident, near miss or unsafe act or condition MUST be verbally communicated by the affected employee or a Ramboll employee witnessing the incident to either the local HSSC, PM, or PD immediately following the incident. Notification to the regional HR representative, Director of HR, and the Corporate HSS Director MUST also be made for incidents involving any employee injury and/or illness that happened while on company time including first aid, and doctor/hospital visits which may or may not involve restricted work and/or lost time.

As soon as possible after the incident but no later than 72 hours after the event, Page One of the Incident/Event Reporting Form (see SPI 19, Incident/Event Reporting) is to be completed by the employee and a witness that was involved in the incident and/or observed the incident.

Post-incident investigations and root cause analysis will be conducted by the Corporate HSS Department to discover the exact circumstances and cause of the incident. Amendments to the HASP will be approved and implemented by the Project HSSC and the Corporate HSS Director, as needed. All site employees will be informed of any revisions to the site-specific HASP and the resolution of any outstanding safety concerns prior to returning to their site functions. The necessary steps to ensure that operations can safely resume include:

- Ensure that all emergency equipment (fire extinguisher, communication system, first aid kits and first aid station) is available and in functional order;
- Clear all incident-caused debris from the site, if safe to do so; and
- Inspect area and equipment for additional hazards that may necessitate a HASP revision.
- Prepare a HASP revision if necessary to incorporate new information, procedures, and/or corrective actions related to the incident/event.

NOTE: Specific emergency contact information is contained in the first and last pages of this HASP. Applicable directions to the nearest medical facility are contained in the last page to this HASP. If an emergency occurs*, SECURE the safety of yourself and those working under your direction and then contact appropriate site and Ramboll representatives that are referenced in Table 1A of this HASP.*

14. HEALTH & SAFETY PLAN FIELD TEAM SIGNATURES

Sign off sheet attesting that the HASP has been made available and reviewed by the individual prior to entry into the site.

Project Employee List & Safety Plan Distribution Record

Ramboll Employees

All project staff must sign indicating they have read and understand the Site Health and Safety Plan. A copy of this Site Health and Safety Plan must be made available for their review and readily available at the job site.

Employee Name/ Job Title	Date Distributed	Signature

Contractors, Subcontractors

A copy of this safety plan shall be provided to contractors and subcontractors who may be affected by activities covered under the scope of this Site Health and Safety Plan for their information only, although the contractors and subcontractors remain responsible for the safety of their own employees. All contractors and subcontractors must comply with applicable country, state and local government rules and regulations.

Firm Name	Contact Person	Date Distributed

Health and Safety Meeting

All employees participating in the project must receive initial Health and Safety Orientation. Thereafter, a brief tailgate safety meeting is required as deemed necessary by the Site Health and Safety Officer (or at least once every 10 working days).

Date	Topics	Name of Attendee	Employee Firm Name	Initials

Visitor

It is Ramboll's policy that visitors must furnish their own personal protective equipment. All visitors are required to sign the visitor log and comply with Health and Safety Plan requirements. If the visitor represents a regulatory agency concerned with site health and safety issues, the Site Health and Safety Officer shall also immediately notify HSSC.

Name of Visitor	Firm Name	Date of Visit	Signature

15. SAFETY MEETING CHECKLIST

The Site Supervisor should consider discussing the following topics with all field employees conducting work as part of this HASP, as applicable.

Date and Time of Meeting: _____

Conducted By: _____

CHECK TOPIC(S) DISCUSSED:

HASP Content	HASP Content
☐ Chemicals of Concern	☐ Employees On-Site (Introductions)
☐ Tasks to be Performed	☐ Responsibilities
☐ Location of Tasks	☐ Monitoring equipment
☐ Hazards/Risks of Tasks	☐ Other _____
☐ Site Limitations (e.g., cell phone use)	☐ Other _____
First Aid	**Industrial Sanitation and Hygiene**
☐ Facilities	☐ Drinking water
☐ Reporting and Records	☐ Restrooms/Porta toilets
☐ Treatment of _____	☐ Personal Cleanliness
Personal Protective Equipment	**Housekeeping**
☐ Glasses, Goggles, and Shields	☐ Waste Containers
☐ Hard Hats	☐ Waste Materials
☐ Respirators	☐ Other _____
☐ Gloves	
☐ Other _____	
Emergency Procedures	**Fire Prevention**
☐ Communications	☐ Extinguisher Locations
☐ Primary Rally Point:	☐ Designated Smoking Areas
☐ Secondary Rally Point:	☐ Hot Work
☐ Headcount	☐ Flammable Liquids Present
☐ Hospital Location/Route	☐ Explosives Present
☐ PPE/Decon	☐ Other _____
☐ Other _____	
Special Tools / Equipment	**Vehicles/Heavy Equipment**
☐ Chain saws / Chop saws	☐ Transportation of Employees
☐ Other _____	☐ Operation and Inspection
☐ Other _____	☐ Preventative Maintenance
	☐ Other _____

Discussion

_____

_____

APPENDIX A
CHEMICAL INFORMATION AND SAFETY DATA SHEETS

Hazardous Property Information

Check if Present	Material (CAS #)	Water Solubility [a]	Specific Gravity	Flash Point [c] (°F)	Vapor Pressure [d]	LEL UEL	Cal/OSHA PEL- TWA [f]	IDLH Level [h]	Range of Odor Values (ppm)	eV
Volatile Organic Compounds (VOCs)										
☐	Acetic acid (64-19-7)	Miscible	1.05	103	11 mm	4.0% 19.9%	10 ppm	50 ppm	0.0004-204	
☐	Acetone (67-64-1)	Miscible	0.79	0	180 mm	2.5% 12.8%	500 ppm	2,500 ppm	0.40-11,745	
☐	Acrolein (107-02-8)	40%	0.84	-15	210 mm	2.8% 31%	C 0.1 ppm Skin	2 ppm	0.0036-1.8	
☐	Acrylonitrile (107-13-1)	7%	0.81	30	83 mm	3% 17%	2 ppm Skin	85 ppm Ca	1.6 -22	
☒	Benzene (71-43-2)	0.07%	0.88	12	75 mm	1.2% 7.8%	1 ppm Skin	500 ppm Ca	0.47-313	
☐	Bromodichloro-methane (75-27-4)	4500 mg/l	1.98	--	50 mm	Non-flam	None established	None determined	--	
☐	Bromoform (75-25-2)	0.10%	2.89	--	5 mm	Non-flam	0.5 ppm Skin	850 ppm	0.19-15	
☐	Bromomethane (74-83-9)	2%	1.73	--	1.9 atm	10% 16.0%	1 ppm	250 ppm Ca	--	
☐	Carbon Tetrachloride (56-23-5)	0.05%	1.59	--	91 mm	Non-flam	2 ppm Skin	200 ppm Ca	1.68-720	
☐	Chlorobenzene (108-90-7)	0.05%	1.11	82	9 mm	1.3% 9.6%	10 ppm	1000 ppm	0.087-13	
☐	2-Chloroethyl-vinyl Ether (110-75-8)	0.02%	1.05	61	27 mm	--	None established	None determined	--	
☐	Chloroethane (75-00-3)	0.60%	0.92	-58	1000 mm	3.8% 15.4%	100 ppm Skin	3800 ppm	3.8-379[j]	
☐	Chloroform (67-66-3)	0.50%	1.48	--	160 mm	Non-flam	2 ppm	500 ppm Ca	0.102-1,413	
☐	Chloromethane (74-87-3)	0.50%	0.92	--	5.0 atm	8.1% 17.4%	50 ppm	2000 ppm Ca	>10	
☐	Dibromo-chloromethane (124-48-1)	2700 mg/l	2.5	--	76 mm	--	None established	None Determined	--	
☐	Dibutyl phthalate (84-74-2)	0.001% (77°F)	1.05	315	0.00007 mm	0.5% --	5 mg/m^3	4,000 mg/m^3	0.023	
☐	1,2-Dichlorobenzene (95-50-1)	0.01%	1.3	151	1 mm	2.2% 9.2%	25 ppm Skin	200 ppm	0.02-50	
☐	1,1-Dichloroethane (75-34-3)	0.60%	1.18	2	182 mm	5.4% 11.40%	100 ppm	3,000 ppm	49-1,359	
☐	1,1-Dichloroethylene (DCE) (75-35-4)	0.04%	1.21	-2	500 mm	6.5% 15.5%	1 ppm	None determined	50-1,387	

Check if Present	Material (CAS #)	Water Solubility [a]	Specific Gravity	Flash Point [c] (°F)	Vapor Pressure [d]	LEL UEL	Cal/OSHA PEL- TWA [f]	IDLH Level [h]	Range of Odor Values (ppm)	eV
☐	1,2-Dichloroethane (107-06-2)	0.90%	1.24	56	64 mm	6.2% 16%	1 ppm	50 ppm Ca	4.3-988	
☐	1,2-Dichloroethylene (540-59-0)	0.40%	1.27	36-39	180-265 mm	5.6% 12.8%	200 ppm	1,000 ppm	277	
☐	1,2-Dichloropropane (78-87-5)	0.30%	1.16	60	40 mm	3.4% 14.5%	75 ppm	400 ppm Ca	0.26-8.66	
☐	1,3-Dichloropropene (542-75-6)	0.20%	1.21	77	28 mm	5.3% 14.5%	1 ppm Skin	None Determined Ca	<0.99	
☐	Bis-(2-Ethylhexyl)-phthalate (DEHP) (117-81-7)	0.00003%	0.99	420	<0.01 mm	0.3% --	5 mg/m^3	5,000 mg/m^3 Ca	--	
☐	Diethyl phthalate (84-66-2)	0.10%	1.12	322	0.002 mm	0.7% --	5 mg/m^3	None Determined	0.036-0.363	
☐	Dinitrotoluene (DNT) (25321-14-6)	Insoluble	1.32	404	1 mm	-- --	0.15 mg/m^3 Skin	50 mg/m^3 Ca	--	
☐	Endrin (72-20-8)	Insoluble	1.7	--	0.00001 mm	--	0.1 mg/m^3 Skin	2 mg/m^3	--	
☒	Ethyl benzene (100-41-4)	0.01%	0.87	55	7 mm	0.8% 6.7%	5 ppm	800 ppm	<0.002-18	
☒	Hydrazine (302-01-2)	Miscible	1.01	99	10 mm	2.9% 98%	0.01 ppm Skin	50 ppm Ca	3.0-4.0	
☐	Methyl ethyl ketone (MEK) (78-93-3)	28%	0.81	16	78 mm	1.4% 11.4%	200 ppm	3000 ppm	0.07-339	
☐	Methyl tert-butyl ether (MTBE) (1634-04-4)	5.1 g/100ml	0.7	-18	245 mm	1.6% 8.4%	40 ppm	None determined	0.03-0.17	
☐	Methylene chloride (75-09-2)	2%	1.33	--	350 mm	13% 23%	25 ppm	2,300 ppm Ca	1.2-440	
☐	Phenol (108-95-2)	9% (77°F)	1.06	175	0.4 mm	1.8% 8.6%	5 ppm Skin	250 ppm	0.0045-1.95	
☐	1,1,2,2-Tetrachloroethane (79-34-5)	0.30%	1.59	--	5 mm	Non-flam	1 ppm Skin	100ppm Ca	0.233-7.3	
☐	Tetrachloroethylene (PCE) (127-18-4)	0.02%	1.62	--	14 mm	Non-flam	25 ppm	150 ppm Ca	0.767-71	
☒	Toluene (108-88-3)	0.07% (74°F)	0.87	40	21 mm	1.1% 7.1%	10 ppm Skin	500 ppm	0.021-157	
☐	1,1,1-Trichloroethane (71-55-6)	0.40%	1.34	--	100 mm	7.5% 12.5%	350 ppm	700 ppm	0.97-715	
☐	1,1,2-Trichloro-ethane (79-00-5)	0.40%	1.44	--	19 mm	6% 15.5%	10 ppm Skin	100 ppm Ca	--	

Check if Present	Material (CAS #)	Water Solubility [a]	Specific Gravity	Flash Point [c] (°F)	Vapor Pressure [d]	LEL UEL	Cal/OSHA PEL- TWA [f]	IDLH Level [h]	Range of Odor Values (ppm)	eV
☐	1,2,4-Trichlorobenzene (120-82-1)	0.003%	1.45	222	1 mm	2.5% 6.6% (302 °F)	C 5 ppm	None Determined	2.96	
☐	Trichloroethylene (TCE) (79-01-6)	0.1% (77°F)	1.46	--	58 mm	8% 10.5%	25 ppm	1,000 ppm Ca	0.5-167	
☐	Trichlorofluoromethane (75-69-4)	0.1% (75°F)	1.47	--	690 mm	Non-flam	C 1,000 ppm	2000 ppm	5-200,057	
☐	1,1,2-Trichloro-1,2,2-trifluoroethane (76-13-1)	0.02%	1.56	--	285 mm	-- --	1,000 ppm	2,000 ppm	--	
☐	1,2,4-Trimethylbenzene (95-63-6)	0.006%	0.88	112	1 mm	0.9% 6.4%	25 ppm	None determined	0.006-2.4	
☐	Vinyl Chloride (75-01-4)	0.1% (77°F)	0.09	--	3.3 atm	3.6% 33%	1 ppm Skin	None Determined Ca	203-356	
☒	Xylene (o, p, m, mix) (1330-20-7)	Slightly soluble	0.86-0.88	81-90	7-9 mm	0.9% 7%	100 ppm	900 ppm	0.012-316	
Metals										
☐	Aluminum metal and oxide (as Al)	[b]	2.7	--	0 mm	[e]	10 mg/m^3 (respirable)	None determined	--	
☐	Antimony ()	[b]	6.69	--	0 mm	[e]	0.5 mg/m^3	50 mg/m^3	--	
☐	Arsenic (inorganic compounds, as As)	[b]	5.73	--	0 mm	[e]	0.01 mg/m^3	5 mg/m^3 Ca	--	
☐	Arsenic (organic compounds, as As)	Properties vary depending upon the specific organic arsenic compound.					0.2 mg/m^3	None determined	--	
☐	Barium chloride(as Ba) (10361-37-2)	38%	3.86	--	low	Non-flam	0.5 mg/m^3	50 mg/m^3	--	
☐	Barium nitrate (as Ba) (10022-31-8)	9%	3.24	--	Low	[e]	0.5 mg/m^3	50 mg/m^3	--	
☐	Beryllium and compounds (as Be)	[b]	1.85	--	0 mm	[e]	0.2 □g/m^3	4 mg/m^3 Ca	--	
☐	Cadmium dust (as Cd)	[b]	8.64	--	--	[e]	0.005 mg/m^3	9 mg/m^3 Ca	--	
☐	Chromium (III) compounds (as Cr)	[b]	Properties vary depending upon the specific compound.				0.5 mg/m^3	25 mg/m^3	--	
☐	Cobalt metal dust and fume (as Co) (7440-48-4)	Insoluble	8.92	--	0 mm	[e]	0.02 mg/m^3	20 mg/m^3	--	
☐	Copper dust and mist (as Cu)	[b]	8.94	--	0 mm	[e]	1 mg/m^3	100 mg/m^3	--	
☒	Lead	Insoluble	11.34	--	0 mm	[e]	0.05 mg/m^3	100 mg/m^3	--	

Check if Present	Material (CAS #)	Water Solubility [a]	Specific Gravity	Flash Point [c] (°F)	Vapor Pressure [d]	LEL UEL	Cal/OSHA PEL- TWA [f]	IDLH Level [h]	Range of Odor Values (ppm)	eV
☐	Manganese, Fume and compounds (as Mn) (7439-96-5)	Insoluble	7.2	--	0 mm	Comb-ustible	0.2 mg/m^3	500 mg/m^3	--	
☐	Mercury compounds (as Hg) Except alkyl compound	[b]	13.6	--	0.0012 mm	[e]	0.025 mg/m^3 Skin	10 mg/m^3	--	
☐	Molybdenum (7439-98-7)	[b]	10.28	--	0 mm	Comb-ustible	10 mg/m^3 3 mg/m^3 (resp.)	5,000 mg/m^3	--	
☐	Nickel and other compounds (as Ni)	[b]	8.9	--	0 mm	[e]	0.5 mg/m^3	10 mg/m^3 Ca	--	
☐	Selenium (7782-49-2)	Insoluble	4.28	--	0 mm	Comb-ustible	0.2 mg/m^3	1 mg/m^3	--	
☐	Silver, metal dust, and soluble compounds (as Ag)	[b]	10.49	--	0 mm	[e]	0.01 mg/m^3	10 mg/m^3	--	
☐	Thallium (soluble compounds, as Ti)	[b]	Properties vary depending upon the specific compound.				0.1 mg/m^3 Skin	15 mg/m^3	--	
☐	Vanadium pentoxide dust and Fume (1314-62-1)	0.8%	3.36	--	0 mm	[e]	0.05 mg/m^3 (Respirable)	35 mg/m^3	--	
☐	Zinc oxide (1314-13-2)	0.0004% (64°F)	5.61	--	0 mm	[e]	5 mg/m^3	500 mg/m^3	--	
Miscellaneous										
☒	Ammonia (7664-41-7)	34%	--	--	8.5 atm	15% 28%	25 ppm	300 ppm	0.043-60.3	
☒	Asbestos (1332-21-4)	Insoluble	--	--	0 mm	Non-flam	0.1 fibers/cc	None determined	--	
☐	Chromic Acid and chromates (1333-82-0)	63%	2.7	--	Very low	Non-flam	0.005 mg/m^3	15 mg/m^3 Ca	--	
☒	Cyanide (as CN)	--	--	--	--	Non-flam	5 mg/m^3 Skin	--	--	
☐	DDT (50-29-3)	Insoluble	0.99	162-171	0.0000002 mm	--	1 mg/m^3 Skin	500 mg/m^3 Ca	--	
☒	Diesel Fuel #2 (68476-34-6)	Insoluble	0.81-0.90	130	--	0.6-1.3 6-7.5	None established	None determined	--	
☐	Fluorides, as F	--	--	--	--	--	2.5 mg/m^3	None determined	--	
☐	Gasoline (8006-61-9)	Insoluble	0.72-0.76	-45	38-300 mm	1.4% 7.6%	300 ppm	Ca None determined	--	
☒	Kerosene (8008-20-6)	Insoluble	0.81	100-162	5mm (100°F)	0.7% 5.0%	200 mg/m^3[g] Skin	None determined	--	

Check if Present	Material (CAS #)	Water Solubility [a]	Specific Gravity	Flash Point [c] (°F)	Vapor Pressure [d]	LEL UEL	Cal/OSHA PEL- TWA [f]	IDLH Level [h]	Range of Odor Values (ppm)	eV
☒	Naphthalene (91-20-3)	0.003%	1.15	174	0.08 mm	0.9% 5.9%	0.1 ppm	250 ppm	0.0019-1.02	
☒	PCB (42% chlorine) (53469-21-9)	Insoluble	1.39	--	0.001 mm	Non-flam	1 mg/m^3 Skin	5 mg/m^3 Ca	--	
☒	PCB (54% chlorine) (11097-69-1)	Insoluble	1.38	--	0.00006	Non-flam	0.5 mg/m^3 Skin	5 mg/m^3 Ca	--	
☐	Phosphorus (yellow) (7723-14-0)	0.00%	1.82	--	0.03 mm	-- --	0.1 mg/m^3	5 mg/m^3	--	
☒	Polycyclic Aromatic Hydrocarbons (PAH)	Properties vary depending upon the specific compound. Listed in NIOSH as Coal Tar Pitch Volatiles					0.2 mg/m^3	80 mg/m^3 Ca	--	

SITE-SPECIFIC SUBSTANCES

(Add hazardous property information on any substances that are of concern at the site but are not listed above.)

