GEI Consultants

Consulting Engineers and Scientists

December 1, 2022

Mr. Justin Starr
New York State Department of Environmental Conservation
Assistant Geologist, Remedial Bureau C
Division of Environmental Remediation
625 Broadway, Floor 11
Albany, NY 12233-7014

Re: Canastota Supplemental PDI Workplan
Former Canastota MGP Site
Canastota, New York
NYSDEC Site no. 727014

Dear Mr. Starr:

On behalf of National Grid, GEI Consultants, Inc., P.C. (GEI) is providing this supplemental work plan for completion of the Pre-Design Investigation (PDI) of the Former Manufactured Gas Plant (MGP) site (Site) located in the Village of Canastota, New York. This supplemental PDI is necessary in order to complete remaining tasks from the March 21, 2022, PDI work plan that could not be performed during the initial mobilization, and to address conditions found at the Site the require additional investigation to complete the objectives of the PDI. The scope of work in this Supplemental PDI work plan are based on the e-mail correspondence provided to you by Dan Kopcow on November 7, 2022, as modified by the telephone discussion between National Grid, GEI, and NYSDEC on November 16, 2022.

PDI Findings

The PDI performed in September 2022 provided site characterization information for remedial design, as planned. The PDI did not change our understanding of the nature of the impacts, but it did refine the delineation of MGP impacts, which will require adjustments of the remedial extent. The key findings were:

- Discovery that the extent of impact extends further in the down-gradient direction to the northwest on the Village of Canastota Department of Public Works property.
- No impacts were found on the west side of the Department of Public Works garage, indicating the impacts do not extend as far west as previously mapped.
- The MGP impacts extend further east than expected, principally in the area east of the salt storage structure.

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- The MGP impacts were found to be deeper in some areas, especially along the east side. Generally, visual impacts extended to 14 feet deep (+/- one foot). However, the Semi-Volatile Organic Compounds analysis shows that outside of areas of visual NAPL impacts, those areas do not exceed the 500 ppm Semi-Volatile Organic Compounds limit. This may require some minor adjustments to the depth of remediation.

- In most locations, a uniform low permeability silt/clay unit above the dense till limits the downward extent of impacts.

- Three types of soil were identified for testing for design of the in-situ stabilization (ISS) mix: Shallow fill associated with the former MGP structures, fill in the former pond located north of the MGP structures, and native alluvial soil. Five-gallon samples of these materials were obtained for ISS treatability testing. Following the completion of the supplemental PDI we will refine where ISS will be applied and based on the boring longs representative soil samples will be prepared and subjected to bench-scale testing.

- The test pits were able to locate the strip footing for the Department of Public Works garage, and its depth and construction were observed and measured. Test pits found that the salt structure is constructed on a thick asphalt slab. Test pits were not able to expose the gas holder located partially under the Department of Public Works garage; however, the existing information will be sufficient for the remedial design.

Supplemental PDI Scope of Work

The Supplemental PDI includes both unfinished work from the original PDI SOW and new work to further delineate the impacts during the remedial design. Unfinished work includes the installation of downgradient monitoring wells, and the completion of boring SB-122 which could not be attempted due to its proximity to a large, active yellow jacket hornet next. Details of the Supplemental PDI are described below:

- Original SOW

    - Installation of two shallow monitoring wells (approximately 12 to 15 feet deep). As discussed on the November 16Th call, National Grid has been unable to obtain access to the downgradient residential property for installation of the three off-site monitoring wells described in the original PDI scope of work. A record of National Grid's efforts to negotiate access will be provided to the NYSDEC. As an alternative to these offsite wells two new wells will be installed, located on the Lenox Ambulance Company and Department of Public Works properties, as shown on Figure 1 (attached). Along with existing monitoring well MW-7, these wells will form a transect across the distal end of the dissolved groundwater plume, defining its location and width. If this transect is not able to define a third shallow monitoring may be installed along the Department of Public Works property line. This well would only be installed after consultation and agreement between National Grid and the NYSDEC.

    - One geotechnical boring (SB-112, 40 feet deep). This location has already been pre-cleared and will be advanced to provide engineering information for protection of the Department of Public Works garage.

- New SOW
    - Three additional delineation borings (20 feet deep) near the northwest side of the site (downgradient end of impacts) (SB-121, SB-122, and SB-123).
    - One delineation boring (20 feet deep) at the east side of salt storage structure to further define lateral extent of impacts (SB-124)
    - One contingency boring further east of SB-124 and the salt storage structure (SB-125).

All work will be performed according to the methods described in the Remedial Investigation and PDI work plans. All borings will be pre-cleared to five feet deep before drilling. In addition, all work will be conducted in accordance with the Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) described in the PDI Work Plan and provided again in Attachments A and B, respectively.

Supplemental PDI Schedule

The proposed schedule for the Supplemental PDI is outlined below. This work is currently proposed to begin on December 5, 2022.

Day	Activity
1	Mobilization, pre-clearing (6 locations, 1 with asphalt cutting)
2	Pre-clearing (4 locations, no asphalt cutting)
3	Delineation borings (SB-121 and SB-122)
4	Delineation borings (SB-123 and SB-124)
5	Deep boring (SB-112)
6	Begin monitoring well installations
7	Finish monitoring well installation
8	Well development, site restoration, demobilization
9	Contingency day (allowance for winter work or weather delays)

If you have any questions regarding the information presented, please call Dan Kopcow at (607) 216-8976 or email dkopcow@geiconsultants.com.

Sincerely,

GEI CONSULTANTS, INC., P.C.

Daniel Kopcow, P.E., PMP
Project Manager

PJ Snyder, P.E.
Senior Engineer

DK:tc
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Attachment: Figure 1 – PDI Results and Supplemental PDI Investigation Locations
Table 1 – Supplemental PDI Location Summary and Rationale
Table 2 – Supplemental PDI Laboratory Samples and Analyses Summary
Attachment A - GEI HASP
Attachment B - Community Air Monitoring Plan

c: A. Omorogbe, NYSDEC (amen.omorogbe@dec.ny.gov)
G. Priscott, NYSDEC (gary.priscott@dec.ny.gov)
A. Ghosh, NYSDOH (arunesh.ghosh@health.ny.gov)
S. McLaughlin, NYSDOH (scarlett.mclaughlin@health.ny.gov)
S. Stucker, National Grid (Steven.Stucker@nationalgrid.com)

Tables

Canastota Supplemental Pre-Design Investigation Scope of Work

Table 1. Supplemental PDI Location Summary and Rationale
Canastota Non-Owned Former MGP Site

Location ID	Location	Rationale	Target Depth	Field Sampling Interval	Field Testing
SB-112	NW of DPW Garage on Excavation Boundary	Geotechnical	45-ft, or 10-ft into till, whichever is deeper	Continuous sampling until top of till, standard sampling (every 5-ft) thereafter, 1 Shelby tube from alluvium layer (if soil conditions allow)	Visual observations, SPT N-values, pocket penetrometer, torvane
SB-121	West of SB-102	Confirm lateral extent of impacts to west of SB-102	20-ft, continue to 10-ft below lowest visual impacts or 2-ft below till, whichever is less	Continuous sampling (every 2-ft)	Visual observations, SPT N-values
SB-122	Northwest of SB-117	Confirm downgradient extent of impact NW of SB-117	20-ft, continue to 10-ft below lowest visual impacts or 2-ft below till, whichever is less	Continuous sampling (every 2-ft)	Visual observations, SPT N-values
SB-123	Northwest of SB-103	Confirm downgradient lateral extent of impact NW of SB-103 and NE of SB-117	20-ft, continue to 10-ft below lowest visual impacts or 2-ft below till, whichever is less	Continuous sampling (every 2-ft)	Visual observations, SPT N-values
SB-124	East of SB-105	Confirm lateral extent of impact east of SB-105	20-ft, continue to 10-ft below lowest visual impacts or 2-ft below till, whichever is less	Continuous sampling (every 2-ft)	Visual observations, SPT N-values
*SB-125	East of SB-124	Contingent boring if SB-124 shows MGP-related impact, to determine extent of impact to the east	20-ft, continue to 10-ft below lowest visual impacts or 2-ft below till, whichever is less	Continuous sampling (every 2-ft)	Visual observations, SPT N-values
MW-101	Offsite to NW, Lenox Property	Downgradient groundwater monitoring	12-ft	Continuous sampling (every 2-ft)	Visual observations
MW-102	Onsite to NW, DPW Property	Downgradient groundwater monitoring	12-ft	Continuous sampling (every 2-ft)	Visual observations
*MW-103	Determined by delineation needs, if needed	Downgradient groundwater monitoring	12-ft	Continuous sampling (every 2-ft)	Visual observations

Notes: * Contingent location

Table 2. PDI Supplemental Laboratory Samples and Analyses Summary
Canastota Non-Owned Former MGP Site

Sample ID	Soil Analysis	Geotech Analysis			ISS Analysis	Waste Characterization	Groundwater Analysis	
Analysis	**SVOCs (8270)**	**Geotechnical Tests**	**Atterberg Limits**	**Gradations and Moisture Contents**	**ISS Treatability Testing**	**Thermal Desorption and Landfill Requirements ***	**Total PAHs (8270)**	**BTEX (8260)**
Sample Total	TBD	6 Samples Max (submit for up to 5 direct shear tests and 5 triaxial tests)	18 Max		10 gallons - Fill 10 gallons - Alluvium **	4 Total: ** 2- Highly impacted 2- Lesser impacted	16 Max (3 New, 13 Existing)	
Sampling Location	Collect samples from most impacted intervals that are not obviously source material, or one-foot interval immediately above water table.	Collect undisturbed Shelby tube samples from soft to stiff cohesive soils in alluvium layer.	Collect samples from each of the different geologic units (fill, alluvium, and/or till) for each boring. Results will determine if Atterberg limits test possible (fines greater than 50%).		Collect material from the most heavily impacted areas and field-screen on a 3/8-inch sieve. See cell for anticipated soil type(s).	Collect samples from the most visibly impacted soils in representative locations and depth intervals where excavation is anticipated. Separate between highly impacted soils (including source material) and lesser impacted soils.	Collect one sample from each monitoring well.	
Subsurface Soil Borings								
SB-112	2	1	3					
SB-121	2							
SB-122	2							
SB-123	2							
SB-124	2							
† SB-125	2							
Soil QA/QC								
Duplicates	1							
MS	1							
MSD	1							
Equipment Blank	1							

Notes:

TBD - To Be Determined

MS - Matrix Spike

MSD - Matrix Spike Duplicate

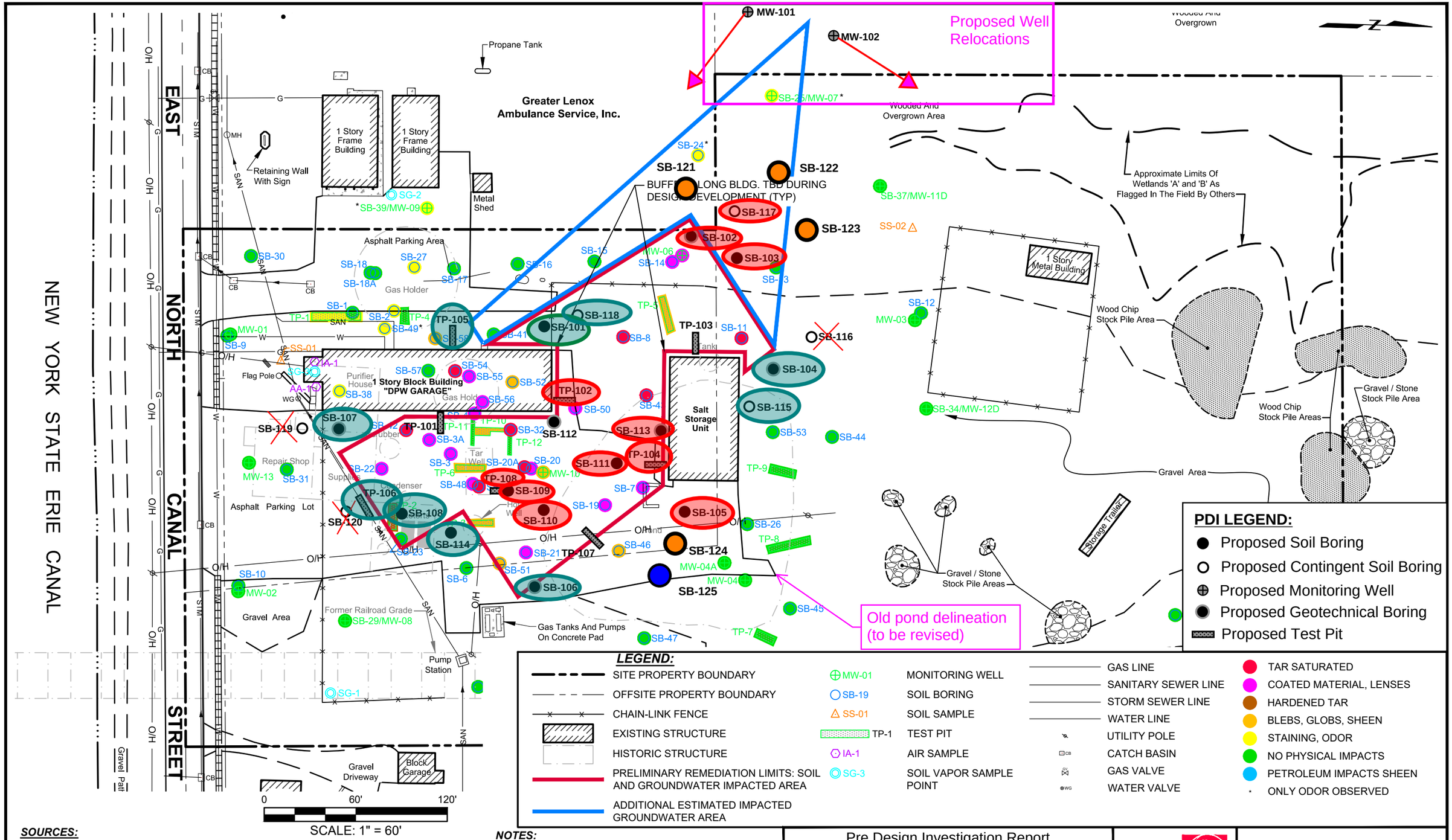
* See Attachment B for a list of waste characterization analyses.

** Possible locations for collecting samples are given. Not all locations need to be sampled if enough samples or materials are obtained from other locations. See "Sample Amount" cell for total amount needed.

† Contingency Location

Figures

NAPL observed | No NAPL (no or low impact) | Proposed delineation boring | Eliminated boring | Proposed step-out contingency boring



PDI LEGEND:

- Proposed Soil Boring
- Proposed Contingent Soil Boring
- Proposed Monitoring Well
- Proposed Geotechnical Boring
- Proposed Test Pit

LEGEND:

- SITE PROPERTY BOUNDARY
- OFFSITE PROPERTY BOUNDARY
- CHAIN-LINK FENCE
- EXISTING STRUCTURE
- HISTORIC STRUCTURE
- PRELIMINARY REMEDIATION LIMITS: SOIL AND GROUNDWATER IMPACTED AREA
- ADDITIONAL ESTIMATED IMPACTED GROUNDWATER AREA
- MW-01 MONITORING WELL
- SB-19 SOIL BORING
- SS-01 SOIL SAMPLE
- TP-1 TEST PIT
- IA-1 AIR SAMPLE
- SG-3 SOIL VAPOR SAMPLE POINT
- GAS LINE
- SANITARY SEWER LINE
- STORM SEWER LINE
- WATER LINE
- UTILITY POLE
- CB CATCH BASIN
- GAS VALVE
- WG WATER VALVE
- TAR SATURATED
- COATED MATERIAL, LENSES
- HARDENED TAR
- BLEBS, GLOBS, SHEEN
- STAINING, ODOR
- NO PHYSICAL IMPACTS
- PETROLEUM IMPACTS SHEEN
- ONLY ODOR OBSERVED

SOURCES:

1. PLAN BASED ON SURVEY MAPS SHEETS 1 AND 2: *LANDS OF VILLAGE OF CANASTOTA, NORTHEAST CANAL STREET AND ROBERTS STREET, BEING PART OF LOT # 86 OF THE CANASTOTA TRACT, VILLAGE OF CANASTOTA - MADISON COUNTY, STATE OF NEW YORK,* PREPARED BY DELTA ENGINEERS, ARCHITECTS & LAND SURVEYORS, 4873 NEW YORK STATE ROUTE #5, VERNON, NY, SCALE: 1" = 30, DATE: 2/10/2010, LAST REVISED JANUARY 20, 2011.
2. 1911 SANBORN FIRE INSURANCE MAP.

NOTES:

1. HORIZONTAL DATUM: NEW YORK STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, (NAD 83).
2. VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29).
3. LOCATIONS OF SOME HISTORIC FEATURES ADJUSTED BASED ON FIELD OBSERVATIONS.

Pre Design Investigation Report
Canastota Non-Owned Former MGP Site
Canastota, New York

nationalgrid

GEI

Project 034390

Pre Design Investigation Locations

November 2021 Fig. 1

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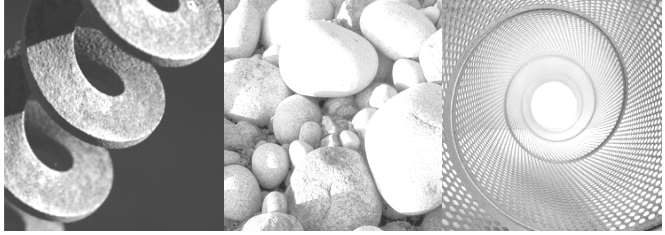
Attachment A

Health and Safety Plan (HASP)



GEI Consultants

Consulting
Engineers and
Scientists

Health and Safety Plan

Canastota Non-Owned Former MGP
Canastota, New York

Prepared For:
National Grid
300 Erie Boulevard West
Syracuse, NY 13202

Submitted by:
GEI Consultants, Inc.
1301 Trumansburg Road, Suite N
Ithaca, NY 14850
607-216-8955

March 2022

Project No. 034390

Daniel Kopcow, P.E.
Project Manager

Jeena Sheppard
Regional Safety Manager

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Appendices

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1. Emergency Contact Information

Table 1. Emergency Contact Information

Important Phone Numbers	
Local Police:	911
Fire Department:	911
Ambulance:	911
Hospital and Occupational Clinic Information *(See Attached Map and Directions in Appendix A)*	
Oneida Health Hospital: 321 Genesee St Oneida, NY 13421 **Occupational Health Clinic:** Will be determined by Medcor Triage	(315) 363-6000 Call Medcor Triage 1-800-775-5866
Contacts	
Project Manager: Daniel Kopcow, P.E.	(607) 216-8976 office (607) 206-9075 cell
Safety Director: Steve Hawkins	(860) 368-5348 office (860) 916-4167 cell
Regional Safety Manager: Jeena Sheppard	 (856) 298-7138 cell
GEI People Team:	(781) 721-4117 Boston (916) 631-4596 Sacramento
Medcor Triage	1-800-775-5866
Client Contact: Steve Stucker	(315) 428-5652 office (315) 247-6490 cell
Other Information	
Contractor Requesting/Performing Utility Clearance: Utility Clearance Ticket Number:	TBD TBD
Nearest Telephone Location (or alternate means of communication)	On-site Cellular

2. Background

Project Name: Canastota Non-Owned Former MGP

Project Location: Canastota, New York

GEI Project No: 034390

This Health and Safety Plan (HASP) establishes policies and procedures to protect GEI Consultants, Inc., P.C. (GEI) personnel from the potential hazards posed by the activities at the Canastota Non-Owned Former Manufactured Gas Plant (MGP) site in Canastota, New York. Reading of the HASP is required of on-site GEI personnel and will be reviewed by GEI subcontractors. Subcontractors will prepare their own site-specific HASP and may use this as a guide. The plan identifies measures to minimize accidents and injuries, which may result from project activities or during adverse weather conditions. Additionally, federal, state and local representatives, as well as National Grid employees may be required to sign and adhere to this HASP, depending on the nature of their presence on site during activities conducted by GEI. A copy of this HASP will be maintained on site for the duration of the work.

Included in Section 1 and Appendix A is a route to the nearest medical facility from the site with directions and contact information. Safety data sheets (SDS), specific to chemicals that may be encountered while working at the site, are in Appendix B. Appendix C details the signs, symptoms, care and procedures to both heat and cold stress. Appendix D includes the Tailgate Safety Briefing form, the Project Safety Briefing form, the Accident/Incident Report Form and the Near Miss Reporting Form. Appendix E contains the GEI Health and Safety (H&S) Standard Operating Procedures (SOPs) that apply to this project. Also included in Appendix F are the GEI COVID-19 Field Work Guidance and the National Grid COVID-19 Health & Safety Plan.

Employees should review National Grid's Safety Procedure, Contractor Safety Requirements for reference. This document represents policies and safety-related work methods unique to National Grid and they may be more stringent than the Occupational Safety and Health Administration (OSHA) regulations. Contractors must follow these requirements as well as their own rules or regulations that meet or exceed OSHA and other regulatory requirements.

2.1 Site Description

The site is located at East North Canal Street, on the east side of the Village of Canastota and immediately across the street from the old Erie Canal. The location of the former MGP is at the southern end of a property approximately 10 acres in area. It is owned by the Village of Canastota and is in active use as the Department of Public Works (DPW) garage and service

yard. The site is bounded by East North Canal Street to the south, Roberts Street to the north, the Greater Lenox Ambulance Service and residential properties to the west, and residential properties to the east.

The former MGP property was a manufacturer of coal gas, operating from 1907 until approximately 1926. Gas was produced by both the Lowe (water gas) process and coal process. Environmental investigations performed from 2003 – 2014 have found coal tar and petroleum products present in subsurface soils and groundwater at the site. The contaminants of concern include volatile organic chemicals (VOCs) such as benzene, toluene, ethyl benzene, and xylenes (BTEX), SVOCs such as polycyclic aromatic hydrocarbons (PAHs), and heavy metals. Coal tar non-aqueous phase liquid (NAPL) was also observed in the subsurface soil.

2.2 Scope of Field Work

GEI will be performing a predesign investigation at the site. Activities to be conducted by contractors are listed below. GEI staff is responsible for management and oversight of these tasks. These tasks include:

- Mobilization and site preparation
- Drilling of soil borings
- Monitoring well installation
- Test pit excavation
- Vacuum extraction
- Waste handling and management
- Site survey, restoration, and demobilization

GEI staff will be performing the following activities:

- Soil logging and visual assessment
- Analytical and geotechnical sampling of soil and groundwater
- Monitoring well gauging and evaluation
- Community air monitoring
- Field-based project management and oversight

If additional field activities are proposed, this HASP will be amended as necessary.

3. GEI Health and Safety Policy

GEI is committed to providing a safe and healthy work environment for its employees. To maintain a safe work environment, GEI has established an organizational structure and a Corporate Health and Safety Program to promote the following objectives:

Reduce the risk of injury, illness, and loss of life to GEI employees.

Maintain compliance with federal, state, and other applicable safety regulations; and minimize GEI employees' work exposure to potential physical, chemical, biological, and radiological hazards.

Safety policy and procedure on any one project cannot be administered, implemented, monitored, and enforced by any one individual. The total objective of a safe, accident-free work environment can only be accomplished by a dedicated, concerted effort by every individual involved with the project from management down to all employees.

Each GEI employee must understand their value to the company; the costs of accidents, both monetary, physical, and emotional; the objective of the safety policy and procedures; the safety rules that apply to the safety policy and procedures; and what their individual role is in administering, implementing, monitoring, and compliance of their safety policy and procedures. This allows for a more personal approach to compliance through planning, training, understanding, and cooperative effort, rather than by strict enforcement. If for any reason an unsafe act persists, strict enforcement will be implemented.

4. Potential Hazards

The potential hazards associated with site conditions and activity hazards related to GEI on-site activities have been identified in this section.

4.1 Special Site Conditions or Concerns

Traffic – The majority of traffic on the project site will be construction traffic and traffic related to the DPW garage operation.

Construction Equipment – Contractor will use drilling and excavation equipment to complete the investigation including direct-push or truck-mounted rotary drill rigs, a backhoe or excavator, and a Vactron vacuum extractor. Specific attention should be given to rotating equipment, pinch points, and overhead equipment.

Biohazards (insect bites, poison ivy, etc.) – Poison ivy is present along with black flies and ticks.

Difficult or remote site access – access throughout the site is moderate due to unpaved areas and open, marshy fields. Precautions will be made to avoid getting stuck in muddy conditions.

Hazardous weather conditions – Cold stress, heat stress, inclement weather, slippery surfaces, and icy conditions are possible dangers.

General safety concerns related to the infection and spread of the COVID-19 coronavirus.

Safety equipment will include: First aid kit, fire extinguisher, eye wash bottles, adequate supply of drinking water and electrolyte fluids, hand cleaner, insect repellent, sunscreen, and cell phone. GEI employees will wear level D personal protective equipment (PPE).

4.2 Activity Hazard Analysis

The potential hazards for this project associated with site conditions and activity hazards associated with GEI on-site activities have been identified in Table 2. General hazards and control measures that are applicable to all site activities are identified in the General Hazards section. The site-specific tasks, potential hazards, and control measures established to reduce the risk of injury or illness are identified in the Activity Hazard section of Table 2. Health and Safety SOPs for routine hazards and common site conditions are referenced in the table below and included in Appendix E.