EXPLANATIONS AND FOOTNOTES:

[a] Water solubility is expressed in different terms in different references. Many references use the term "insoluble" for materials that will not readily mix with water, such as gasoline. However, most of these materials are water soluble at the part per million or part per billion level. Gasoline, for example, is insoluble in the gross sense, and will be found as a discrete layer on top of the ground water. But certain gasoline constituents, such as benzene, toluene, and xylene, will also be found in solution in the ground water at the part per million or part per billion levels.

[b] Solubility of metals depends on the compound in which they are present.

[c] Several chlorinated hydrocarbons exhibit no flash point in a conventional sense, but will burn in the presence of high energy ignition source or will form explosive mixtures at temperatures above 200 □F.

[d] Expressed as mm Hg under standard conditions.

[e] Explosive concentrations of airborne dust can occur in confined areas.

[f] Cal/OSHA Time-weighted Average (TWA) Permissible Exposure Limits (PELs) except where noted in g. The substances designated by "Skin" in the PEL column may be absorbed into the bloodstream through the skin, the mucous membranes and/or the eye, and contribute to the overall exposure. “C” notation indicates the number given is a ceiling value.

[g] TLV-TWA adopted by the American Conference of Governmental Industrial Hygienists (ACGIH). Currently, there is no Cal/OSHA PEL.

[h] The substances with a “Ca” notation in the IDLH column are considered potential occupational carcinogens by NIOSH.

[i] Odor thresholds values extracted from “*ODOR THRESHOLDS for Chemicals with established Occupational Health Standards*”, American Industrial Hygiene Association, 1997.

(d) Odor detection threshold: Lowest concentration at which a stimulus is being detected.

(r) Odor recognition threshold: Lowest concentration at which a definite odor character is detected.

[j] Values extracted from the US Environmental Protection Agency Technology Transfer Network, Air Toxics website. URL: www.epa.gov/ttn/atw/, 2006

[k] Value extracted from “*HESIS Guide to Solvent Safety*” California Department of Health Services, 2004. URL: http://www.dhs.ca.gov/ohb/HESIS/solv_cht.htm

[l] Value extracted from “*Chemical Summary for Methyl-Tert-Butyl Ether”,* US Environmental Protection Agency, Office of Pollution Prevention and Toxics, August 1994. URL: http://www.epa.gov/chemfact/s_mtbe.txt

SAFETY DATA SHEET

Creation Date 01-Sep-2009 **Revision Date** 14-Feb-2020 **Revision Number** 2

1. Identification

Product Name **2-Propanol**

Cat No. : **36644**

CAS-No 67-63-0
Synonyms 2-Propanol; IPA; Isopropyl alcohol; Propan-2-ol; Isopropanol

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system, Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver.	

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor
Causes serious eye irritation
May cause respiratory irritation

May cause drowsiness or dizziness
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Wear protective gloves/protective clothing/eye protection/face protection
Keep cool
Response
Get medical attention/advice if you feel unwell
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Isopropyl alcohol	67-63-0	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if symptoms occur.

Inhalation Remove to fresh air. Get medical attention. If not breathing, give artificial respiration.

Ingestion Do NOT induce vomiting. Get medical attention.

Most important symptoms and effects Difficulty in breathing. May cause central nervous system depression: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media CO_2, dry chemical, dry sand, alcohol-resistant foam. Water mist may be used to cool closed containers.

Unsuitable Extinguishing Media Water may be ineffective

Flash Point 12 °C / 53.6 °F

Method - Abel Closed Cup (BS 2000 Part 170, IP 170, AS/NZS 2106)

Autoignition Temperature 425 °C / 797 °F

Explosion Limits

Upper 12 vol %

Lower 2 vol %

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

Hazardous Combustion Products

Carbon monoxide (CO). Carbon dioxide (CO_2). peroxides.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
2	3	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges. Avoid contact with skin, eyes or clothing.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Prevent further leakage or spillage if safe to do so. Remove all sources of ignition. Soak up with inert absorbent material. Take precautionary measures against static discharges. Use spark-proof tools and explosion-proof equipment. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Keep away from open flames, hot surfaces and sources of ignition. Use spark-proof tools and explosion-proof equipment. Use only non-sparking tools. Take precautionary measures against static discharges. Do not get

in eyes, on skin, or on clothing. Do not breathe mist/vapors/spray. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Storage Keep away from heat, sparks and flame. Flammables area. Keep container tightly closed in a dry and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Isopropyl alcohol	TWA: 200 ppm STEL: 400 ppm	(Vacated) TWA: 400 ppm (Vacated) TWA: 980 mg/m³ (Vacated) STEL: 500 ppm (Vacated) STEL: 1225 mg/m³ TWA: 400 ppm TWA: 980 mg/m³	IDLH: 2000 ppm TWA: 400 ppm TWA: 980 mg/m³ STEL: 500 ppm STEL: 1225 mg/m³	TWA: 200 ppm STEL: 400 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Alcohol-like
Odor Threshold	No information available
pH	7 1% aq. sol
Melting Point/Range	-89.5 °C / -129.1 °F
Boiling Point/Range	81 - 83 °C / 177.8 - 181.4 °F @ 760 mmHg
Flash Point	12 °C / 53.6 °F
Method -	Abel Closed Cup (BS 2000 Part 170, IP 170, AS/NZS 2106)
Evaporation Rate	1.7
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	12 vol %
Lower	2 vol %
Vapor Pressure	43 mmHg @ 20 °C
Vapor Density	2.1 @ 20 °C / 68 °F
Specific Gravity	0.785

Solubility	Miscible with water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	425 °C / 797 °F
Decomposition Temperature	No information available
Viscosity	2.27 mPa.s at 20 °C
Molecular Formula	C3 H8 O
Molecular Weight	60.1
VOC Content(%)	100% (Organic Carbon (by mass) = 59.9 %) (EC/1999/13)
Refractive index	1.377 at 20 °C / 68 °F (ASTM D-1218)
Surface tension	22.7 mN/m at 20 °C / 68 °F
Coefficient of expansion	0.0009 / °C
Dielectric constant	18.6 at 20 °C / 68 °F
Heat of vapourisation	665 J/g
Specific heat capacity	3 kJ/kg °C at 20 °C / 68 °F
Thermal conductivity	0.137 W/m °C at 20 °C / 68 °F

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Heat, flames and sparks. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents, Acids, Halogens, Acid anhydrides

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), peroxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Isopropyl alcohol	5840 mg/kg (Rat)	13900 mg/kg (Rat) 12870 mg/kg (Rabbit)	72.6 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Isopropyl alcohol	67-63-0	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system Central nervous system (CNS)
STOT - repeated exposure Kidney Liver

Aspiration hazard No information available

Symptoms / effects,both acute and delayed May cause central nervous system depression: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
. Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Isopropyl alcohol	EC50: > 1000 mg/L, 72h (Desmodesmus subspicatus) EC50: > 1000 mg/L, 96h (Desmodesmus subspicatus)	LC50: = 9640 mg/L, 96h flow-through (Pimephales promelas) LC50: > 1400000 µg/L, 96h (Lepomis macrochirus) LC50: = 11130 mg/L, 96h static (Pimephales promelas)	= 35390 mg/L EC50 Photobacterium phosphoreum 5 min	13299 mg/L EC50 = 48 h 9714 mg/L EC50 = 24 h

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Isopropyl alcohol	0.05

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT
UN-No UN1219
Proper Shipping Name Isopropanol
Hazard Class 3
Packing Group II

TDG
UN-No UN1219
Proper Shipping Name ISOPROPANOL
Hazard Class 3
Packing Group II

IATA
UN-No UN1219
Proper Shipping Name Isopropanol
Hazard Class 3
Packing Group II

IMDG/IMO
UN-No UN1219
Proper Shipping Name Isopropanol (Isopropyl alcohol)

Hazard Class	3
Packing Group	II

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Isopropyl alcohol	67-63-0	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Isopropyl alcohol	67-63-0	X	-	200-661-7	X	X	X	X	KE-29363

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Isopropyl alcohol	67-63-0	>95	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Isopropyl alcohol	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Serious risk, Grade 3

16. Other information

Prepared By Health, Safety and Environmental Department
Email: tech@alfa.com
www.alfa.com

Creation Date 01-Sep-2009
Revision Date 14-Feb-2020
Print Date 14-Feb-2020
Revision Summary SDS authoring systems update, replaces ChemGes SDS No. 67-63-0.

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 22-Jul-1999 **Revision Date** 24-Dec-2021 **Revision Number** 4

1. Identification

Product Name **Sudan IV**

Cat No. : **S667-25**

CAS No 85-83-6
Synonyms Oil Red IV; Scarlet Red; Fast Oil Red B

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Warning

Hazard Statements
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS No	Weight %
2-Naphthalenol, 1-[[2-methyl-4-[(2-methylphenyl)azo]phenyl]azo]-	85-83-6	~ 100

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention.

Ingestion Do NOT induce vomiting. Get medical attention.

Most important symptoms and effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point Not applicable
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2). Nitrogen oxides (NOx).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Avoid dust formation. Wash hands before breaks and immediately after handling the product.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Incompatible Materials. Strong oxidizing agents.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Red brown
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	181.1 °C / 358 °F
Boiling Point/Range	260 °C / 500 °F
Flash Point	Not applicable
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	negligible
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C24H20N4O
Molecular Weight	380.1662

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat. Avoid dust formation.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO_2), Nitrogen oxides (NOx)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information	No acute toxicity information is available for this product
Component Information	
Toxicologically Synergistic Products	No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
2-Naphthalenol, 1-[[2-methyl-4-[(2-methylphenyl)azo]phenyl]azo]-	85-83-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Persistence and Degradability Insoluble in water

Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
2-Naphthalenol, 1-[[2-methyl-4-[(2-methylphenyl)az	85-83-6	X	ACTIVE	-

o]phenyl]azo]-				

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
2-Naphthalenol, 1-[[2-methyl-4-[(2-methylphenyl)azo]phenyl]azo]-	85-83-6	X	-	201-635-8	X	X	X	X	X	KE-08591

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations Not applicable

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
2-Naphthalenol,	-	Use restricted. See item 75.	-

1-[[2-methyl-4-[(2-methylphenyl)azo]phenyl]azo]-		(see link for restriction details)	

https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
2-Naphthalenol, 1-[[2-methyl-4-[(2-methylphenyl)azo]phenyl]azo]-	85-83-6	Not applicable	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
2-Naphthalenol, 1-[[2-methyl-4-[(2-methylphenyl)azo]phenyl]azo]-	85-83-6	Not applicable	Not applicable	Not applicable	Not applicable

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 22-Jul-1999
Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
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End of SDS

APPENDIX B
CONTROL MECHANISMS

The following Control Methods should be implemented for Hazards that were identified as part of the Tasks that will be conducted as part of this Project.

B1–Chemical–Ramboll employees shall familiarize themselves with the appropriate health and safety responses for exposure to known on-site chemicals prior to beginning work at the site. site-specific chemicals are not limited to known chemicals of concern present in environmental media. During the preparation of the site-specific HASP, Ramboll employees shall also consider historical chemical use resulting in potential chemicals of concern, as well as any current chemical use (e.g., drums, cylinders, containers) or chemicals brought on-site to complete project work (e.g., laboratory chemicals, sample preservatives). Employees shall include relevant Safety Data Sheets in the site-specific HASP and review Attachment A Hazardous Material Properties prior to work involving hazardous materials.

Ramboll employees, contractors, subcontractors, and visitors shall wear appropriate personal protective equipment (PPE) while performing site activities based on the expected COCs and additional site hazards. At a minimum, equipment shall include safety glasses, steel-toed boots, and hard hats (when overhead work is being performed or when overhead hazards exist). Additional PPE requirements, addressing the site-specific hazards and chemicals of concern, will be outlined in the site-specific Health and Safety Plan (HASP).

Air monitoring may be performed to ensure on-site exposure levels are maintained below regulatory requirements. Air monitoring equipment, monitoring plan and controls shall be specified in the site-specific HASP.

Containers of unknown origin and/or unknown contents should not be opened by Ramboll employees without approval from the Corporate Director of Health, Safety & Security (HSS). For projects in which containers are present with unknown contents, consult the site/facility representative for additional information and, if appropriate, consider retaining a qualified waste management company for testing and identification.

For additional information, refer to Standard Practice Instruction 6–Hazard Communication. Consult with your local Health, Safety & Security Coordinator (HSSC) for any personal air monitoring requirements.

B2–Dust/Particulates/Fumes–Working near operating equipment (e.g., drilling rigs, heavy machinery, excavating equipment, power tools) poses unique safety situations including generation of dusts, particulate and fumes.

When the surface is disturbed soil, dust, and other particulates (e.g., concrete dust) can be released to the air. Severe weather conditions can also generate or contribute to hazardous dust and particulate conditions. This presents a hazard to the breathing zone of Ramboll employees, subcontractors, facility employees, and other bystanders. It can also present an off-site hazard if transport of the generated dust and/or particulates off the subject property is possible. The level of risk associated with dust and particulate exposure is generally tied to the level of contamination in the soil, however, soil to dust/particulate transfer is not easily predictable and typically requires on-site real time monitoring to establish baseline exposure values.

Depending upon the work to be done by Ramboll employees, a preliminary site field survey may need to be performed prior to involvement in drilling and/or heavy equipment operations. In the pre-planning stage, the site geology, ground cover, and scope of work (i.e., methods of investigation) should be discussed with the PM, PD, and any subcontractors. If operating equipment will be utilized, and dust/particulate generation is a potential hazard, subcontractors should be directed (in the

subcontract) to be prepared to control this hazard with water spray, or other method (e.g., tenting). The site-specific HASP should include clear directives to monitor breathing the zone and/or site perimeter conditions using approved monitoring devices including, but not limited to personal air monitoring (PAM), dust meters, or perimeter monitoring with data logging equipment.

For additional information, refer to B18–Heavy Machinery, SPI 11–Trenching and Excavation Awareness, and SPI 37–Rigging and Material Lifting. Consult with your local HSSC for any additional requirements.

Both fuel operated equipment and volatile chemicals can present a fume hazard to Ramboll employees. Typically, when work is conducted outside, staff can anticipate that standard scopes of work and typically encountered constituents of concern will not present a fume hazard when best practices such as standing up wind are established and followed. However, there are scenarios in which Ramboll employees must be prepared to implement additional controls to address hazardous fumes. Certain work circumstances, specifically interior work conducted with gasoline-powered motors warrants evaluation for proper ventilation and monitoring to ensure sufficient oxygen and to avoid the buildup of harmful fumes (e.g., carbon monoxide, specific constituents of concern).

Prior to start of work, the scope of work and site-specific factors must be discussed with the PM, PD, and/or local HSSC to ensure that the site-specific HASP includes appropriate controls to address the potential site-specific hazards. Regardless of the site-specific constituents of concern, oxygen must be maintained at a percentage ranging between 19.5 percent and 23.5 percent of the total ambient air. Ramboll employees shall monitor the work area for oxygen deficiency hazards using monitoring devices that have been appropriately calibrated and are recommended for this specific use, as applicable. If direct air monitoring readings suggest an oxygen deficiency and/or the build-up of harmful substances, attempt to employ a passive corrective action such as moving the position of Ramboll employees upwind of the hazardous area or equipment exhaust. If warranted, additional corrective engineering controls may include moving or removing the equipment, venting exhaust to the exterior of the building (typically if interior work is to be conducted, contractors need to be notified in advance that venting will be required), increasing work zone ventilation by opening overhead doors, utilizing fans or the facility ventilation system and/or upgrading PPE. If engineering controls do not adequately address the hazard, leave the area and contact the PM, PD, and/or HSSC. Work will not continue until the hazardous fumes are properly addressed and safe work conditions are verified.

The presence of petroleum and solvent contaminated material presents a potential fire hazard. Smoking and use of open flame will be prohibited and the use of non-sparking tools and equipment will be required, if conditions warrant. Where the potential of fire exists, Ramboll will provide portable fire extinguishers and employees must be trained on proper use. All fire extinguishers shall be maintained as follows:

- Fully charged and in operable condition.
- Clean and free of defects.
- Readily accessible at all times.
- Be visually inspected each month and undergo a maintenance check each year.

Fire prevention and protection measures include elimination of ignition sources, where feasible, identification of combustion sources and atmospheres (e.g., Lower Explosive Limit [LEL] will be monitored), and early detection and rapid response to fire/explosion situations. In addition to standard operating procedures, the following safe work practices will be implemented:

- Site activities will comply with National Electric Code and explosion proof criteria.
- Smoking will not be permitted (or only in designated areas, if such areas are available). On sites where subcontractors are under the direction of Ramboll and fire/explosion hazards will be present, the subcontract shall state that smoking will not be permitted on-site and the Ramboll site supervisor shall enforce this requirement.
- Appropriate air monitoring will be conducted, when necessary.
- Welding, open flame or spark-producing operations will not be allowed on-site.
- Solvents with a flash point of less than or equal to 100 degrees Fahrenheit will not be used for cleaning purposes.
- Fire extinguishers shall be kept in all work vehicles.

All fires and visible smoke that are detected at the site will be dealt with immediately by the individual recognizing the fire and/or smoke. In the event of visible smoke, fire or explosion, the following emergency response procedures will be implemented:

- Immediately cease operations.
- In all emergency fire situations, contact emergency services.