Table 2. Activity Hazard Analysis

General Hazards **These Hazards Apply to All Site Activities**	**Control Measure**
Chemical / Contaminant Exposure – Skin and eye injury/irritation	• Wear protective coveralls (e.g. Tyvek®) with shoe covers, safety glasses, face shield, Nitrile gloves. • Dispose of gloves after use and wash hands. • Avoid contact with pooled liquids and limit contact with contaminated soils/groundwater. • See SOP HS-009
Cold Stress – Hypothermia, Frostbite	• Take breaks in heated shelters when working in extremely cold temperatures. • Drink warm liquids to reduce the susceptibility to cold stress. • Wear protective clothing (recommended three layers: an outside layer to break the wind, a middle layer to provide insulation, and an inner layer of cotton of synthetic weave to allow ventilation). • Wear a hat and insulated boots. • Keep a change of dry clothing available in case clothes become wet. • Do heavy work during the warmer parts of the day and take breaks from the cold. • If possible shield work areas from drafts of wind and use insulating material on equipment handles when temperatures are below 30°F • Watch for symptoms of cold stress. (Appendix C)
Coronavirus – COVID-19	• Maintain a distance of 3-6 feet from others. • If tasks needed to be performed close to others, limit time spent in close proximity. • When travelling to project site, travel in separate vehicles. • Frequent washing of hands with soap and warm water for 20 seconds. If soap is not available, use hand sanitizer with 60% alcohol. • Wipe down surfaces such as equipment surfaces, vehicle steering wheel, gear shifter, controls and door handles with disinfectant routinely before and after use. • Wear Nitrile gloves as frequently as possible. • Wash hands after gloves removal. • Avoid shaking hands, hugging, or other personal contact.
Cuts and Lacerations	• Keep free hand out of the way. • Secure work if cutting through thick material. • Use only sharp blades; dull blades require more force that results in less knife control. • Pull the knife through the object and away from your body; pulling motions are easier to manage. • Do not put the knife in your pocket. • Wear leather or Kevlar® gloves when using knives or blades, or when removing sharp objects caught or dangling in sampling gear.

General Hazards **These Hazards Apply to All Site Activities**	**Control Measure**
Driving	• Employees must wear their safety belt while in a moving vehicle. • Vehicle accidents will be reported in accordance with GEI's accident reporting procedures. • Vehicles will be properly maintained and safely operated (refer to GEI's Fleet Maintenance Program). • Employees will follow safe driving behaviors, which include limiting distractions such as manipulating radios or other equipment that may cause a distraction. Employees will not exceed the posted speed limit and will maintain a safe distance between other vehicles. • Use defensive driving techniques. • Driving distance and time after a 12-hour shift will not exceed 30 miles or 30 minutes (whichever is greater). • See SOP HS-004
Dusty Conditions – Eye and respiratory irritation	• Avoid travel at extreme times • Wear protective gear – dust masks, safety glasses
Heat Stress – Fainting, Fatigue, Heat Stroke	• Increase water intake while working. • Increase number of rest breaks and/or rotate workers in shorter work shifts. Rest in cool, dry areas. • Watch for signs and symptoms of heat exhaustion and fatigue. • Plan work for early morning or evening during hot months. • Use ice vests when necessary. • In the event of heat stroke, bring the victim to a cool environment and initiate first aid procedures. • See Appendix C
Inclement Weather	• Listen to local forecasts for warnings about specific weather hazards such as tornados, thunderstorms, and flash floods. • If the storms produce thunder and/or lightning, leave the work area immediately and move to a safe area. • Discuss an action plan prior to the severe weather. • Wear appropriate PPE for the type of weather that could be encountered. • Stop work until conditions are suitable. Take cover in vehicles or shelter as appropriate. • See SOP HS-010

General Hazards **These Hazards Apply to All Site Activities**	**Control Measure**
Insects – Bites, Stings, Allergic Reactions	• Apply insect repellent prior to performing field work and as often as needed throughout the work shift • Wear proper protective clothing (work boots, socks and light colored clothing) • Wear shoes, long pants with bottoms tucked into boots or socks, and a long-sleeved shirt when outdoors for long periods of time, or when many insects are most active (between dawn and dusk). • When walking in wooded areas, avoid contact with bushes, tall grass, or brush as much as possible • Field personnel who may have insect allergies will have bee sting allergy medication on site and will provide this information to the SSO and the CHSO prior to commencing work. • Field personnel will perform a self-check at the end of the day for ticks. • See SOP HS-001
Noise - Hearing loss	• Wear appropriate hearing protection based on the noise. • Remove the hazard by taking away the source of the noise. • Remove the employee from the source of the noise. • Provide the employee with appropriate personal protective equipment (PPE). • Other employees who do not need to be in proximity of the noise should distance themselves from the equipment generating the noise. • See SOP HS-012
Physical Injury – Slips, Trips and Falls	• Wear PPE that properly fits, is in good condition and appropriate for the activities and hazards. • Maintain good visibility of the work area. • Avoid walking on uneven, steeply sloped or debris ridden ground surfaces. • Plan tasks prior to preforming them including an activity hazard analysis. • Keep trafficked areas free from slip/trip/fall hazards. • Maintain weed growth in sampling areas, especially on slopes. • Wear shoes with traction. • Avoid traversing steep areas in slippery conditions. • Do not carry heavy objects to sampling areas, on steeply sloped areas, or where steep areas must be traversed to arrive at sample points.

General Hazards **These Hazards Apply to All Site Activities**	**Control Measure**
Poisonous Plants - Poison Ivy, Poison Oak, and Poison Sumac	• Avoid areas infested with poisonous plants. • Use a barrier cream to provide some protection. • Wash exposed clothing separately in hot water with detergent. • After use, clean tools, and soles of boots with rubbing alcohol or soap and lots of water. • Immediately wash with soap and water any areas that come into contact with poisonous plants. • If exposed to a poisonous plant, wash with soap and water or a product such as Technu™. First aid kits are available in the company vehicles. • See SOP HS-001
Repetitive Motion Injury - Standing, Squatting, and Bending Over	• Take regular breaks and do not work in unusual positions for long periods of time. • Walk and stretch between tasks. • See SOP HS-025
Sun Exposure	• Liberally apply sunscreen, with a minimum broad-spectrum sun protection factor (SPF) of 30 • Wear safety glasses that offer protection from ultraviolet A and B (UVA/UVB) rays. • Bring shade to the site to reduce exposure. • When possible, wear long-sleeved shirts and long pants. • Clothes made from tightly woven fabric and darker colors offer the best protection. Some clothing is certified as offering UV protection. • Wear a hat that has a brim all the way around that shades your face, ears, and the back of your neck. A tightly woven fabric, such as canvas, works best to protect your skin from UV rays. • Sunscreen wears off. Put it on again if you stay out in the sun for more than 2 hours. • Check the sunscreen's expiration date. Sunscreen without an expiration date has a shelf life of no more than 3 years.
Utilities – Shock, Electrocution, Fire, Explosion	• An underground utility survey must be conducted prior to intrusive activities. Coordination with utility locating services, property owner(s) or utility companies must be conducted. • Utilities are to be considered live or active until documented otherwise. • For overhead utilities within 50 feet, determine with the utility company the appropriate distance. Minimum distance for clearance is based on voltage of the line. • If exposing a utility, proper support and protection must be provided so that the utility will not be damaged. • If a gas line is contacted, the contractor must notify police, fire, and emergency personnel, and evacuate employees according to the site evacuation procedures. No attempt will be made to tamper with or correct the damaged utility. • See SOP HS-014

General Hazards These Hazards Apply to All Site Activities	Control Measure
Vehicular Traffic – Struck by injury, crushing	• Increase visibility of the work area to others by using cones, flags, barricades, proper lighting and caution tape to define work area. • Use a "spotter" to locate oncoming vehicles. • Use vehicle to block work area. • Engage police detail for all work conducted in appropriate areas. • Wear high-visibility, reflective vest at all times. • Maintain minimum DOT defined distances to other traffic lanes. • See SOP HS-016.

Activity	Potential Hazard	Control Measures
Carrying Equipment	Heavy lifting, strains/sprains, slips/trips/falls, pinch points	• Use proper lifting techniques as defined in the heavy lifting activity analysis below • Wear the proper type of glove to protect hands against sharp edges and skin/soft tissue injuries • Wear appropriate footwear • Be aware of hard to grip and hold items that may force your hand or wrist into awkward, stressful positions and cause disorders like tendinitis or carpal tunnel syndrome • Take breaks when carrying items frequently and/or for long distances • Do not over reach when picking up or placing items. • Use the buddy system when necessary • When climbing ladders, maintain three points of contact at all times. DO NOT carry equipment up or down ladders unless it is in a secure backpack or similar hands-free shoulder-strap bag or case. Lower or raise larger equipment by crane or rope

Activity	Potential Hazard	Control Measures
Construction Site Entry	Struck-by, caught-in-between equipment, crushing, pinch points	• Wear hardhat; high visibility reflective safety vest; steel-toed, steel-shank boots or (electrical hazard) EH-rated safety boots with composite toe and shank; safety glasses; nitrile/neoprene gloves; and earplugs. • Identify yourself and your work location to heavy equipment operators, so they may incorporate you into their operations. • Coordinate hand signals with operators. • Stay Alert! Pay attention to equipment backup alarms and swing radii. • Wear a high-visibility, reflective vest when working near equipment or motor vehicle traffic. • Position yourself in a safe location when filling out logs talking with the contractor. • Notify the contractor immediately if any problems arise. • Do not stand or sit under suspended loads or near any pressurized equipment lines. • Do not operate cellular telephones in the vicinity of heavy equipment operation. • See HS-018
Cutting Cores	Cuts/lacerations	• Use care when cutting cores. Use mechanical shears, electric knife or self-retracting safety blade when handling cores. • Eliminate hazard by having the drillers open the cores for you. • When using cutting tools, follow the safety precautions listed below: • Keep free hand out of the way. • Secure work if cutting through thick material. • Use only sharp blades; dull blades require more force that results in less knife control. • Pull the knife through the object and away from your body; pulling motions are easier to manage. • Do not put the knife in your pocket. • Wear leather or Kevlar® gloves when using knives or blades, or when removing sharp objects caught or dangling in sampling gear.
Drilling Oversight/ Sampling	Contaminant Exposure, Noise, Contact with Utilities, Cuts/Scrapes, Heavy Lifting, Repetition, Slips/Trips/Falls	• Wear hardhat; high visibility reflective safety vest; steel-toed, steel-shank boots or composite toe and shank; safety glasses; Nitrile/neoprene gloves; and earplugs. • Confirm utility locate has been completed. • Confirm adequate clearance from overhead utilities. • Dispose of gloves after use and wash hands. • Take regular breaks and do not work in unusual positions for long periods of time. • Keep trafficked areas free from slip/trip/fall hazards. • If cutting through concrete, follow the work practices and respiratory protection recommended in Table 1 of the GEI Silica Program based on the type of equipment being used to cut through the concrete.

Activity	Potential Hazard	Control Measures
Drum Handling	Contaminant Contact Cuts or Abrasions Heavy Lifting Slips/Trips/Falls	• Wear proper PPE including nitrile gloves and safety glasses and face shield as appropriate. • Use proper dollies or drum moving tools. • Use applicable tools to open/close drum lids. • Do not handle drums with bulging sides. • Dispose of gloves after use and wash hands. • Wear work gloves over nitrile gloves. • Use proper lifting techniques. • Ask fellow worker for help. • Keep trafficked areas free from slip/trip/fall hazards. • See SOP HS-003
Heavy Lifting	Back injury, knee injury	• Use proper lifting techniques. • Ask fellow worker for help. • Use a mechanical lifting device or a lifting aid where appropriate. • If you must lift, plan the lift before doing it. • Check your route for clearance. • Bend at the knees and use leg muscles when lifting. • Use the buddy system when lifting heavy or awkward objects. • Do not twist your body while lifting. • See SOP HS-025
Electrical Safety	Electrocution, burns, shock	• Conductive items such as jewelry or clothing containing metals will not be worn • Visually inspect equipment or systems for indications of possible damage. Equipment found damaged or defective will not be used and will be properly tagged as “Out of Service”. • Shut down the machine/equipment by the normal stopping procedure (stop button, open switch, close valve, etc.). • Disconnect the machine/equipment from the energy source. • Be aware of stored or residual energy and dissipate or restrain. • When the system/equipment is ready to be returned to service, make sure all tools are removed and the system is operationally intact. • Verify that all employees are in a safe position and have been removed from the area and notify when system/equipment is ready for use. • See SOP HS-005 a/b
Groundwater Sampling	Contaminant Exposure Heavy Lifting Repetition Slips/Trips/Falls	• Wear hardhat; high visibility reflective safety vest; steel-toed, steel-shank boots or composite toe and shank; safety glasses and Nitrile/neoprene gloves. • Dispose of gloves after use and wash hands. • User proper lifting techniques. • Take regular breaks and do not work in unusual positions for long periods of time. • Keep trafficked areas free from slip/trip/fall hazards.

Activity	Potential Hazard	Control Measures
Hand Augering	Repetition, pinch point, back/wrist/knee injury, cuts and scrapes	• Wear appropriate PPE including safety glasses and gloves that provide protection and grip. • Remove excavated soil only after stopping the hand auger. • Keep trafficked areas free from slip/trip/fall hazards. • An underground utility survey must be conducted prior to intrusive activities. Coordination with utility locating services, property owner(s) or utility companies must be conducted. • Inspect hand auger prior to use to determine if it is functioning properly and free of metal burs. • Use the appropriate size hand auger for the job. • Use hand movements that exert minimum pressure on wrist bones. • Take regular breaks and do not work in unusual positions for long periods of time.
Heavy Equipment – Working Near	Struck-by, caught-in-between equipment, crushing, pinch points	• Wear hardhat; high visibility reflective safety vest; steel-toed, steel-shank boots or (electrical hazard) EH-rated safety boots with composite toe and shank; safety glasses; nitrile/neoprene gloves; and earplugs. • Identify yourself and your work location to heavy equipment operators, so they may incorporate you into their operations. • Coordinate hand signals with operators. • Stay Alert! Pay attention to equipment backup alarms and swing radii. • Wear a high-visibility, reflective vest when working near equipment or motor vehicle traffic. • Position yourself in a safe location when filling out logs talking with the contractor. • Notify the contractor immediately if any problems arise. • Do not stand or sit under suspended loads or near any pressurized equipment lines. • Do not operate cellular telephones in the vicinity of heavy equipment operation. • See SOP HS-018
Non-Powered Hand Tools Use (loppers, pruning shears, machete, and honeysuckle hopper)	Cuts/Scrapes, Slips/Trips/Falls, Heavy Lifting, Repetition, caught-in-between equipment, pinch points	• Wear appropriate PPE including: gloves, steel toed/shank safety boots, safety glasses, high visibility reflective clothing, and hard hat (as necessary). • Keep hands away from pinch points or cutting parts • Use proper lifting techniques. • Do not remove equipment guards on equipment. • Take regular breaks and do not work in unusual positions for long periods of time. • Inspect equipment or tools prior to use. Tag and remove from service if tool is damaged.

Activity	Potential Hazard	Control Measures
Soil Sampling / Soil Vapor Sampling	Contaminant Exposure, Cuts/Scrapes, Heavy Lifting, Repetition, Slips/Trips/Falls	• Wear hardhat; high visibility reflective safety vest; steel-toed, steel-shank boots or composite toe and shank; safety glasses; Nitrile/neoprene gloves; and earplugs as necessary. • Dispose of gloves after use and wash hands. • Wear work gloves over nitrile gloves. • Excavation entry will be allowed only with proper sloping or shoring. • Take regular breaks and do not work in unusual positions for long periods of time. • Keep trafficked areas free from slip/trip/fall hazards.
Waste Characterization	Contaminant Contact Cuts or Abrasions Slips/Trips/Falls	• Wear proper PPE during sampling including nitrile gloves and safety glasses. • Dispose of gloves after use and wash hands. • Wear work gloves over nitrile gloves. • Keep trafficked areas free from slip/trip/fall hazards.

PPE is the initial level of protection based on the activity hazards and site conditions which have been identified. Upgrades to respiratory protection may be required based on the designated Action Levels found in Section 9. If site conditions suggest the existence of a situation more hazardous than anticipated, the site personnel will evacuate the immediate area. The hazard, the level of precautions, and the PPE will then be reevaluated with the assistance and approval of the Safety Director and the Project Manager (PM).

4.3 Personal Safety

Field activities have the potential to take employees into areas which may pose a risk to personal safety. The following websites (sources) have been researched to identify potential crime activity in the area of the project:

www.cityrating.com/crimestatistics.asp

> Canastota Village crime statistics report an overall downward trend in crime based on data from 8 years with violent crime increasing and property crime decreasing. Based on this trend, the crime rate in Canastota Village for 2022 is expected to be lower than in 2019.
>
> The city violent crime rate for Canastota Village in 2019 was lower than the national violent crime rate average by 59.12% and the city property crime rate in Canastota Village was lower than the national property crime rate average by 65.34%.
>
> In 2019 the city violent crime rate in Canastota Village was lower than the violent crime rate in New York by 56.75% and the city property crime rate in Canastota Village was lower than the property crime rate in New York by 46.75%.

To protect yourself, take the following precautions:

If deemed necessary by the PM, use the buddy system (teams of a minimum of two persons present);

Let the Site Safety Manager (SSM) know when you begin work in these areas and when you leave;

Call in regularly;

Pay attention to what is going on around you; and

If you arrive in an area and it does not look safe to get out of your vehicle, lock the doors and drive off quickly but safely.

Employees must not knowingly enter into a situation where there is the potential for physical and violent behaviors to occur. If employees encounter hostile individuals or a confrontation develops in the work area, suspend work activities, immediately leave the area of concern, and contact local 911 for assistance. Notify the SSM and Safety Team (Safety Director and Regional Safety Managers – SafetyTeam@geiconsultants.com) of any incidents once you are out of potential danger.

In the event of an emergency, prompt communications with local emergency responders is essential. At least one charged and otherwise functioning cell phone to facilitate emergency communications will be on site. Confirmation of cellular phone operation will be confirmed at the start of each working day.

4.3.1 Coronavirus (COVID-19)

GEI field employees will follow the COVID-19 Field Guidance and the National Grid COVID-19 Health & Safety Plan in Appendix F.

Distancing

COVID-19 spreads from person-to-person primarily through droplets that are emitted from the initial person to a distance of 6 feet.

Maintain a distance of at least 6 feet (2 meters) from others. This includes during site meetings and breaks and while performing work tasks. Meetings should be held outside or by phone/video.

Minimize the number of employees in one location to the extent possible. Follow local restrictions for maximum number of people congregated in one location at a time.

If tasks need to be performed close to others (within 6 feet) and that cannot be avoided, wear appropriate PPE including a face mask (surgical or cloth), gloves, and eye protection.

> NOTE: Face masks are not a substitute for distancing. Masks are meant to protect others in case you are infected. Contact the Safety Team

(safetyteam@geiconsultants.com) to discuss any special circumstances and the PPE warranted.

Wear nitrile gloves as much as practicable and change them frequently. As practicable, wash your hands or use sanitizer between glove changes. Wash your hands after wearing gloves.

Minimize and stagger time in office spaces to performing essential duties such as picking up and dropping off equipment and samples. If you need to spend more time in a project office (e.g., a construction trailer), it's important that the workspace allows for proper social distancing.

When traveling to project sites, travel in separate vehicles. Do not travel in the same vehicle.

Hygiene Practices

The hygiene practices we have been instructed to perform more routinely apply to performing field work as well, such as:

Frequent hand washing with soap and warm water for 20 seconds. If soap and water are not readily available, use hand sanitizer (containing 60% alcohol) until soap and water can be used. If sanitizer is not available, bringing gallon containers of water and soap may be a good substitute.

If you are filling water bottles (for drinking or hand washing) keep the bottle away from the spigot to avoid transfer of germs or contaminants.

Wipe down surfaces with disinfectant on a routine basis (at least once per day). This includes field equipment and other items that may have previously been used by others. This is especially important while working in construction trailers. When using company and personal vehicles, wipe surfaces including the steering wheel, gear shifter, controls, and door handles before and after use.

Wear nitrile gloves as frequently as possible. Hand washing is necessary after removing gloves.

When greeting others do not shake hands, hug, or engage in other personal contact. A greeting from a distance such as a wave is suggested.

Avoid sharing field equipment and other materials with others. Before using field equipment or putting it away, wipe it down with disinfectant or wash it with soap and water. Note, use extra caution using disinfectants while collecting environmental samples to ensure that the samples are not compromised.

4.3.2 Handling Drums and Containers

Regulations for handling drums and containers are specified by OSHA 29 Code of Federal Regulations (CFR) 1910.120(j). Potential hazards associated with handling drums include vapor generation, fire, explosions, and possible physical injury. Handling of drums/containers during the site investigation and remediation activities may be necessary.

If drum/container handling is necessary, it will be performed in accordance with applicable regulations.

4.3.3 Electrical Hazards

Utilities

The site may have shallow, buried utilities and also overhead utilities in certain areas. It will be necessary for parties disturbing the existing ground surface and conducting operations with heavy equipment having high clearances to exercise caution in performing project-related work with respect to the presence of utilities. Utility companies with active, buried lines in the site area will be asked by the Contractor performing intrusive activities to mark their facilities. Employees will use these data to choose work locations.

Underground Utilities

No excavating, drilling, boring, or other intrusive activities will be performed until an underground utility survey, conducted by knowledgeable persons or agencies, has been made. This survey will identify underground and in-workplace utilities such as the following:

Electrical lines and appliances

Telephone lines

Cable television lines

Gas line

Pipelines

Steam lines

Water line

Sewer lines

Pressurized air lines

The location of utilities will be discussed with GEI employees and subcontractors during a site safety briefing. Identified utilities should be marked or access otherwise restricted to avoid chance of accidental contact.

Even when a utility search has been completed, drilling, boring, and excavation should commence with caution until advanced beyond the depth at which such utilities are usually located. Utilities will be considered “live” or active until reliable sources demonstrate otherwise.

Overhead Utilities

Overhead transmission and distribution lines will be carried on towers and poles which provide adequate safety clearance over roadways and structures. Clearances will be adequate for the safe movement of vehicles and for the operation of construction equipment.

Overhead or above-ground electric lines should be considered active until a reliable source has documented them to be otherwise. Elevated work platforms, ladders, scaffolding, man-lifts, and drill or vehicle superstructures will be erected a minimum of 20 feet (the actual distance is dependent upon the voltage of the line) from overhead electrical lines until the line is de-energized, grounded, or shielded so arcing cannot occur between the work location or superstructure.

4.3.4 Excavations and Trenches

The safety requirements for excavations and trenches must be determined by a competent person who is capable of identifying existing and predictable hazards and work conditions that are unsanitary, hazardous, or dangerous to GEI employees. The competent person must also have the authorization to take prompt corrective measures to eliminate unsatisfactory conditions. GEI employees will not enter trenches.

The following are general requirements for work activities in and around excavations:

- Prior to initiation of excavation activity (or ground intrusive activity, such as drilling), the location of underground installations will be determined. The <One-Call/Dig-Safe> center will be contacted by the Contractor/Subcontractor a minimum of 72 hours prior to excavation activities. It may also be necessary to temporarily support underground utilities during excavation. When excavations approach the estimated location of underground installations, the exact location of the underground installations will be determined by means that are safe for GEI employees, i.e., hand dig, test pits, etc.
- Excavations should be inspected daily by the excavating company's competent person prior to commencement of work activities. Evidence of cave-ins, slides, sloughing, or surface cracks or excavations will be cause for work to cease until necessary precautions are taken to safeguard employees.
- Excavated and other materials or equipment that could fall or roll into the excavation, and vehicular traffic and heavy equipment will be placed at least 5 feet from the edge of the excavation.

Excavation operations will cease immediately during hazardous weather conditions such as high winds, heavy rain, lightning, and heavy snow.

Atmospheres are to be tested with a properly calibrated Combustion Gas Indicator (CGI) or Gas Measurement Instrument (GMI) in accordance with National Grid excavation procedures as required.

Employees will refer to GEI's Excavation Safety SOP for further information.

4.3.5 Fire and Explosion

When conducting excavating activities, the opportunity for encountering fire and explosion hazards exists from contamination in soil and the possibility of free product in underground structures and pipelines. Additionally, the use of diesel-powered excavating equipment could present the possibility of encountering fire and explosion hazards.

4.3.6 Heat Stress

Employees may be exposed to the hazards associated with heat stress when ambient temperatures exceed 70ºF. Employees should increase water intake while working in conditions of high heat. Enough water should be available so that each employee can consume 1 quart of water per hour. In addition, they should increase number of rest breaks and/or rotate employees in shorter work shifts. Employees should rest in cool, dry, shaded areas for at least 5 minutes. Employees should not wait until they feel sick to cool down. Watch for signs and symptoms of heat exhaustion and fatigue. In the event of heat stroke, bring the victim to a cool environment, call for help, and initiate first aid procedures

The procedures to be followed regarding avoiding heat stress are provided in Appendix C – Heat Stress Guidelines and in GEI's Heat Stress program.

4.3.7 Cold Stress

Employees may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia, as well as slippery surfaces, brittle equipment, and poor judgment. The procedures to be followed regarding avoiding cold stress are provided in Appendix C – Cold Stress Guidelines and in GEI's Cold Stress program.

4.3.8 Noise

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps, and generators. Employees who will perform suspected or established high noise tasks and operations will wear hearing protection. If deemed necessary by the SSM, the Safety Director will be consulted on the need for additional hearing protection and the need to monitor sound levels for site activities. Other employees who do not need to be in proximity of the noise should distance themselves from the equipment generating the noise.

4.3.9 Hand and Power Tools

In order to complete the various tasks for the project, personnel may use hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Work gloves, safety glasses, and hard hats will be worn by the operating personnel when using hand and power tools and Ground Fault Circuit Interrupter (GFCI)-equipped circuits will be used for power tools.

4.3.10 Slips, Trips, and Falls

Working in and around the site may pose slip, trip, and fall hazards due to slippery and uneven surfaces. Excavation at the site may cause uneven footing in trenches and around the soil piles. Steep slope and uneven terrain conditions at the site are also a primary concern. GEI employees will wear proper foot gear and will employ good work practice and housekeeping procedures to minimize the potential for slips, trips, and falls.

4.3.11 Manual Lifting

Manual lifting of objects and equipment may be required. Failure to follow proper lifting technique can result in back injuries and strains. Employees should use a buddy system and/or power equipment to lift heavy loads whenever possible and should evaluate loads before trying to lift them (i.e., they should be able to easily tip the load and then return it to its original position). Carrying heavy loads with a buddy and proper lifting techniques include: 1) make sure footing is solid; 2) make back straight with no curving or slouching; 3) center body over feet; 4) grasp the object firmly and as close to your body as possible; 5) lift with legs; and 6) turn with your feet, don't twist.

4.3.12 Projectile Objects and Overhead Dangers

Overhead dangers, including but not limited to falling debris and equipment, can occur while operating drill rigs. GEI employees will maintain a minimum distance from large overhead operations and to maintain proper communication with heavy equipment operators and their handlers, should work necessitate their presence beyond the minimum safety distance. Proper PPE will be worn during these types of activities including steel-toed/shank boots, safety vests, and hard hats.

4.3.13 Cuts and Lacerations

The core sampling program may require employees to use powered cutting tools (circular saw or shears) or a hooked knife to cut open the sample liner. Safety box cutters will be utilized for routine operations such as opening boxes of supplies or cutting rope or string. When using cutting tools, follow the safety precautions listed below:

Keep free hand out of the way.

Secure work if cutting through thick material.

Use only sharp blades; dull blades require more force that results in less knife control.

Pull the knife through the object and away from your body; pulling motions are easier to manage.

Do not put the knife in your pocket.

Wear leather or Kevlar® gloves when using knives or blades, or when removing sharp objects caught or dangling in sampling gear.

4.4 Chemical Hazards

The characteristics of compounds at the site are discussed below for information purposes. Adherence to the safety and health guidelines in this HASP should reduce the potential for exposure to the compounds discussed below.

Coal Tar and Coal Tar Products

Coal tar products, which are semi-volatile organic compounds (SVOCs) consist of a mixture of acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluorethene, benz(a)pyrene, benzo(e)pyrene, benzo(g,h,i)peryline, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3cd)pyrene, 2-methyl naphthalene, naphththalene, phenanthrene, phenols, pyrene.

Coal tar products and other SVOCs are present at the Site within impacted soil and groundwater and as a dense non-aqueous phase liquid (DNAPL) by-product of gas production within soils, former MGP structures, and abandoned pipelines.

Coal tar products such as those listed above may cause contact dermatitis. Direct contact can be irritating to the skin and produce itching, burning, swelling, and redness. Direct contact or exposure to the vapors may be irritating to the eyes. Conjunctivitis may result from prolonged exposure. Coal tar is considered to be very toxic, if ingested. High levels of exposure to coal tar, though not anticipated during work activities conducted during this project, may increase the risk of cancer including lung, kidney, and skin cancer. Naphthalene

is also an eye and skin irritant and can cause nausea, headache, fever, anemia, liver damage, vomiting, convulsions, and coma. Poisoning may occur by ingestion of large doses, inhalation, or skin absorption.

The major route of entry for the work activities to be conducted at this Site is through direct contact. Exposure is most likely when handling soil and water samples. Inhalation may occur when the soil is disturbed causing respirable and nuisance dust particles to become airborne.

Cyanide

Cyanide compounds are common by-products of manufactured gas production. Hydrogen cyanide is toxic because it is a chemical asphyxiate. It replaces the oxygen in the blood and thereby suffocates the cells. Ferro cyanides are not considered toxic because the hydrogen cyanide ion is bound too tightly to the iron and cannot therefore replace the oxygen. It takes a great amount of heat and/or acid to release cyanide gas from the ferro cyanide molecule; therefore, hydrogen cyanide is not a concern at this Site.

Heavy Metals

Exposure to high concentrations of arsenic can cause dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, and hyper pigmentation of skin. Chronic exposure to arsenic has resulted in lung cancer in humans.

Exposure to lead may cause acute symptoms such as eye irritation, weakness, weight loss, abdominal pain, and anemia. Chronic exposure to lead may result in kidney disease, effects to the reproductive system, blood forming organs, and CNS.

Lead and arsenic are regulated by specific OSHA standards. They are 29 CFR 1910.1025/1926.52 and 29 CFR 1910.1018/1926.1118, respectively. These standards include specific requirements for air monitoring, signs and labels, training and medical surveillance.

Exposure to high concentrations of nickel may cause sensitization dermatitis, allergic asthma, and pneumonitis. Exposure to mercury can cause dizziness, salivation nausea, vomiting, diarrhea, constipation, emotional disturbance, and kidney injury. Chronic exposure to mercury can cause CNS damage.

Exposure to high concentrations of zinc through ingestion can cause abdominal pain, nausea, vomiting, and diarrhea. Chronic exposure can lead to low blood pressure, jaundice, and seizures.

These metals are at environmental concentrations and are not expected to be at concentrations that exposure symptoms would occur. As with SVOCs, the primary route of exposure is through inhalation of dust particles when soil is disturbed and becomes airborne.

Polycyclic Aromatic Hydrocarbons

Polycyclic aromatic hydrocarbons (PAHs) are a group of chemicals consisting of numerous carbon atoms joined together to form multiple rings. Most are formed from the incomplete combustion of plant or animal matter, or carbon fuels, such as coal or petroleum. PAHs may cause contact dermatitis. Direct contact can be irritating to the skin and produce itching, burning, swelling, and redness. Direct contact or exposure to the vapors may be irritating to the eyes. Conjunctivitis may result from prolonged exposure. High levels of exposure to PAHs, though not anticipated during work activities conducted during this project, may increase the risk of cancer including lung, kidney, and skin cancer. Naphthalene is also an eye and skin irritant and can cause nausea, headache, fever, anemia, liver damage, vomiting, convulsions, and coma. Poisoning may occur by ingestion of large doses, inhalation, or skin absorption.

The major route of entry for the work activities to be conducted at this Site is through direct contact. Exposure is most likely when handling soil and water samples. Inhalation may occur when the soil is disturbed causing respirable and nuisance dust particles to become airborne.

Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs) have previously been encountered during MGP site investigations at other sites. PCBs have historically been used from a number of sources including, but not limited to; electrical systems, hydraulic oils, lubricants, cutting oils, printer's ink, and asphalt. Exposure to PCBs can occur through unbroken skin without immediate pain or irritation. PCBs detected at the site are at environmental concentrations and are not expected to be at concentrations that exposure symptoms would occur. Acute effects of exposure to high concentrations of PCB can include eye, skin, nose, and throat irritation. Chronic effects of PCB exposure can include skin swelling and redness, gastro-intestinal disturbances, and neurological effects such as headache, dizziness, nervousness, and numbness of extremities. PCBs are suspected human carcinogens that can cause liver cancer. PCBs can accumulate in fatty tissues and result in health effects after the initial exposure has occurred. The primary route of exposure for PCBs is inhalation, dermal contact, and ingestion. Analysis of soils from the Site did not indicate elevated PCB concentrations.

Semi-Volatile Organic Compounds

Semi-volatile organic compounds (SVOCs) usually consist of a mixture of acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluorethene, benz(a)pyrene, benzo(e)pyrene, benzo(g,h,i)peryline, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3cd)pyrene, 2-methyl naphthalene, naphththalene, phenanthrene, phenols, and pyrene.

These SVOCs are present at the Site within impacted soil and groundwater and as a DNAPL by-product of gas production within soils, former MGP structures, and abandoned pipelines.

SVOCs such as those listed above may cause contact dermatitis. Direct contact can be irritating to the skin and produce itching, burning, swelling, and redness. Direct contact or exposure to the vapors may be irritating to the eyes. Conjunctivitis may result from prolonged exposure. Many SVOCs are considered to be very toxic, if ingested. High levels of exposure to SVOCs, though not anticipated during work activities conducted during this project, may increase the risk of cancer including lung, kidney, and skin cancer. Naphthalene is also an eye and skin irritant and can cause nausea, headache, fever, anemia, liver damage, vomiting, convulsions, and coma. Poisoning may occur by ingestion of large doses, inhalation, or skin absorption.

The major route of entry for the work activities to be conducted at this Site is through direct contact. Exposure is most likely when handling soil and water samples. Inhalation may occur when the soil is disturbed causing respirable and nuisance dust particles to become airborne.

Volatile Organic Compounds

Volatile organic chemicals (VOCs), such as benzene, toluene, ethyl benzene, and xylene (BTEX) are present as soil and groundwater contaminants, and in some cases chemical components in non-aqueous phase liquids (NAPL) such as oil or tar within soils and abandoned pipelines. These compounds are not expected to be at concentrations that exposure symptoms would occur. These compounds generally have a depressant effect on the Central Nervous System (CNS), may cause chronic liver and kidney damage, and some are suspected human carcinogens. Benzene is a known human carcinogen. Acute exposure may include headache, dizziness, nausea, and skin and eye irritation. The primary route of exposure to VOCs is through inhalation and therefore respiratory protection is the primary control against exposure to VOCs.

4.4.1 Evaluation of Organic Vapor Exposure

Air monitoring reduces the risk of overexposure by indicating when action levels have been exceeded and when PPE must be upgraded or changed. Action Levels for VOCs and associated contingency plans for the work zone are discussed within Section 9 of this HASP.

Exposure to organic vapors will be evaluated and/or controlled by:

Monitoring air concentrations for organic vapors in the breathing zone with a photoionization detector (PID) or a flame ionization detector (FID).

When possible, engineering control measures will be utilized to suppress the volatile organic vapors. Engineering methods can include utilizing a fan to promote air circulation, utilizing volatile suppressant foam, providing artificial ground cover, or covering up the impacted material with a tarp to mitigate volatile odors.

When volatile suppression engineering controls are not effective and organic vapor meters indicate concentrations above the action levels, then appropriate respiratory protection (i.e., air purifying respirator with organic vapor cartridge) will be employed.

4.4.2 Evaluation of Skin Contact and Absorption

Skin contact by contaminants may be controlled by use of proper hygiene practices, PPE, and good housekeeping procedures. The proper PPE (e.g., Tyvek, gloves, safety glasses) as described in Section 5 will be worn for activities where contact with potential contaminated media or materials are expected.

SDSs for decontamination chemicals and laboratory reagents that may be used on site are included in Appendix B. Specific chemical hazards information from the occupational health sources are summarized in Table 3.

Table 3. Chemical Data

Compound	CAS #	ACGIH TLV	OSHA PEL	Route of Exposure	Symptoms of Exposure	Target Organs	Physical Data
Arsenic	7440-38-2	0.01 mg/m^3	0.01 mg/m^3 A.L. .005mg/m3	Inhalation Skin Absorption Ingestion Skin Contact	Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, potential carcinogen	Liver, kidneys, skin, lungs, lymphatic system	Metal: Silver-gray or tin-white, brittle, odorless solid FP: NA IP: NA LEL: NA UEL: NA VP: 0 mm
Benzene	71-43-2	0.5 ppm (Skin)	1 ppm TWA 5 ppm STEL	Inhalation Skin Absorption Ingestion Skin Contact	Irritation of eyes, skin, nose, respiratory system, giddiness, headache, nausea; staggering gait, fatigue, anorexia, weakness, dermatitis, bone marrow depression, potential carcinogen	Eyes, skin, CNS, bone marrow, blood	FP: 12^o F IP: 9.24 eve LEL: 1.2% UEL:7.8% VP: 75 mm
Ethylbenzene	100-41-4	100 ppm	100 ppm	Inhalation Ingestion Skin Contact	Eye, skin, mucous membrane irritation; headache; dermatitis, narcosis; coma	Eyes, skin, respiratory system, CNS	FP: 55^o F IP: 8.76 eV LEL: 0.8% UEL:6.7% VP: 7 mm
Iron	1309-37-1	Iron oxide dust and fume (Fe2O3) as Fe: 5 mg/m3 (TWA);	Iron oxide dust and fume: 10 mg/m3	Inhalation, ingestion, eye contact	Respiratory tract irritation, coughing, shortness of breath, overdose of iron may cause vomiting, abdominal pain, bloody diarrhea, vomiting blood, lethargy, and shock; acidity in the blood, bluish skin discoloration, fever, liver damage, and possibly death; eye and cornea irritation and discoloration	Eyes, respiratory system, GI tract, liver	Reddish brown solid FP: NA LEL: NA UEL: NA VP: 0 mmHg
Lead	7439-92-1	0.050 mg/m^3	0.05 mg/m^3 A.L. 0.03 mg/m3	Inhalation Ingestion Skin Contact	Weakness, insomnia; facial pallor; pal eye, anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis of wrist and ankles; irritates eyes, hypo tension	Eyes, GI tract, CNS, kidneys, blood, gingival tissue	A heavy, ductile, soft, gray solid. FP: NA IP: NA LEL: NA UEL: NA VP: 0 mm

Table 3. Chemical Data

Compound	CAS #	ACGIH TLV	OSHA PEL	Route of Exposure	Symptoms of Exposure	Target Organs	Physical Data
Mercury	7439-97-6	0.025 mg/m^3	0.10 mg/m3	Inhalation Ingestion Skin Contact Skin Absorption	Irritates eyes and skin, chest pain, cough, difficulty breathing, bronchitis, pneumonitis, tremor, insomnia, irritability, indecision, headache, fatigue, weakness, stomatitis, salivation, Gastrointestinal disturbance, weight loss, proteinuria	Eyes, skin, respiratory tract, central nervous system	Silver-white, heavy odorless liquid FP: NA IP:? LEL: NA UEL:NA VP: 0.0012 mm
Naphthalene	91-20-3	10 ppm (52 mg/m3) TWA, 15 ppm (79 mg/m3) STEL	10 ppm (50 mg/m^3) TWA	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage	Eyes, skin, blood, liver, kidneys, central nervous system	FP: 174 F IP: 8.12 eV, LEL: 0.8% UEL:6.7%, VP: 0.08 mm
Nickel	7440-02-0 (Metal)	NIOSH REL*: Ca TWA 0.015 mg/m3 [*Note: The REL does not apply to Nickel carbonyl.]	TWA 1 mg/m3 [*Note: The PEL does not apply to Nickel carbonyl.]	Inhalation, ingestion, skin and/or eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Nasal cavities, lungs, skin Cancer Site: [lung and nasal cancer]	Metal: Lustrous, silvery, odorless solid FP: none LEL:N/A UEL: N/A VP: 0 mm
Toluene	108-88-3	50 ppm	200 ppm	Inhalation Skin Absorption Ingestion Skin Contact	Eye, nose irritation; fatigue, weakness, confusion, euphoria, dizziness, headache; dilated pupils, tearing of eyes; nervousness, muscle fatigue, insomnia, tingling in limbs; dermatitis	Eyes, skin, respiratory system, CNS, liver, kidneys	FP: 40o F IP: 8.82 eV LEL: 1.1% UEL:7.1% VP: 21 mm

Table 3. Chemical Data

Compound	CAS #	ACGIH TLV	OSHA PEL	Route of Exposure	Symptoms of Exposure	Target Organs	Physical Data
Xylene	1330-20-7	100 ppm	100 ppm	Inhalation Skin Absorption Ingestion, Skin Contact	Eye, skin, nose, throat irritation; dizziness, excitement, drowsiness; incoordination, staggering gait; corneal damage; appetite loss, nausea, vomiting, abdominal pain; dermatitis	Eyes, skin, respiratory system, Central Nervous System, GI tract, blood, liver, kidneys	FP: 90o F LEL: 0.9% UEL: 6.7% VP: 9 mm
Zinc	1314-13-2	5 mg/m3 (TWA), 10 mg/m3 (STEL) for zinc oxide fume	10 mg/m3 (TWA), for zinc oxide fume	Inhalation	Metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function	Respiratory system	Colorless liquid FP: NA? IP: 11 eV LEL: 7.5% UEL: 12.5% VP: 100 mmHg

Abbreviations:

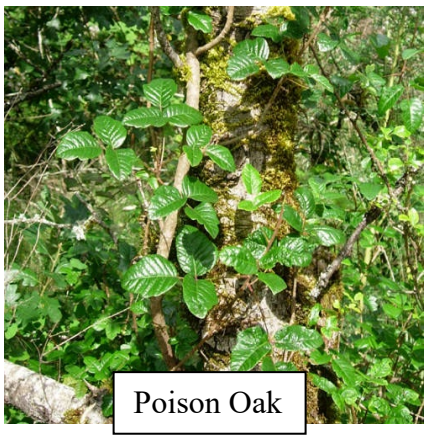
°F = degrees Fahrenheit
ACGIH = American Conference of Industrial Hygienists
A.L. = Action Level
atm = atmosphere
C = ceiling limit, not to be exceeded
CAS # = chemical abstract services number
CNS = Central Nervous System
CTPV = Coal Tar Pitch Volatiles
CVS = Cardiovascular System
eV = electron volt
f/cc = fibers per cubic centimeter
FP = Flash point
GI = Gastro-intestinal
H2S = Hydrogen Sulfide
HCN = Hydrogen Cyanide
hr. = hour
IP = Ionization Potential
LEL = Lower explosive limit
Mg/min = micrograms per cubic meter
min = minute
mm = millimeter
mmHg = millimeters of mercury
N/A = not applicable
OSHA = Occupational Safety and Health Administration
PAH = Polycyclic Aromatic Hydrocarbons
PCB = Polychlorinated Biphenyls
PEL = Permissible exposure limit
ppm = parts per million
Skin = significant route of exposure
STEL = Short-term exposure limit (15 minutes)
TWA = Time-weighted average (8 hours)
VP = vapor pressure approximately 68°F in mm Hg

4.5 Biological Hazards

Areas of the site may be wooded, surrounded with brush, or landscaped. Therefore, employees working on this project should be aware of the potential biological hazards at this site. Each is discussed in detail below:

4.5.1 Poisonous Plants

Persons working on the site should be aware of the possible presence of poisonous plants and insects. Poison ivy is a climbing plant with leaves that consist of three glossy, greenish leaflets. Poison ivy has conspicuous red foliage in the fall. Small yellowish-white flowers appear in May through July at the lower leaf axils of the plant. White berries appear from August through November. Poison ivy is typically found east of the Rockies. Poison oak is similar to poison ivy, but its leaves are oak-like in form. Poison oak occurs mainly in the south and southwest. Poison sumac typically occurs as a small tree or shrub and may be 6 to 20 feet in height. The bark is smooth, dark and speckled with darker spots. Poison sumac is typically found in swampy areas and east of the Mississippi. The leaves have 7 to 13 smooth-edged leaflets and drooping clusters of ivory-white berries that appear in August and last through spring.



Poison Oak

Poison Ivy

Poison Sumac

The leaves, roots, stems and fruit of these poisonous plants contain urushiol. Contact with the irritating oil causes an intensely itching skin rash and characteristic, blister-like lesions.

The oil can be transmitted on soot particles when burned and may be carried on the fur of animals, equipment, and apparel.

Proper identification of these plants is the key to preventing contact and subsequent dermatitis. Wear long sleeves and pants when working in wooded areas. In areas of known infestation, wear Tyvek coveralls and gloves. Oils are easily transferred from one surface to another. If you come in contact with these poisonous plants, wash exposed areas immediately with cool water to remove the oils. Some commercial products such as Tecnu's Poison Oak-n-Ivy Cleanser claim to further help with the removal of oils.

4.5.2 Ticks

Lyme Disease

Ticks are bloodsuckers, attaching themselves to warm-blooded vertebrates to feed. Deer ticks are associated with the transmission the bacteria that causes Lyme disease. Female deer ticks are about ¼-inch in length and are black and brick red in color. Males are smaller and all black. If a tick is not removed, or if the tick is allowed to remain for days feeding on human blood, a condition known as tick paralysis can develop. This is due to a neurotoxin, which the tick apparently injects while engorging. This neurotoxin acts upon the spinal cord causing incoordination, weakness, and paralysis.

The early stages of Lyme disease, which can develop within a week to a few weeks of the tick bite, are usually marked by one or more of these signs and symptoms:

Tiredness

Chills and fever

Headache

Muscle and/or join pain

Swollen lymph glands

Characteristic skin rash (i.e. bullseye rash)

Rocky Mountain Spotted Fever

Rocky Mountain spotted fever is spread by the American dog tick, the lone-star tick, and the wood tick, all of which like to live in wooded areas and tall, grassy fields. The disease is most common in the spring and summer when these ticks are active, but it can occur anytime during the year when the weather is warm.

Initial signs and symptoms of the disease include sudden onset of fever, headache, and muscle pain, followed by development of a rash. Initial symptoms may include fever, nausea, vomiting, severe headache, muscle pain, and/or lack of appetite.

The rash first appears 2 to 5 days after the onset of fever and is often not present or may be very subtle. Most often it begins as small, flat, pink, non-itchy spots on the wrists, forearms, and ankles. These spots turn pale when pressure is applied and eventually become raised on the skin. Later signs and symptoms include rash, abdominal pain, joint pain, and/or diarrhea.

The characteristic red, spotted rash of Rocky Mountain spotted fever is usually not seen until the 6th day or later after onset of symptoms, and this type of rash occurs in only 35% to 60% of patients with Rocky Mountain spotted fever. The rash involves the palms or soles in as many as 50% to 80% of patients; however, this distribution may not occur until later in the course of the disease.

Prevention

Tick season lasts from April through October; peak season is May through July. You can reduce your risk by taking these precautions:

During outside activities, wear long sleeves and long pants tucked into socks. Wear a hat, and tie hair back.

Use insecticides to repel or kill ticks. Repellents containing the compound n,n-diethyl-meta-toluamide (DEET) can be used on exposed skin except for the face, but they do not kill ticks and are not 100% effective in discouraging ticks from biting. Products containing permethrin kill ticks, but they cannot be used on the skin -- only on clothing. When using any of these chemicals, follow label directions carefully.

After outdoor activities, perform a tick check. Check body areas where ticks are commonly found behind the knees, between the fingers and toes, under the arms, in and behind the ears, and on the neck, hairline, and top of the head. Check places where clothing presses on the skin.

Remove attached ticks promptly. Removing a tick before it has been attached for more than 24 hours greatly reduces the risk of infection. Use tweezers and grab as closely to the skin as possible. Do not try to remove ticks by squeezing them, coating them with petroleum jelly, or burning them with a match. Keep ticks in a zip-lock baggie in case testing needs to be performed.

Report any of the above symptoms and all tick bites to the PM and Safety Team for evaluation.

4.5.3 Mosquito- Borne Disease – West Nile Virus

West Nile encephalitis is an infection of the brain caused by the West Nile virus, which is transmitted by infected mosquitoes. Following transmission from an infected mosquito, West Nile virus multiplies in the person's blood system and crosses the blood-brain barrier to reach the brain. The virus interferes with normal CNS functioning and causes inflammation of the brain tissue. However, most infections are mild, and symptoms include fever, headache, and body aches. More severe infections may be marked by headache, high fever,

neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and rarely, death. Persons over the age of 50 have the highest risk of severe disease.

Prevention centers on public health action to control mosquitoes and on individual action to avoid mosquito bites. To avoid being bitten by the mosquitoes that cause the disease, use the following control measures:

If possible, stay inside between dusk and dark. This is when mosquitoes are most active. When outside (between dusk and dark), wear long pants and long-sleeved shirts. Spray exposed skin with an insect repellent, preferably containing DEET.

4.5.4 Wasps and Bees

Wasps (hornets and yellow jackets) and bees (honeybees and bumblebees) are common insects that may pose a potential hazard to the field team if work is performed during spring, summer, or fall. Bees normally build their nests in the soil. However, they use other natural holes such as abandoned rodent nests or tree hollows. Wasps make a football-shaped, paper-like nest either below or above the ground. Yellow jackets tend to build their nests in the ground, but hornets tend to build their nests in trees and shrubbery. Bees are generally more mild-mannered than wasps and are less likely to sting. Bees can only sting once while wasps sting multiple times because their stinger is barbless. Wasps sting when they feel threatened. By remaining calm and not annoying wasps by swatting, you lessen the chance of being stung.

Wasps and bees inject a venomous fluid under the skin when they sting. The venom causes a painful swelling that may last for several days. If the stinger is still present, carefully remove it with tweezers. Some people may develop an allergic reaction (i.e. anaphylactic shock) to a wasp or bee sting. If such a reaction develops, seek medical attention at once. If a GEI employee is allergic to bees or wasps notify the SSM and if, needed, the location of the epi pen.

4.5.5 Sun Exposure

Employees are encouraged to liberally apply sunscreen, with a minimum broad-spectrum sun protection factor (SPF) of 30, when working outdoors to avoid sunburn and potential skin cancer, which is associated with excessive sun exposure to unprotected skin. Additionally, employees should wear safety glasses that offer protection from ultraviolet A and B (UVA/UVB) rays.

5. Personal Protective Equipment

The PPE specified in Table 4 represents PPE selection required by 29 CFR 1910.132, and is based on the Activity Hazard Analysis of Section 4 (Table 2). Specific information on the selection rationale activity can be found in the GEI Health and Safety Manual.

The PPE program addresses elements, such as PPE selection based on site hazards, use and limitations, donning and doffing procedures, maintenance and storage, decontamination and disposal, training and proper fitting, inspection procedures prior to / during / and after use, evaluation of the effectiveness of the PPE program, and limitations during temperature extremes, heat stress, and other appropriate medical considerations. A summary of PPE for each level of protection is in Table 4.