For small fires, employees may attempt to extinguish the fire, if safe to do so and they have been trained. One fire extinguisher ONLY may be used to fight the fire. After one fire extinguisher is depleted, employees must evacuate the area. For larger fires, perform immediate site evacuation.

For more information, please refer to SPI 3–Emergency Action Plan. Consult with your local HSSC for any additional requirements.

B3–Job Zone Control–Implementation of Ramboll scopes of work require that field employees have a clear and organized plan prior to the start of work to control the chemical hazards of the job, ensure all contaminated materials (environmental media and otherwise) are contained and employees, PPE, and/or equipment are appropriately decontaminated. Job zone control will vary depending on the level contamination and complexity of the project and site and may include but not limited to:

- A site map.
- Site preparation for project activities (e.g., making roads, establishing traffic patterns).
- Establish work zones (i.e., Exclusion Zone, Contamination Reduction Zone, and Support Zone).
- Use of the buddy system.
- Decontamination procedures.
- Site security (e.g., fences, locks, hired security).
- Communication plan.
- Safe work practices (e.g., good hygiene, avoid contact with contaminated media).

If the site investigation/remediation is being done at hazardous waste site, the PPE requirements will be forwarded as noted in the site-specific health and safety plan. Kneeling, lying in, or sitting on contaminated ground or materials must be avoided or a protective barrier must be used. Avoid or minimize handling of contaminated materials. Clean water will be kept available for decontamination, washing, and dust control. When water is required for decontamination, the necessity of containerizing

and properly handling this water must also be evaluated. Consideration must also be given to decontamination of equipment such as drilling rigs, augers, and heavy equipment used for excavation/trenching. Subcontractors may need to include items such as decontamination pads and wash water containerization in the cost estimation stage; advance planning for job zone control is imperative.

The job zone control plan must be clearly outlined in the site-specific HASP and discussed in advance of start of work with all Ramboll project employees, associated subcontractors, and site contacts, as appropriate. Consult with your local HSSC for any additional requirements.

B4–Heat–Heat stress can be a significant hazard, especially for workers wearing protective clothing. Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly, within as little as 15 minutes. Site employees will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim and in the prevention of heat stress incidents.

Workers will be encouraged to immediately report any heat-related problems that they experience or observe in fellow workers. Any worker exhibiting signs of heat stress and exhaustion should be made to rest in a cool location and drink plenty of water. Emergency help by a medical professional is required immediately for anyone exhibiting symptoms of heat stroke, such as red, dry skin, confusion, delirium, or unconsciousness. Heat stroke is a life-threatening condition that must be treated immediately by competent medical authority.

The following American Conference of Governmental and Industrial Hygienists (ACGIH) screening criteria table shows heat stress exposure in degrees Celsius for an 8-hour work day, 5 days per week with conventional breaks will be used in determining safe exposure for acclimatized (adapted to site-specific environmental conditions) and unacclimatized (not adapted to site-specific environmental conditions) employees. Please note that at elevated temperatures, the ability to safely complete heavy or very heavy work is very limited and frequent rest breaks are required. The project schedule and budget should account for additional staff and/or a longer timeline to completion.

Allocation of Work in a Work/Rest Cycle	Acclimatized				Action Limit (Unacclimatized)			
	Light	Moderate	Heavy	Very Heavy	Light	Moderate	Heavy	Very Heavy
75-100%	31.0 (87.8F)	28.0 (82.4F)	--	--	28.0 (82.4F)	25.0 (77F)	--	--
50-75%	31.0 (87.8F)	29.0 (84.2F)	27.5 (81.5)	--	28.5 (83.3F)	26.0 (78.8F)	24.0 75.2F)	--
25-50%	32.0 (89.6F)	30.0 (86F)	29.0 (84.2F)	28.0 (82.4F)	29.5 (85.1F)	27.0 (80.6F)	25.5 (77.9)	24.5 (76.1F)
0-25%	32.5 (90.5F)	31.5 (88.7F)	30.5 (86.9F)	30.0 (86F)	30.0 (86F)	29.0 (84.2F)	28.0 (82.4F)	27.0 (80.6F)

Heat Stress Prevention

Whenever possible, or within the control of Ramboll, engineering controls should be utilized to protect workers from heat related hazards. For example, isolation from the heat source, ventilation such as

open windows, fans or other methods of creating air flow and heat shielding such as awnings or umbrellas.

Appropriate work practices can also lessen the chances of heat related hazards as follows:

- Water intake should be about equal to the amount of sweat produced (i.e., drinking 5-7 ounces of water every 15-20 minutes). Electrolyte fluids may also be necessary.
- Whenever possible, gradual exposure to heat (i.e., acclimatization) is preferred to allow the body's internal temperature to actuate to the working conditions.
- Whenever possible, adjust the work schedule to reduce risk of heat stress. For example, postpone nonessential or heavier work to the cooler part of the day and perform work in the shade if portable.
- Rotate employees to reduce the amount of time spent working in direct sun and heat. Work at sites where heat stress is a significant hazard should not be completed by Ramboll employees working alone.
- Increase the number and/or duration of rest breaks, and whenever possible, rest break areas should be in a cool area as close to the work area as is feasible.

Wear appropriate PPE when necessary, such as thermally conditioned clothing, self-contained air conditioning in a backpack and plastic jackets/vests with pockets that can be filled with dry ice or ice. However, based on the type of work being done, where work is being performed or other required PPE, these options may be prohibited or make the use of this PPE impossible or impractical.

For more information, please refer to SPI 30–Heat Stress. For additional information on Heat Stress first aid, refer to Appendix D First Aid Guidance. Consult with your local HSSC for any additional requirements.

B5–Cold-The four environmental conditions that cause cold-related stress are low temperatures, high/cool winds (wind chill), dampness, and cold water. One, or any combination of these factors, can cause cold-related hazards. Cold stress, including frostbite and hypothermia, can result in severe health effects.

A dangerous situation of rapid heat loss may arise for any individual exposed to high winds and cold temperatures. Major risk factors for cold-related stresses include:

- Wearing inadequate or wet clothing thus increasing the effects of cold on the body.
- Taking certain drugs or medications such as alcohol, nicotine, caffeine and medication thus inhibiting the body's response to the cold and/or impairing judgment.
- Having a cold or certain disease, such as diabetes, heart, vascular and thyroid problems, and thereby increasing susceptibility to the winter elements.
- Lower body-fat composition or other physiological differences. Statistics show that men experience far greater death rates due to cold exposure than women, potentially attributable to participation in risk-taking activities, lower body-fat composition and/or other physiological differences.
- Becoming exhausted or immobilized, especially due to injury or entrapment, thus speeding up the effects of cold weather.
- Advanced age. The elderly are more vulnerable to the effects of harsh winter weather.

The following table provides the resulting equivalent chill temperature to exposed skin because of increasing wind speeds at decreasing actual temperatures. Ramboll employees shall be aware of predicted weather conditions before beginning site work and stay apprised of changes.

TABLE 2. Cooling Power or Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
5	48	37	27	16	6	−5	−15	−26	−36	−47	−57	−68
10	40	28	16	4	−9	−24	−33	−46	−58	−70	−83	−95
15	36	22	9	−5	−18	−32	−45	−58	−72	−85	−99	−112
20	32	18	4	−10	−25	−39	−53	−67	−82	−96	−110	−121
25	30	16	0	−15	−29	−44	−59	−74	−88	−104	−118	−133
30	28	13	−2	−18	−33	−48	−63	−79	−94	−109	−125	−140
35	27	11	−4	−20	−35	−51	−67	−82	−98	−113	−129	−145
40	26	10	−6	−21	−37	−53	−69	−85	−100	−116	−132	−148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER In < hr with dry skin. Maximum danger of false sense of security				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trenchfoot and immersion foot may occur at any point on this chart.											

*Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

Equivalent chilll temperature requiring dry clothing to maintain core body tempearture above 36°C (96.8°F) per cold stress TLV

For more information, please refer to SPI 29–Cold Stress. For additional information on Cold Stress first aid refer to Appendix D First Aid Guidance. Consult with your local HSSC for any additional requirements.

B6–Severe Weather–Monitor the potential for severe weather in the days following the project. Severe weather conditions include but are not limited to high winds, electrical storms, and heavy rain, the highest hazard being lightning. When lightning is spotted, site employees should seek shelter immediately, and use the following steps to avoid injury:

- Note the flash-boom ratio: count the time from the flash to the bang—for each 5 seconds between, the lightning is 1 mile away (activate lightning safety plan at count of 30 or 6 miles (9.6 kilometers) away) and don't resume activities for 30 minutes—it's called the **30-30 rule**).
- If the storm is more than 6 miles (9.6 kilometers) away (greater than 30 seconds between lightning and thunder), the site supervisor should monitor the storm and be prepared to cease work if the storm becomes closer than the safe distance of 6 miles (9.6 kilometers). Since storms can travel at varying speeds, and the amount of time it takes to cease, and secure operations will also vary, prudent judgment should be exercised when storms are in the vicinity and/or developing (e.g., darkening skies, increasing wind speeds, etc.).
- Regardless of travel distance to the storm, based on the flash-boom ratio, workers should not stay in exposed areas (on a roof, in an aerial lift, on a steel truss, on an ungrounded steel structure, in a golf cart, un-sided building, etc.) after lightning has been witnessed. All employees must move to a safe, preferably interior, location.

- Workers should wait 30 minutes from the last sight of lightning or sound of thunder before returning to work.
- Those required to travel from one building to another during the 30-minute wait time should do so only by enclosed vehicle.
- Once the 30-minute wait time has elapsed and no additional lightning or thunder has been seen or heard, individuals may resume normal work.

Here are some guidelines in preventing this electrifying hazard:

- Always monitor weather conditions, especially when going outdoors. Be prepared to shut down the job if thunderstorms are forecast.
- Keep an eye on the weather throughout the day. Stay tuned to the radio for updates on the weather.
- If lightning threatens, seek shelter indoors.
- If a storm is up and you are caught outdoors, seek the appropriate shelter. Here are examples of safe shelter sites:
  - substantial buildings
  - low ground — seek cover in clumps of bushes
  - fully enclosed metal vehicles with the windows rolled up
  - trees of uniform height
- The following are unsafe areas to seek shelter in:
  - electric/power poles
  - electrical equipment
  - heavy and road machinery
  - solitary trees
  - high ground and caves
  - water
  - open fields
  - all outdoor metal objects, like gates and fences
  - high mast light poles
  - metal bleachers
- If you feel your hair standing on end, and/or hear “crackling noises”, you are in lightning’s electric field and it is close.
- If lightning is extremely close to you and you are caught outside without shelter, immediately remove baseball cap and other metal objects and place them away from you. Put your feet together, duck your head, and crouch down low in baseball catcher’s stance with hands on knees.
- Be cautious in following a thunderstorm as the lightning may not be over.

- If a co-worker gets struck by lightning, administer first aid immediately. Remember that it is safe to touch them as they do not carry an electric charge. Seek medical assistance immediately.

For more information about severe weather systems not described herein, please refer to SPI 3-Emergency Action Plan. Consult with your local HSSC for any additional requirements.

B7–Safe Walking Surfaces and Work Areas–Hazards from floor and wall openings, careless movements, protruding objects, debris, spills, placement of materials on paths or foot traffic areas, present a problem with regards to slips, trips, falls and injury. When possible, prior to site work, evaluate site ground conditions and identify areas where an increased risk of slips, trip or falls may exist. If conditions warrant, consider distinguishing a safe work path or establishing road/walk ways on longer term projects.

Ramboll employees shall minimize the risk of slips, trips and falls by establishing general good housekeeping in work areas at all times including, but not limited to keeping the work area clear of excess equipment and cleaning up wet surfaces as soon as possible. In addition, the floor of every workroom shall be maintained in a clean and, as much as possible, a dry condition. Employees should avoid walking on wet and/or cluttered surfaces and be conscious of the fact the wet surfaces could be slippery and have the potential to cause injury. Spilled materials should be cleaned up immediately.

Employees should always stay alert and, if tired or distracted, take this into account when working at the site. To minimize the possibility of injury:

- Wear sturdy, steel-toed work boots with good tread.
- Do not run.
- Slide feet when walking on slick/wet surfaces.
- Do not walk up or down steep embankments/hills, if possible. If not possible, walk at an angle when going up/down embankments/hills.
- Do not carry items that block your vision.
- Use handrails/grips when available and maintain 3-point contact whenever possible.
- Do not jump down from equipment. Look down before you step down.
- Report any floor openings that are not clearly marked and/or guarded.
- Keep paths and work areas clear of tools, equipment, boxes, cords, etc. Tape or secure cords, wires, etc. to minimize trip/fall hazard.
- If a protruding object cannot be moved, make sure the object can be easily seen or guard/pad the object, if possible.
- Use ancillary lighting, such as flashlights and headband lights, when necessary.

Sufficient lighting should always be provided in all areas. Employees should notify the responsible person of conditions where there is an absence of sufficient natural and/or permanent artificial light.

Emergency exit doors will always be kept free of obstacles. Any employee finding an emergency door blocked should immediately report the condition and correct it if possible. Exit lights and signs will also be maintained in proper condition at all times and immediately reported if deficient.

For more information about physical hazards, please refer to SPI 26–Slips, Trips and Falls. Consult with your local HSSC for any additional requirements.

B8–Noise–Hearing protection will be worn by all employees working within the vicinity of equipment where noise is sufficient to interfere with general conversation at a normal speaking volume, when noise levels exceed 85 A-weighted decibels (dBA), and/or when the manufacturers' requirements indicate that hearing protection is mandatory. Personal hearing protection, such as earplugs or earmuffs, may be used to reduce the amount of noise exposure while the above control measures are being evaluated or if such controls fail to reduce the exposure levels to below the PELs.

HPDs (hearing protective devices) may be used to reduce the amount of noise exposure while control measures are being evaluated or if controls fail to reduce the exposure levels to below 85 dBA. The use of HPDs is mandatory for Ramboll employees whose 8-hour TWA noise exposure exceeds 85 dBA. Other employees may also voluntarily wear HPDs, as long as their use does not interfere with the safe performance of on the job duties.

HPDs can prevent significant hearing loss, but only if they are used properly and the correct device is chosen. This can be difficult when employees work in a different environment for each project. When evaluating the need for hearing protection, consider the sources of noise that will be present on the project, your proximity to those sources, and the duration of your exposure. If the exact source(s) of noise are known, you can consult the manufacturer (or internet) for an accurate dBA. Conversely, example sound levels can be researched on the internet for common types of machinery and ALWAYS use conservative professional judgment.

Each type of HPD has a noise reduction rating (NRR), found on its packaging, which is the measure, in dB, of how well a hearing protector reduces noise. The higher the number, the greater the noise reduction.

Ramboll uses the following method to assess the hearing protector's adequacy:

- Obtain the employee's noise exposure A-weighted TWA, when possible, or use an estimate
- Subtract 7 dB from the NRR, and subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector
- For example, if an earplug has an NRR of 26 and the 8-hour TWA is 100 dBA, the exposure would be 100-(26-7) = 81 dBA. Thus, this type of earplug, if worn properly, should provide adequate protection

Also, when dual protectors are used, the combined NRR provides approximately 5 dB more protection than the higher rated of the two products. For example, using ear plugs (NRR of 29 dB) with ear muffs (NRR 27 dB) would provide an NRR of 34 dB

(Earplugs NNR 29) + 5 = 34 dB (the combined NRR)

There are three types of HPDs:

1. Ear plugs, the most popular HPD, which are inserted into the ear canal to provide a tight seal against the canal walls to keep out excess noise
2. Ear bands, which rest outside the ear canal and provide a seal to keep out excess noise
3. Ear muffs, which enclose the entire ear inside rigid cups and the inside of the muff cup is lined with acoustic foam

Multiple types of earplugs and ear muffs should be provided to employees and the appropriate pair selected to control the noise hazards they may experience in the field.

Hearing protection should be worn when working within 25 feet of operating heavy equipment (drilling rigs, earth working equipment, etc.) as working around this type of equipment can result in exposure to hazardous levels of noise (levels greater than 90 dBA).

For more information about acoustical hazards, please refer to SPI 8–Occupational Noise Exposure. Consult with your local HSSC for any additional requirements.

B9–Unexploded Ordinances–Some sites (e.g., mines, firing ranges, former military-owned/operated sites, ordinance manufacturing facilities, etc.) may have old explosives, blasting caps, or other types of unexploded ordinances stored on site (e.g., in mines, in structures surrounding the mine or buried on site). Individuals must take immediate action in the event of finding and/or suspecting that explosives may be present. These actions include, but are not limited to, not touching or disturbing suspected explosives or making loud noises in their immediate vicinity. Slowly retreat from the area and immediately report to the PD/PM, local HSSC and Corporate HSS Director so that ordinance experts can be contacted.

B10–Closed/Abandoned Mines–Project work conducted on former mining sites presents a higher level of risk to Ramboll employees. The underground mine and associated buildings and equipment may not have been maintained over the years. The structural soundness of the mine, buildings and equipment may be compromised and could collapse. Mining sites are often in remote and dangerous areas. Mining operations are often specifically controlled by an administration or group designated by the country-specific location of the site (i.e., Mine Safety and Health Administration in the US) and have specific health and safety regulations they are accountable to meet. Additional training is typically required before Ramboll employees are permitted to work at a mine site.

Employees are to avoid all contact with mines, mine structures, and building supports without prior HS authorization. Employees are not to venture into mines or perform work in any areas should they appear structurally unstable. These conditions are to be immediately reported to the PC, Project HSSC, and Corporate HSS Director.

B11–Operational Facility –Working in an operational facility requires that Ramboll establish a safe work perimeter and cordon work area to the extent that it is possible and appropriate. Creating this safe work area will protect Ramboll employees and its subcontractors from traffic and hazards created in the operating environment and, in turn, protect facility employees or other observers, pedestrians, vehicles, adjacent property owners, etc. from hazards created by Ramboll activities. Prior to start of work, Ramboll employees shall discuss this safe work area with the operational facility representative(s) in coordination with any Ramboll subcontractors. Consideration for potential hazards including forklift traffic, pedestrian traffic, overhead and/or underground hazards, dust and/or fume generation, at a minimum, shall be discussed. If traffic control is required beyond cones, signage, and temporary fencing, etc., and the facility cannot provide in-house traffic control, Ramboll shall consider contracting with a traffic control contractor and/or conducting work during off-hours.