Table 4. Site-Specific PPE

Task	PPE Level	Site-Specific Requirements	Respirator
Mobilization/Demobilization			
Reconnaissance	D	Hard hat, safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D - None
Mobilization/Demobilization of Equipment and Supplies	D	Hard hat, safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D – None
Establishment of Site Security, Work Zones, and Staging Area	D	Hard hat, safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D - None
Investigation			
Drilling, Groundwater Well Installation, Excavation, Digging Test Pits, Backfilling, Grading Observation, Sampling	D	Hard hat, safety glasses, steel toe/shank safety boot with overboot as needed, reflective vest, leather work gloves as needed, nitrile gloves, hearing protection as needed, Tyvek as needed	Level D initially, Level C-If action levels exceeded (see Section 9 of HASP)
Hazardous Materials Assessment			
Soil and Groundwater Sampling	D	Hard hat, safety glasses, steel toe/shank safety boot with overboot as needed, reflective vest, leather work gloves as needed, nitrile gloves, hearing protection as needed, Tyvek as needed	D - None
Observation			
Observe Contractor Activities	D	Hard hat, safety glasses, steel toe/shank safety boot with overboot as needed, reflective vest, leather work gloves as needed, nitrile gloves, hearing protection as needed, Tyvek as needed	D - None

Use of Level A or Level B PPE is not anticipated. If conditions indicating the need for Level A or Level B PPE are encountered, personnel will leave the site and this HASP will be revised with oversight of the Safety Director or GEI personnel will not re-enter the site until conditions allow.

For most work conducted at the site, Level D PPE will include long pants, hard hats, safety glasses with side shields, and steel toe/shank or EH-rated safety boots. When work is conducted in areas where non-aqueous phase liquid (NAPL) or tar-saturated soil is anticipated, employees will wear, at a minimum, modified Level D PPE, which can include Tyvek coveralls and safety boots with overboots.

5.1 OSHA Requirements for PPE

Personal protective equipment used during the course of this field investigation must meet the following OSHA standards:

Table 5. OSHA Standards for PPE

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133	ANSI Z87.1 1968
Respiratory	29 CFR 1910.134	ANSI Z88.1 1980
Head	29 CFR 1910.135	ANSI Z89.1 1969
Foot	29 CFR 1910.136	ANSI Z41.1 1999 or ASTM F-2412-2005, and ASTM F-2413-2005

CRF = Code of Federal Regulations
ANSI = American National Standards Institute
ASTM = American Society for Testing and Materials

On-site GEI personnel who have the potential to don a respirator must have a valid fit test certification and documentation of medical clearance. The Safety Director will maintain such information on file for on-site personnel. The PM will obtain such information from the subcontractor's site supervisor prior to the initiation of such work. Both the respirator and cartridges specified for use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.134). Air purifying respirators cannot be worn under the following conditions:

Oxygen deficiency (less than 20.7%).

Imminent Danger to Life and Health (IDLH) concentrations.

If contaminant levels exceed designated use concentrations.

6. Key Project Personnel/Responsibilities and Lines of Authority

6.1 GEI Personnel

Dan Kopcow	Project Manager
PJ Snyder	Project Engineer
TBD	Site Safety Manager
Breana Pabst	Field Personnel
Steve Hawkins	Safety Director
Jeena Sheppard	Regional Safety Manager

The implementation of health and safety at this project location will be the shared responsibility of the PM, the Safety Director, Regional Safety Manager, the Site Safety Manager (SSM), other GEI personnel implementing the proposed scope of work.

6.1.1 GEI Project Manager

The PM is responsible for confirming that the requirements of this HASP are implemented. Some of the PM's specific responsibilities include:

Conducting and documenting the Project Safety Briefing for GEI project employees and forwarding the signed form (Appendix D) to the Safety Team;

Verifying that the GEI staff selected to work on this program are sufficiently trained for site activities;

Assuring that personnel to whom this HASP applies, including subcontractor personnel, have received a copy of it;

Providing the Safety Director with updated information regarding conditions at the site and the scope of site work;

Providing adequate authority and resources to the on-site SSM to allow for the successful implementation of necessary safety procedures;

Supporting the decisions made by the SSM and Safety Director;

Maintaining regular communications with the SSM and, if necessary, the Safety Director;

Verifying that the subcontractors selected by GEI to work on this program have completed GEI environmental, health and safety requirements and has been deemed acceptable for the proposed scope of work; and

Coordinating the activities of GEI subcontractors and confirming that they are aware of the pertinent health and safety requirements for this project.

6.1.2 GEI Safety Director

The Safety Director is the individual responsible for the review, interpretation, and modification of this HASP. Modifications to this HASP which may result in less stringent precautions cannot be undertaken by the PM or the SSM without the approval of the Safety Director. Specific duties of the Safety Director include:

Writing, approving, and amending the HASP for this project;

Advising the PM and SSM on matters relating to health and safety on this site;

Recommending appropriate PPE and safety equipment to protect personnel from potential site hazards;

Conducting accident investigations; and

Maintaining regular contact with the PM and SSM to evaluate site conditions and new information which might require modifications to the HASP.

6.1.3 GEI Site Safety Manager

GEI field staff are responsible for implementing the safety requirements specified in this HASP. However, one person will serve as the SSM. The SSM will be on-site during all activities covered by this HASP. The SSM is responsible for enforcing the requirements of this HASP once work begins. The SSM has the authority to immediately correct situations where noncompliance with this HASP is noted and to immediately stop work in cases where an immediate danger is perceived. Some of the SSM's specific responsibilities include:

Conducting/attending the Project Safety Briefing prior to beginning work, and subsequent safety meetings as necessary;

Conduct regular Safety Tailgate meeting in accordance with National Grid requirements (can be combined with "pre-entry") briefing for site-related work;

Verifying that personnel to whom this HASP applies have attended and participated in the Project Safety Briefing and subsequent safety meetings that are conducted during the implementation of the program;

Maintaining a high level of health and safety consciousness among employees implementing the proposed activities;

Procuring the air monitoring instrumentation required and performing air monitoring for investigative activities;

Procuring and distributing the PPE and safety equipment needed for this project for GEI employees;

Verifying that PPE and health and safety equipment used by GEI is in good working order;

Verifying that the selected contractors are prepared with the correct PPE and safety equipment and supplies;

Notifying the PM of noncompliance situations and stopping work in the event that an immediate danger situation is perceived;

Monitoring and controlling the safety performance of personnel within the established restricted areas to confirm that required safety and health procedures are being followed;

Stopping work in the event that an immediate danger situation is perceived; and

Reporting accident/incident and preparing accident/incident reports, if necessary.

6.1.4 GEI Field Personnel

GEI field personnel covered by this HASP are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

Reading and signing the HASP in its entirety prior to the start of on-site work;

Attending and actively participating in the required Project Safety Briefing prior to beginning on-site work and any subsequent safety meetings that are conducted during the implementation of the program;

Stopping work in the event that an immediate danger situation is perceived;

Bringing forth any questions or concerns regarding the content of the HASP to the PM or the SSM, prior to the start of work;

Reporting accidents, injuries, and illnesses, regardless of their severity, to the SSM, Safety Director, and HR; and

Complying with the requirements of this HASP and the requests of the SSM.

6.1.5 Lines of Authority will be as follows:

On site – GEI will have responsibility for safety of its employees during the work performed at the site. GEI's field representative will have a cell phone available to contact the appropriate local authorities, in the event of an emergency. GEI's field representative will be available for communication with the GEI PM and with the National Grid's representative.

GEI employees have the authority to stop work activities if an unanticipated hazard is encountered or a potential unsafe condition is observed. The GEI employee should contact the Safety Director and the Project Manager to discuss the stop work conditions and potential control methods that can be implemented.

6.2 Subcontractors

GEI has subcontracted the following firms to assist in performing work on this project:

Subcontractor Name	Contact Name
Parratt Wolff	Will Hackett
	Office: (315) 657 - 8101
	Cell: TBD
Keystone Associates	Laura Tuttle
	Office: (607) 722 - 1100
	Cell: TBD
Bloodhound (SUI)	Bob Korosec
	Office: (315) 797 - 5194
	Cell: (315) 525 - 3597

GEI requires its subcontractors to work in a responsible and safe manner. Subcontractors hired by GEI are required to submit documentation of their safety practices as part of GEI's Subcontractor Management Program for evaluation and approval before the start of work. Subcontractors for this project will be required to develop their own HASP for protection of their employees, but, at a minimum, must adhere to applicable requirements set forth in this HASP.

7. Training Requirements

7.1 HAZWOPER Training

In accordance with OSHA Standard 29 CFR 1910.120 "Hazardous Waste Operations and Emergency Response" (HAZWOPER) responders will, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations. At a minimum, the training will have consisted of instruction in the topics outlined in the standard. Personnel who have not met the requirements for initial training will not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical). Prior to commencement of field activities, the PM will verify that GEI field personnel assigned to the project have completed the required training.

7.2 Annual 8-Hour Refresher Training

Annual 8-hour refresher training will be required of hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The training will cover a review of 29 CFR 1910.120 requirements and related company programs and procedures. Prior to commencement of field activities, the PM will verify that GEI field personnel assigned to the project have completed the required training and have a current training certificate.

7.3 Supervisor Training

Personnel acting in a supervisory capacity will have received 8 hours of instruction in addition to the initial 40-hour training. In addition, supervisors will have 1 year of field experience and training specific to work activities (i.e., sampling, construction observation, etc.)

7.4 Site-Specific Training

Prior to commencement of field activities, the PM or the SSM will verify GEI field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the site operations. It will include site and facility layout, hazards, and emergency services at the site, and will highlight the provisions contained within this HASP and applicable GEI H&S SOPs (Appendix E). This training will be documented on the Project Safety Briefing Form Appendix D). The signed form will be forwarded to the Safety Team at SafetyTeam@geiconsultants.com. In addition, GEI personnel will sign the plan to document that they understand the hazards and control measures presented and agree to comply with the procedures established in the HASP. Personnel that have not received project-specific training will not be allowed on-site.

7.5 On-Site Safety Briefings

Other GEI personnel will be given health and safety briefings daily by the SSM or field representative to assist GEI personnel in safely conducting work activities. The briefing will include GEI subcontractors. The briefings can include information on new operations to be conducted, changes in work practices, or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. Documentation of these briefings will be recorded in the GEI field book, if the project duration is less than 5 days. If the project is longer than 5 days, the Tailgate Safety Briefing Form (Appendix D) will be used to document briefings. The meetings will also be an opportunity to periodically update the employees on monitoring results.

7.6 First Aid and CPR

The PM will verify that GEI field staff has current certifications in first aid and Cardiopulmonary Resuscitation (CPR), so that emergency medical treatment is available during field activities. The training will be consistent with the requirements of the American Red Cross Association. GEI employees also attend annual Bloodborne Pathogens training in compliance with OSHA regulations.

8. Medical Surveillance Program

GEI maintains a continuous, corporate, medical surveillance program that includes a plan designed specifically for field personnel engaged in work at sites where hazardous or toxic materials may be present. GEI's Safety Director and is responsible for the administration and coordination of medical evaluations conducted for GEI's employees at branch office locations. Comprehensive examinations are given to GEI field personnel on an annual basis who participate in hazardous waste operations. The medical results of the examinations aid in determining the overall fitness of employees participating in field activities.

Under the Safety Director's supervision, field personnel undergo a complete initial physical examination, including a detailed medical and occupational history before they participate in hazardous waste site investigations. Upon completion of these tests, personnel are certified by an occupational health physician as to whether they are fit for field work in general and fit to use respiratory protection.

If a GEI employee or other project worker shows symptoms of exposure to a hazardous substance and wishes to be rechecked, he/she will be directed to the nearest area hospital or medical facility.

GEI subcontractor personnel that will enter any active waste handling or other active non-"clean" area must certify that they are participating in a medical surveillance program that complies with OSHA regulations for hazardous waste operations (i.e., 29 CFR 1910.120 and 29 CFR 1926.65). Proof of medical clearance will be submitted to the GEI PM or SSM prior to the start of field activities.

9. Atmospheric Monitoring

Air monitoring will be performed to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of worker protection needed on-site in the event that intrusive work is conducted. Work requiring air monitoring includes the installation and/or abandonment of monitoring wells, DNAPL recovery wells, oxygen injection wells, and soil vapor points. Additionally, PID screening of the well head space will be conducted during groundwater sampling activities.

GEI will conduct work zone monitoring for on-site GEI employees during intrusive activities only. GEI will monitor and document daily site conditions and operations and inform field representatives of results. ***If Action Levels are exceeded, the SSM will immediately implement site action(s) according to Table 6 below and notify the PM and Safety Team***.

The following air monitoring equipment will be on site:

PID with 10.6 eV lamp or equivalent

Particulate Meter (PM-10 capable)

9.1 Equipment Use

9.1.1 Calibration

Air monitoring equipment will be calibrated and maintained in accordance with manufacturer's requirements. Calibrations will be recorded in the project notes daily or on a daily calibration form.

9.1.2 Photoionization Detector

Organic vapor concentrations will be measured using a PID during intrusive activities. During intrusive operations, organic vapor concentrations will be measured continuously. Organic vapor concentrations will be measured upwind of the work site(s) to determine background concentrations at least twice a day, (once in the morning and once in the afternoon). The SSM will interpret monitoring results using professional judgment and according to the alert and Action Limits set forth in the associated Site Work Plan.

9.2 Particulate Meter

A particulate meter will be used to measure airborne particulate matter during intrusive activities. Monitoring will be continuous, and readings will be averaged over a 15-minute period for comparison with the Action Levels. Monitoring personnel will make a best effort

to collect dust monitoring data from downwind of the intrusive activity. If off-site sources are considered to be the source of the measured dust, upwind readings will also be collected.

9.3 Action Levels

Table 6 provides a summary of real time air monitoring Action Levels and contingency plans for work zone activities. The below Action Levels are determined by halving the Permissible Exposure Limits (PELs) or Threshold Limit Values (TLVs) as set forth by OSHA and the American Conference of Government Industrial Hygienists (ACGIH). O_2 values are based on the maximum use limits of a full-face respirator if oxygen were being displaced by a chemical.

Table 6. Real-Time Work Zone Air Monitoring Action Levels

Air Monitoring Instrument	Action Level (above background)	Site Action
Action Levels for the following parameters are 15-minute time weighted averages (TWA), not a single exceedance.		
PID (Monitoring for VOCs)	0.0 – 50 ppm	No respiratory protection is required if VOCs are not present.
	50 – 100 ppm	Stop work, withdrawal from work area, institute engineering controls, if levels persist, upgrade to Level C.
	> 100 ppm	Stop work, withdraw from work area, notify PM and Safety Team.
PID (Monitoring for benzene)	1.0 ppm	Use detector tube for benzene to verify if concentration is benzene. No respiratory protection is required if benzene is not present.
	1.0 – 50 ppm	No respiratory protection is required if benzene is not present. If benzene is present, stop work and contact your PM. If work continues, upgrade to Level C.
	50 – 100 ppm	Stop work, withdrawal from work area, institute engineering controls, if levels persist, stop work, contact PM and upgrade to Level C.
	> 100 ppm	Stop work, withdraw from work area, notify PM and Safety Team.
PID (Monitoring for naphthalene)	0.0 - 10 ppm	Use Sensodyne detector tube for naphthalene to verify if concentration is naphthalene. No respiratory protection is required if naphthalene is not present. If naphthalene is present, stop work and contact your PM. If work continues, upgrade to Level C.
	10 – 50 ppm	No respiratory protection is required if naphthalene is not present.
	50 – 100 ppm	Stop work, withdrawal from work area, institute engineering controls, if levels persist, stop work, contact PM and upgrade to Level C.
	> 100 ppm	Stop work, withdraw from work area, notify PM and Safety Team.
Particulate Meter	150 µg/m^3	Implement work practices to reduce/minimize airborne dust generation, e.g., spray/misting of soil with water.

10. Site Control

10.1 Site Zones

Site zones are intended to control the potential spread of contamination and to assure that only authorized individuals are permitted into potentially hazardous areas. A three-zone approach will be utilized. It will include an Exclusion Zone (EZ), Contamination Reduction Zone (CRZ) and a Support Zone (SZ). Specific zones will be established on the work site by the Contractor when operations begin for each task requiring such delineation. Maps depicting the zones will be available at the site.

This project is being conducted under the requirements of 29 CFR 1910.120, and any personnel working in an area where the potential for exposure to site contaminants exists, will only be allowed access after proper training and medical documentation.

The following will be used for guidance in revising these preliminary zone designations, if necessary.

Support Zone – The SZ is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for medical emergency. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone.

Contamination Reduction Zone – The CRZ is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides an area for decontamination of personnel and portable hand-held equipment, tools and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for EZ entry and egress in addition to access for heavy equipment and emergency support services.

Exclusion Zone – Activities which may involve exposure to site contaminants, hazardous materials, and/or conditions should be considered an EZ. This zone will be clearly delineated by cones, tapes, or other means. The Contractor may establish more than one EZ where different levels of protection may be employed, or different hazards exist. The size of the EZ will be determined by the Contractor allowing adequate space for the activity to be completed, field members, and emergency equipment.

The Contractor is responsible for constructing, maintaining, and enforcing the zones.

10.2 Buddy System

GEI personnel should be in line-of-site or communication contact with another on-site person. The other on-site person should be aware of his or her role as a "buddy" and be able to help in the event of an emergency. A copy of this plan will be given to any person acting as a GEI "buddy" for informational purposes.

10.3 Sanitation for Temporary Work Sites

Sanitation requirements identified in the OSHA Standard 29 CFR 1926.51 "Sanitation" specifies that employees working at temporary project sites have at least one sanitary facility available to them. Nearest sanitary facilities are located within the DPW garage building.

10.4 Illumination

Illumination requirements identified by OSHA are directed to work efforts inside buildings and/or during non-daylight hours. Activities planned for the site are anticipated to occur outside during daylight hours. However, if work areas do not meet illumination requirements, they will be equipped with appropriate illumination that meets or exceeds requirements specified in OSHA Standard 29 CFR 1926.56 "Illumination." Employees will not work on sites that are not properly lighted.

10.5 Smoking

Smoking is prohibited at or in the vicinity of hazardous operations or materials. Where smoking is permitted, safe receptacles will be provided for smoking materials.

10.6 Alcohol and Drug Abuse Prevention

Alcohol and drugs will not be allowed on the site. Project personnel under the influence of alcohol or drugs will not be allowed to enter the site.

11. Incident Reporting

GEI will report incidents involving GEI personnel or subcontractor personnel, such as: lost time injuries, injuries requiring medical attention, near miss incidents, fires, fatalities, accidents involving the public, chemical spills, vehicle accidents, and property damage. The following steps must be followed when an incident occurs:

1. For incidents involving life-threatening situations or serious injury that require emergency response personnel (Police, Fire, EMS), call 9-1-1 from a safe area.
2. **Stop work** activity to address any injury, illness, property damage, spill or other emergency.
3. Call Medcor Triage at 1-800-775-5866 to speak with a medical professional following any injury or illness.
4. Notify the Project Manager of the incident or injury.
5. The Project Manager will immediately inform the Safety Director, GEI National Grid Client Manager, and the Project-Specific National Grid Representative of any accident, incident, injury or near miss.
6. Complete an incident report using the GEI Incident Report Form located on the GEI Safety Smartphone App, GEI Connections intranet page, or in the project HASP.
7. Resume work activity if all steps above have been completed and it is safe to do so.
8. A DRAFT Incident Report Form including root cause/corrective actions will be completed by a member of the Safety Team and submitted to the Project-Specific National Grid Representative within 4 hours.
9. A FINAL Incident Report will be submitted within 24 hours via e-mail to the Project-Specific National Grid PM, National Grid Regional Safety Lead, and/or the person to whom the verbal notification was initially provided.

All work will be suspended until contact is made with the Project-Specific PM so that National Grid can assess if continued work suspension or if a stand down is necessary. If the National Grid PM cannot be reached, contact the National Grid SIR Regional Safety Lead as noted in the table below.

Name	Region	Phone Numbers	E-Mail
William Ryan	Downstate NY	W- (516) 545-2586 C - (516) 790-1660	William.Ryan@nationalgrid.com
Brian Stearns	Upstate NY	W- (315) 428-5731 C - (315) 461-7892	Brian.Stearns@nationalgrid.com
Elizabeth Greene	MA/RI	W- (781) 907-3656 C- (781) 248-6469	Elizabeth.Greene@nationalgrid.com

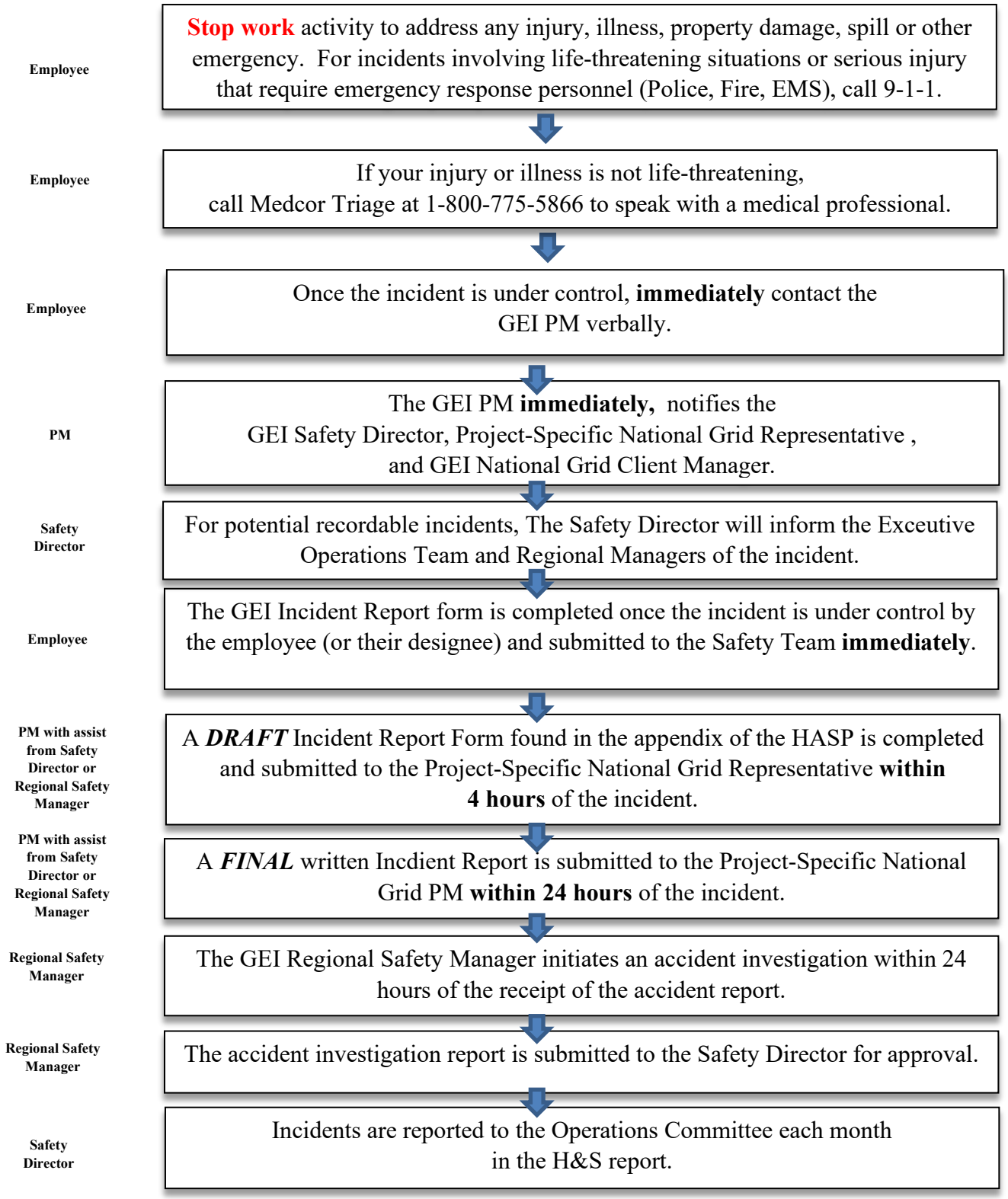
For vehicle accidents involving another vehicle or damage to property, the employee will take pictures of each vehicle or property involved in the incident and obtain a police report. In some municipalities police will not be dispatched to a non-injury accident, but every effort needs to be made to try and obtain the report.

The Incident Report Form and the Near Miss Reporting Form can be found in Appendix D, on the GEI Health and Safety smartphone app, or on the Safety page of the GEI Intranet. To report subcontractor injuries or incidents, follow the same verbal reporting procedures and submit an email describing the event to the PM and the Safety Team. A representative with knowledge of the incident should be available to provide incident information until the investigation is completed by National Grid.

11.1 Injury Triage Service

If a GEI employee experiences a work-related injury that is not life-threatening, the employee will initiate a call to Medcor Triage at 1-800-775-5866. The injured employee will detail any medical symptoms or complaints which will be evaluated by a Registered Nurse (RN) specially trained to perform telephonic triage. The RN will recommend first aid self-treatment or refer the injured employee for an off-site medical evaluation by a health professional at a clinic within GEI's workers compensation provider network. GEI employees are still required to follow our Accident Reporting procedures as listed above.

11.2 Flow Chart for Accident Reporting



12. Decontamination Procedures

A temporary decontamination pad will be established during investigation activities for equipment decontamination.

12.1 Heavy Equipment Decontamination

Heavy equipment decontamination will be performed by the Contractor within the limits of the on-site decontamination pad in accordance with the contract specifications. A steam generator and brushes will be used to clean demolition equipment and other tools. No heavy equipment will be permitted to leave the site unless it has been decontaminated.

Wastewater from the heavy equipment and personnel decontamination areas will be collected and disposed of in accordance with applicable state and federal regulations. The Contractor will be responsible for ultimate disposal of investigation-derived wastes.

12.2 Decontamination Equipment Requirements

The following equipment, if required, should be in sufficient supply to implement decontamination procedures for GEI's equipment.

Buckets

Alconox detergent concentrate

Hand pump sprayers

Long handled soft bristle brushes

Large sponges

Cleaning wipes for respirators

Bench or stool(s)

Methanol and/or Nitric Acid

Liquid detergent and paper towels

Plastic trash bags

13. Supplemental Contingency Plan Procedures

13.1 Hazard Communication Plan

GEI personnel have received hazard communication training as part of their annual health and safety training and new employee health and safety orientation training. Hazardous materials used on the site will be properly labeled, stored, and handled. SDS will be available to potentially exposed employees.

13.2 Fire

In the event of a fire personnel will evacuate the area. GEI's field representative will contact the local fire department with jurisdiction and report the fire. Notification of evacuation will be made to the PM and the Safety Team. The field representative will account for GEI personnel and subcontractor personnel and report their status to the PM.

13.3 Medical Support

In case of minor injuries, on-site care will be administered with the site first aid kit. For serious injuries, call 911 and request emergency medical assistance. Seriously injured persons should not be moved, unless they are in immediate danger. Notify the PM and the Safety Team of the emergency.

Section 1 and Table 1 of this HASP contain detailed emergency information, including directions to the nearest hospital, and a list of emergency services and their telephone numbers. In addition, Appendix A includes maps to the hospital and/or occupational health clinic. GEI field personnel will carry a cellular telephone.

13.4 Severe Weather

The contingency plan for severe weather includes reviewing the expected weather to determine if severe weather is in the forecast. Severe weather includes high winds over 40 miles per hour (mph), heavy rains or snow squalls, thunderstorms, tornados, and lightning storms. If severe weather is approaching, the decision to evacuate GEI personnel and subcontractor personnel from the site will be the responsibility of GEI's field representative. Notification of evacuation will be made to the PM and the Safety Team. The field representative will account for GEI personnel and subcontractor personnel and report their status to the PM. If safe, work can resume 30 minutes after the last clap of thunder or flash of lightening.

13.5 Spills or Material Release

If a hazardous waste spill or material release occurs, if safe, the SSM or their representative will immediately assess the magnitude and potential seriousness of the spill or release based on the following:

SDS for the material spilled or released;

Source of the release or spillage of hazardous material;

An estimate of the quantity released and the rate at which it is being released;

The direction in which the spill or air release is moving;

Personnel who may be or may have been in contact with the material, or air release, and possible injury or sickness as a result;

Potential for fire and/or explosion resulting from the situation; and

Estimates of area under influence of release.

If the spill or release is determined to be within the on-site emergency response capabilities, the SSM will verify implementation of the necessary remedial action. If the release is beyond the capabilities of the site personnel, personnel will be evacuated from the immediate area and the local fire department will be contacted. The SSM will notify the PM and the Safety Team.

14. Health and Safety Plan Sign-Off

GEI personnel conducting site activities will be familiar with the information in this HASP. After reviewing this plan, please sign the copy in the project files, and bring a copy of the plan with you to the site. By signing this site-specific HASP, you are agreeing that you have read, understand, and will adhere to the provisions described in this plan while working on the Project site below.

Site Name: Canastota Non-Owned Former MGP

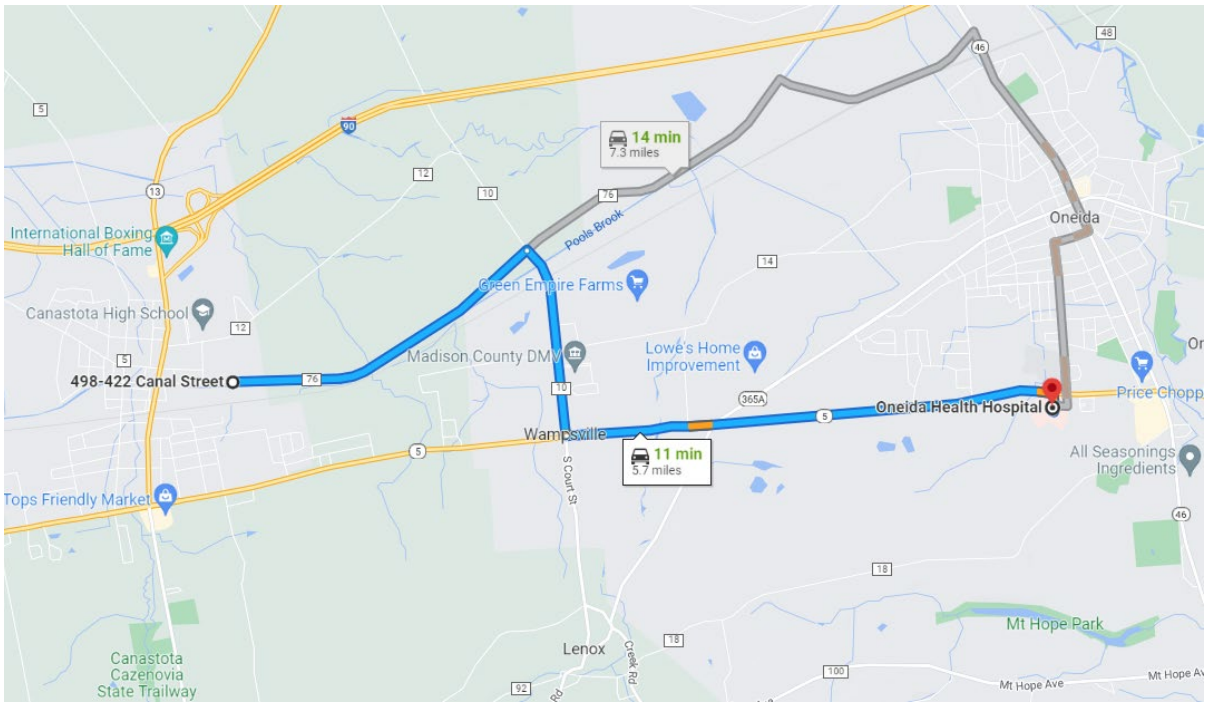
Investigation: Preliminary Design Investigation

GEI Project No: 034390

Print Name	Signature
Project Manager: Dan Kopcow	

Appendix A

Map to Hospital



Oneida Health Hospital

Directions to Hospital

Google Maps 498-422 Canal St, Canastota, NY 13032 to Oneida Health Hospital — Drive 5.7 miles, 11 min

498-422 Canal St
Canastota, NY 13032

1. Head east on Canal St
1.9 mi
2. Turn right onto N Court St
1.1 mi
3. Turn left onto NY-5 E/Genesee St
2.7 mi
4. Turn right onto Fields Dr
0.1 mi
5. Turn right
62 ft
6. Turn right
Destination will be on the right
43 ft

Oneida Health Hospital
321 Genesee St, Oneida, NY 13421

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Appendix B

Safety Data Sheets

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Alconox
Synonyms:
Product number: Alconox

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer	Supplier
Alconox, Inc. 30 Glenn Street White Plains, NY 10603 1-914-948-4040	Not Applicable

Emergency telephone number:
ChemTel Inc
North America: 1-800-255-3924
International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:
Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Skin irritation, category 2.
Eye irritation, category 2A.

Hazard pictograms:

Signal word: Warning

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	2-16

3.4 Additional Information : None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities :

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

8 Exposure controls/personal protection

8.1 Control parameters :

7722-88-5, Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3.

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection.

General hygienic measures:

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	**Explosion limit lower:** **Explosion limit upper:**	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C:**	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density:**	Not determined or not available.
pH-value:	9.5 (aqueous solution)	**Relative density:**	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities:**	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water):**	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature:**	Not determined or not available.
Evaporation rate:	Not determined or not available.	**Decomposition temperature:**	Not determined or not available.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

Tetrasodium Pyrophosphate: Rabbit - Risk of serious damage to eyes .

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours.
Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: None
ADR, ADN, DOT, IMDG, IATA

14.2 UN Proper shipping name: None
ADR, ADN, DOT, IMDG, IATA

14.3 Transport hazard classes:
ADR, ADN, DOT, IMDG, IATA

Class: None
Label: None
LTD. QTY: None

US DOT
Limited Quantity Exception: None

Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Non Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

	Comments: None	**Comments:** None
14.4	**Packing group:** ADR, ADN, DOT, IMDG, IATA	None
14.5	**Environmental hazards** :	None
14.6	**Special precautions for user:**	None
	Danger code (Kemler):	None
	EMS number:	None
	Segregation groups:	None
14.7	**Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** Not applicable.	
14.8	**Transport/Additional information:**	
	Transport category:	None
	Tunnel restriction code:	None
	UN "Model Regulation":	None

15 Regulatory information

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

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Germany MAK: Not classified.

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:

H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

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 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.

NFPA: 1-0-0

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

HMIS: 1-0-0

SAFETY DATA SHEET

Version 5.1
Revision Date 07/02/2014
Print Date 05/10/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : DEET

Product Number : 36542
Brand : Sigma-Aldrich
Index-No. : 616-018-00-2

CAS-No. : 134-62-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P280 Wear protective gloves/ eye protection/ face protection.

P301 + P312	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P321	Specific treatment (see supplemental first aid instructions on this label).
P330	Rinse mouth.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : N,N-Diethyl-m-toluamide

Formula : $C_{12}H_{17}NO$

Molecular Weight : 191.27 g/mol

CAS-No. : 134-62-3

EC-No. : 205-149-7

Index-No. : 616-018-00-2

Hazardous components

Component	Classification	Concentration
Deet		
	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Aquatic Acute 3; Aquatic Chronic 3; H302, H315, H319, H412	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 60 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: light yellow
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	no data available
f)	Initial boiling point and boiling range	111 °C (232 °F) at 1 hPa (1 mmHg)
g)	Flash point	95 °C (203 °F) - closed cup
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	< 0.01 hPa (< 0.01 mmHg) at 25 °C (77 °F)
l)	Vapour density	6.6 - (Air = 1.0)
m)	Relative density	0.998 g/cm3
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available

r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information

Relative vapour density 6.6 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents, Strong acids, Strong bases, Strong reducing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 1,950 mg/kg

LC50 Inhalation - rat - 5,950 mg/m3
Remarks: Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

LD50 Dermal - rat - 5,000 mg/kg

no data available

Skin corrosion/irritation
Skin - rabbit
Result: Skin irritation

Serious eye damage/eye irritation
Eyes - rabbit
Result: Moderate eye irritation

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity

rat
sperm

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Reproductive toxicity - rabbit - Oral
Maternal Effects: Other effects.

Reproductive toxicity - rat - Oral
Maternal Effects: Other effects. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: XS3675000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 110 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 75 mg/l - 48 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Deet	134-62-3	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Deet	134-62-3	

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling

or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.1 Revision Date: 07/02/2014 Print Date: 05/10/2019

PURELL® VF481™ Hand Sanitizer Gel

Version 1.1 SDS Number: 400000000475 Revision Date: 01/29/2018

SECTION 1. IDENTIFICATION

Product name : PURELL® VF481™ Hand Sanitizer Gel

Manufacturer or supplier's details

Company name of supplier : GOJO Industries, Inc.

Address : One GOJO Plaza, Suite 500
Akron, Ohio 44311

Telephone : 1 (330) 255-6000

Emergency telephone number : CHEMTREC 1-800-424-9300
CHEMTREC +1-703-527-3887: Outside USA & CANADA

Recommended use of the chemical and restrictions on use

Recommended use : Hand Sanitizer

Restrictions on use : This is a personal care or cosmetic product that is safe for consumers and other users under normal and reasonably foreseeable use. Cosmetics and consumer products, specifically defined by regulations around the world, are exempt from the requirement of an SDS for the consumer. While this material is not considered hazardous, this SDS contains valuable information critical to the safe handling and proper use of the product for industrial workplace conditions as well as unusual and unintended exposures such as large spills. This SDS should be retained and available for employees and other users of this product. For specific intended-use guidance, please refer to the information provided on the package or instruction sheet.

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquids : Category 3

Eye irritation : Category 2A

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : H226 Flammable liquid and vapour.
H319 Causes serious eye irritation.

Precautionary statements : **Prevention:**
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P280 Wear eye protection/ face protection.
Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Storage:
P403 + P235 Store in a well-ventilated place. Keep cool.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components

Chemical name	CAS-No.	Concentration (%)
Ethyl Alcohol	64-17-5	>= 50 - < 70
Isopropyl Alcohol	67-63-0	>= 1 - < 5

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

If inhaled : If inhaled, remove to fresh air.
If symptoms persist, call a physician.

In case of skin contact : Wash with water and soap as a precaution.
Get medical attention if irritation develops and persists.

In case of eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.
If easy to do, remove contact lens, if worn.

Seek medical advice.

If swallowed	:	If swallowed, DO NOT induce vomiting. Rinse mouth with water. Obtain medical attention.
Most important symptoms and effects, both acute and delayed	:	Causes serious eye irritation.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection and use the recommended protective clothing

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during firefighting	:	Do not use a solid water stream as it may scatter and spread fire. Cool closed containers exposed to fire with water spray. Flash back possible over considerable distance. May form explosive mixtures in air. Exposure to decomposition products may be a hazard to health. Carbon oxides
Hazardous combustion products	:	Carbon oxides
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Material can create slippery conditions.

Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.
Methods and materials for containment and cleaning up	:	Non-sparking tools should be used. Soak up with inert absorbent material. Suppress (knock down) gases/vapours/mists with a water spray jet. Keep in suitable, closed containers for disposal. Clean contaminated floors and objects thoroughly while observing environmental regulations.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	For personal protection see section 8. Keep away from heat and flame. Use with local exhaust ventilation. Avoid contact with eyes.
Conditions for safe storage	:	Take measures to prevent the build up of electrostatic charge. Keep in properly labelled containers. Keep containers tightly closed in a dry, cool and well-ventilated place. Store in accordance with the particular national regulations.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Ethyl Alcohol	64-17-5	TWA	1,000 ppm 1,900 mg/m3	NIOSH REL
		TWA	1,000 ppm 1,900 mg/m3	OSHA Z-1
		STEL	1,000 ppm	ACGIH
Isopropyl Alcohol	67-63-0	TWA	200 ppm	ACGIH
		STEL	400 ppm	ACGIH
		TWA	400 ppm 980 mg/m3	NIOSH REL
		ST	500 ppm 1,225 mg/m3	NIOSH REL
		TWA	400 ppm 980 mg/m3	OSHA Z-1

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Isopropyl Alcohol	67-63-0	Acetone	Urine	End of	40 mg/l	ACGIH

				shift at end of workweek		BEI

Personal protective equipment

Respiratory protection	:	No personal respiratory protective equipment normally required.
Hand protection Remarks	:	No special protective equipment required.
Eye protection	:	Wear face-shield and protective suit for abnormal processing problems.
Skin and body protection	:	No special measures necessary provided product is used correctly.
Protective measures	:	Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Ensure that eye flushing systems and safety showers are located close to the working place.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Avoid contact with eyes.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	clear, greenish-blue
Odour	:	alcohol-like
Odour Threshold	:	No data available
pH	:	3.8 - 5.2, (20 °C)
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	75.00 °C
Flash point	:	26.50 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	
Upper explosion limit	:	No data available

Lower explosion limit	:	No data available
Vapour pressure	:	No data available
Relative vapour density	:	No data available
Density	:	0.8742 g/cm3
Solubility(ies) Water solubility	:	soluble
Partition coefficient: n-octanol/water	:	Not applicable
Auto-ignition temperature	:	No data available
Thermal decomposition	:	The substance or mixture is not classified self-reactive.
Viscosity Viscosity, kinematic	:	80 - 600 mm2/s (20 °C)
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Vapours may form explosive mixture with air.
Conditions to avoid	:	Heat, flames and sparks.
Incompatible materials	:	Strong oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Eye contact
Skin contact

Acute toxicity

Not classified based on available information.

Components:

Ethyl Alcohol:

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC50 (Rat): 124.7 mg/l
Exposure time: 4 h
Test atmosphere: vapour

Isopropyl Alcohol:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC50 (Rat): 72.6 mg/l
Exposure time: 4 h
Test atmosphere: vapour

Acute dermal toxicity : LD50 (Rat): > 5,000 mg/kg

Skin corrosion/irritation

Not classified based on available information.

Components:

Ethyl Alcohol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Isopropyl Alcohol:
Species: Rabbit
Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Components:

Ethyl Alcohol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Method: OECD Test Guideline 405

Isopropyl Alcohol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Respiratory or skin sensitisation

Skin sensitisation: Not classified based on available information.
Respiratory sensitisation: Not classified based on available information.

Components:

Ethyl Alcohol:
Test Type: Local lymph node assay (LLNA)
Exposure routes: Skin contact
Species: Mouse
Result: negative

Isopropyl Alcohol:
Test Type: Buehler Test
Exposure routes: Skin contact

Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative

Germ cell mutagenicity

Not classified based on available information.

Components:

Ethyl Alcohol:

Genotoxicity in vitro	:	Test Type: In vitro mammalian cell gene mutation test Result: negative
Genotoxicity in vivo	:	Test Type: Rodent dominant lethal test (germ cell) (in vivo) Test species: Mouse Application Route: Ingestion Result: negative

Isopropyl Alcohol:

Genotoxicity in vitro	:	Test Type: Bacterial reverse mutation assay (AMES) Result: negative
Genotoxicity in vivo	:	Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Test species: Mouse Application Route: Intraperitoneal injection Result: negative

Carcinogenicity

Not classified based on available information.

Components:

Isopropyl Alcohol:
Species: Rat
Application Route: inhalation (vapour)
Exposure time: 104 weeks
Method: OECD Test Guideline 451
Result: negative

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
NTP	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Not classified based on available information.

Components:

Ethyl Alcohol:

Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 416
Result: negative

Isopropyl Alcohol:

Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative

Effects on foetal development : Test Type: Embryo-foetal development
Species: Rat
Application Route: Ingestion
Result: negative

STOT - single exposure

Not classified based on available information.

Components:

Isopropyl Alcohol:

Assessment: May cause drowsiness or dizziness.

STOT - repeated exposure

Not classified based on available information.

Repeated dose toxicity

Components:

Ethyl Alcohol:

Species: Rat
NOAEL: 2,400 mg/kg
Application Route: Ingestion
Exposure time: 2 y

Isopropyl Alcohol:

Species: Rat
NOAEL: 5000 ppm
Application Route: inhalation (vapour)
Exposure time: 104 w
Method: OECD Test Guideline 413

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Ethyl Alcohol:

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): > 1,000 mg/l

Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 1,000 mg/l Exposure time: 48 h
Toxicity to algae	:	EC50 (Chlorella vulgaris (Fresh water algae)): 275 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 9.6 mg/l Exposure time: 9 d
Toxicity to bacteria	:	EC50 (Photobacterium phosphoreum): 32.1 mg/l Exposure time: 0.25 h

Isopropyl Alcohol:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 10,000 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 10,000 mg/l Exposure time: 24 h
Toxicity to bacteria	:	EC50 (Pseudomonas putida): > 1,050 mg/l Exposure time: 16 h

Persistence and degradability

Components:

Ethyl Alcohol:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 84 % Exposure time: 20 d

Isopropyl Alcohol:

Biodegradability	:	Result: rapidly degradable

Bioaccumulative potential

Components:

Ethyl Alcohol:

Partition coefficient: n-octanol/water	:	log Pow: -0.35

Isopropyl Alcohol:

Partition coefficient: n-octanol/water	:	log Pow: 0.05

Mobility in soil

No data available

Other adverse effects

No data available

Product:

Regulation	40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks	This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with local regulations.
Contaminated packaging	:	Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR

UN/ID No.	:	UN 1987
Proper shipping name	:	Alcohols, n.o.s. (Ethanol, Propan-2-ol)
Class	:	3
Packing group	:	III
Packing instruction (cargo aircraft)	:	366
Packing instruction (passenger aircraft)	:	355

IMDG-Code

UN number	:	UN 1987
Proper shipping name	:	ALCOHOLS, N.O.S. (Ethanol, Propan-2-ol)
Class	:	3
Packing group	:	III
Labels	:	3
EmS Code	:	F-E, S-D
Marine pollutant	:	no

National Regulations

49 CFR

UN/ID/NA number	:	UN 1987
Proper shipping name	:	Alcohols, n.o.s.
Class	:	3
Packing group	:	III
ERG Code	:	127
Marine pollutant	:	no

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Isopropyl Alcohol	67-63-0	3.4086 %

Clean Air Act

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 12 (40 CFR 61).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

Ethyl Alcohol	64-17-5	65.2821 %
Isopropyl Alcohol	67-63-0	3.4086 %

This product does not contain any VOC exemptions listed under the U.S. Clean Air Act Section 450.

Clean Water Act

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

US State Regulations

Massachusetts Right To Know

Ethyl Alcohol	64-17-5	50 - 70 %
Isopropyl Alcohol	67-63-0	1 - 5 %

Pennsylvania Right To Know

Ethyl Alcohol	64-17-5	50 - 70 %
Water (Aqua)	7732-18-5	30 - 50 %
Isopropyl Alcohol	67-63-0	1 - 5 %

New Jersey Right To Know

Ethyl Alcohol	64-17-5	50 - 70 %
Water (Aqua)	7732-18-5	30 - 50 %
Isopropyl Alcohol	67-63-0	1 - 5 %

California Prop 65 This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other

reproductive harm.

The components of this product are reported in the following inventories:

TSCA	:	On TSCA Inventory
AICS	:	On the inventory, or in compliance with the inventory
DSL	:	On the inventory, or in compliance with the inventory
ENCS	:	On the inventory, or in compliance with the inventory
ISHL	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory
NZIoC	:	On the inventory, or in compliance with the inventory

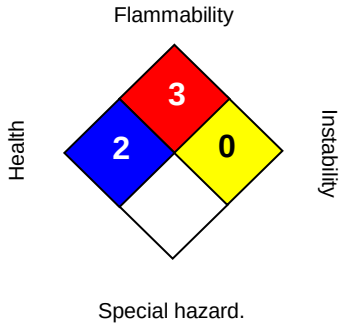
Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

SECTION 16. OTHER INFORMATION

Further information

NFPA:



HMIS III:

HEALTH	2
FLAMMABILITY	3
PHYSICAL HAZARD	0

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

Revision Date : 01/29/2018

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.

SAFETY DATA SHEET

Isobutylene

Section 1. Identification

GHS product identifier : Isobutylene

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

Product type : Gas.

Product use : Synthetic/Analytical chemistry.

Synonym : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

SDS # : 001031

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE GASES - Category 1
GASES UNDER PRESSURE - Liquefied gas

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Extremely flammable gas.
May form explosive mixtures with air.
Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.

Prevention : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response : Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage : Protect from sunlight. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

Product code : 001031

CAS number/other identifiers

CAS number : 115-11-7

Ingredient name	%	CAS number
Isobutylene	100	115-11-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Use only non-sparking tools. Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Isobutylene	**ACGIH TLV (United States, 3/2017).** TWA: 250 ppm 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Color : Colorless.

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Melting point : -140.7°C (-221.3°F)

Boiling point : -6.9°C (19.6°F)

Critical temperature : 144.75°C (292.6°F)

Flash point : Closed cup: -76.1°C (-105°F)

Evaporation rate : Not available.

Flammability (solid, gas) : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and oxidizing materials.

Lower and upper explosive (flammable) limits : Lower: 1.8%
Upper: 9.6%

Vapor pressure : 24.3 (psig)

Vapor density : 1.94 (Air = 1)

Specific Volume (ft ^{3}/lb) : 6.6845

Gas Density (lb/ft ^{3}) : 0.1496 (25°C / 77 to °F)

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 0.26 g/l

Partition coefficient: n-octanol/water : 2.34

Auto-ignition temperature : 465°C (869°F)

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Molecular weight : 56.12 g/mole

Aerosol product

Heat of combustion : -45029034 J/kg

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials : Oxidizers

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Isobutylene	LC50 Inhalation Vapor	Rat	550000 mg/m³	4 hours

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Section 11. Toxicological information

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Isobutylene	2.34	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1055	UN1055	UN1055	UN1055	UN1055
UN proper shipping name	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

DOT Classification : **Limited quantity** Yes.
Quantity limitation Passenger aircraft/rail: Forbidden. Cargo aircraft: 150 kg.
Special provisions 19, T50

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
ERAP Index 3000
Passenger Carrying Ship Index Forbidden
Passenger Carrying Road or Rail Index Forbidden
Special provisions 29

IATA : **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Cargo Aircraft Only: 150 kg.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

Clean Air Act (CAA) 112 regulated flammable substances: Isobutylene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : **Japan inventory (ENCS)**: This material is listed or exempted.
Japan inventory (ISHL): Not determined.

Malaysia : Not determined.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Section 15. Regulatory information

Taiwan : This material is listed or exempted.

Thailand : Not determined.

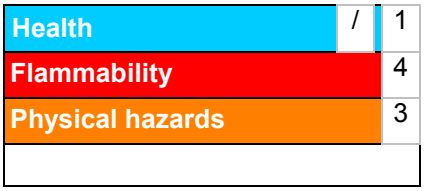
Turkey : Not determined.

United States : This material is listed or exempted.