Working in an operational facility requires that Ramboll establish a safe work perimeter and cordon work area to the extent that it is possible and appropriate. Creating this safe work area will protect Ramboll employees and its subcontractors from traffic and hazards created in the operating environment and, in turn, protect facility employees or other bystanders from hazards created by Ramboll activities. Prior to start of work, Ramboll employees shall discuss this safe work area with the operational facility representative(s) in coordination with any Ramboll subcontractors. Considerations including forklift traffic, pedestrian traffic, overhead and/or underground hazards, dust and/or fume generation, at a minimum, shall be discussed. Consider the use of cones, signage, and temporary fencing, etc. If conditions warrant, and the facility cannot provide in-house traffic control, Ramboll

shall consider contracting with a traffic control contractor. Depending on the operations conducted by the facility, and the investigation required by Ramboll, it may be necessary to consider modifying work hours to early morning, overnight, weekend, or some other time where facility operations can be modified.

For additional information, refer to B18–Heavy Machinery, SPI 11–Trenching and Excavation Awareness, SPI 27 Subsurface and Overhead Clearance, SPI 33–Tool and Equipment Safety and SPI 37–Rigging and Material Lifting. Consult with your local HSSC for any additional requirements.

B12–Radiation–The two broad categories of radiation–non-ionizing and ionizing–are distinguished by the frequency, low and high, respectively. Non-ionizing radiation is commonly encountered, is low frequency and is typically benign (e.g., radio waves, microwaves, infrared radiation). Non-ionizing radiation also encompasses lasers and the visible light spectrum. In general, neither hazard evaluation nor controls are typically needed when conducting work where non-ionizing radiation is present. However, in a commercial/industrial occupational setting, non-ionizing radiation can present significant hazards without proper controls. Each work site presents unique hazards and as such should be evaluated for any necessary controls. At a minimum, PPE shall include appropriate eye and skin protection.

Ionizing radiation includes the higher frequency radiation classes including ultraviolet, x-ray, and gamma rays. Chronic or acute exposure to ionizing radiation can cause injury under certain circumstances and hazard evaluation is required. While there is no level of ionizing radiation that is considered “safe”, health professionals generally agree on limiting a person's exposure beyond background radiation to about 100 millirem (mrem) per year from all sources. Exceptions are occupational, medical or accidental exposures. Medical X-rays generally deliver less than 10 mrem.

Work on projects involving ionizing radiation exposure requires approval from the HS department, additional radiation training and the development or participation in an exposure monitoring program. Contact the HS Director for additional information.

B13–Confined Spaces–With the exception of Ramboll’s wastewater treatment operations, Ramboll does not have confined spaces on its premises. However, sites that are visited by Ramboll or its subcontractors could possibly have confined spaces and, as such, must obtain, and review confined-space information from the host facility.

In general, Ramboll employees are not permitted to enter a confined space or perform work in a confined space that would create a hazard and make it a permit-required confined space. If Ramboll employees are asked by a client to enter a confined space, Ramboll management must be informed, and be contacted for prior authorization.

To be a "confined space", **all** the following must be met:

- The space is large enough, and configured such that a person can bodily enter, and perform assigned work,
- The space has limited or restricted means for entry or exit, and
- The space is not designed for continuous occupancy.

Permit-required confined spaces. To be a "permit-required confined space", the space must first meet all the definitions given above, and present one or more of the following conditions:

- Contains or has a potential to contain a hazardous atmosphere,
- Contains a material that could engulf an entrant (person entering the space),

- Is configured such that an entrant could be trapped or asphyxiated by inwardly converging walls or floors, or
- Contains any other recognized serious safety or health hazard.

Ramboll's health and safety policy prohibits unauthorized entry of site and facility employees into confined spaces.

Prior to entering a confined space, Ramboll employees (or its subcontractor's employees) need additional training. Without Confined Space training, entry into confined spaces is prohibited. In addition, entry authorization will only be given after Ramboll management has reviewed the nature of the confined space, the hazards present, and the measures needed to ensure safety. Under these circumstances, Ramboll will work with the host facility to determine training requirements, sampling requirements, written program requirements, and equipment needed to safely enter the confined space. Ramboll shall develop a standardized training format to meet the requirement for a safe confined space entry, as applicable.

Ramboll employees should prevent unknowing entry into confined spaces through heightened awareness when assessing new or unfamiliar facilities and job tasks. Some common structures employees may encounter in the field that *may* trigger confined space entry requirements include crawl spaces, ditches, trenches/excavations, underground equipment rooms or vaults and other industrial equipment spaces. Early identification of potential confined space issues allows the project team and the HS department to assess the hazards and implement the appropriate controls prior to the start of work activities. If you are unsure if a space at your worksite triggers confined space requirements, contact your PM, HSSC and the HS department for addition assistance.

For more information, please refer to SPI 10–Confined Space Awareness. Consult with your local HSSC for any additional requirements.

B14–Live Electrical Equipment–Electricity may pose a hazard to site workers due to the need to supply power to operate a newly installed system (e.g., remediation system) or the ongoing operations at the job site (e.g., electrically powered pumps/sampling devices, electrically generated lighting)). If wiring or other electrical work is needed to complete a Ramboll project scope of work, a qualified, licensed electrician must perform it.

In advance of starting work, it is important to understand the environment where work will be performed to ensure that work can be conducted safely. Depending on the environment, electrical equipment may need to be labeled as inherently safe and/or grounded in a specific manner. Consult with facility employees for any site-specific directives.

General electrical safety requirements include:

- All electrical wiring and equipment must be a type listed by Underwriters Laboratories (UL), Factory Mutual Engineering Corporation (FM), or other recognized testing or listing agency.
- All portable generators or other portable internal combustion type devices used on site will be grounded. All grounds will be validated twice daily with a multimeter to confirm a resistance of less than ten ohms.
- All installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or United States Coast Guard regulations.

- Portable and semi-portable tools and equipment must be grounded by a multiconductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.
- Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double-insulated tools must be distinctly marked and listed by UL or FM.
- Live parts of wiring or equipment must be guarded to prevent persons or objects from touching them.
- Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
- All circuits must be protected from overload.
- Temporary power lines, switchboxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.
- Plugs and receptacles must be kept out of water unless constructed for submersion.
- All extension cord outlets must be equipped with ground-fault-circuit interrupters (GFCIs), if possible.
- Attachment plugs, or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.
- Extension cords or cables must be inspected prior to each use and replaced if worn or damaged.
- Cords and cables must not be fastened with staples, hung from nails or suspended by bare wire.
- Flexible cords must be used only in continuous lengths without splice, except for molded or vulcanized splices made by a qualified electrician.

If a live electrical hazard presents the potential for fire, Ramboll will provide portable fire extinguishers and employees shall be trained on proper use. All fire extinguishers shall be maintained as follows:

- Fully charged and in operable condition.
- Clean and free of defects.
- Readily accessible at all times.
- Be visually inspected each month and undergo a maintenance check each year.

Fire prevention and protection measures include elimination of ignition sources, where feasible, identification of combustion sources and atmospheres, and early detection and rapid response to fire/explosion situations. In addition to standard operating procedures, the following safe work practices will be implemented:

- Site activities will comply with National Electric Code and explosion proof criteria.
- Smoking will not be permitted (or only in designated areas, if available). On sites where subcontractors are under the direction of Ramboll and fire/explosion hazards will be present, the subcontract shall state that smoking will not be permitted on-site and the Ramboll site supervisor shall enforce this requirement.
- Appropriate air monitoring will be conducted, when necessary.

- Welding, open flame or spark-producing operations will not be allowed on-site.
- Solvents with a flash point of less than or equal to 100 degrees Fahrenheit will not be used for cleaning purposes.
- Fire extinguishers shall be kept in all work vehicles

All fires and visible smoke that are detected at the site will be dealt with immediately by the individual recognizing the fire and/or smoke. In the event of visible smoke, fire or explosion, the following emergency response procedures will be implemented:

- Immediately cease operations.
- In all emergency fire situations, contact emergency services.

For small fires, employees may attempt to extinguish the fire, if safe to do so and they have been trained. One fire extinguisher ONLY may be used to fight the fire. After one fire extinguisher is depleted, employees must evacuate the area. For larger fires, perform immediate site evacuation.

For more information, please refer to SPI 3–Emergency Action Plan and SPI 9–Electrical Safety. Consult with your local HSSC for any additional requirements.

B15–Overhead Hazards-Work near operating equipment (e.g., drill rigs, heavy machinery, excavating equipment, etc.), near structural features such as scaffolding, cranes/rigging, low overhead clearance, and in unstable environments with falling debris presents overhead safety hazards. Ramboll employees shall evaluate the presence of overhead hazards prior to the start of work and ensure that appropriate controls are put in place to protect site employees including, but not limited to PPE (i.e., hard hats). As circumstances may change after work begins, Ramboll employees should be aware that site controls to address overhead hazards may need to change as well.

When conducting work around a scaffold, controls are required in addition to wearing hardhats. Employees shall be provided with additional protection from falling hand tools, debris, and other small objects through the installation of toe boards, screens, or guardrail systems, or through the erection of debris nets, catch platforms, or canopy structures that contain or deflect the falling objects. When the falling objects are too large, heavy or massive to be contained or deflected by any of the above-listed measures, the employer shall place such potential falling objects away from the edge of the surface from which they could fall and shall secure those materials as necessary to prevent their falling.

When Ramboll is conducting work at an operational site and/or with the assistance of a subcontractor, these precautions and safety mechanisms must be discussed and established prior to the start of work and documented in the site-specific HASP.

B16–Work Near Railroads-In the event that work activities are required adjacent (within 25 feet) to a railroad track, the rail company must be contacted prior to the start of work and access provided. Access may require additional discussion, planning, fees and employees. The health and safety procedures must be coordinated with the rail company.

If work activities are planned near a rail line (greater than 25 feet), the following procedures will be implemented:

- The hazards of working near railroad lines will be included in job briefings prior to commencing work and when the activity changes.
- Mounting, dismounting, or crossing over moving locomotives or cars is prohibited.

- Employees will be alert for the movement of cars, locomotives, or equipment at any time, in either direction, on any track and will remain at least 25 feet (8 meters) from the end of standing cars, equipment, or locomotives, except when proper protection is provided (e.g., a flagman is present or the track is taken out of service by the proper authority, prior to starting any work on or about the tracks).
- Employees will not take refuge under any car, equipment, or locomotive.

Please refer to SPI 33–Tool and Equipment Safety for additional information. Consult with your local HSSC for any additional requirements.

B17–Traffic Management–If Ramboll employees are required to conduct work within an active public roadway, the appropriate entity–local, state, federal–responsible for the roadway must be contacted. Specialized permits may be required in addition to retention of specialized traffic management contractors. Various degrees of barrier protection may be required based on site-specific traffic conditions.

In addition to and in the absence of local traffic management requirements, Ramboll employees will take the appropriate steps to protect the worksite from interference with traffic/pedestrians and vice versa. The following measures for safe coexistence of traffic and employees shall be considered:

- Alternative walkways where possible;
- Use of an air horn to alert drivers or other workers;
- Maintain good housekeeping and clean the areas as work is completes;
- Use the buddy system while performing work;
- Use a spotter for backing, tight maneuvers and equipment/tank/bin drop-offs;
- Use traffic control devices, field vehicles and barricades;
- Park all vehicles (with wheels in a safe direction away from fieldwork) to block traffic with a flashing yellow light. Also, park so that access to the vehicle is away from oncoming traffic while working;
- When parking a vehicle and equipment, utilize a 'first move forward' driving practice;
- Work in an upright position, facing traffic when possible;
- Make eye contact with vehicle drivers so that they can recognize your presence;
- Minimize work time in traffic through scheduling, and;
- Establish a 'stop work' hand signal.

If controls have been reviewed and upgraded but the situation with speeding vehicles is still unsatisfactory, request additional assistance from the local Police department.

Please refer to SPI 33–Tool and Equipment Safety for additional information. Consult with your local HSSC for any additional requirements.

B18-Heavy Machinery/Drilling Rigs–Working near operating equipment (e.g., drill rigs, heavy machinery, excavating equipment, power tools, pumps, etc.) poses unique safety situations such as high-pressure hazards from hoses and pipes, overhead hazards, and material releases. Also, other hazards may be present such as falls from elevation, electrical contact and improper machine guarding. Ramboll employees shall only operate equipment they are trained to operate and that is

equipped with appropriate protection devices. For equipment operated by subcontractors, Ramboll employees shall familiarize themselves with the equipment being utilized, and shall, at a minimum, know how to stop or turn off the equipment in the event of an emergency. Ramboll employees do not operate drilling or other heavy equipment, however, it is every employee's responsibility to recognize safe, appropriate use and be familiar with all potential and/or existing hazards related to the use of operating equipment. In the event of unsafe work practices by facility employees, subcontractors, and/or other Ramboll employees, all Ramboll employees have stop work authority for any unsafe operations.

Certain scopes of work conducted during Ramboll projects, require the use of heavy equipment (e.g., excavators, loaders, cranes, etc.) that must be subcontracted with a qualified subcontractor. Ramboll employees should, under no circumstances, operate or ride on heavy equipment. Site employees will don high visibility vests and maintain a safe distance of at least 20 feet (6.1 meters) from all heavy equipment in operation. If the equipment has a mast or an arm characteristic of a drill rig, crane, or excavator, a safe distance is approximately one and a half times the height of the equipment. If activities warrant closer proximities to operating equipment employees will discuss this need and safe procedures for approach with the equipment operator in advance of the start of work. Prior to approach, personal shall make eye contact with the operator and ensure that the equipment is powered down, or at a minimum, in a resting position. A second Ramboll employee will stand watch to keep him/her out of the path of equipment while performing the required activity. Further, employees shall keep a minimum distance of 3 feet from an open drill hole, excavation, mud pit, or any other opening. Ramboll employees will not place tools, meters, etc. in a position that could create a fall, trip or slip hazard. As much as is possible, employees will work with the appropriate site employees to ensure the area near the operating equipment is clean, orderly and free of slip, trip and fall hazards. The following procedures should be followed when heavy equipment is in use:

- Use common sense. Do no assume that the equipment operator is keeping track of your whereabouts. Never walk directly behind, or to the side of, heavy equipment without advance discussion and agreed upon procedures, the operator's knowledge, eye contact and acknowledgement.
- All heavy equipment must be shut down during refueling.
- Maintain visual contact of moving equipment at all times.
- Establish hand signal communication prior to the start of work in circumstances when verbal communication is difficult. This mode of communication should be discussed at the start of each work day during the health and safety tailgate meeting.
- All heavy equipment shall have backup alarms of some type.
- Use chains, hoist, straps, and any other equipment to safely aid in moving heavy materials.
- Be sure that no underground or overhead power lines, sewer lines, gas lines, or telephone lines, will present a hazard in the work area. Specifically note overhead hazards in the area where equipment will need to mobilize across the site from the site entrance to the work area.
- Restrict all non-essential people from of the work area. If observation by non-essential third parties (e.g., the client, facility personnel, stakeholders) is necessary, determine a safe zone outside the active work area and cordon the area in some manner.

- Prohibit loose-fitting clothing or loose long hair around moving machinery.
- Instruct equipment operators to report any abnormalities such as equipment failures, unusual odors, etc.
- Store tools in clean, secure areas so that they will not be damaged, lost or stolen.
- When an equipment operator must negotiate in tight quarters, request that the subcontractor provide a second person to ensure adequate clearance. Ramboll employees shall not provide specific direction as to how to operate equipment–it is the responsibility of the subcontractor.
- All heavy equipment must be properly leveled and supported prior to use.
- When heavy equipment is utilized inside a building, precautions must be taken to ensure that there is appropriate ventilation and exhaust is vented to the outside.
- Heavy equipment and trucks will be operated in specific site control zones and marked traffic lanes.
- Materials, tools, or other objects will not be thrown, tossed or dropped. Always hand off or lower items as needed.

Employee Restrictions and Responsibilities

Under no circumstances will a Ramboll employee operate a heavy machinery, a portion thereof, or any other piece of contractor or facility equipment.

In addition, Ramboll employees will not:

- Direct equipment operator to a work location, provide specific guidance to subcontractor with respect to the operation of the equipment, assist in the movement of equipment or participate in the movement or breaking down of any portion of the equipment.
- Climb on the equipment.
- Watch a subcontractor arc-weld.
- Smoke while at the work site.
- Refuel an engine while it is still running or hot, siphon gasoline or park near equipment exhaust.
- Wear loose fitting clothing or PPE near operating equipment.

B19-Trenching/Excavation–An excavation is any manmade cut, cavity, trench, or depression in the ground surface, formed by earth removal. A trench is narrow excavation (in relation to its length) made below the surface of the ground. The following safe operating guidelines apply to open trenches or excavations exceeding four (4) feet (1.3 meters) in depth **or** of any depth if unstable soil conditions exist.

Excavations and trenches present a heightened risk on Ramboll projects. In addition to the heavy equipment hazards discussed in control B18, trenches and excavation create hazards associated with confined spaces, dangerous gas build up, unstable soil conditions, water retention, etc. For these reasons, excavation and trenching work shall only be performed by competent contractors training in the health and safety requirement associated with this type of work, in accordance with corporate standards and local/region regulations. When excavation/trenching work in managed by Ramboll

employees under a direct subcontractor, additional health and safety planning should be performed in conjunction with the subcontractor to ensure all HS requirements are satisfied.

Regardless of the management of the excavation or trenching work, Ramboll employees working on projects where this type of work is being performed shall have an awareness level of training on the topic and ensure best practices are followed, including but not limited to:

- Excavated materials will be stored and retained at least 2 feet (0.6 meters) from the edge of the excavation. This procedure must be observed even when excavation/trench entry will not occur. The location for staging soil shall be determined by Ramboll employees, the subcontractor, and facility personnel, if applicable, in advance of the start of work.
- Trees, boulders, and other surface encumbrances that create a hazard will be removed or made safe before the start of work.
- Special precautions will be taken in sloping or shoring the sides of excavations adjacent to a previously backfilled excavation.
- Except in hard rock, excavations below the level of the base of the footing of any foundation or retaining wall will not be permitted, unless the wall is underpinned and all other precautions have been taken to ensure the stability of the adjacent walls. Please consult directly with the project PM, PD, local HSSC, and the Corporate Director of HSS when planned excavations potentially threaten the integrity of any structures.
- Excavations will be inspected at least daily, or more often as conditions warrant, by a **competent person** (i.e., the subcontractor in coordinator with the Ramboll site supervisor) to ensure that changes in temperature, precipitation, shallow groundwater, overburden, nearby building weight, vibrations, or nearby equipment operation has not caused weakening of sides, faces and flows. Without proper training in confined space entry, Ramboll employees shall not enter any excavation greater than four (4) feet (1.3 meters) in depth (or less if soil is deemed unstable by a competent person). If a Ramboll employee is properly trained in confined space entry and has project-specific approval from the Corporate Director of HSS prior to entry, the atmosphere of the excavation must be tested to ensure that an oxygen deficient or hazardous atmosphere does not exist. If, at any time, the concentration of any airborne contaminant exceeds one-half its permissible exposure limit (PEL), or other applicable occupational exposure limit (OEL), the airborne oxygen concentration is less than 19.5 percent, or explosivity exceeds ten percent of the lower explosive limit (LEL), employees shall not be permitted to enter the excavation. Engineering controls or other hazard controls (i.e., upgraded PPE) shall be instituted to eliminate or control the hazard.
- Field employees shall not enter any excavation, greater than 4 feet in depth, without specific direction, for any reason. If employees fall into the excavation and require rescue, properly trained emergency personnel shall be contacted for support.
- Ramboll employees shall not operate trenching or excavation equipment. However, prior to start of work, the subcontractors shall direct Ramboll staff to the emergency stop for all equipment.