Viet Nam : Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Liquefied gas	Expert judgment Expert judgment

History

Date of printing : 5/10/2018

Date of issue/Date of revision : 5/10/2018

Date of previous issue : 7/11/2016

Version : 0.02

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973

Section 16. Other information

as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Methanol
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Date of issue: 07/03/2013 Revision date: 12/12/2017 Supersedes: 12/12/2017 Version: 1.3

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Substance
Substance name : Methanol
CAS-No. : 67-56-1
Product code : VT430
Formula : CH4O
Synonyms : acetone alcohol / alcohol C1 / alcohol, methyl / carbinol / colonial spirits / columbian spirits / green wood spirits / manhattan spirits / methyl alcohol / methyl hydrate / methyl hydroxide / methylen / methylol / monohydroxymethane / pyroligneous spirit / pyroxylic spirit / wood alcohol / wood naphtha

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Solvent

1.3. Details of the supplier of the safety data sheet

Val Tech Diagnostics, A Division of LabChem Inc
Jackson's Pointe Commerce Park Building 1000
1010 Jackson's Pointe Court
Zelienople, PA 16063
T 412-826-5230
F 724-473-0647

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or +1-703-741-5970

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification

Flam. Liq. 2	H225
Acute Tox. 3 (Oral)	H301
Acute Tox. 3 (Dermal)	H311
Acute Tox. 3 (Inhalation)	H331
STOT SE 1	H370

Full text of H statements : see section 16

2.2. Label elements

GHS US labeling

Hazard pictograms (GHS US) :

GHS02 GHS06 GHS08

Signal word (GHS US) : Danger

Hazard statements (GHS US) : H225 - Highly flammable liquid and vapour
H301+H311+H331 - Toxic if swallowed, in contact with skin or if inhaled
H370 - Causes damage to organs (liver, kidneys, central nervous system, optic nerve) (Dermal, oral)

Precautionary statements (GHS US) : P210 - Keep away from heat, sparks, open flames, hot surfaces. - No smoking.
P233 - Keep container tightly closed.
P240 - Ground/bond container and receiving equipment.
P241 - Use explosion-proof electrical, ventilating, lighting equipment
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P260 - Do not breathe mist, vapors, spray.
P264 - Wash exposed skin thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.

P280 - Wear protective gloves, protective clothing, eye protection, face protection.
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P330 - If swallowed, rinse mouth
P361+P364 - Take off immediately all contaminated clothing and wash it before reuse.
P370+P378 - In case of fire: Use carbon dioxide (CO2), powder, alcohol-resistant foam to extinguish
P403+P235 - Store in a well-ventilated place. Keep cool.
P405 - Store locked up.
P501 - Dispose of contents/container to comply with local, state and federal regulations

2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type : Mono-constituent

Name	Product identifier	%	GHS-US classification
Methanol (Main constituent)	(CAS-No.) 67-56-1	100	Flam. Liq. 2, H225 Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Dermal), H311 Acute Tox. 3 (Inhalation), H331 STOT SE 1, H370

Full text of H-phrases: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Check the vital functions. Unconscious: maintain adequate airway and respiration. Respiratory arrest: artificial respiration or oxygen. Cardiac arrest: perform resuscitation. Victim conscious with labored breathing: half-seated. Victim in shock: on his back with legs slightly raised. Vomiting: prevent asphyxia/aspiration pneumonia. Prevent cooling by covering the victim (no warming up). Keep watching the victim. Give psychological aid. Keep the victim calm, avoid physical strain.

First-aid measures after inhalation : Remove the victim into fresh air. Immediately consult a doctor/medical service.

First-aid measures after skin contact : Wash immediately with lots of water. Soap may be used. Do not apply (chemical) neutralizing agents. Remove clothing before washing. Consult a doctor/medical service.

First-aid measures after eye contact : Rinse with water. Remove contact lenses, if present and easy to do. Continue rinsing. Take victim to an ophthalmologist if irritation persists.

First-aid measures after ingestion : Rinse mouth with water. Immediately after ingestion, give alcohol to drink. Give nothing to drink. Do not induce vomiting. Immediately consult a doctor/medical service. Take the container/vomit to the doctor/hospital. Call Poison Information Centre (www.big.be/antigif.htm).

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after inhalation : EXPOSURE TO HIGH CONCENTRATIONS: Coughing. Symptoms similar to those listed under ingestion.

Symptoms/effects after skin contact : Symptoms similar to those listed under ingestion.

Symptoms/effects after eye contact : Redness of the eye tissue. Lacrimation.

Symptoms/effects after ingestion : Nausea. Vomiting. AFTER ABSORPTION OF LARGE QUANTITIES: FOLLOWING SYMPTOMS MAY APPEAR LATER: Change in the blood composition. Headache. Feeling of weakness. Abdominal pain. Muscular pain. Central nervous system depression. Dizziness. Mental confusion. Drunkenness. Coordination disorders. Disturbed motor response. Disturbances of consciousness. Visual disturbances. Blindness. Respiratory difficulties. Cramps/uncontrolled muscular contractions.

Chronic symptoms : Red skin. Dry skin. Skin rash/inflammation. Headache. Disturbed tactile sensibility. Visual disturbances. Sleeplessness. Gastrointestinal complaints. Cardiac and blood circulation effects.

4.3. Indication of any immediate medical attention and special treatment needed

Immediately after ingestion, give a glass of strong drink, beer or wine to drink. Hospitalize at once for treatment with the right antidotes.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Quick-acting ABC powder extinguisher. Quick-acting BC powder extinguisher. Quick-acting class B foam extinguisher. Quick-acting CO2 extinguisher. Class B foam (alcohol-resistant). Water spray if puddle cannot expand.

Unsuitable extinguishing media : Water (quick-acting extinguisher, reel); risk of puddle expansion. Water; risk of puddle expansion.

5.2. Special hazards arising from the substance or mixture

Fire hazard : DIRECT FIRE HAZARD. Highly flammable liquid and vapour. Gas/vapor flammable with air within explosion limits. INDIRECT FIRE HAZARD. May be ignited by sparks.

Explosion hazard : DIRECT EXPLOSION HAZARD. Gas/vapour explosive with air within explosion limits. INDIRECT EXPLOSION HAZARD. may be ignited by sparks. Reactions with explosion hazards: see "Reactivity Hazard".

Reactivity : Violent to explosive reaction with (some) metal powders and with (strong) oxidizers. Violent exothermic reaction with (some) acids and with (some) halogens compounds.

5.3. Advice for firefighters

Firefighting instructions : Cool tanks/drums with water spray/remove them into safety. Do not move the load if exposed to heat. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : No flames, no sparks. Eliminate all sources of ignition. No naked lights. No smoking. Dike and contain spill.

6.1.1. For non-emergency personnel

Protective equipment : Gas-tight suit.

Emergency procedures : Keep upwind. Mark the danger area. Consider evacuation. Close doors and windows of adjacent premises. Stop engines and no smoking. No naked flames or sparks. Spark- and explosion-proof appliances and lighting equipment. Keep containers closed. Wash contaminated clothes.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Stop leak if safe to do so. Ventilate area.

6.2. Environmental precautions

Prevent soil and water pollution. Prevent spreading in sewers.

6.3. Methods and material for containment and cleaning up

For containment : Contain released substance, pump into suitable containers. Plug the leak, cut off the supply. Dam up the liquid spill. Try to reduce evaporation. Measure the concentration of the explosive gas-air mixture. Dilute combustible/toxic gases/vapours with water spray. Take account of toxic/corrosive precipitation water. Provide equipment/receptacles with earthing. Do not use compressed air for pumping over spills.

Methods for cleaning up : Take up liquid spill into a non combustible material e.g.: sand, earth, vermiculite slaked lime or soda ash. Scoop absorbed substance into closing containers. Carefully collect the spill/leftovers. Damaged/cooled tanks must be emptied. Do not use compressed air for pumping over spills. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling.

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Use spark-/explosionproof appliances and lighting system. Take precautions against electrostatic charges. Keep away from naked flames/heat. Keep away from ignition sources/sparks. Measure the concentration in the air regularly. Work under local exhaust/ventilation. Comply with the legal requirements. Remove contaminated clothing immediately. Clean contaminated clothing. Handle uncleaned empty containers as full ones. Thoroughly clean/dry the installation before use. Do not discharge the waste into the drain. Do not use compressed air for pumping over. Keep container tightly closed.

Hygiene measures : Do not eat, drink or smoke when using this product. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Incompatible products : Strong oxidizers. Strong bases. Strong acids. Acid anhydrides. Acid chlorides.

Incompatible materials : Direct sunlight. Heat sources. Sources of ignition.

Heat-ignition : KEEP SUBSTANCE AWAY FROM: heat sources. ignition sources.

Prohibitions on mixed storage : KEEP SUBSTANCE AWAY FROM: combustible materials. oxidizing agents. strong acids. (strong) bases. halogens. amines. water/moisture.

Storage area : Store in a cool area. Store in a dry area. Keep container in a well-ventilated place. Fireproof storeroom. Keep locked up. Provide for a tub to collect spills. Provide the tank with earthing. Unauthorized persons are not admitted. Aboveground. Meet the legal requirements.

Special rules on packaging : SPECIAL REQUIREMENTS: closing. dry. clean. correctly labelled. meet the legal requirements. Secure fragile packagings in solid containers.

Packaging materials : SUITABLE MATERIAL: steel. stainless steel. iron. glass. MATERIAL TO AVOID: lead. aluminium. zinc. polyethylene. PVC.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Methanol (67-56-1)		
USA ACGIH	ACGIH TWA (ppm)	200 ppm
USA ACGIH	ACGIH STEL (ppm)	250 ppm

8.2. Exposure controls

Appropriate engineering controls : Emergency eye wash fountains should be available in the immediate vicinity of any potential exposure. Keep concentrations well below lower explosion limits.

Personal protective equipment : Safety glasses. Protective clothing. Gloves. Full protective flameproof clothing. Face shield.

Materials for protective clothing : GIVE GOOD RESISTANCE: polyethylene/ethylenevinylalcohol. styrene-butadiene rubber. viton. GIVE LESS RESISTANCE: chloroprene rubber. chlorinated polyethylene. natural rubber. nitrile rubber/PVC. GIVE POOR RESISTANCE: leather. neoprene. nitrile rubber. polyethylene. PVA. PVC. polyurethane.

Hand protection : Protective gloves against chemicals (EN374).

Eye protection : Safety glasses.

Skin and body protection : Head/neck protection. Protective clothing.

Respiratory protection : Full face mask with filter type AX at conc. in air > exposure limit. High vapour/gas concentration: self-contained respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Appearance : Liquid.

Molecular mass : 32.04 g/mol

Color : Colourless.

Odor	:	Characteristic odour. Mild odour. Pleasant odour. Alcohol odour. Commercial/unpurified substance: irritating/pungent odour.
Odor threshold	:	No data available
pH	:	No data available
Relative evaporation rate (butyl acetate=1)	:	4.1
Relative evaporation rate (ether=1)	:	6.3
Melting point	:	-97.8 °C
Freezing point	:	No data available
Boiling point	:	64.7 °C (1013 hPa)
Flash point	:	9.7 °C (Closed cup, 1013 hPa, EU Method A.9: Flash-Point)
Critical temperature	:	240 °C
Auto-ignition temperature	:	455 °C (1013 hPa, DIN 51794: Self-ignition temperature)
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	No data available
Vapor pressure	:	128 hPa (20 °C)
Vapor pressure at 50 °C	:	552 hPa
Critical pressure	:	79547 hPa
Relative vapor density at 20 °C	:	1.1
Relative density	:	0.79 - 0.80 (20 °C)
Relative density of saturated gas/air mixture	:	1
Specific gravity / density	:	790 - 800 kg/m³ (20 °C)
Solubility	:	Soluble in water. Soluble in ethanol. Soluble in ether. Soluble in acetone. Soluble in chloroform. Water: 100 g/100ml (20 °C) Ethanol: complete Ether: complete Acetone: complete
Log Pow	:	-0.77 (Experimental value)
Log Kow	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	0.544 - 0.59 mPa·s (25 °C)
Explosive properties	:	No data available
Oxidizing properties	:	No data available
Explosion limits	:	5.5 - 36.5 vol %

9.2. Other information

Minimum ignition energy	:	0.14 mJ
Saturation concentration	:	166 g/m³
VOC content	:	100 %
Other properties	:	Clear. Hygroscopic. Volatile. Neutral reaction.

SECTION 10: Stability and reactivity

10.1. Reactivity

Violent to explosive reaction with (some) metal powders and with (strong) oxidizers. Violent exothermic reaction with (some) acids and with (some) halogens compounds.

10.2. Chemical stability

Hygroscopic.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

Direct sunlight. High temperature. Incompatible materials. Open flame. Sparks. Overheating.

10.5. Incompatible materials

Strong oxidizers. Strong bases. Strong acids. Peroxides. Acid anhydrides. Acid chlorides.

10.6. Hazardous decomposition products

Carbon dioxide. Carbon monoxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Methanol (\f)67-56-1	
LD50 oral rat	1187 - 2769 mg/kg body weight (BASF test, Rat, Male / female, Weight of evidence, Aqueous solution, Oral, 7 day(s))
LD50 dermal rabbit	17100 mg/kg (Rabbit, Inconclusive, insufficient data, Dermal)
LC50 inhalation rat (mg/l)	128.2 mg/l air (BASF test, 4 h, Rat, Male / female, Experimental value, Inhalation (vapours))
ATE CLP (oral)	100 mg/kg body weight
ATE CLP (dermal)	300 mg/kg body weight
ATE CLP (gases)	700 ppmV/4h
ATE CLP (vapors)	3 mg/l/4h
ATE CLP (dust, mist)	0.5 mg/l/4h

Skin corrosion/irritation : Not classified

Serious eye damage/irritation : Not classified

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity – single exposure : Causes damage to organs (liver, kidneys, central nervous system, optic nerve) (Dermal, oral).

Specific target organ toxicity – repeated exposure : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Toxic in contact with skin. Toxic if swallowed. Toxic if inhaled.

Symptoms/effects after inhalation : EXPOSURE TO HIGH CONCENTRATIONS: Coughing. Symptoms similar to those listed under ingestion.

Symptoms/effects after skin contact : Symptoms similar to those listed under ingestion.

Symptoms/effects after eye contact : Redness of the eye tissue. Lacrimation.

Symptoms/effects after ingestion : Nausea. Vomiting. AFTER ABSORPTION OF LARGE QUANTITIES: FOLLOWING SYMPTOMS MAY APPEAR LATER: Change in the blood composition. Headache. Feeling of weakness. Abdominal pain. Muscular pain. Central nervous system depression. Dizziness. Mental confusion. Drunkenness. Coordination disorders. Disturbed motor response. Disturbances of consciousness. Visual disturbances. Blindness. Respiratory difficulties. Cramps/uncontrolled muscular contractions.

Chronic symptoms : Red skin. Dry skin. Skin rash/inflammation. Headache. Disturbed tactile sensibility. Visual disturbances. Sleeplessness. Gastrointestinal complaints. Cardiac and blood circulation effects.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Not classified as dangerous for the environment according to the criteria of Regulation (EC) No 1272/2008.

Ecology - air : Not included in the list of substances which may contribute to the greenhouse effect (IPCC). Not included in the list of fluorinated greenhouse gases (Regulation (EU) No 517/2014). Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009).

Ecology - water : Not harmful to crustacea. Not harmful to fishes. Groundwater pollutant. Inhibition of activated sludge. Nitrification of activated sludge is inhibited. Not harmful to algae. Not harmful to bacteria.

Methanol (67-56-1)	
LC50 fish 1	15400 mg/l (EPA 660/3 - 75/009, 96 h, Lepomis macrochirus, Flow-through system, Fresh water, Experimental value, Lethal)
EC50 Daphnia 1	18260 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 96 h, Daphnia magna, Semi-static system, Fresh water, Experimental value, Locomotor effect)
ErC50 (algae)	22000 mg/l (OECD 201: Alga, Growth Inhibition Test, 96 h, Pseudokirchneriella subcapitata, Static system, Fresh water, Experimental value)

12.2. Persistence and degradability

Methanol (67-56-1)	
Persistence and degradability	Readily biodegradable in the soil. Readily biodegradable in water.
Biochemical oxygen demand (BOD)	0.6 - 1.12 g O □/g substance
Chemical oxygen demand (COD)	1.42 g O □/g substance
ThOD	1.5 g O □/g substance

12.3. Bioaccumulative potential

Methanol (67-56-1)	
BCF fish 1	1 - 4.5 (72 h, Cyprinus carpio, Static system, Fresh water, Experimental value)
Log Pow	-0.77 (Experimental value)
Bioaccumulative potential	Low potential for bioaccumulation (BCF < 500).

12.4. Mobility in soil

Methanol (67-56-1)	
Surface tension	0.023 N/m (20 °C)
Log Koc	0.088 (log Koc, SRC PCKOCWIN v2.0, Calculated value)
Ecology - soil	Highly mobile in soil.

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Do not discharge into drains or the environment. Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Recycle by distillation. Incinerate under surveillance with energy recovery. Obtain the consent of pollution control authorities before discharging to wastewater treatment plants.

Additional information : Hazardous waste according to Directive 2008/98/EC, as amended by Regulation (EU) No 1357/2014 and Regulation (EU) No 2017/997.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1230 Methanol, 3, II

UN-No.(DOT) : 1230

DOT NA no. : UN1230

Proper Shipping Name (DOT) : Methanol

Transport hazard class(es) (DOT) : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120

Hazard labels (DOT) : 3 - Flammable liquid

DOT Symbols : D - Proper shipping name for domestic use only, or to and from Canada

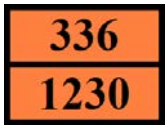
Packing group (DOT) : II - Medium Danger

DOT Special Provisions (49 CFR 172.102)	:	IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized. T7 - 4 178.274(d)(2) Normal..... 178.275(d)(3) TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	150
DOT Packaging Non Bulk (49 CFR 173.xxx)	:	202
DOT Packaging Bulk (49 CFR 173.xxx)	:	242
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	1 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	60 L
DOT Vessel Stowage Location	:	B - (i) The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) ‘‘On deck only’’ on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.
DOT Vessel Stowage Other	:	40 - Stow ‘‘clear of living quarters’’
Marine pollutant	:	-

Additional information

Other information : No supplementary information available.

ADR

Transport document description	:	
Hazard identification number (Kemler No.)	:	336
Orange plates	:	
Tunnel restriction code	:	D/E

Transport by sea

UN-No. (IMDG)	:	1230
Proper Shipping Name (IMDG)	:	methanol
Class (IMDG)	:	3 - Flammable liquids
Packing group (IMDG)	:	II - substances presenting medium danger
EmS-No. (1)	:	F-E
MFAG-No	:	19
EmS-No. (2)	:	S-D

Air transport

UN-No. (IATA)	:	1230
Proper Shipping Name (IATA)	:	Methanol
Class (IATA)	:	3 - Flammable Liquids
Packing group (IATA)	:	II - Medium Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

Methanol (67-56-1)

Listed on the United States TSCA (Toxic Substances Control Act) inventory
Subject to reporting requirements of United States SARA Section 313

Methanol (67-56-1)	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	5000 lb
SARA Section 311/312 Hazard Classes	Physical hazard - Flammable (gases, aerosols, liquids, or solids) Health hazard - Acute toxicity (any route of exposure) Health hazard - Specific target organ toxicity (single or repeated exposure)

15.2. International regulations

CANADA

Methanol (67-56-1)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class B Division 2 - Flammable Liquid Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects

EU-Regulations

No additional information available

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flam. Liq. 2	H225
Acute Tox. 3 (Inhalation)	H331
Acute Tox. 3 (Dermal)	H311
Acute Tox. 3 (Oral)	H301
STOT SE 1	H370

Full text of H statements : see section 16

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Not classified

15.2.2. National regulations

No additional information available

15.3. US State regulations

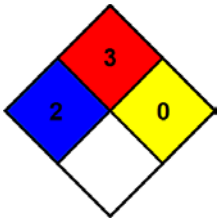
Methanol(67-56-1)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	Yes
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No

SECTION 16: Other information

Full text of H-phrases: see section 16:

H225	Highly flammable liquid and vapour
H301	Toxic if swallowed
H311	Toxic in contact with skin
H331	Toxic if inhaled
H370	Causes damage to organs

NFPA health hazard	:	2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.
NFPA fire hazard	:	3 - Liquids and solids (including finely divided suspended solids) that can be ignited under almost all ambient temperature conditions.
NFPA reactivity	:	0 - Material that in themselves are normally stable, even under fire conditions.



Hazard Rating

Health	:	2 Moderate Hazard - Temporary or minor injury may occur
Flammability	:	3 Serious Hazard
Physical	:	0 Minimal Hazard
Personal protection	:	H

SDS US ValTech

Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.

SAFETY DATA SHEET

Nitric Acid

Version	Revision Date:	SDS Number:	Date of last issue: 10/11/2018
4.1	04/05/2019	1334196-00034	Date of first issue: 02/27/2017

SECTION 1. IDENTIFICATION

Product name : Nitric Acid

SDS-Identcode : 130000036514

Manufacturer or supplier's details

Company name of supplier : First Chemical Corporation

Address : 1001 Industrial Road
Pascagoula, MS 39581 United States of America (USA)

Telephone : +1-228-762-0870

Emergency telephone : Medical emergency: 1-866-595-1473 (outside the U.S. 1-302-773-2000) ; Transport emergency: +1-800-424-9300 (outside the U.S. +1-703-527-3887)

Recommended use of the chemical and restrictions on use

Recommended use : Intermediate

Restrictions on use : For industrial use only.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200

Corrosive to Metals : Category 1

Acute toxicity (Inhalation) : Category 3

Skin corrosion : Category 1A

Serious eye damage : Category 1

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements : H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H331 Toxic if inhaled.

Precautionary Statements : **Prevention:**

P234 Keep only in original container.
P261 Avoid breathing mist or vapors.

P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P301 + P330 + P331 + P310 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/doctor.
P303 + P361 + P353 + P310 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a POISON CENTER/doctor.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.

Storage:

P405 Store locked up.
P406 Store in corrosive resistant container with a resistant inner liner.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

Corrosive to the respiratory tract.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Components

Chemical name	CAS-No.	Concentration (% w/w)
Nitric acid	7697-37-2	>= 65 - < 70

Actual concentration is withheld as a trade secret

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

If inhaled : If inhaled, remove to fresh air.
If not breathing, give artificial respiration.
If breathing is difficult, give oxygen.

Get medical attention immediately.

In case of skin contact	:	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.
In case of eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention immediately.
If swallowed	:	If swallowed, DO NOT induce vomiting. If vomiting occurs have person lean forward. Call a physician or poison control center immediately. Rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person.
Most important symptoms and effects, both acute and delayed	:	Causes serious eye damage. Toxic if inhaled. Causes severe burns. Causes digestive tract burns. Corrosive to respiratory system.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
Notes to physician	:	Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire fighting	:	Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Nitrogen oxides (NOx)
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.

Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.
Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g., by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures	:	See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.
Local/Total ventilation	:	Use with local exhaust ventilation.
Advice on safe handling	:	Do not get on skin or clothing. Do not breathe vapors or spray mist. Do not swallow. Do not get in eyes. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment Keep container tightly closed. Keep away from metals. Store in original container or corrosive resistant and/or lined container. Take care to prevent spills, waste and minimize release to the environment.
Conditions for safe storage	:	Keep in properly labeled containers.

Store in original container.
Store locked up.
Keep tightly closed.
Keep in a cool, well-ventilated place.
Store in accordance with the particular national regulations.
Reacts with many metals to liberate hydrogen gas which can form explosive mixtures with air. Hydrogen, a highly flammable gas, can accumulate to explosive concentrations inside drums, or any types of steel containers or tanks upon storage.

Materials to avoid : Do not store with the following product types:
Strong oxidizing agents
Organic peroxides
Explosives
Gases

Recommended storage temperature : 100.0 °F / 37.8 °C

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Nitric acid	7697-37-2	TWA	2 ppm	ACGIH
		STEL	4 ppm	ACGIH
		ST	4 ppm 10 mg/m³	NIOSH REL
		TWA	2 ppm 5 mg/m³	NIOSH REL
		TWA	2 ppm 5 mg/m³	OSHA Z-1

Engineering measures : Minimize workplace exposure concentrations.
Use with local exhaust ventilation.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Material	:	Chemical-resistant gloves
Remarks	:	Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.
Eye protection	:	Wear the following personal protective equipment: Chemical resistant goggles must be worn. If splashes are likely to occur, wear: Face-shield
Skin and body protection	:	Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential. Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).
Hygiene measures	:	Ensure that eye flushing systems and safety showers are located close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	colorless, light yellow
Odor	:	odorless
Odor Threshold	:	No data available
pH	:	0.75
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	248 °F / 120 °C
Flash point	:	does not flash
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available

Self-ignition	:	The substance or mixture is not classified as pyrophoric.
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	65.3 - 73.3 hPa (77 °F / 25 °C)
Relative vapor density	:	1.4
Relative density	:	No data available
Solubility(ies)		
Water solubility	:	completely soluble
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Metal corrosion rate	:	Corrosive to metals
Particle size	:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Can react with strong oxidizing agents. May be corrosive to metals.
Conditions to avoid	:	None known.
Incompatible materials	:	Oxidizing agents Bases
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity

Toxic if inhaled.

Product:

Acute inhalation toxicity	:	Acute toxicity estimate: 4.62 mg/l Exposure time: 4 h Test atmosphere: vapor Method: Calculation method

Components:

Nitric acid:

Acute inhalation toxicity	:	LC50 (Rat): > 2.65 mg/l Exposure time: 4 h Test atmosphere: vapor Method: OECD Test Guideline 403 Assessment: Corrosive to the respiratory tract.

Skin corrosion/irritation

Causes severe burns.

Components:

Nitric acid:

Result	:	Corrosive after 3 minutes or less of exposure
Remarks	:	Based on harmonised classification in EU regulation 1272/2008, Annex VI

Serious eye damage/eye irritation

Causes serious eye damage.

Components:

Nitric acid:

Result	:	Irreversible effects on the eye
Remarks	:	Based on skin corrosivity.

Respiratory or skin sensitization

Skin sensitization

Not classified based on available information.

Respiratory sensitization

Not classified based on available information.

Germ cell mutagenicity

Not classified based on available information.

Components:

Nitric acid:

Genotoxicity in vitro	:	Test Type: Bacterial reverse mutation assay (AMES) Result: negative
Genotoxicity in vivo	:	Test Type: Unscheduled DNA synthesis test (UDS) in testicular cells Species: Mouse Application Route: Ingestion Result: negative Remarks: Based on data from similar materials

Carcinogenicity

Not classified based on available information.

Components:

Nitric acid:

Species	:	Rat
Application Route	:	Ingestion
Exposure time	:	273 days
Result	:	negative
Remarks	:	Based on data from similar materials

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Not classified based on available information.

Components:

Nitric acid:

Effects on fertility	:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative Remarks: Based on data from similar materials
Effects on fetal development	:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion

Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

STOT-single exposure

Not classified based on available information.

STOT-repeated exposure

Not classified based on available information.

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Nitric acid:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 6,000 mg/l Exposure time: 96 h Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 8,609 mg/l Exposure time: 48 h Remarks: Based on data from similar materials
Toxicity to fish (Chronic toxicity)	:	NOEC: 97.8 mg/l Exposure time: 3 Months Remarks: Based on data from similar materials
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 3 h Remarks: Based on data from similar materials

Persistence and degradability

No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with local regulations.
Contaminated packaging	:	Empty containers should be taken to an approved waste

handling site for recycling or disposal.
If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number	:	UN 2031
Proper shipping name	:	NITRIC ACID
Class	:	8
Packing group	:	II
Labels	:	8

IATA-DGR

UN/ID No.	:	UN 2031
Proper shipping name	:	Nitric acid
Class	:	8
Packing group	:	II
Labels	:	Corrosive
Packing instruction (cargo aircraft)	:	855
Packing instruction (passenger aircraft)	:	Not permitted for transport

IMDG-Code

UN number	:	UN 2031
Proper shipping name	:	NITRIC ACID
Class	:	8
Packing group	:	II
Labels	:	8
EmS Code	:	F-A, S-B
Marine pollutant	:	no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

Domestic regulation

49 CFR

UN/ID/NA number	:	UN 2031
Proper shipping name	:	Nitric acid
Class	:	8
Packing group	:	II
Labels	:	CORROSIVE
ERG Code	:	157
Marine pollutant	:	no

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Nitric acid	7697-37-2	1000	1538

SARA 304 Extremely Hazardous Substances Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Nitric acid	7697-37-2	1000	1538

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

Components	CAS-No.	Component TPQ (lbs)
Nitric acid	7697-37-2	1000

SARA 311/312 Hazards : Corrosive to Metals
Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Nitric acid 7697-37-2 >= 50 - < 70 %

US State Regulations

Pennsylvania Right To Know

Nitric acid 7697-37-2
Water 7732-18-5

California List of Hazardous Substances

Nitric acid 7697-37-2

California Permissible Exposure Limits for Chemical Contaminants

Nitric acid 7697-37-2

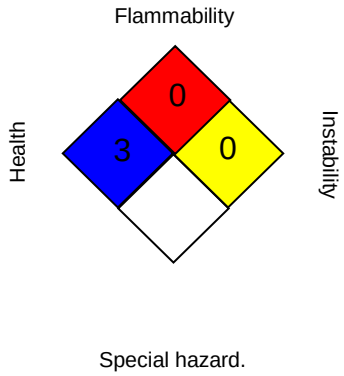
California List of Acutely Hazardous Chemicals, Toxics and Reactives

Nitric acid 7697-37-2

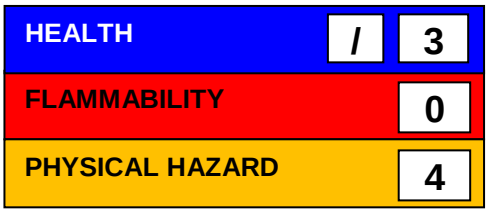
SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



HMIS® IV:



HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Before use read Chemours safety information.
For further information contact the local Chemours office or nominated distributors.
All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
ACGIH / TWA	:	8-hour, time-weighted average
ACGIH / STEL	:	Short-term exposure limit
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
NIOSH REL / ST	:	STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
OSHA Z-1 / TWA	:	8-hour time weighted average

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health

Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, http://echa.europa.eu/
Revision Date	:	04/05/2019

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 is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

US / Z8

1 IDENTIFICATION OF THE PREPARATION AND COMPANY

Product Name:	Sawyer Permethrin Insect Repellent(s): Clothing & Gear
EPA Reg. No.:	50404-3-58188
Product Code(s):	SP649, SP657, SP647, SP652, SP653, PH647, RB648
Application:	Pump / Liquid Insecticide/Repellent for use on clothing
Supplier:	Sawyer Products, Inc. 605 7th Avenue North P.O. Box 188 Safety Harbor, FL 34695
E-mail:	feedback@sawyer.com
Website:	http://sawyer.com
Telephone Number:	800-356-7811 (M-F, 9-5, EST)

2 HAZARD IDENTIFICATION

Classification of Preparation:	None.
Primary Hazards:	R50/53: Very toxic to aquatic organisms, may cause long-term adverse affects in the aquatic environment.

3 COMPOSITION / INFORMATION ON INGREDIENTS

Product Description: Dangerous preparation according to EU directive 1999/45EC:
Information of Hazardous Substances:

Substance Name	Concentration	CAS Number	EC Number	Symbols	R-Phrases
Permethrin	0.50%w/w	52645-53-1	258-067-9	Xn, R50/53	R22

Reference is made to Chapter 16 for full test of each relevant R phrase. Occupational exposure limit(s), if relevant, are listed in Section 8.

4 FIRST-AID MEASURES

Any Special Measure:	None.
First Aid Measures –	
If Swallowed:	Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.
If Inhaled:	Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for treatment advice.
Skin Contact:	Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
If In Eyes:	Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

5 FIRE-FIGHTING MEASURES

Extinguishing Media –

Suitable: Carbon dioxide (CO_2), Dry chemical, Foam, Water

Not Suitable: As appropriate for surrounding fire.

Special Exposure Hazards: None known.

Hazardous Thermal Decomposition Products: None.

Special Protective Equipment for Firefighters: Use adequate respiratory equipment in case of insufficient ventilation.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions:	Avoid contact with face, eyes, or skin. Avoid breathing vapors or spray mist. Harmful if swallowed. Wash thoroughly after handling and before eating or smoking. Do not use on humans.
Environmental Precautions:	This product is extremely toxic to fish and other aquatic organisms. Do not apply directly to water. Do not contaminate water when disposing of equipment washwaters. Large Spills: Contain with a dike.
Methods for Clean-up:	Absorb residues in sand or other inert material. Collect spilled material in containers. Call your local solid waste agency for disposal instructions.
Other Information:	Notify Authorities if any exposure to the general public or the environment occurs or is likely to occur.

7 HANDLING AND STORAGE

Handling:	Handle in accordance with good occupational hygiene and safety practices in well-ventilated areas.
Storage:	Keep in a cool, dry and well-ventilated place (< 95°F)(< 35°C). Do not store where temperature falls below (32°F)(0°C). Protect from sunlight. Keep away from food, drink and animal feedstuff.
Recommended Packaging:	Keep only in the original packaging.
Use:	Use insecticides safely. Always read the label and product information before use.

8 EXPOSURE CONTROL/PERSONAL PROTECTION

Engineering Measure: Use only in well-ventilated areas. Comply with standard precautionary measures for working with chemicals.
Hygienic Measures: When using do not eat, drink or smoke.
Occupational Exposure Limits: Occupational exposure limits have not been established for this product.
Workplace exposure limits (mg/m³): Not determined for this product.
Personal Protective Equipment: Exposure limits: non-assigned. As a consumer use product there is no requirement for personal protection.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Liquid
Color:	Milky white
Odor:	Slight (Characteristic)
pH:	6.0 – 7.0
Flash Point (TCC):	>200°F (>93°C)
Specific Gravity:	0.995
Pounds/Gallon:	8.31
Solubility (Oil):	Negligible
Solubility (Water):	Miscible
Shelf Life:	5-years

10 STABILITY AND REACTIVITY

Stability: Stable under normal conditions.
Conditions to avoid: Do not store when Temperature exceeds (< 95°F)(< 35°C) or falls below (32°F)(0°C).
Materials to avoid: None.
Hazardous Decomposition Products: No known.
Reactivity: None.

11 TOXICOLOGICAL INFORMATION

Symptoms of Overexposure for Each Potential Route of Exposure:

Inhaled: None.
Contact with skin or eyes: None.
Absorbed through skin: None.
Swallowed: None.
Health effects or risk from exposure: Acute: *None established* Chronic: *None established*

12 ECOLOGICAL INFORMATION*

No Ecotoxicological research has been carried out on this product.

Eco Toxicity:	LD50 quail >675g/kg, LC50 96hr fish (Guppy) = 0.38mg/l, EC50 48hr daphnia = 0.0085mg/l, EC50 72hr algae = 25mg/l.
Mobility:	Not specified.
Persistence – degradability:	Data given in this section are for the active ingredient: Soil DT50<28 days. Water DT50 6 TO 24 HOURS (ponds & streams), 7 Days (pond sediment).
Bioaccumulative potential:	Not specified.

**Extrapolated from Technical Concentrate*

13 DISPOSAL CONSIDERATION

Product residues:	Replace cap, wrap clean, empty container in several layers of newspaper, and discard container in rubbish. Containers may be recycled. Treat product residues and non-empty pack as hazardous waste.
Additional warning:	None.

14 TRANSPORT INFORMATION

This preparation is not classified as a Dangerous Goods for Transport.

Proper Shipping Name:	Insect Repellent/Clothing Treatment
	Not Restricted.

15 REGULATORY INFORMATION

TSCA (Toxic Substances Control Act) Regulations, 40CFR710: This preparation is a pesticide and is exempt from TSCA regulation.

CERCLA and SARA Regulations (40CFR355, 370, 372): this preparation does not contain any chemicals subject to the reporting requirements of SARA Sec. 313.

This preparation is classified and labelled in accordance with the Control of Pesticides Regulations (1986) and EU DIRECTIVE 1999/45/EC.


DANGEROUS FOR THE ENVIRONMENT

R50/53: Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.
S29: Do not empty into drains.

To avoid risks to man and the environment, comply with the instructions for use.

16 OTHER INFORMATION

Prepared in accordance with OSHA Hazard Communication Standard (HCS) to conform to the United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

The information in this safety data sheet is compiled in compliance with Regulation (EC) 1907/2006.

This product is intended for consumer (amateur) use only.

The information given in this safety data sheet is correct to the best of our knowledge at the date of issue. It is intended as a guide for the safe use, handling, disposal, storage and transportation and is not intended as warranty or as a specification. Recipients of our products must take responsibility for observing the law and regulations. The information relates only to the product supplied and may not be suitable for use with other product materials other than those described within.

Sawyer Products, Inc. disclaims any liability for loss or damage resulting from the use of this data, information suggestions.

Appendix C

Heat Stress and Cold Stress Guidelines

Heat Stress Guidelines

Form	Signs & Symptoms	Care	Prevention[3]
Heat Rash	Tiny red vesicles in affected skin area. If the area is extensive, sweating can be impaired.	Apply mild lotions and cleanse the affected area.	Cool resting and sleeping areas to permit skin to dry between heat exposures.
Heat Cramps	Spasm, muscular pain (cramps) in stomach area and extremities (arms and legs).	Provide replacement fluids with minerals (salt) such as Gatorade.	Adequate salt intake with meals[1]. ACCLIMATIZATION[2]
Heat Exhaustion	Profuse sweating, cool (clammy) moist skin, dizziness, confusion, pale skin color, faint, rapid shallow breathing, headache, weakness, and/or muscle cramps.	Remove from heat, sit or lie down, rest, replace lost water with electrolyte replacement fluids (water, Gatorade) take frequent sips of liquids in amounts greater than required to satisfy thirst.	ACCLIMATIZATION[2] Adequate salt intake with meals[1], only during early part of heat season. Ample water intake, frequently during the day.
Heat Stroke	HOT Dry Skin. Sweating has stopped. Mental confusion, dizziness, nausea, chills, severe headache, collapse, delirium, and/or coma.	HEAT STROKE IS A MEDICAL EMERGENCY • Remove from heat. • COOL THE BODY AS RAPIDLY AS POSSIBLE by immersing in cold (or cool) water, or splash with water and fan. • Call for Emergency Assistance. • Observe for signs of shock.	ACCLIMATIZATION[2] Initially moderate workload in heat (8 to 14 days). Monitor worker's activities.

Footnotes:

1.) American diets are normally high in salt, sufficient to aid acclimatization. However, during the early part of the heat season, (May, June), one extra shake of salt during one to two meals per day may help, so long as this is permitted by your physician. Check with your personal physician.

2.) ACCLIMATIZATION - The process of adapting to heat is indicated by worker's ability to perform hot jobs less fluid loss, lower concentrations of salt loss in sweat, and a reduced core (body) temperature and heart rate.

3.) Method to Achieve Acclimatization - Moderate work or exercise in hot temperatures during early part of heat season. Adequate salt (mineral) and water intake. Gradually increasing work time in hot temperatures. Avoid alcohol. Normally takes 8 to 14 days to achieve acclimatization. Lost rapidly, if removed from strenuous work (or exercise) in hot temperature for more than approximately 5 days.

Cold Stress Guidelines

Stress	Symptoms	What to do
Mild Hypothermia	• Body Temp 98 to 90°F • Shivering • Lack of coordination, stumbling, fumbling hands • Slurred speech • Memory loss • Pale, cold skin	• Move to warm area • Stay active • Remove wet clothes and replace with dry clothes or blankets • Cover the head • Drink warm (not hot) sugary drink

Moderate Hypothermia	• Body temp 90 to 86°F
	• Shivering stops
	• Unable to walk or stand
	• Confused and/or irrational
		• All of the above, plus:
		  ○ Call 911
		  ○ Cover all extremities completely
		  ○ Place very warm objects, such as hot packs on the victim's head, neck, chest, and groin

Severe Hypothermia	• Body temp 86 to 78°F • Severe muscle stiffness • Very sleepy or unconscious • Ice cold skin • Death	• Call 911 • Treat victim very gently • Do not attempt to re-warm
Frostbite	• Cold, tingling, stinging, or aching feeling in the frostbitten area, followed by numbness • Skin color turns red, then purple, then white or very pale skin • Cold to the touch • Blisters in severe cases	• Call 911 • Do not rub the area • Wrap in soft cloth • If help is delayed, immerse in warm (not hot) water
Trench Foot	• Tingling, itching, or burning sensation • Blisters	• Soak feet in warm water, then wrap with dry cloth bandages • Drink a warm (not hot) sugary drink

Appendix D

Forms

Follow the GEI incident reporting procedures and send the completed form to: SafetyTeam@GEIConsulants.com.

Accident/Incident Report Form

SECTION A ACCIDENT/INCIDENT DETAILS

EMPLOYEE INFORMATION:

Name: _____

Home Address: _____
Street Address City State Zip Code

Contact Information: ( ) ( )
Primary Secondary

Date of Birth: _____

Date of Hire: _____

Branch: _____

Supervisor: _____

OTHER INJURED (IF APPLICABLE):

Name: _____

Home Address: _____
Street Address City State Zip Code

Contact Information: ( ) ( )
Primary Secondary

Date of Birth: _____

Date of Hire: _____

Branch: _____

Supervisor: _____

Date and Time Accident/Incident	Date and Time Reported
____ /____ /____ Month Day Year	____ /____ /____ Month Day Year
____ A.M. ____ P.M.	____ A.M. ____ P.M.

LOCATION OF INCIDENT/ACCIDENT

Project Name: _____

Client and Location: _____

or _____

Office Location: _____

INCIDENT TYPE: (Check All That Applies)

- ☐ **Personal Injury/Illness**
- ☐ **Vehicle Accident**
- ☐ **Property Damage**
- ☐ **Environmental Spill**
- ☐ **Other**

WITNESS INFORMATION

Name: _____

Contact Number: _____

Company: _____

WHAT HAPPENED TO THE INJURED PARTY: ☐First Aid Administered ☐Refused Treatment/Transport ☐Transported to Hospital ☐Returned to Work ☐ Went Home ☐ Went to Physician ☐ Unknown

Clinic/Hospital or Treating Physician: _____ Phone: _____
Name Street Address City State Zip Code

SECTION B PERSONAL INJURY

Cause of Injury: _____

Part of Body Injured: _____ Multiple Injuries: ☐Y ☐N

Was PPE worn when injured? : ☐Y ☐N What PPE was worn? _____

WAS INJURY A RESULT OF THE USE A MOTOR VEHICLE: ☐ **YES** ☐ **NO** **(If yes, complete Section C)**

Follow the GEI incident reporting procedures and send the completed form to: SafetyTeam@GEIConsulants.com.

Accident/Incident Report Form

SECTION C — AUTO ACCIDENT ONLY

DRIVER/VEHICLE INFORMATION

Name of Insured: _____

Department: _____

Driver's License Number: _____

DOB: ____/____/____ State: _____

Description of Vehicle: License Plate Number: _____

Make: _____ Model: _____ Year:_____ Color:_____

Owner: _____

Name of Other Driver: _____

Driver's License Number: _____

State: _____

Description of Vehicle: License Plate Number: _____

Make: _____ Model:_____ Year:_____ Color:_____

Insurance Carrier: _____

Policy Number: _____Ph. Number:_____

SECTION D — PROPERTY DAMAGE OR CHEMICAL RELEASE ONLY

Type of Damage(s): _____

Cause of Damage(s): _____

Type of Chemical Released (if known): _____

Quantity of Chemical Released: _____

Spill Measures Employed: _____

SECTION E — NATURE OF ACCIDENT/INCIDENT AND EXTENT OF INJURIES/DAMAGES

(Please give a detailed description of what happened. Attach a sketch or picture if applicable)

_____

_____

_____

_____

_____

_____

_____

_____

_____

I hereby certify that the above information is true and correct to my understanding of this accident/incident.

_____ _____

Employee/Preparer's Name **Date and Time**

GEI Consultants

Near Miss Report Form

Follow the GEI incident reporting procedures and send the completed form to: SafetyTeam@GEIConsulants.com.

NEAR MISS DETAILS

Employee Name: _____

Phone Number: _____

Branch: _____

Supervisor: _____

Date and Time Accident/Incident	Date and Time Reported	LOCATION OF NEAR MISS
____/____/____ Month Day Year ____A.M. ____P.M.	____/____/____ Month Day Year ____A.M. ____P.M.	**Project Name:** _____ **Client and Location:** _____ **or** _____ **Office Location:** _____

WHAT HAPPENED?

(Please give a detailed description of what happened. Attach photos or a sketch, if applicable.)

_____

_____

_____

_____

_____

☐ **Photos were Taken**

WHAT WAS DONE?

(Please give a detailed description of what was done to prevent and incident from occurring.)

_____

_____

_____

_____

_____

_____

☐ **I have verbally contacted a member of the Safety Team and my Supervisor.**

_____ _____

Employee/Preparer's Name **Date and Time**

Project Safety Briefing Form

Project Number:	**Project Name:**
Date:	**Time:**
Briefing Conducted by:	**Signature:**

This sign-in log documents that a project specific-briefing was conducted in accordance with the site-specific HASP and GEI's H&S policy. GEI personnel who perform work on site are required to attend this project briefing. Applicable health and safety SOPs and any additional hazards are also required to be reviewed during this briefing. Prior to the start of the project or upon the start of a new on-site project team member, this form must be completed. Please email this completed form to:

SafetyTeam@geiconsultants.com

TOPICS COVERED (check all those covered):			
SOP HS-001 Biological Hazards		SOP HS-025 Manual Lifting	
SOP HS-002 Bloodborne Pathogens		SOP HS -26 Hazard Identification	
SOP HS-003 Container Management		SOP HS-27 Confined Space Entry for Sanitary Sewers	
SOP HS-004 Driver Safety		SOP HS-28 Safe Trailer Use	
SOP HS-005a Electrical Safety		SOP HS-29 Overtime and Fatigue Management	
SOP HS-005b Lockout/Tagout		Accident Reporting Procedures	
SOP HS-006 Excavation/Trenching		Changes to the HASP	
SOP HS-008a Hand Tools (Non-Powered)		Cold Stress	
SOP HS-008b Powered Hand Tools		Confined Space	
SOP HS-009 Hazardous Substances Management		Decon Procedures	
SOP HS-010 Inclement Weather		Exposure Guidelines	
SOP HS-011 Ladders		General PPE Usage	
SOP HS-012 Noise Exposure		Heat Stress	
SOP HS-013 Nuclear Density Gauge		Hearing Conservation	
SOP HS-014 Utility Markout		Lockout/Tagout	
SOP HS-015 Respirator Fit Test		Personal Hygiene	
SOP HS-016 Traffic Hazards		Respiratory Protection	
SOP HS-017 Water Safety		Review of Hazard Evaluation	
SOP HS-018 Working Around Heavy Equipment		Site Control	
SOP HS-019 Rail Safety		Site Emergency Procedures	
SOP HS-020 Aerial Lift		Slips, Trips, Falls	
SOP HS-021 Mobile Equipment		Other (Specify):	
SOP HS-022 Aquatic Ecological Survey/Electrofishing		Other (Specify):	
SOP HS-023 Scaffolding		Other (Specify):	
SOP HS-024 Wilderness Safety		Other (Specify):	

Personnel Sign-in List	
Printed Name	**Signature**

GEI Consultants

Daily Safety Briefing and Site Visitor Sign-In

Project Number:	**Project Name:**
[1]Date:	**Time:**
Briefing Conducted by:	**Signature:**

This sign-in log documents the tailgate briefing conducted in accordance with the site specific HASP. Personnel who perform work operations on site are required to attend each briefing and to acknowledge receipt of each briefing, daily.

TOPICS COVERED (check all those covered):

☐ Accident Reporting Procedures	☐ General PPE Usage	☐ Site Control	☐ Other:
☐ Cellular Phone Charged w/Service	☐ Heat Stress	☐ Site Emergency Procedures	☐ Other:
☐ Changes to the HASP	☐ Hearing Conservation	☐ Slips, Trips, Falls	☐ Other:
☐ Cold Stress	☐ Lockout/Tagout	☐ Traffic Safety	☐ Other:
☐ Confined Space	☐ Personal Hygiene	☐ Other:	☐ Other:
☐ Decon Procedures	☐ Respiratory Protection	☐ Other:	☐ Other:
☐ Exposure Guidelines	☐ Review of Hazards	☐ Other:	☐ Other:

Daily Safety Topic Description:

Personnel Sign-in List

Printed Name	Signature	Company Name	Time-In	Time-Out

[1] This form is applicable for *only* 1 day of site activity.

GEI Consultants

Utility Clearance Documentation

Project: _____

Site: _____

Drilling Location ID: _____

Driller: _____

GEI PM: _____

GEI Field Team Leader: _____

Utility Drawings Reviewed: _____

Provided By: _____

Reviewed By: _____

One Call Utility Clearance Call Date: _____

Utility Clearance Received back from (list utilities): _____

Completed By (Company): _____ Date: _____

GEI Staff Responsible for Oversight: _____

Metal Detector Survey (yes/no): _____

Drilling Location Cleared by: _____

Contractor: _____ Date: _____

GEI Staff Responsible for Oversight: _____

Physical Test Pit Clearance Required (yes/no): _____

Contractor: _____ Date: _____

GEI Staff Responsible for Oversight: _____

Handclearing Performed: _____ Date: _____

Contractor: _____

GEI Staff Responsible for Oversight: _____

Notes: _____

_____

Based upon the best available information, appropriate utility clearance proceedures were performed for the invasive work specified. If client ordered/site specific deviations from existing GEI utility clearance procedures exist, they are approved by the client signature below.

Client Signature (Optional): _____ Date: _____

GEI, Inc. Representative: _____ Date: _____

Appendix E

GEI's Health and Safety SOPs

Applicable GEI H&S SOPs *(check all that apply)*				
☒ Biological Hazards – 001		☐ Ladders -011		☒ Mobile Equipment – 021
☒ Bloodborne Pathogens – 002		☒ Noise Exposure -012		☐ Aquatic Ecological Survey & Electrofishing -022
☒ Container Management – 003		☐ Nuclear Density Gauge Operation -013		☐ Scaffolding - 023
☒ Driver Safety -004		☒ Utility Markout-014		☐ Wilderness Safety - 024
☒ Electrical Safety Lock Out Tag Out -005		☒ Respirator Fit Test Procedure-015		☒ Manual Lifting – 025
☒ Excavation Trenching - 006		☒ Traffic Hazards -016		☒ Hazard Identification - 026
☒ Non-Powered Hand Tools -008a		☐ Water Safety – 017		☐ Confined Space Entry for Sanitary Sewers – 027
☒ Powered Hand Tools – 008b		☒ Working Around Heavy Equipment – 018		☐ Safe Trailer Use – 028
☒ Hazardous Substances Management -009		☐ Rail Safety -019		
☒ Inclement Weather – 010		☐ Aerial Lift – 020		

STANDARD OPERATING PROCEDURES

SOP No. HS-001 Biological Hazards

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to prevent or limit the potential for GEI personnel to encounter biological hazards during field activities.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for contact with biological hazards such as animals, insects, plants, and sewage. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for encounters with biological hazards and the control methods to be implemented by GEI employees. These hazards must be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Mammals

During some site operations, animals such as stray or domesticated dogs or cats, raccoons, snakes, bears, rats, bats, etc. may be encountered. Employees should use discretion and attempt to avoid contact with animals. If these animals present a problem, efforts will be made to remove these animals from the site by contacting a licensed animal control technician.