Ramboll employees directing subcontractors conducting trenching/excavation activities shall request, at the subcontracting stage, if possible, the following safe work practices:

- When mobile equipment is used or allowed adjacent to excavations, stop logs, or barricades will be installed. The grade will always be away from the excavation. Construction of such features shall be the responsibility of the subcontractor.
- A means of egress (ladder, ramps, stairways, etc.) shall be accessible at any location inside the excavation without requiring more than 25 feet (8.3 meters) of lateral travel distance.
- Dust conditions during excavation will be kept to a minimum. Wetting agents shall be used when appropriate.
- Diversion ditches, dikes, or other suitable means will be used to prevent water from entering an excavation and for drainage of the excavation. Construction of such features shall be the responsibility of the subcontractor.
- All excavations will be marked and protected at all times to ensure site employees, visitors, or unauthorized employees do not enter without permission or fall into the trench.
- Employees will work in pairs when working around an excavation of 2 feet (0.6 meters) or more.

In the event of unsafe work practices by facility personnel, subcontractors, and/or other Ramboll employees, all Ramboll employees have stop work authority for any unsafe operations. For more information, please refer to SPI 11–Trenching and Excavation Awareness. Consult with your local HSSC for any additional requirements.

B20-Vehicle Use–Work areas and site conditions must be considered when designating and selecting a vehicle for use (i.e., rental or company-owned). The vehicle shall be maintained in safe working order as required by the manufacturer. This would include a routine preventive maintenance schedule for servicing and checking of safety-related equipment. Special consideration should be taken when weather conditions reduce the safety and visibility while driving. Appropriate measures should be taken while driving during inclement weather including snow, icy and/or wet conditions; high winds; hail, heavy rains; debris or other impairments to safe driving caused by natural weather.

Special-use vehicles (e.g., All-Terrain Vehicles (ATV), snowmobiles, etc.) are vehicles with a light engine or electric motor, other than construction equipment, and are not intended and/or allowed for highway use. These vehicles may not have seat belts and **do not** meet substantial roll over protection standards (ROPS).

When operating vehicles, the following general practices will be followed:

- All vehicles will be operated in accordance with the manufacturer's requirements and specifications.
- Drivers should use prudent judgment and proceed cautiously when driving on non-paved roads. If using a rental car, ensure that the rental agreement allows driving on non-paved roads.
- Drivers will adhere to all site, local and state traffic laws including, but not limited to use of a hands-free device when speaking on a mobile phone. TEXTING WHILE DRIVING ANY VEHICLE IS STRICTLY PROHIBITED.

- Operators of special-use vehicles shall be trained by a competent person–senior Ramboll employees or otherwise. At a minimum, the training will be hands-on, and the operator shall demonstrate basic skills prior to the conclusion of the training exercise. All individuals are required meet all training aspects before vehicle operation. This training shall be documented with the local HSSC prior to the start of work.
- Vehicles shall always remain on flat surfaces and shall not be operated on slopes steeper than a 30 percent grade;
- Daily inspections of vehicles for safety and maintenance will be required (i.e., fluid leaks/levels, tire pressure, tire surfaces, lights, fuel levels, brakes, etc.).
- Speed limits shall be maintained relative to legal requirements, safe operating speeds for the vehicle and in compliance with any facility-specific directives.
- Make sure the engine is turned OFF before dismounting the vehicle.
- Avoid driving over any extreme obstacles (i.e. wood/logs, fences, boulders, etc.).
- Operation is limited to the daylight hours, if possible.
- Do not carry passengers.
- Slow down before coming to a stop.
- Shut engine down prior to refueling.
- Each driver will have a valid driver's license.

For more information, please refer to SPI 40–Driving Safety. Consult with your local HSSC for any additional requirements.

B21-Water On/Near Water–Certain scopes of work conducted during Ramboll projects, require work on, over, or near water. All employees and visitors must wear a United States Coast Guard (USCG) approved personal floatation device (PFD), or location-specific equivalent, when near water (i.e., within 4 feet/1.22 meter), over water, wading in water or on any vessel, where the danger of drowning exists. This PFD must be properly secured to the wearer, free of all defects including rips, tears, stress, and fading, and be kept clean and free of excessive dirt and oil. Several factors are relevant to determining whether a danger of drowning exists. These include the type of water body (i.e., a pool, a river, and a canal), depth, presence, or absence of a current, height above the water surface, the use of fall protection when working above a water body, and other site-specific/work-specific factors. Prior to the start of work, the contemplated scope of work shall be discussed with the PM, PD, and local HSSC to determine appropriate controls.

Depending on the factors present, there are some circumstances where a drowning hazard could exist where workers are near or over water that is relatively shallow (i.e., less than 2 feet/0.6 meters) in depth. For example, where workers are not using fall protection and are 10 feet above a river, a worker may fall and be knocked unconscious. Without the use of a life jacket or buoyant work vest, a worker in such a scenario could drown.

A life ring equipped with 90 feet of solid braid polycarbonate line, or equivalent must be close to the working area and accessible for use. This includes activities on board all vessels.

USCG boating safety guidelines or equivalent should be adhered to when operating a boat during sampling activities. Boats must be equipped with the required running lights for night-time and/or,

country-specific poor visibility conditions. Boats must be equipped with an anchor and alternate means of locomotion (e.g., extra motor, floatable oars).

All water work shall be performed by at least a two-person team. Both people shall be equipped with the proper safety gear and capable of readily summoning emergency rescue if needed. Ramboll employees are prohibited from working in or near water by themselves.

At least one lifesaving rescue vessel (e.g., a skiff) shall be immediately available at locations where employees are working over, in, on or adjacent to water where the danger of drowning exists. The need to have a rescue vessel "immediately available" for use is dependent upon a number of factors, including but not limited to:

- The number of work locations operating;
- The distance to each of those locations;
- Water temperature;
- Currents, and;
- Other hazards such as, but not limited to, rapids, dams, and water intakes.

In general, if the water is so shallow that rescuers could simply run into the water body without endangering themselves and/or others or the work was being conducted very close to shore (e.g., the length of the skiff from shore would be greater than the working distance from shore and/or the skiff would foul on the bottom anyway), a skiff would not be required.

All work aboard a vessel shall be performed by at least a two-person team. If work is performed at times when water temperatures are less than 38°F (3-4°C), it is recommended, but not mandatory, that sampling employees wear float coats. The vessel should be operated only by designated, experienced staff.

For additional information, please refer to SPI 31–Water Safety. Consult with your local HSSC for any additional requirements.

B22–Working from Heights (Less than 4 feet [1.2m])–Fall protection is not required for work conducted at heights less than 4 feet above ground level. However, when the potential for work at varying heights exists, or the potential that implementation of the scope of work may increase the height at which work is being conducted (e.g., excavation/trenching), hazards associated with work at heights should be considered. Further, a mechanism for monitoring and documenting the potential changing conditions and a contingency plan for controlling potential hazards should be included in the site-specific HASP.

In the event that unanticipated conditions resulting in work at heights greater than 4 feet (1.2 m) are encountered during implementation of the scope of work, site work should be stopped immediately and the Ramboll site supervisor shall contact the project PM, PD, and/or local HSSC.

Work up to four feet (1.2 meters) in height presents an increased risk of slips, trips, and falls and an increased severity of injury. Working off the back of a pick up or sport utility vehicle is a common low height situation encountered in the field. When ascending and descending a truck bed, dock or other raised structure implement best work practices like two-person teams and safe, deliberate movements.

For additional information, please refer to SPI 10–Fall Protection and SPI 26-Scaffolding. Consult with your local HSSC for any additional requirements.

B23–Working from Heights (Greater than 4 feet (1.2m)) increased risk is presented when Ramboll employees work from heights greater than 4 feet (1.2m) and an increase awareness and frequent assessment of changing work conditions is expected. Work from height greater than six feet (1.8m) requires additional fall protection requirements, potentially fall prevention devices and PPE, and additional HS training. Since the height of the work required for many projects may vary (e.g., work near and around excavations), Ramboll employees must evaluate the need to fall protection controls when work is conducted at heights greater than 4 feet (1.2m).

The best fall protection control is to eliminate the hazard using engineering controls or modification of the scope of work. However, at times hazards are identified during project work or develop because of changing site conditions. If dangerous or unexpected work conditions are identified, site work should be stopped immediately and the Ramboll site supervisor shall contact the project PM, PD, and/or local HSSC and the appropriate controls shall be implemented before work begins again.

In general, due to the tasks included in the scope of work, the hazards associated with working at heights can be anticipated in advance and depending on the objectives of the work, cannot be avoided. Hazard controls shall be documented in the site-specific HASP. At a minimum, the HASP shall include the hazards and risks associated with working at heights and control methods and will detail the required steps for protecting employees from fall hazards. Fall protection includes but is not limited to personal fall arrest systems consisting of a full body harness, a lifeline, and an attachment point. HS department notification and additional training is required for job tasks that involve fall protection equipment (i.e., body harness and lifeline, etc.).

Ramboll will provide training to ensure that the purpose, function, and proper use of fall protection is understood by employees and that the knowledge and skills required for the safe application, and usage is acquired by employees. Training will be conducted prior to job assignment and will include, as a minimum the types of fall protection equipment appropriate for use; recognition of applicable fall hazards associated with the work location and the work to be completed; and load determination and balancing requirements. All other employees whose work operations are or may be in an area where fall protection devices may be utilized, will be instructed to an awareness level concerning hazards associated with fall protection operations.

For additional information, please refer to SPI 10–Fall Protection and SPI 26-Scaffolding. Consult with your local HSSC for any additional requirements.

B24–Overhead/Underground Utilities–Various forms of underground and overhead utility lines, pipes (carrying water, wastewater, gas, electricity, and/or communication lines), or other hazards may be encountered during work activities. Every effort shall be made to locate and mark underground utilities, pipes, and other hazards prior to the start of intrusive work. Intrusive work includes any work activity where the work surface is penetrated. At a minimum, Ramboll will conduct a historical site review to develop a plot plan with the most up to date utility information, contact the appropriate One Call service (where available), contract a private utility locating service (where available [REQUIRED IN THE US]), and clear the critical zone around any intrusive location to 5 feet (1.3 meters) in every direction. The measures described herein are required for interior work as well, including, but not limited to sub-slab soil gas probe installation. It is imperative, prior to any utility locating activities conducted by Ramboll employees and/or a subcontractor, that the geology, surface covering (e.g., asphalt, concrete), and other potential interfering factors such as reinforced flooring, the presence of metal in the subsurface are identified and understood. This information must be transmitted to the private locating service in advance of start of work and preferably during the contracting phase so that appropriate locating equipment is selected.

As line voltage increases, your safe working distance will also increase. If overhead lines are present, call the utility company and find out what voltage is on the lines, so the safe working distance can be calculated, or stay at least 28 feet (9m) from cables supported on wooden poles, and 50 feet (15m) from cables supported on metal poles. Work involving machinery with high extensions (drill rigs, backhoes, etc.) will remain at least 10 feet (3.3 meters) from overhead power lines or further depending on the voltage of the line.

Should any operations cause equipment to come into contact with utility lines, the appropriate authority will be notified immediately and an Incident Report consistent with SPI 19–Incident Reporting will be completed. Work will be suspended until the appropriate actions for the situation can be taken.

Please reference Section 6 of the site-specific HASP and SPI 27–Subsurface and Overhead Clearance for additional information. Consult with your local HSSC for any additional requirements.

B25–Electrically Powered Equipment and Tools–Many Ramboll scopes of work require that Ramboll employees and/or its subcontractors utilize electrically powered equipment and tools. To use this equipment safely, ensure that all electrical equipment is properly grounded prior to use. Avoid standing in water when operating electrical equipment. Ground fault outlets or adapters shall be used for any electrical equipment, if possible. Apparatus, tools, equipment, and machinery will not be repaired while in operation; lockout/tagout (LOTO) procedures will be implemented when necessary (See B28–LOTO).

Tools can be hazardous when improperly used since these types of tools utilize energy in the form of electricity, liquid fuel, hydraulics, pneumatics, and/or powder-actuated. The following precautions will be taken by employees to prevent injury:

- Power tools will always be operated within their design limitations, and only by employees who have been appropriately trained in the use, operation, and proper handling of such tools.
- Guards are not to be removed or rendered inoperative.
- Eye protection, gloves, and steel-toed safety footwear are required during operation. Refer to the equipment manuals for guidance and include this information in the site-specific HASP.
- Store tools in an appropriate dry location when not in use.
- Work only in well illuminated locations.
- If power tools will be used to penetrate a ground, parking, floor surface or other surface, Ramboll employees must first evaluate the presence of underground utilities or obstructions.
- Tools will not be carried by the cord or hose and cords or hoses will not be yanked to disconnect from the power receptacle.
- Cords and hoses will be kept away from heat, oils and sharp edges or any other source that could result in damage.
- Tools will be disconnected when not in use, before servicing and when changing accessories such as blades, bits and cutters.
- Observers will always be kept at a safe distance from the work area.

- Tools will be maintained in a clean manner, and properly maintained in accordance with the manufacturer's guidelines. Pre-use inspection of hand and portable power tools should occur.
- Ensure that the work area is kept clean to maintain proper footing and good balance.
- Ensure that proper apparel is worn. Loose clothing, ties, or jewelry can become caught in moving parts.
- Tools that are damaged will be removed from service immediately and tagged "Do Not Use" until proper repair or disposal.

Please refer to SPI 9–Electrical Safety, SPI 33–Tool and Equipment Safety, and SPI 34–Equipment Grounding. Consult with your local HSSC for any additional requirements.

B26–Cutting Devices and Tools-Cutting devices are a type of hand tool that may frequently be encountered on Ramboll projects. The devices range from household scissors to box cutters and other sharp, exposed blades used to cut materials. Cutting devices should only be used by Ramboll employees when it is an inherent part of their job task, like cutting open packing tape on a box that has been shipped to you for your project. For further example, cutting soil sample liners is a job task generally appointed to our drilling subcontractors and should not be performed by Ramboll employees. If the use of a cutting device is required for a certain task, the safest device available that meets the needs of the job should be used. Safety cutting devices, like the "Klever Kutter" should be the first choice, when they are appropriate for the job. This device is designed to naturally shield the blade from the user. Some other guidance to consider:

- Always cut away from the body.
- Evaluate the need for work gloves or cut-resistant gloves during the planning stages of the project. Different types of gloves provide varying levels of protection that should be considered during the risk assessment. The materials used to make the gloves and the tensile strength of the weave determine exactly how much pressure can be applied before the fabric fails and cuts through. Usually the more protective gloves have less dexterity (or ease of movement) for the user, increasing other hazards in the process. A risk assessment should consider all these factors when evaluating PPE.

Please refer to SPI 33 –Tool and Equipment Safety for further information. Consult with your local HSSC for any additional requirements.

B27–Lifting Operations-Ramboll will ensure that all potential hazards regarding rigging and material lifting in our job sites are properly evaluated; however, Ramboll does not intend to provide employees with the knowledge/skill/ training to erect and/or dismantle rigging and/or material lifting equipment. The site-specific HASP should include provide documentation of the factors involved when rigging and material equipment is used by our direct subcontractors. In general, all scaffolds, rigging, and material lifting equipment must be erected and dismantled by a qualified and competent 3rd party contractor.

For lifting operations, even those conducted by a contractor, Ramboll employees shall be aware of proper procedures and observe the following precautions:

- Store materials and equipment in designated areas to avoid creating additional hazards (e.g., block exits and/or unstable storage). Properly demarcate areas where materials and/or equipment may be placed, loaded or unloaded by adequate guarding and posting.

- Safely arrange materials and equipment to prevent tipping, falling, collapsing, rolling (i.e., properly stack, secure and/or stabilize items by interlocking, strapping or securing by an effective method to protect persons and property from potential injury and/or damage).
- Ensure that storage areas are kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage. Vegetation control must be exercised when necessary.
- Manual lifting and handling of material must be done by methods that ensure the safety of both the employee, the material, and the structure. Tag lines may be used to stabilize loads unless their use creates an unsafe condition.
- Employees are prohibited from walking and/or working under loads that are about to be lifted and/or are suspended.
- Wear required employee protective equipment as applicable, including, but not limited to a hard hat to protect against overhead hazards. See B15–Overhead Hazards for additional control information.

Please refer to SPI 37–Rigging and Material Lifting for further information. Consult with your local HSSC for any additional requirements.

B28–Lock Out/Tag Out (LOTO)-LOTO applies to the control of energy during servicing and/or maintenance of machines and equipment. In general, Ramboll employees will not be authorized to perform LOTO job tasks unless additional training has been provided and employees are considered competent in that task. Where applicable, Ramboll will establish a program and utilize procedures for affixing appropriate LOTO devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start-up or release of stored energy to prevent injury to employees. Any LOTO procedure will be clearly identified and will be incorporated into the site-specific HASP. Ramboll will ensure that all equipment and machinery meeting the criteria for LOTO that are part of the work activities are evaluated, and that information and training programs, and LOTO procedures are implemented.

LOTO requirements do not apply to minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations if they are routine, repetitive, and integral to the use of the equipment for production. This exception is appropriate provided that the work is performed using alternative measures which provide effective protection in accordance with the site-specific HASP and equipment manual recommended procedures.

Please refer to SPI 20–Control of Hazardous Energy Sources (Lockout/Tagout) for further information. Consult with your local HSSC for any additional requirements.

B29 –Material Handling/Ergonomics–Lifting, carrying and lowering objects represent a potential physical hazard to Ramboll employees. Therefore, it is every employee's responsibility to realistically evaluate the object to determine if the weight and size exceeds the employee's ability to lift, lower or carry it. To eliminate or minimize the risk of lifting hazards, utilize proper techniques, such as keeping the back straight and legs bent. Objects should always be lifted, lowered and carried as close to the body as possible. If the equipment cannot be lifted in this manner, it is too heavy to lift alone. Call other employee or use a mechanical device for aid in lifting. Mechanical aids, like hand trucks and carts, or the buddy system should be used to move heavy objects, objects with poor handgrips, or large bulky objects. Some other things to consider:

- Evaluate the object for the presence of any physical hazards such as pinch points, sharp or jagged edges, burrs or rough and slippery surfaces.
- The route in which the object will be moved should be free from obstructions, which could cause difficulty in moving the object.
- Asses other hazards such as stairs before you move the object and consider smaller loads with multiple trips as a safe alternative
- If an object is stored at a level higher than five feet, or on the floor, an appropriate mechanical device may be necessary to move the object.
- Recognized lifting hazards should be designed out of the work process whenever possible.
- Seek help when handling loads that are too bulky to grasp or lift, when employees cannot see around or over a load, or when they cannot safely handle a load for any other reason.
- Consider the use of PPE, such as gloves and forearm protection, when appropriate.

Proper lifting and lowering techniques should be followed even if the object or material to be lifted is of lighter weight. Keep the objects as close to the body as possible and:

- Establish a firm footing with feet at approximately shoulder width and one foot slightly ahead of the other. This posture will aid in keeping good balance and will establish a stable lifting base.
- Always bend at the knees, not at the waist when lifting or lowering an object.
- Obtain a good secure grip on the object.
- When beginning to lift, tighten your stomach muscles and use your legs to lift the object, as leg muscles are generally stronger than back muscles.
- Lift slowly and smoothly.
- If you need to turn as you lift, **do not twist** at the waist, but instead pivot with the feet. When lowering the object, reverse the procedure.
- When possible, conduct lifting activities over a period with adequate rest breaks. If material handling must take place over a short period of time, use mechanical means and/or the buddy system.

When it is necessary to move heavy and/or bulky objects, a non-powered hand truck should be used whenever possible. Some things to consider are:

- Keep the center of gravity of the load as low as possible, and place heavy objects below lighter ones.
- Place loads where the weight of the load will be carried by the axle, not the handles, and where it will not slip, shift of fall during movement.
- Load only to height to allow a clear view ahead. Only walk backwards with a hand truck in specific instances such as when going up an incline.
- When going down an incline the hand truck should be in front of the operator and when going up an incline, it should be downhill from the operator.

- Move the hand truck at a safe speed.

Please refer to SPI 44–Occupational Ergonomics for additional information. Consult with your local HSSC for any additional requirements.

B30–SIMOPS (Simultaneous Operations)-SIMOPS are one or more activities or work taking place at the same time, with the potential to affect one another. The operations must be occurring within significant proximity to each other that they create new or additional hazards. The Designated Site Supervisor will be responsible for determining when SIMOPS are present on a Ramboll work site and coordinating safe work for all activities.

SIMOPS shall be identified on the site-specific HASP/RA and appropriate mitigation/hazard controls shall be identified and implemented to eliminate or minimize risks through the hierarchy of controls:

- Eliminating SIMOPS via scheduling or permitting;
- Substituting work processes with less hazardous processes;
- Separating SIMOPS by distance, barricade, signage, isolation or engineering controls; and/or
- Implementing other controls such as training, communication, PPE and Stop Work authority.

Planning, scheduling, communication, and cooperation are essential for safe and effective SIMOPS on Ramboll work sites and should be documented in the site-specific HASP/RA. A communication plan should be established between each work group to include coordination meetings prior to projects where multiple operations are scheduled and the appropriate response if an unexpected event occurs.

B31–Bloodborne Pathogens–In general, Ramboll must determine which employee(s) have a potential occupational exposure to bloodborne pathogens and establish an exposure control plan. Ramboll currently does not have employees that have a continuous potential for occupational exposures to bloodborne pathogens; however, during the implementation of Ramboll scopes of work, there is potential for injury and the potential for employees to respond and all employees approved to conduct field work are required to complete first aid or country-equivalent training. Procedures in which a potential for occupational exposure may occur without regard to the use of PPE include, but are not limited to, basic first aid treatment and Cardio Pulmonary Resuscitation (CPR).

The best method for ensuring the health of the employees at risk is to understand and follow the concept of Universal Precautions. This concept refers to the assumption that all blood and bodily fluids are contaminated with pathogens. Universal Precautions shall be observed by all Ramboll employees. Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. When differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials.

Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Where occupational exposure remains after institution of these controls, PPE shall also be used. Hand washing is a primary work practice control. If this is not available or feasible, then alternative methods, such as antiseptic hand cleaners, in conjunction with clean cloths or paper towels, or antiseptic towels will be provided. When these alternative methods are used, employees shall wash their hands (or other affected areas) with soap and running water as soon as feasible thereafter. Ramboll will provide hand washing facilities or alternative methods which will be readily accessible to employees. Additional considerations include the following:

- Eating, drinking, smoking, etc. are prohibited in first-aid and restroom areas where there is reasonable likelihood of occupational exposure.
- Employees should don appropriate personal protective equipment prior to performing any first aid to ensure that they will not contact blood. Each office will maintain the appropriate personal protective equipment with the first aid supplies. This equipment should include impervious gloves and mouth shields. Gloves worn should be compatible with cleaning and disinfection solutions used.

In any circumstance where there is a potential exposure to bloodborne pathogens by a Ramboll employee or its subcontractors, an Incident Report must be filed in a timely manner in accordance with SPI 19–Incident Reporting.

Please refer to SPI 4–Medical and First Aid Program and SPI 20–Bloodborne Pathogens for additional information. Consult with your local HSSC for any additional requirements.

B32 –Plants and Animals–Care will be taken by all site workers to avoid poisonous plants, animals, and/or stinging or biting insects such as ticks, mosquitos, spiders, bees, wasps, hornets, and yellow jackets. Workers allergic to any plant, animal exposure, or insect sting or bite should notify the local HSSC and all site employees (including facility and subcontractor personnel) prior to start of work. If stung, bitten, or otherwise exposed to an allergen, the affected person shall utilize emergency medicine, if prescribed by their doctor, and seek emergency support when appropriate.

The first step in controlling the risks presented by certain plants and animals is thorough field preparations, including but not limited to the following:

- Research local species that are present or active in your area
- Identify important information to aid in identification and plan for appropriate control mechanisms
- Document hazards in your field-specific project plan (i.e. HASP, HSP or RA) and communicate with field employees
- Follow the hierarchy of controls to reduce risks, which we will discuss later in this lesson
- Identify first aid treatments and emergency protocols

Animals and insects that pose a threat to human safety vary greatly by region and local environment. Furthermore, the level of threat they pose varies greatly by species and situation. Some animals only pose nuisance threats while others can be life threatening. Of those animals that can be harmful to humans, few will outright attack unless they feel threatened or are protecting their young. Therefore, it is very important to evaluate each situation where animals can be encountered individually to assess the risk.

The hazards posed by poisonous plants are different because plants are stationary. Once properly identified, harmful species can typically be removed or cordoned off, so employees do not encounter them. But be cautious! If poisonous plants are identified in one area of the site, it’s likely they may be in others as well.

Before you travel to a site to perform field work, perform your due diligence by identifying the plants and animals that may pose a threat in that area. This information can be conducted through internet research but be sure to consider only reputable sources and cross-reference important information. Field guides from various sources, including Peterson and Oxford, provide valuable information on a wide variety of plant and animal hazards. Some guides are specific to a certain geographical location.

These guides are a great resource for local staff; share them when possible! Finally, many local regional agencies supply information on dangerous plants and animals in their area.

Even though you may be familiar with the plants and animals in your area, you might not be as familiar with things in another region of your country, another country, or even another continent! So, when traveling to different areas for your projects it is prudent to consult with:

- Site contact (client, maintenance staff, etc.)
- Ramboll employees who have previously been on-site
- Ramboll employees who are local to the region
- Local and regional wildlife agencies
- Reputable field guides

Document important species-specific information to the site HASP/HSP/RA or other site-specific plan. Keeping track of this information will help everyone on the project to identify and control plant and animal hazards. It will also be useful as a quick guide in the event of a field encounter. Further, this information should be used during daily HS meetings to keep employees aware and informed of site risks. Consider providing the following:

- Names of species
- Photographs of the animals/plants discussed
- Indicators of animal/plant presence
- Measures of what to do if animals/plants are encountered
- Controls and safe work practices, which will be discussed next
- First aid measures

Please refer to SPI 28–Plants and Animals for additional information. For species-specific information and first aid procedures, including information on tick removal and first aid, refer to Appendix D First Aid Guidance. If first aid is required for any encounter with a poisonous plant, insect, or animal, an incident report, consistent with SPI 19–Incident Reporting, must be completed. Consult with your local HSSC for any additional requirements.

B33–Job Safety–If it is deemed that a work site is in an area where Ramboll employees and/or the job site may be at risk from potential criminal acts, wild animals, etc. the risks will be evaluated, and implementation of site-specific preventative measures will be taken to minimize the risk. Consideration shall also be given to security for equipment left on-site. For example, if Ramboll installed a remediation system on an isolated client site, it is prudent, at a minimum, to plan for site and equipment security with fencing and locking devices on any valves.

Informational resources such as the client, local law enforcement officials, Park or Wildlife Service, and Animal Control could be utilized to assess the risk and to ensure the safest possible work environment. For example, local law enforcement can be made present or make frequent patrols in the area while work is being done, outside security can be hired, and work can occur only during certain times of the day. It is also possible that after initial risk evaluation, the PM, PD, local HSSC and/or the Corporate Director of HSS may determine that work may not proceed at all.

B34–Personal Safety–If it is deemed that a work site is in an area where an employee's personal safety may be at risk from working in an isolated area, working early/late, or in areas of limited cell

phone service, the risks will be evaluated, and implementation of site-specific preventative measures will be taken to minimize the risk. Informational resources such as the client and local law enforcement officials, could be utilized to assess the risk and to ensure the safest possible work environment. For example, when working early/late, or in areas of limited cell phone service, local law enforcement can be made present or make frequent patrols in the area while work is being done or check in with on-site client representatives may be arranged. It is also possible that after initial risk evaluation, the PM, PD, local HSSC and/or the Corporate Director of HSS may determine that work may not proceed at all. Some general guidelines are provided here, but each situation is different, and actions must be taken based on the specifics of each.

In areas of risk, employees will communicate via cell phones or 2-way radios and will check-in at predetermined times throughout each workday. The communication schedule and the responsible parties shall be clearly documented in the site-specific HASP. See SPI 42 Working Alone for additional information.

B35-Working Alone–Further personal safety risk evaluation is warranted when working alone. Ramboll considers employees to be working alone when they cannot be seen or heard by another worker, and/or where assistance is not readily available in the event of an injury, illness or emergency. Whenever possible, employees will not work alone in isolated areas or under extreme conditions. If conducting high risk activities, such as confined space entry, electrical system work or work involving the use of respirators, work may not be performed alone. If the isolated area work involves hiking/walking into areas that are unmarked, or if there is potential to become directionally disoriented (e.g., no trails, unmarked trails, forested or highly vegetated areas), employees will be trained on the use of a compass and trail/topography maps. If necessary, Ramboll employees will complete wilderness safety training. The employee will work with the Park/Wildlife service in advance to determine what emergency planning is necessary to prepare to complete the proposed scope of work including scenarios such as unexpected weather, animal attack, and search/rescue.

Communicating through cell phones or 2-Way Radios will be utilized whenever possible. Employees will check-in at predetermined times throughout each workday and if the risk rating increases, employees will check-in more frequently. If employees do not call in to the PM, or designated representative, the employee will be contacted. If contacting the employee is unsuccessful, the appropriate authorities will be notified. In addition, the planned start and estimated finish times for each work day will be communicated by the site supervisor to the PM, or designated representative, and employees will check in at the beginning and end of the work day. If employees will be moving from isolated area to isolated area, there will be established beginning and ending locations, planned start and estimated finish times, and planned routes that will be followed throughout the day. Employees will not deviate from this schedule without first contacting the appropriate employees. It may also be necessary to notify the client, law enforcement, or Park/Wildlife officials of these schedules.

The communication schedule and the responsible parties shall be clearly documented in the site-specific HASP.

Please refer to SPI 42–Working Alone for additional information. Consult with your local HSSC for any additional requirements.

B36–Seasonal Hunting and Dangerous Wildlife–When planning to complete a scope of work in an isolated and/or wooded area, seasonal hunting hazards should be considered. Contact the client, local law enforcement, and/or Park/Wildlife officials to evaluate this risk. During recreational hunting seasons, field employees will wear appropriate clothing, such as fluorescent orange high visibility

vests, to enhance visibility to potential hunters and not blend in with the landscape. Field employees should also use whistles, air horns and/or other means to make their presence known to hunters and wildlife alike. The schedule of the hunting season, if applicable, will be included as an addendum to the site-specific HASP to inform employees of the type of game (e.g., deer, pheasant, duck, etc.) that is being hunted and the type of weapon being used (e.g., bow & arrow, shot gun, single shot rifle, etc.). Be aware that even if "No Trespassing" and/or "No Hunting Allowed" signs are posted, trespassers and/or hunting may still be on-going in the work area. At no point should field employees or contractors confront trespassers.

Local authorities should be contacted about any hunting season that may be in session, and if it is possible that hunters may be present in the area in which Ramboll employees will be working. If so, employees will wear brightly colored hardhats/hats and reflective vests, will not work before dawn. Work will end 30 minutes before dusk.

If you see wild animals while driving, stay in your vehicle. Never get out for a photo or a closer look. Keep windows up and do not try to keep the animal from crossing a road with your vehicle. If you see a wild animal while on foot, never approach the animal. If the animal has not seen you, go back the way you came. Do NOT turn your back and run which could evoke their natural predator instinct. Instead, keep facing the animal and back away at a steady pace. If you are near a car or building, get inside. In addition, in areas of higher risk (i.e., contacted officials have indicated that wild animals are a nuisance), employees may want to consider carrying "pepper spray".

If, while on the project site, and despite any precautions set forth, if an employee feels that their personal safety is at risk, they shall cease work, leave the work area and immediately report their concerns to the project PM, PD and local HSSC so that appropriate steps can be taken.

Please refer to SPI 28–Plants and Animals for additional information. Consult with your local HSSC for any additional requirements.

APPENDIX C
PRE-PROJECT PLANNING CHECKLIST AND SUBSURFACE CLEARANCE FIELD CHECKLIST

Table 8: Pre-Project Planning Checklist

Subsurface Clearance (SSC) Pre-Project Planning Worksheet
Document the steps that must be followed and justify any exceptions.
This checklist MUST be completed in its entirety.

SSC Requirements	Yes	No	N/A	Comments
Clearance Site Supervisor: Sarah Ostertag Contact: 530-613-4587 SSC Area Expert: Sarah Stoneking (703-587-4356)	☐	☐	☐	Contact SSC expert if you are unable to meet minimum SSC requirements.
Identify a **Knowledgeable Site Representative**, as available Name: Click or tap here to enter text. Contact:	☐	☐	☒	Describe information exchanges and site utility documents gathered from the Knowledgeable Site Representative, as applicable, including request and receipt of site maps, built-as drawings, etc. Make plans to have them present during the Private Locate.
Gather applicable **Site Utility Information** Note: If no Site Utility information and/or no Knowledgeable Site Representative is provided consider additional controls such as soft digging.	☒	☐	☐	Reviewed provided CAD files including an Alta utility survey.
Create a Site-specific **Plot Plan**	☒	☐	☐	*Must depict all known utilities identified prior to intrusive work from review of aerial photos, site documents/maps/plans gathered and discussions with knowledgeable site person(s).*
Mark **Intrusive Locations**/**Areas** and **Alternate Locations** on the Plot Plan	☒	☐	☐	*All proposed Intrusive Locations must be marked on the Plot Plan prior to work beginning. ONLY Alternate locations/areas cleared using the SSC Program are permitted for continued drilling if refusal is meet on site.*
Private Locator responsible for Private Locate.	☒	☐	☐	Name of subcontractor: GPRS LLC Contact information: 419-767-2528
Discuss SSC Site Investigation with **Private Locate**	☒	☐	☐	*Discuss with subcontractor, as applicable, and document the specific technology(s) that will be used to confirm Public Utilities, actively clear the site, and clear specific intrusive locations. Discuss specifics site details such as ground surface, soil conditions, known utilities and underground structures, and any site-specific features that may create interference.*
Assess **Public Utilities** Note: Either via One Call, 811, directly with utility owners or via a webservice - confirm the presence and absence of commonly expected services in the area. In some cases, the utility company may need to be contacted directly to request a utility locate. All commonly expected utilities must be marked or positively confirmed to be absent from our work area prior to intrusive work.	☐	☐	☐	List companies notified for public locate (for example): Electric: Dominion Energy, PEPCO Gas: Washington Gas Water: City of Alexandria, Virginia American Water Sewer: City of Alexandria Telephone: Comcast, Verizon Data: Comcast, Verizon Cable: Comcast, Verizon Other: Click or tap here to enter text. Who contacted Public Utilities: Lucas Cherry List One Call #: 811 List locate ticket #: B302501032-00B Expiration Date: 2/16/2023 Renewal by Date: 2/13/2023
Proposed date for SSC site locate and participants (Clearance Site Supervisor must participate for the duration of the site locate)	☒	☐	☐	Date: February 2, 2023 Participants: *Clearance Site Supervisor, private utility lcator*

SUBSURFACE and OVERHEAD CLEARANCE (SSC) FIELD CHECK LIST (1 of __) DATE: _____

(Use this form to document & identify field elements of SSC. Retain the completed form with the project file)

Site Name/Project No.: _____ Clearance Site Supervisor: _____

RAMBOLL SUBSURFACE CLEARANCE ACTIVITIES	**Yes**	**No**	**N/A**	Notes/Comments
1. Confirm Public Utilities on-site have been marked by a public locate, where available. Public utilities should be marked to the edge of the private property on all areas surrounding our work site.	☐	☐	☐	Many Public utilities are members of a program (e.g., One Call, 811) and will mark or positively confirm if no utilities are present. Each expected utility type must be marked or confirmed as absent, or Ramboll must follow up directly with the utility owner.
Electric:	☐	☐	☐	
Gas (natural gas lines, oil):	☐	☐	☐	
Water (potable) pipes, hydrants/fire lines:	☐	☐	☐	
Sewers (storm/process water/sanitary):	☐	☐	☐	
Public lighting (street and traffic):	☐	☐	☐	
Telephone and Data Lines:	☐	☐	☐	
Other underground hazards, Potential for UXO:	☐	☐	☐	
2. Accompany Private Utility locator, as applicable, during site locate. Supervise the Identification of each expected major utility onto private property and the respective emergency shut off.	☐	☐	☐	All surrounding Public utility lines should be confirmed and traced by the Private locate onto site, and to termination or outside our work zone.
Electric:	☐	☐	☐	
Water (potable) pipes, hydrants/fire lines, sprinklers:	☐	☐	☐	
Sewers (storm/process water/sanitary):	☐	☐	☐	
Gas (natural gas lines, oil):	☐	☐	☐	
Private lighting (signs, security lighting):	☐	☐	☐	
Telephone and Data Lines:	☐	☐	☐	
Other underground utilities:	☐	☐	☐	
3. Site Walkover performed to assess potential of additional private utility lines and high-risk areas. Confirm the presence or absence of each of the following Visual Indicators:	☐	☐	☐	The presence of certain Visual Indicators can signal an associated underground utility. When Visual Indicators are present underground utilities must be investigated prior to intrusive activities.
Manways, indication of underground storage tank/piping and dispenser islands	☐	☐	☐	
Non-native soils, surface depressions, new/dead vegetation, which may indicate recent underground work	☐	☐	☐	
Saw cuts, patched surfaces, warning tape, or other surficial indicators of below ground work	☐	☐	☐	
Pumps, pump galleries, piping manifolds and/or racks, process equipment, compressors, etc.	☐	☐	☐	
On or below-grade transformers	☐	☐	☐	
Fuel oil lines, tanks, fill ports, observation wells, vent stacks, hydraulic lift systems	☐	☐	☐	
Adjacent/supplemental buildings with no apparent utility feeds (electricity, water, gas)	☐	☐	☐	
Other On-Site Visual Indicators:	☐	☐	☐	
4.. Overhead areas examined to determine above head utility hazards	☐	☐	☐	Where overhead lines exist, approach distances are based on line voltage, which can be determined by contacting the utility owner.
5. Update Site Plot Plan to reflect most accurate site SSC information based on Private locate and Site Walkover.	☐	☐	☐	Using the Plot Plan initiated in pre-planning, confirm existing utility markings based on ground conditions and update further with based on Site Locate.
6. Confirm intrusive location(s) and Critical Zones (5ft/1.5m distance in every horizontal direction surrounding intrusive locations) are cleared of utilities, anomalies and visual indicators.	☐	☐	☐	Contact PD/PM and HSS Director if utilities pass through the Critical Zone of a planned intrusive location
7. Communicate updated site utility information, including updated Plot Plan with Project Management and mutually agree on clearance of intrusive points in accordance with SSC Policy.	☐	☐	☐	
If uncertainties regarding the presence or absence of underground utilities exist, intrusive activities may not proceed!	☐	☐	☐	Additional controls should be implemented when underground uncertainties exist including employment of additional and diverse locating technologies, soft digging, further communication with client and HSS, etc.

To the best of my knowledge all known site utilities have been located or confirm to not interfere with planned intrusive locations. All intrusive locations have been cleared with a 5ft (1.2m) critical around the intrusive point.

Form completed by:

_____ _____ _____

Name date signature

Site Representative:

_____ _____ _____

Name date signature

APPENDIX D
FIRST AID GUIDANCE

Prepared By:
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SITE-SPECIFIC FIRST AID GUIDANCE

CONTENTS

1. FIELD PREPARATIONS

The first step in controlling the risks presented by certain plants and animals is thorough field preparations, including but not limited to the following:

- Research local species that are present or active in your area
- Identify important information to aid in identification and plan for appropriate control mechanisms
- Document hazards in your field-specific project plan (i.e. HASP, HSP or RA) and communicate with field employees
- Follow the hierarchy of controls to reduce risks, which we'll discuss later in this lesson
- Identify first aid treatments and emergency protocols

Animals and insects that pose a threat to human safety vary greatly by region and local environment. Furthermore, the level of threat they pose varies greatly by species and situation. Some animals only pose nuisance threats while others can be life threatening. Of those animals that can be harmful to humans, few will outright attack unless they feel threatened or are protecting their young. Therefore, it is very important to evaluate each situation where animals can be encountered individually to assess the risk.

2. INSECT BITES AND STINGS

Care will be taken by all site workers to avoid stinging or biting insects such as ticks, spiders, bees, wasps, hornets, and yellow jackets. Workers allergic to any insect sting or bite should seek medical attention if stung or bitten and may need to carry emergency medicine prescribed by their doctor.

Care should always be taken to avoid these insects and increased vigilance is necessary during high infestation seasons, when opening protective casings of monitoring wells, and when walking through areas of heavy vegetation or areas known to be infested.

To minimize the chance of bites/stings:

- Wear appropriate PPE such as light-colored clothing so you can see insects, long pants tucked into boots, long sleeves when possible, a hat, and gloves if you are cutting brush or need to handle or move vegetation.
- Check your body and clothing for insects, shower after work and wash/dry clothes at as high a temperature as possible.
- Do not swat at insects and do not eat in areas where there are insects.
- Avoid sweet smelling personal hygiene products and, unless contraindicated by the work being performed (e.g., sampling, data collection), wear EPA approved repellants such as those containing DEET.

2.1 Spider Bites

Spider bites generally cause only localized reactions such as swelling, pain, and redness. However, bites from a Black Widow or Brown Recluse, or if you are allergic to spiders, can cause symptoms that are more serious.

Black Widow Spider

Brown Recluse Spider

2.1.1 First Aid for Spider and Scorpion Bites and Stings

- Clean the bite area with soap and water and place a cold pack over the bite area to reduce swelling.
- Monitor for allergic reactions. If the victim has more than minor pain or if nausea, vomiting, difficulty breathing, or swallowing occurs: medical attention should be sought immediately. CALL 911.

2.2 Ticks

Ticks are common in tropic & temperate regions across the world. They prefer moist areas with dense vegetation/long grass, but they can survive in many places including urban parks and gardens.

Ticks are small and easily overlooked. They vary in size, depending on the species, stage of development, gender, and whether the tick has recently fed. Ticks do not fly or jump but patiently wait for a mammal to pass by and then climb on. They are most active between spring and autumn.

Ticks feed off the blood of mammals, birds, amphibians, and reptiles. However, they are more likely to feed off mammals as they mature from nymphs into adulthood and as adults. Ticks find their hosts by detecting animals´ breath and body odors, body heat, moisture, and vibrations. Some species can even recognize a shadow.

They wait in a position call "questing," resting on the tips of grasses and shrubs. When the host brushes by the tick, it will climb aboard. Some ticks will attach quickly, and others will wander, looking for places like the ear, or other areas where the skin is thinner.

The main hazard associated with ticks is the transmission of disease. The ability of a tick to transmit disease, however, depends on a number of factors:

- The type of tick (only certain species carry transmittable diseases)
- The region of the world the tick inhabits
- The duration of time it is attached to a host

In most cases, tick bites are unlikely to result in a tick-borne illness, especially when removed soon after the bite. For example, the Lyme disease research foundation estimates that only about 2% of all tick bites result in Lyme disease. In addition, in most cases, a tick must be attached for at least 24 hours before disease can be transmitted.

To determine the risk of a tick-borne disease, it is important to research the risk prior to starting field activities. Research should include species of tick(s) local to jobsite and diseases the tick species can carry. Some common tick-borne diseases include:

- Bacteria: Lyme disease & Rocky Mountain spotted fever
- Viruses: Heartland virus & tick-borne encephalitis virus (TBEV)
- Parasites: Babesiosis

Once you are knowledgeable about the hazards and risks presented by ticks at your site you should take as much of the following preventative measures as needed:

- Identify potential tick habitats and avoid them when possible

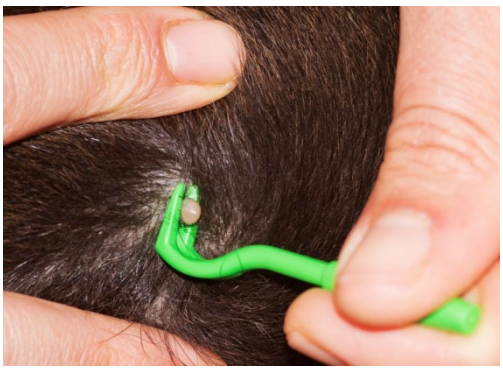
- Treat clothes and/or yourself with bug repellent prior to going to the site (check in with PM prior to use)
- Tuck and/or tape pants and long sleeves
- Wear light colors or Tyvek suits
- Clear vegetation if possible
- Perform tick checks periodically throughout the day
- Perform a thorough tick check at the end of the day.

It is important to conduct regular tick checks throughout the day and at the end of a work shift, since risk of disease transmission is directly related to the length of time a tick is attached. You may not know you have been bitten as ticks can secrete small amounts of saliva with anesthetic properties. Ticks prefer warm, moist places and may look like a freckle or dirt. Nymphs will be harder to spot!

2.2.1 First Aid for Tick Bites

If you are bitten by a tick -

- Remove tick as soon as possible using tweezers or a tick removing tool
- Grasp the tick as close to skin as possible to grab the head and slowly pull upwards with even pressure. Do not twist or jerk the tick, as mouthparts left behind can cause a local infection
- If you are unable to remove the mouthpart, leave it alone and let the skin heal. DO NOT attempt to remove the tick with heat or "painting" the tick with nail polish or petroleum jelly. You should remove the tick as quickly as possible, do not wait for it to detach.
- Wash the bite area (soap and water or rubbing alcohol) and apply antiseptic. Monitor the bits spot for several weeks.



Some regions have tools specific to the removal of ticks. Ask your local HSSC if they can get you one.

After you remove a tick, monitor the bite area and yourself for several weeks. If you begin to feel unwell (common symptoms of tick-related illnesses are fever/chills, aches and pains, like the flu) or start to develop a red bulls-eye like rash around the bite area, see a doctor immediately.

If you seek or need medical attention, employees are encouraged, when possible, to go to occupational clinics familiar with the hazards and risks that our type of work incurs, as opposed to going to a generic doc-in-the-box or an Emergency Room. In the US, Ramboll's third party medical surveillance partner WorkCare provides an Incident Intervention service that includes a 24 hour help

line and information/access to hundreds of clinics around the US. Employees are encouraged to contact WorkCare with their questions/concerns.

2.3 Chiggers

Chiggers are tiny, s-legged wingless organisms that grow up to become a type of mite. They are found in tall grass and weeds and their bites cause severe itching.

1: Chigger
2: Bites

2.3.1 First Aid for Chiggers

- Reduce discomfort and prevent infection
- The affected area should be kept clean by washing with soap and water
- A topical hydrocortisone cream, antihistamine, or local anesthetic may be of value in reducing the itching
- The wounds should not be scratched, if possible
- If signs of infection occur, consult your physician

2.4 Bees and Wasps

Bees and wasps belong to the phylum Arthropod family, and they are crucially important to the pollination of plants, specifically flowers, fruits, and vegetables. A sting from a bee or wasp will cause itching, irritation, redness and/or swelling at the sting site.

A small percentage of people are allergic to stings and a sting can be fatal, caused by a disruption to breathing and circulatory systems called anaphylactic shock. If the sting is followed by severe symptoms, seek medical attention immediately. Allergic people should never be alone for outdoor activities since help may be needed for prompt emergency treatment. Allergic people should have an

identification bracelet as well as carry something like an "EpiPen" for immediate treatment for anaphylactic shock.

2.4.1 First Aid for Bee Stings

- Remove the stinger as quickly as possible-venom continues to enter the skin from the stinger for 45 to 60 seconds following a sting–using a flat dull object, like a credit card. Slid the flat object in the opposite direction of the stinger to remove it from the skin.
- Wash the wound using soap and water
- Apply ice for swelling and pain
- A topical hydrocortisone cream, antihistamine, or local anesthetic may be of value in reducing the itching
- If the sting occurs on the neck or mouth, seek medical attention immediately, swelling in these areas may cause suffocation

2.5 Fire Ants

Fire ants are a variety of stinging ants with over 280 species worldwide. Typically, a colony produces large mounds in open areas, and feeds mostly on young plants, seeds, and insects. They nest in the soil, often near moist areas such as river banks and pond edges. Unlike other ants which bite and then spray acid on the wound, fire ants bite only to get a grip and then sting, injecting toxic alkaloid venom. This results in a painful stinging sensation, like what a fire burn feels like.



2.5.1 First Aid for Fire Ant Bites

- Move rapidly away from the nest
- Quickly remove or kill ants on skin and clothing to prevent further stings
- Wash the area gently with soap and water to rid the skin of any venom.
- Place cool cloth or ice cloth on sites for 15 minutes, and to relieve pain, dab the area with calamine lotion, a topical (cortisone) or oral antihistamine (e.g., Benadryl) to help with swelling
- Do not scratch the blister because this can lead to infection
- Allergic response is rare, but symptoms are difficulty breathing, light headedness, and weakness. Immediate medical attention is required.

3. SNAKES

Snakes serve as an important role as predators in the ecosystem and help maintain populations of rodents and other prey.

3.1 First Aid for Venomous Snake Bites

- Wash and immobilize the injured area, keeping it lower than the heart if possible
- Seek medical attention immediately
- DO NOT apply ice, cut the wound, or apply a tourniquet
- Do not cut or suck the bite
- Remain calm and try not to move the bitten body part
- Remove jewelry or other items that may be affected by rapid swelling of affected body parts
- Try to identify the type of snake: note color, size, patterns, and markings
- The bite will be painful and have two distinct puncture wounds
- If venom is injected there will be burning and swelling
- ONLY FOR CORAL SNAKE BITES: apply a mild wrapping on the bite wound

Water Moccasin
(aka cotton mouth)

Rattlesnake

Coral Snake

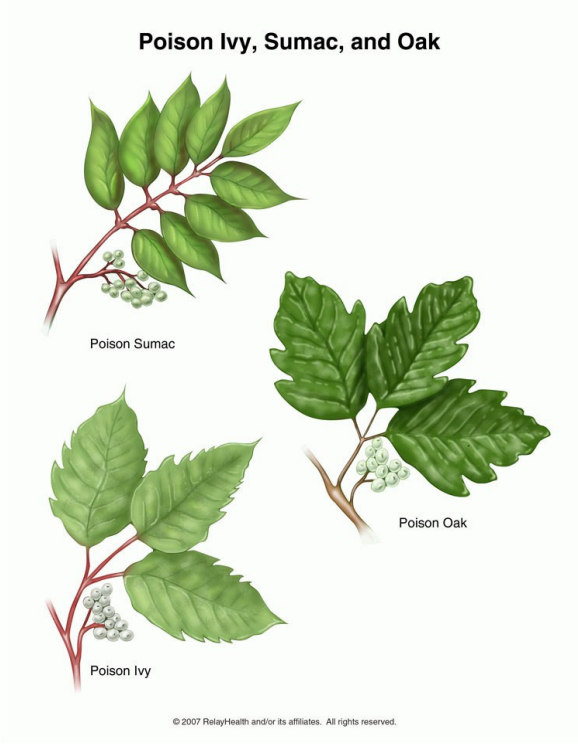
Copperhead

4. POISONOUS PLANTS

Poisonous Plants – Plants poison on contact, through ingestion, or by absorption or inhalation. They cause painful skin irritations upon contact and can cause internal poisoning when eaten.

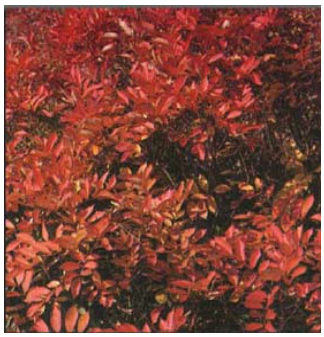
4.1 First Aid for Poisonous Plants

- Wash exposed areas with cold running water as soon as you can
- When possible, wash your clothing
- Relieve itching by taking cool showers and applying topical anti-itch medications or hydrocortisone
- The rash is often arranged in streaks or lines where you brushed against the plant
- In a few days, the blisters become crusted and take 10 days or longer to heal
- If the reaction is severe or worsens, seek medical attention



POISON IVY

POISON SUMAC


POISON OAK


GIANT HOGWEED

5. HEAT STRESS

Heat stress can be a significant hazard, especially for workers wearing protective clothing.

Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly, within as little as 15 minutes. Site employees will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim and in the prevention of heat stress incidents.

Workers will be encouraged to immediately report any heat-related problems that they experience or observe in fellow workers. Any worker exhibiting signs of heat stress and exhaustion should be made to rest in a cool location and drink plenty of water. Emergency help by a medical professional is required immediately for anyone exhibiting symptoms of heat stroke, such as red, dry skin, confusion, delirium, or unconsciousness. Heat stroke is a life-threatening condition that must be treated by competent medical authority.

ACGIH screening criteria for heat stress exposure in degrees Celsius for an 8-hour work day 5 days per week with conventional breaks will be used in determining safe exposure for acclimatized and unacclimatized employees.

Allocation of Work in a Work/Rest Cycle	Acclimatized				Action Limit (Unacclimatized)			
	Light	Moderate	Heavy	Very Heavy	Light	Moderate	Heavy	Very Heavy
75-100%	31.0 (87.8F)	28.0 (82.4F)	--	--	28.0 (82.4F)	25.0 (77F)	--	--
50-75%	31.0 (87.8F)	29.0 (84.2F)	27.5 (81.5)	--	28.5 (83.3F)	26.0 (78.8F)	24.0 (75.2F)	--
25-50%	32.0 (89.6F)	30.0 (86F)	29.0 (84.2F)	28.0 (82.4F)	29.5 (85.1F)	27.0 (80.6F)	25.5 (77.9)	24.5 (76.1F)
0-25%	32.5 (90.5F)	31.5 (88.7F)	30.5 (86.9F)	30.0 (86F)	30.0 (86F)	29.0 (84.2F)	28.0 (82.4F)	27.0 (80.6F)

5.1 Heat Stress Prevention

Whenever possible or within the control of Ramboll, engineering controls should be utilized to protect workers from heat related hazards (e.g., heat shielding such as using awnings or umbrellas). Appropriate work practices can also lessen the chances of heat related hazards. Some of these include:

- Water and/or electrolyte fluids should be about equal to the amount of sweat produced (i.e., drinking 5-7 ounces (150 -200 mL) of water every 15-20 minutes). Ideally, fluids should be at room temperature to allow for quicker absorption. Consider keeping water at room temperature and electrolyte fluids chilled. Do NOT chill both.
- Whenever possible, gradual exposure to heat is preferred to allow the body's internal temperature to actuate to the working conditions.

- Whenever possible, adjust the work schedule to reduce risk of heat stress. For example, postpone nonessential or heavier work to the cooler part of the day and perform work in the shade if portable.
- Rotate employees to reduce the amount of time spent working in direct sun and heat.
- Increase the number and/or duration of rest breaks, and whenever possible, rest break areas should be in a cool area and as close to the work area as is feasible.

Wear appropriate PPE when necessary, such as thermally conditioned clothing, self-contained air conditioning in a backpack, and plastic jackets/vests with pockets that can be filled with dry ice or ice. However, based on the type of work being done, where work is being performed, or other required PPE, these options may be prohibited or make the use of this PPE impossible or impractical.

5.2 Heat Related Illnesses

5.2.1 Heat Stress

This is the mildest heat-related illness, but prompt action may prevent it from turning into a more severe heat-related illness. Symptoms include irritability, lethargy, significant sweating, headache, or nausea. The following guidance can be used in the identification and treatment of heat related illness.

5.2.2 Heat Stress First Aid

- Take victim to a protected (e.g., shaded, cool) area, remove any excess protective clothing, and provide cool fluids.
- If an air-conditioned spot is available, this is an ideal break location.
- Once the victim shows improvement he/she may resume working, however the work pace and practices (e.g., does fluid intake need to be increased) should be moderated to prevent recurrence of the symptoms.

5.2.3 Heat Exhaustion

Usually begins with muscular weakness, dizziness, nausea, and a staggering gait. Symptoms include pale, clammy skin, and profuse sweating, vomiting, and the bowels may move involuntarily. The pulse is weak and fast, breathing is shallow. Fainting can occur.

5.2.4 Heat Exhaustion First Aid

Immediately remove the victim from the work area to a shady or cool area with good air circulation (avoid drafts or sudden chilling – you do not want the victim to shiver).

- Call a physician or emergency service or transport the victim to medical care.
- Remove all protective outerwear.
- If the victim is conscious, it may be helpful to give him/her sips of water.

5.2.5 Heat Stroke

Heat stroke is a severe medical condition requiring first aid and emergency treatment by a medical professional as death can occur without appropriate care. Heat Stroke represents the collapse of the body's cooling mechanisms. As a result, body temperatures often rise to between 105° – 110° F (40.5° – 43.3° C). As the victim progresses toward heat stroke symptoms include hot and usually dry, red and spotted skin, headache, dizziness, nausea, mental confusion, delirium, possible convulsions and loss of consciousness.

5.2.6 Heat Stroke First Aid

- Immediately remove the victim from the work area to a shady or cool area with good air circulation (avoid drafts or sudden chilling – you do not want the victim to shiver).
- Summon emergency medical help to provide on-site treatment and transportation to a medical facility.
- Remove all protective outerwear and loosen personal clothing.
- Apply cool wet towels, ice bags, etc. to the head, armpits, and thighs. Sponge off the bare skin with cool water or even place the victim in a tub of cool water.

5.2.7 Skin Hazards

Sunburn and prickly heat are both symptoms of skin irritation/damage produced through exposure to sunlight and operating in hot work environments.

- Protect exposed skin with an appropriate sunscreen. A sunscreen with a sun protection factor (SPF) of 15 or greater is required for work in the sun with reapplication at breaks and lunch.
- Heat rash, also known as prickly heat, can be prevented by the application of a hydrophobic, water repellent barrier cream such as Kerodex 71.

6. COLD STRESS

The four environmental conditions that cause cold-related stress are low temperatures, high/cool winds (wind chill), dampness, and cold water. One or any combination of these factors can cause cold-related hazards. Cold stress, including frostbite and hypothermia, can result in severe health effects.

A dangerous situation of rapid heat loss may arise for any individual exposed to high winds and cold temperatures. Major risk factors for cold-related stresses include:

- Wearing inadequate or wet clothing increases the effects of cold on the body.
- Taking certain drugs or medications such as alcohol, nicotine, caffeine, and medication that inhibits the body's response to the cold or impairs judgment.
- Having a cold or certain disease, such as diabetes, heart, vascular, and thyroid problems, may make a person more susceptible to the winter elements.
- Being male increases a person's risk to cold-related stresses. Men experience far greater death rates due to cold exposure than women, perhaps due to inherent risk-taking activities, body-fat composition, or other physiological differences.
- Becoming exhausted or immobilized, especially due to injury or entrapment, may speed up the effects of cold weather.
- Aging -- the elderly are more vulnerable to the effects of harsh winter weather.

TABLE 2. Cooling Power or Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
5	48	37	27	16	6	−5	−15	−26	−36	−47	−57	−68
10	40	28	16	4	−9	−24	−33	−46	−58	−70	−83	−95
15	36	22	9	−5	−18	−32	−45	−58	−72	−85	−99	−112
20	32	18	4	−10	−25	−39	−53	−67	−82	−96	−110	−121
25	30	16	0	−15	−29	−44	−59	−74	−88	−104	−118	−133
30	28	13	−2	−18	−33	−48	−63	−79	−94	−109	−125	−140
35	27	11	−4	−20	−35	−51	−67	−82	−98	−113	−129	−145
40	26	10	−6	−21	−37	−53	−69	−85	−100	−116	−132	−148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER In < hr with dry skin. Maximum danger of false sense of security				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trenchfoot and immersion foot may occur at any point on this chart.											

*Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.
Equivalent chilll temperature requiring dry clothing to maintain core body tempearture above 36°C (96.8°F) per cold stress TLV

6.1 Cold Stress Prevention

Engineering controls should be utilized whenever possible to protect workers from cold related hazards. For example, on-site heat sources, heated shelters, work areas shielded from drafty or windy

conditions, and the use of thermal insulating material on equipment handles. Effects arising from cold exposure will be minimized by the following control measures:

- Employees will be trained to recognize cold stress symptoms.
- Field activities will be curtailed or halted if the equivalent chill temperature is below 20 F (7C).
- As much as possible, work that exposes employees to the cold will be done during the warmest hours of the day.
- Inactivity in cold conditions will be kept to a minimum.
- Frequent short breaks in warm, dry shelters will be taken.
- Vehicles will be equipped with supplies in case the vehicle becomes inoperable (e.g., blanket, dry clothing, water, food, a shovel, etc.

TABLE 3. Threshold Limit Values Work/Warm-up Schedule for Four-Hour Shift*

Air Temperature—Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
°C (approx.)	°F (approx.)	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
–26° to –28°	–15° to –19°	(Norm. Breaks)	1	(Norm. Breaks)		75 min	2	55 min	3	40 min	4
–29° to –31°	–20° to –24°	(Norm. Breaks)	1	75 min	2	55 min	3	40 min	4	30 min	5
–32° to –34°	–25° to –29°	75 min	2	55 min	3	40 min	4	30 min	5	Non-emergency work should cease	
–35° to –37°	–30° to –34°	55 min	3	40 min	4	30 min	5	Non-emergency work should cease			
–38° to –39°	–35° to –39°	40 min	4	30 min	5	Non-emergency work should cease					
–40° to –42°	–40° to –44°	30 min	5	Non-emergency work should cease							
–43° & below	–45° & below	Non-emergency work should cease									

Notes for Table 3

1. Schedule applies to moderate to heavy work activity with warm-up breaks of ten (10) minutes in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule one step lower. For example, at –35°C (–30°F) with no noticeable wind (Step 4), a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period (Step 5).
2. The following is suggested as a guide for estimating wind velocity if accurate information is not available: 5 mph: light flag moves; 10 mph: light flag fully extended; 15 mph: raises newspaper sheet; 20 mph: blowing and drifting snow.
3. If only the wind chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factors given above would be: 1) special warm-up breaks should be initiated at a wind chill cooling rate of about 1750 W/m^2; 2) all non-emergency work should have ceased at or before a wind chill of 2250 W/m^2. In general the warm-up schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart slightly over-compensates for the actual temperatures in the colder ranges, since windy conditions rarely prevail at extremely low temperatures.
4. TLVs apply only for workers in dry clothing.

*Adapted from Occupational Health & Safety Division, Saskatchewan Department of Labour.

6.2 Cold-Related Illness

6.2.1 Hypothermia

Hypothermia occurs when the body temperature falls to a level where normal muscular and cerebral functions are impaired. Although it usually occurs in freezing air and water temperatures, it can occur in any climate if a person's internal body temperature falls below normal. Symptoms should not be ignored, and a supervisor should be notified as soon as hypothermia is suspected.

Initially, symptoms may include shivering, an inability to do complex motor functions, sluggishness and mild confusion as the body temperature drops to around 95 F. As the body temperature falls, speech may become slurred, and behavior may be irrational, simple motor functions may be difficult to do and a state of "dazed consciousness" may exist. In severe state (below 90 F or 32 C), heart rate, blood flow, and breathing will slow. Unconsciousness and full heart failure can occur.

6.2.2 Hypothermia First Aid

6.2.2.1 On Land

- Call for emergency, and then help move the victim (unless other injuries prohibit their being moved) to a warm, dry area and replace wet clothing with warm, dry clothing or a blanket. Move the person carefully because movement can increase the irritability of the heart.
- If the person is conscious and lucid, warm liquids can be provided, but never alcohol or caffeinated drinks. If possible, have them to move their arms and legs to create muscle heat.
- If the person is unconscious or unable to assist, place warm bottles/packs in the person's arm pits, groin, neck and head areas.
- Do not rub the person's body or place them in warm water.

6.2.2.2 In Water

- Call for emergency help and get the victim out of the water. Move them carefully because movement can increase the irritability of the heart.
- If it is you in the water, do not swim unless a floating object or person can be reached quickly as swimming uses the body's heat and reduces survival time by about 50%.
- If you are in the water, conserve body heat by folding arms across the chest, keeping thighs together, bending knees and crossing ankles, if another person is in the water with you, huddle together.
- If you are in the water, do not remove clothing-button, buckle, zip, and tighten collars, cuffs, shoes, and hoods as the water trapped next to the body provides a layer of insulation that may slow the loss of heat.

6.2.3 Frostbite

Frostbite occurs when the skin literally freezes, and deep frostbite can affect deeper tissues such as tendons and muscles. Frostbite usually occurs when temperatures drop below 30 F (1C), but wind chill effects can cause frostbite at above-freezing temperatures. The ears, fingers, toes, cheeks, and nose are the most commonly affected body parts. Initially, symptoms include an uncomfortable sensation of coldness. Tingling, stinging or an aching feeling of the exposed area is followed by numbness. Frostbitten areas appear white and cold to the touch and with deeper frostbite, the area becomes numb, painless, and hard, and can turn black.

6.2.4 Frostbite First Aid

- Seek medical attention as soon as possible and treat any existing hypothermia first.
- Warm liquid can be provided, but not alcohol or caffeinated drinks such as tea and coffee.
- Do not rub the affected areas, but cover them with dry, sterile gauze or soft, clean bandages.
- Do not try rewarming the affected area if you have not been specifically trained to do so and/or if there is a chance the affected area will get cold again

7. SMALL CHEMICAL SPILLS

Chemical hazards present in environmental samples or in the environment being sampled are NOT the only "chemicals of concern". Toxic chemicals may also be brought onto a site as part of the sampling event in the form of sample preservatives. In general, sample preservation is required for most water samples. Two practices exist for adding a preservative: 1) addition of the preservative to the samples in the field; and 2) addition of the preservative to the sampling containers prior to sending the samplers into the field. In either case, EXTREME caution MUST be exercised when adding a preservative to a sample vial or using vials which already contain a preservative since these preservatives will vary in concentration and type. Some examples of the type of preservatives which may be encountered include sodium thiosulfate to remove chlorine; hydrochloric acid or ammonium chloride to stabilize pH and reduce biological activity; or sodium bisulfate.

7.1 Chemical First Aid (Body)

In the event that you suspect that you have been exposed to a chemical, whether or not you were wearing PPE, you should:

- Remove yourself or the victim from the accident area.
- Remove any contaminated clothing.
- Wash the injured area to dilute or remove the substance, using large volumes of water.
- Wash for at least 20 minutes, taking care not to allow runoff to contact unaffected parts of your body.
- Gently brush away any solid materials, again avoiding unaffected body surfaces.
- Especially wash away any chemical in your eye. Sometimes the best way to get large amounts of water to your eye is to step into the shower.

7.2 Chemical First Aid (Eye)

For all chemical injuries to the eye, the first thing you should do is immediately irrigate the eye copiously. Ideally, specific eye irrigating solutions should be used for this, but if none are available regular tap water will do just fine.

- Begin washing your eye before taking any other action and continue for at least 10 minutes. The longer a chemical is in your eye, the more damage will occur. Diluting the substance and washing away any particles that may have been in the chemical are extremely important.
- Ideally, in a work setting, you would be placed in an emergency eyewash or shower station and your eye washed with sterile isotonic saline solution. If sterile saline is not available, use cold tap water.
- All acid or alkali eye burns require immediate treatment and evaluation by a doctor. You should be taken immediately to the closest emergency department. If you suspect a serious injury may have occurred or are otherwise not able to make the trip to the emergency room quickly, then you should call an ambulance to shorten transport time. Take the Safety Data Sheet (SDS) on the chemical you were exposed to with you to the hospital.

Any time you experience pain, tearing, redness, irritation, or vision loss, go to a hospital's emergency department for immediate evaluation, even if you believe the chemical is only a mild irritant.

APPENDIX E
COVID-19 PROJECT RESPONSE PLAN

APPENDIX F
EMERGENCY INFORMATION

Table 1A: Emergency Response Telephone Roster		
	Office	**Cell**
PROJECT TEAM		
Ramboll		
Project Director: Sarah Stoneking	703-516-2407	703-587-4356
Project Manager: Greg Grose	703-516-2479	703-895-6244
Designated Site Supervisor: Lucas Cherry		703-939-1506
Designated Site Supervisor: Leah Wise		607-661-2124
Designated Site Supervisor: McNeill Bauer		703-307-3087
Health, Safety & Security Coordinator: Greg Grose	703-516-2479	703-895-6244
Corporate HS&S Director: Mark Watka	312-927-1140	
Contractors		
Company: Blood Hound Contact: Elliot	800-825-9283	
Company: Eichelbergers Contact: Dwayne Kocher	717-691-6062	717-649-0206
Company: GPRS Contact: Aaron Brown	419-767-2528	
Company: Long Fence Contact: David Eback	703-471-0960	540-327-5724
Company: Cascade Contact: Nicholas King	732-296-6620	732-403-4306
Company: Eurofins Test America Contact: Marrissa Williams	717-556-7246	
Company: PMI Contact: Larry Hockman	703-434-2676	804-824-8919
Company: Capitol Environmental Contact: Sandy Haynick	434-327-2688	
Client/Security		
Client Contact: Joseph Jeray		978-729-3209
Client Contact: Laura Pasquine		207-356-7468
Client Contact: Julianna Connelly		617-240-8695
Site Contact: George [Crockett Facility Services]		301-852-4752
EMERGENCY RESPONSE AGENCIES		
Hospital	911	
Emergency Fire	911	
Emergency Police	911	
Health Department	911	
OTHER EMERGENCY ASSISTANCE		
National Response Center (oil and chemical spills)	800-424-8802	

Table 1A: Emergency Response Telephone Roster		
	Office	**Cell**
Poison Control Center	800-222-1222	
Federal Emergency Management Agency	202-646-2500	
NON-EMERGENCY PHONE NUMBERS		
Police: Alexandria City PD	703-746-4444	
Occupational Clinic: [WorkCare in US]	888-449-7787	
Fire Department: Alexandria Fire Station 204	703-746-5200	
Hospital: Inova Alexandria Hospital	703-504-3000	

Table 1B: Emergency Services Instructions

For Emergency Medical Incidents, Emergency Fire Response, or Hazardous Materials Incidents

Emergency Telephone Numbers:

- Hospital: 911
- Police: 911
- Fire Department: 911
- Site Security/Client: Joseph Jeray, 978-729-3209

4. Remember to speak SLOWLY and CLEARLY. Do NOT hang up first: let the dispatcher conclude the call.
5. Provide the following information:
   d. Location: 1400 North Royal Street, Alexandria, VA
   e. Your name and phone number
6. Describe nature of Incident:
   a. Emergency Medical Incident
      - How many victims
      - Type of incident-physical injury, etc.
      - Assessment of victims' condition if known (whether victim is conscious/unconscious, breathing/not breathing, pulse/no pulse, nature of injuries, first aid measures used, etc.)
      - Where incident occurred
   b. Fire:
      - Location of Fire
   c. Hazardous Materials Incident:
      - This is a hazardous materials incident requiring dispatch of HAZMAT unit
      - Type of incident (fire, explosion, spill, etc.)
      - Type of material (specific chemicals or general description)
      - Whether there is also a Medical Emergency
7. Give your location at the Site.

Note: Security, Site Supervisor or designee must meet the emergency personnel at the staging area to brief them on the situation.

ROUTE DESCRIPTION AND MAP TO HOSPITAL

Hospital Information:

Hospital Name: *Inova Alexandria Hospital*

Hospital Address: *4320 Seminary Road, Alexandria, VA 22304*

Hospital Phone Number: *703-504-3000*

Directions to Area Hospital:

- Head south on N Royal St towards Mt Vernon Trail (115 ft)
- Turn left onto Bashford Lane (0.2 mi)
- Turn left onto George Washington Memorial Pkwy (0.9 mi)
- Turn right onto Cameron St (351 ft)
- Turn left onto N Columbus St (52 ft)
- Turn right onto Cameron St (0.7 mi)
- Continue straight 171 ft then turn right onto King St (0.8 mi)
- Turn left onto Janneys Ln (1.0 mi)
- Continue straight onto Seminary Road (0.9 mi)
- Turn left onto N Howard St (177 ft) then turn right (246 ft)
- Take a slight right and the destination is on the right (92 ft)

SITE EMERGENCY EVACUATION ROUTE AND MAP

Rally Point(s):

Location #1: Southern driveway/main entrance to the property. Corner of Bashford Ln and N Royal St.

Location #2 (alternate): Western side of the northwestern parking lot nearest to the rail line/tree line at the edge of the property.