1.3.1 Rabies

The rabies virus is transmitted through the bite of an infected animal or contact with saliva or brain/nervous system tissue of an infected animal. The rabies virus infects the central nervous system, causing disease in the brain. The early symptoms of rabies in people are fever, headache, and general weakness or discomfort. As the disease progresses, more specific symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation (increase in saliva), difficulty swallowing, and hydrophobia (fear of water). Death usually occurs within days of the onset of these symptoms.

If you are bitten or think you may be exposed, wash any wounds immediately and thoroughly with soap and water. Then go to the hospital emergency room and notify the Project Manager and the People Safety Team. The doctor, possibly in consultation with the state or local health department, will decide if you need a rabies vaccination. Decisions to start series of vaccinations will be based on your type of exposure and the animal you were exposed to, as well as laboratory and surveillance information for the geographic area where the exposure occurred. If possible have someone document what type of animal it was, how it was behaving prior to the bite, what caused it to bite the

employee, and if it's not a domestic animal that would be easy to find again in the future, try to get animal control on site to capture it. An Incident Report Form must be completed and submitted, per GEI's Incident reporting procedures. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

1.4 Insects and Arachnids

Insects, including bees, wasps, hornets, mosquitoes, ticks, spiders, etc., may be present at a job site making the chance of a bite/sting possible. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life-threatening condition. Some insect bites can transmit diseases such as Lyme disease or a virus such as West Nile. The following is a list of preventive measures:

- Apply insect repellent prior to performing field work and as often as needed throughout the work shift.
- Wear proper personal protective equipment (PPE), including protective clothing (work boots, socks, and light colored clothing).
- Wear shoes, long pants with bottoms tucked into boots or socks, and a long-sleeved shirt when outdoors for long periods of time, or when many insects are most active (between dawn and dusk).
- When walking in wooded areas, avoid contact with bushes, tall grass, or brush as much as possible.
- Field personnel who have or may have insect allergies must have insect allergy medication onsite and must inform the Site Safety Officer (SSO) and the People and Safety Team of their particular allergy prior to commencing work.
- Field personnel should perform a self-check at the end of the day for ticks.

1.4.1 Tick-borne Diseases

Lyme Disease

Lyme disease is caused by infection from a deer tick that carries a spirochete (a bacterium). During the painless tick bite, the spirochete may be transmitted into the bloodstream, often after feeding on the host for 12 to 24 hours. The ticks that cause the disease are often no bigger than a poppy seed or a comma in newsprint. The peak months for human infection are from May to September.

Symptoms appear in three stages. First symptoms usually appear from 2 days to a few weeks after a person is bitten by an infected tick. Symptoms usually consist of a ring-like red rash on the skin where the tick was attached. The rash is often bulls-eye like with red around the edges and clear in the center. The rash may be warm, itchy, tender, and/or "doughy." This rash appears in only 60 to 80 percent of infected persons. An infected

person also has flu-like symptoms of a stiff neck, chills, fever, sore throat, headache, fatigue, and joint pain. These symptoms often disappear after a few weeks.

The second stage symptoms, which occur weeks to months later include meningitis, severe headache, drooping of the muscles on the face, called Bell's Palsy, encephalitis, numbness, withdrawal, and lethargy. These symptoms may last for several weeks to several months. Third stage symptoms, which occur months or years later include arthritis, heart problems, and loss of memory. The third stage symptoms may mimic multiple sclerosis and Alzheimer's disease.

When in areas that could harbor deer ticks, employees should wear light color clothing, and visually check themselves and check and be checked by another employee when coming from wooded or vegetated areas. If a GEI employee has a tick bite, the People and Safety Team and Project Manager must be contacted immediately. The employee will be offered the option for medical treatment by a physician, which typically involves antibiotics. An Incident Report form must be completed in compliance with the Incident Reporting procedures. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

If personnel feel sick or have signs similar to those mentioned above, the SSO and the People and Safety Team must be notified immediately.

Figure 1: From left to right, the deer tick adult female, adult male, nymph, and larva on a centimeter scale.

How to Remove a Tick

A tick can be removed from the skin by pulling gently at the head with tweezers. If tweezers are not available, use tissue paper or cloth to grasp the tick. It is important to grasp the tick as close to the site of attachment and use a firm steady pull to remove it. Wash hands immediately after with soap and water. The affected area should also be washed with soap and water, then disinfected with an antiseptic wipe, if available. All mouth parts must be removed from the skin. If the tick was removed by breaking off the

mouth parts, an irritation or infection may occur because the organism that is causing the disease can still enter the body through the skin.

Treatment for Lyme Disease

Treatment with antibiotics is effective and recovery is usually complete. For first stage symptoms, antibiotics are usually given orally. However, treatment for second and third stage symptoms is prolonged and recovery may take longer. Antibiotic treatment is usually provided intravenously for second and third stage Lyme disease.

Babesiosis

The deer tick can also cause Babesiosis, an infection of the parasite Babesia Microti. Symptoms of Baesiosis may not be evident, but may also include fever, fatigue and hemolytic anemia lasting from several days to several months. Babesiosis is most commonly diagnosed in the elderly or in individuals whose immune systems are compromised. If there are no signs or symptoms of Babesiosis, usually no treatment it needed. If an employee believes they might have Babesiosis they'll see a physician to be tested. Treatment usually consists of taking prescription medications for 7 to 10 days.

Ehrlichiosis

Ehrlichiosis is a tick-borne disease which can be caused by either of two different organisms. Human monocytic ehrlichiosis (HME) is caused by *Ehrlichia chaffeensis*, which is transmitted by the lone star tick (*Amblyomma americanum*). Human granulocytic anaplasmosis (HGA), previously known as human granulocytic ehrlichiosis (HGE), is caused by *Anaplasma phagocytophilia*, which is transmitted by the deer tick (*Ixodes scapularis*).

Ehrlichiosis is transmitted by the bite of infected ticks, including the deer tick and the lone star tick. The symptoms of HME and HGE are the same and usually include fever, muscle aches, weakness and headache. Patients may also experience confusion, nausea, vomiting and joint pain. Unlike Lyme disease or Rocky Mountain spotted fever, a rash is not common. Infection usually produces mild to moderately severe illness, with high fever and headache, but may occasionally be life-threatening or even fatal. Symptoms appear 1 to 3 weeks after the bite of an infected tick. However, not every exposure results in infection. For those that become infected a drug called Doxcycline will be prescribed.

Rocky Mountain Spotted Fever

Rocky Mountain spotted fever is a tick-borne disease caused by a rickettsia (a microbe that differs somewhat from bacteria and virus). In the eastern United States, children are infected most frequently, while in the western United States, disease incidence is highest among adult males. Disease incidence is directly related to exposure to tick-infested habitats or to infested pets. Rocky Mountain spotted fever is characterized by a sudden onset of moderate to high fever (which can last for 2-3 weeks), severe headache, fatigue, deep muscle pain, chills and rash. The rash begins on the legs or arms, may include the

soles of the feet or palms of the hands and may spread rapidly to the trunk or rest of the body. Symptoms usually appear within 2 weeks of the bite of an infected tick. Like Ehrlichiosis the prescription drug Doxcycline is the first line treatment option.

1.4.2 Mosquito-Borne Disease

West Nile Virus
West Nile Virus is a mosquito-borne infection transmitted through the bite of an infected mosquito. The symptoms of West Nile Virus can be asymptomatic (no symptoms) or in more serious cases can lead to West Nile Fever. West Nile Fever can include fever, headache, tiredness, body ache, an occasional rash on the trunk of the body, and swollen lymph glands, In severe cases, people have developed West Nile Encephalitis or Meningitis which symptoms include fever, headache, neck stiffness, tremors, coma, and in some cases death. The incubation period for the disease is usually 2 to 15 days. The symptoms can range from a few days to several weeks. Most mosquitoes are not infected and the chance of infection from a mosquito bite of an on-site employee is very small.

1.5 Repellants

The following precautions will be used to help reduce the risk of mosquito bites:

Reduce mosquito-breeding areas by making sure wheelbarrows, buckets, and other containers are turned upside down when not used so that they do not collect standing water. According to the Environmental Protection Agency (EPA), many mosquitoes can breed in pooled water that's minimal enough to fill a bottle cap.

Wear shoes, long pants with bottoms tucked into boots or socks, and a long-sleeved shirt when outdoors for long periods of time, or when many mosquitoes are most active (between dawn and dusk).

Use mosquito repellant according to the manufacturer's directions when outdoors for long periods of time and when mosquitoes are most active.

Centers for Disease Control and Prevention (CDC) evaluation of information contained in peer-reviewed scientific literature and data available from the EPA has identified several EPA-registered products that provide repellent activity sufficient to help people avoid the bites of disease carrying mosquitoes. Products containing these active ingredients typically provide reasonably long-lasting protection:

- **DEET** (Chemical Name: N,N-diethyl-m-toluamide or N,N-diethly-3-methyl-benzamide)
- **Picaridin** (KBR 3023, Chemical Name: 2-(2-hydroxyethyl)-1-piperidinecarboxylic acid 1-methylpropyl ester)

- **Oil of Lemon Eucalyptus** or **PMD** (Chemical Name: para-Menthane-3,8-diol) the synthesized version of oil of lemon eucalyptus
- **IR3535** (Chemical Name: 3-[N-Butyl-N-acetyl]-aminopropionic acid, ethyl ester)
- **Permethrin** (3-Phenoxybenzyl (1RS)-cis,trans-3-(2,2-dichlorovinyl) -2,2-dimethylcyclopropanecarboxylate) **–** Permethrin kills ticks and can be used on clothing (but not skin)

The EPA characterizes the active ingredients DEET and Picaridin as "conventional repellents" and Oil of Lemon Eucalyptus, PMD, and IR3535 as "biopesticide repellents", which are derived from natural materials.

In general, higher concentrations of active ingredient provide longer duration of protection, regardless of the active ingredient, although concentrations above approximately 50 percent do not offer a marked increase in protection time. Products with less than 10 percent active ingredient may offer only limited protection, often from 1 to 2 hours. Products that offer sustained release or controlled release (micro-encapsulated) formulations, even with lower active ingredient concentrations, may provide longer protection times. Regardless of what product you use, if you start to get mosquito bites reapply the repellent according to the label instructions or remove yourself from the area with biting insects if possible.

Clothing and other products can be purchased pre-treated, or products can be treated using EPA-registered products. Permethrin is the only pesticide approved by the EPA for these uses. Permethrin binds tightly to the fabrics, resulting in little loss during washing and minimal transfer to the skin. Permethrin is poorly absorbed through the skin, although sunscreens and other products may increase the rate of skin absorption.

If you decide to use permethrin-treated clothing, consider these tips:

- Read the application instructions carefully and apply the product according to the label directions. Do not over-treat products.
- Permethrin treatments are only intended for use on fabrics; do not apply them directly to the skin or other items.
- Do not apply permethrin to clothing while it is being worn.
- Apply the product to clothing outdoors in well ventilated areas that are protected from wind.
- Hang treated fabrics outdoors and allow them to dry completely before wearing them.
- Wash permethrin treated clothing separately from other clothing items.

1.6 Poisonous Plants

The potential for contact with poisonous plants, such as poison ivy, oak, and sumac exists when performing fieldwork in wooded or boggy areas. Urushiol, an oily organic allergen found in plants, can cause an allergic reaction when in contact with the leaves or vines.

Poison ivy can be found as vines on tree trunks or as upright bushes. Poison ivy consists of three leaflets with notched edges. Two leaflets form a pair on opposite sides of the stalk, and the third leaflet stands by itself at the tip. Poison ivy is red in the early spring and turns shiny green later in the spring. Poison ivy grows throughout much of North America, including all states east of the Rocky Mountains. It is normally found in wooded areas, especially along edge areas where the tree line breaks and allows sunshine to filter through. It also grows in exposed rocky areas, open fields, and disturbed areas.

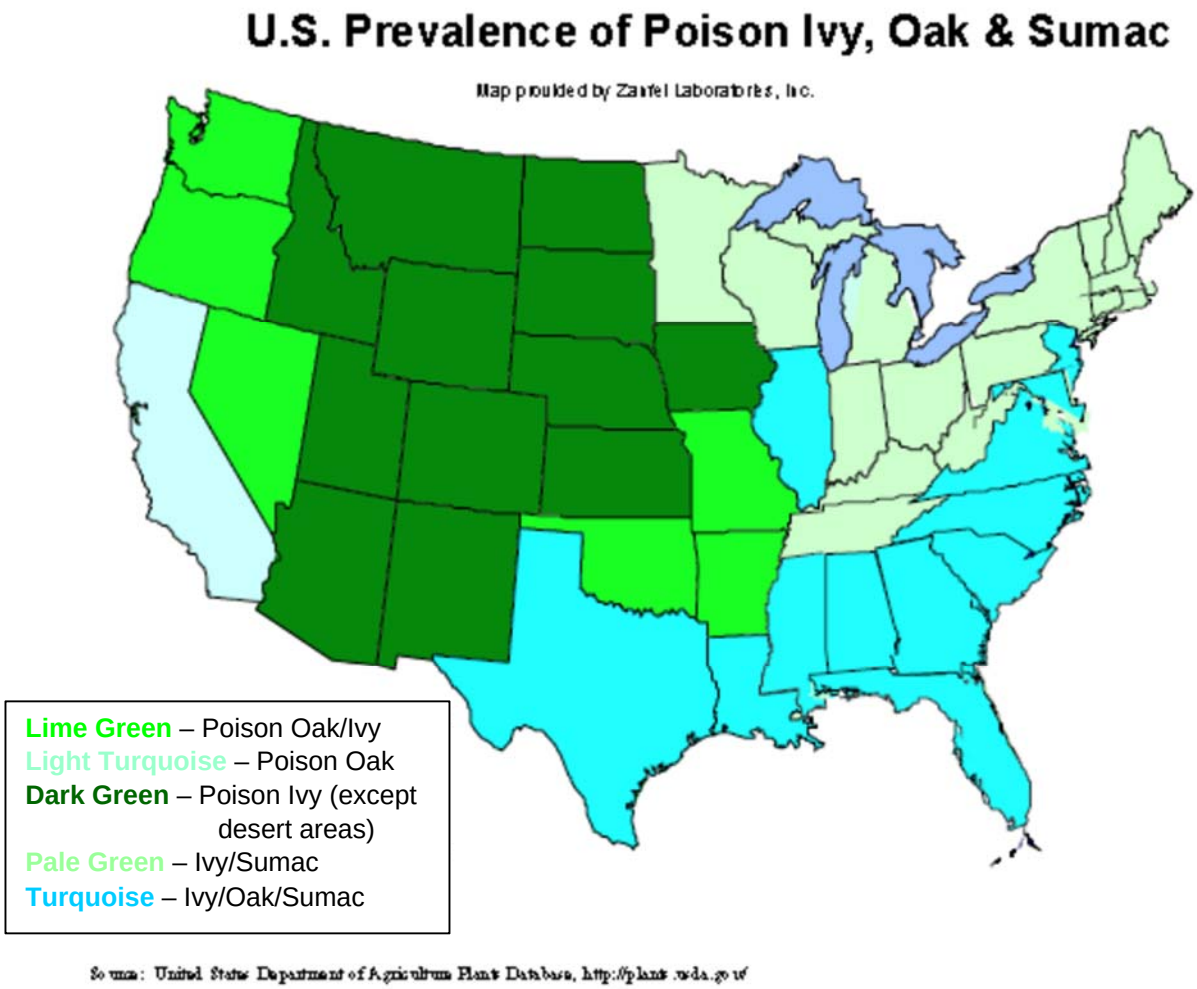
Poison oak can be present as a sparsely-branched shrub. Poison oak can grow anywhere in the United States with the exception of Hawaii, Alaska, and some southwest areas that have desert climates. Poison oak is similar to poison ivy in that it has the same leaflet configuration; however, the leaves have slightly deeper notches.

Poison sumac can be present in the form of a flat-topped shrub or tree. It has fern-like leaves, which are velvety dark green on top and pale underneath. The branches of immature trees have a velvety “down.” Poison sumac has white, “hairy” berry clusters. Poison sumac grows exclusively in very wet or flooded soils, usually in swamps and peat bogs, in the eastern United States.

Poison Ivy

Poison Oak

Poison Sumac



To prevent exposure to these poisonous plants:

- Wear proper PPE, including long sleeves, long pants, boots, and gloves.
- Barrier skin creams, such as lotion containing bentoquatum (Tecnu®), may offer some protection prevent the occurrence of exposure symptoms.
- Contact with poison ivy, sumac, or oak may lead to a skin rash, characterized by reddened, itchy, blistering skin which needs first aid treatment. Employees with known allergies should identify themselves to the SSO or Project Manager prior to starting field work as a precautionary measure. If you believe you have contacted one of these plants:
    - Immediately wash skin thoroughly with soap and water, taking care not to touch your face or other body parts.
    - Contact the People and Safety Team and Project Manager immediately after caring for affected skin.

- Wash exposed clothing separately in hot water with detergent.

- After use, clean tools, and soles of boots with rubbing alcohol or soap and lots of water. Urushiol can remain active on the surface of objects for up to 5 years.
- If a rash occurs, contact the People and Safety Team and complete and submit an Incident Report Form. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

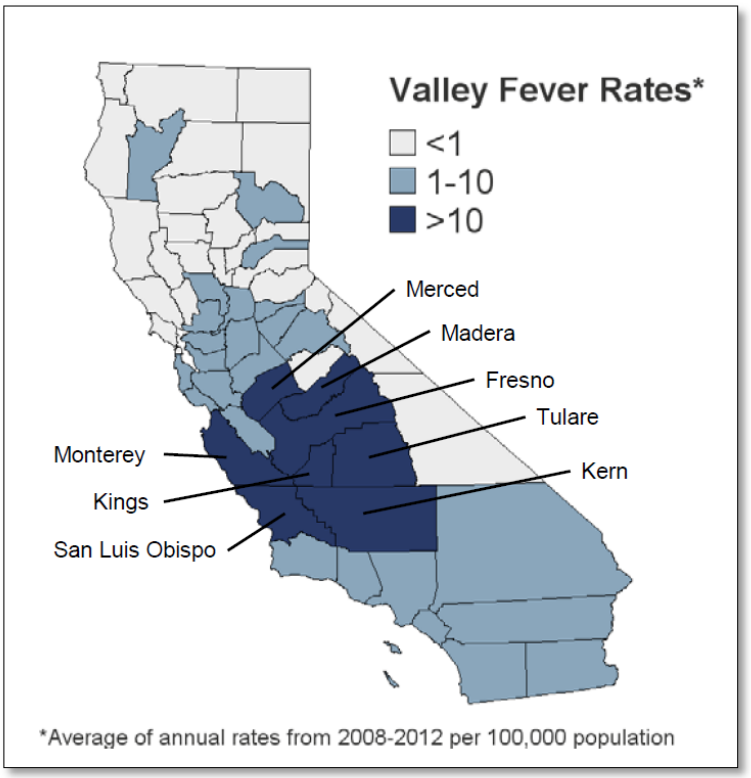
1.7 Sewage and Bacterial Impacted Sediments

Some project work may be conducted at sites that serve or have served as a combined sewer overflow and consequently may have received untreated sanitary sewage from numerous sources. Decomposed sewage can potentially be encountered within sites and their sediments. Sediments could contain soil and marine microorganisms, and bacterium associated with sewage. Many of these bacterium can cause illness through ingestion, direct contact, or the inhalation of a bio-aerosol possibly in the form of dust. Potential respiratory exposure to biological agents can also occur through the inhalation of aerosols produced during sediment handling activities. PPE as identified in the site-specific HASP will be worn to minimize potential exposures. Employees will follow the decontamination or disposal procedures identified in the HASP.

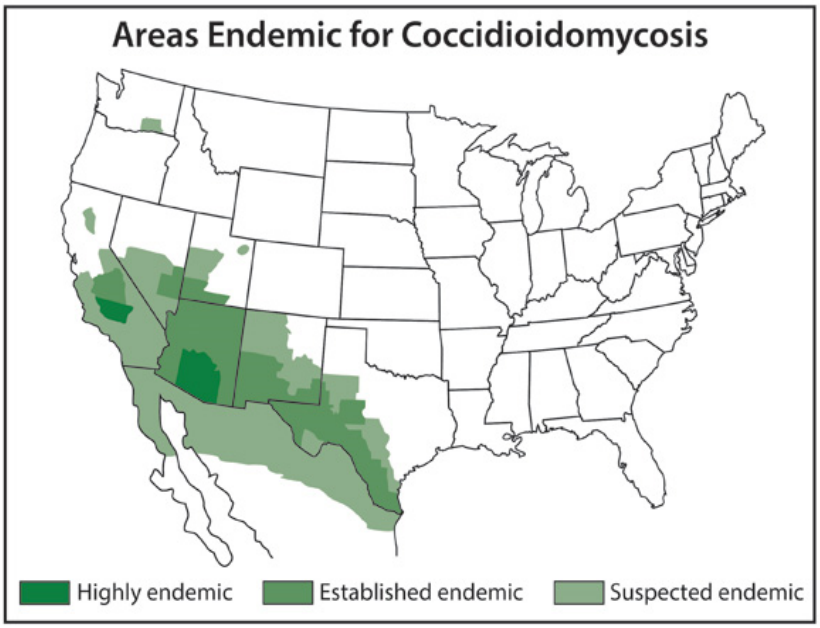
1.7.1 Fungal Spores in Soil – Valley Fever

Valley Fever is an illness that usually affects the lungs. It is caused by the fungus *Coccidioides immitis* that lives in the top 2 to 12 inches of soil in many parts of California. When fungal spores are present, any work activity that disturbs the soil, such as digging, grading, or other earth moving operations, or vehicle operation on dirt roads, can cause the spores to become airborne, therefore increasing the risk of Valley Fever. All employees on sites where the fungus is present, and who are exposed to dusty conditions and wind-blown dusts are at increased risk of becoming infected.

Valley Fever fungal spores are too small to be seen, and there is no reliable way to test the soil for spores before working in a particular place. Valley Fever can be found throughout the southwestern United States, parts of Mexico, and South America. Some California counties consistently have Valley Fever fungus present in the soil. In these regions Valley Fever is considered endemic. Health departments track the number of cases of Valley Fever illness that occur. This information is used to map illness rates as seen on the figures below from the Center of Disease Control Valley Fever Awareness website.



Rates of reported Valley Fever cases in California counties from 2008–2012. Darkest colored counties had the highest rates of Valley Fever.



When present, symptoms usually occur between 7 to 21 days after breathing in spores, and can include:

- Cough
- Fever
- Chest pain
- Headache
- Muscle aches
- Rash on upper trunk or extremities
- Joint pain in the knees or ankles
- Fatigue

Symptoms of Valley Fever can be mistaken for other diseases such as the flu (influenza) and TB (tuberculosis), so it is important for employees to obtain medical care for an accurate diagnosis and possible treatment.

While there is no vaccine to prevent Valley Fever, the following important steps must be taken in order to limit risk:

- Determine if the worksite is in an endemic area. Contact the local health department for more information about the risk in the county GEI is performing work that may disturb soils.
- Prepare work plans and work practices that reduce employee's exposure, which may include:
    - Provide air conditioned cabs with properly maintained dust filters for vehicles that generate heavy dust and make sure employees keep windows and vents closed.
    - Suspend work during heavy winds.
- When exposure to dust is unavoidable, National Institute for Occupational Safety and Health (NIOSH)-approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or High Efficiency Particulate Air (HEPA) must be provided. The Project Manager must work with the Safety Team to develop and implement a respiratory protection program in accordance with California's Occupational Safety and Health Administration (Cal/OSHA's) Respiratory Protection standard (8 CCR 5144) for the project.
- Take measures to reduce transporting spores offsite, such as:
    - Clean tools, equipment, PPE, and vehicles before transporting offsite.
    - If employee's clothing is likely to be heavily contaminated with dust, provide coveralls and change rooms, and showers where possible.

1.8 Injury Reporting

If a GEI employee suffers an injury, bite, or sting on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.9 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.10 References

http://www.cdc.gov/ncidod/dvbid/westnile/index.htm
http://www.cdc.gov/ncidod/dvbid/westnile/qa/insect_repellent.htm
http://www.epa.gov/pesticides/health/mosquitoes/insectrp.htm
http://www.cdc.gov/niosh/topics/lyme/
Protecting Yourself from Ticks and Mosquitoes, NIOSH Fast Facts, Publication No. 2010-119
http://npic.orst.edu/pest/mosquito/ptc.html
http://www.cdc.gov/features/valley-fever-10-things/
https://www.cdph.ca.gov/HealthInfo/discond/Documents/VFGeneral.pdf
https://blog.epa.gov/blog/tag/mosquitoes/

1.11 Attachments

None

1.12 Contact

Health&SafetyTeam@geiconsultants.com

1.13 Review History

- June 2016
- June 2014
- November 2013
- October 2010

STANDARD OPERATING PROCEDURES

SOP No. HS-002 Infectious Materials and Bloodborne Pathogens Exposure Control Plan

1.1 Objective

GEI personnel may come in contact with potentially infectious agents (materials) when performing first aid or cardiopulmonary resuscitation (CPR). Employees may also come into contact with these agents when working at certain contaminated sites (i.e., urban sites, discarded contaminated needles, or sewer outfall exposures). This standard operating procedure (SOP) has been developed to minimize the potential for exposure to employees who may contact, directly or indirectly, infectious agents.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for contact with infectious materials and bloodborne pathogens. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for encounters with infectious materials or bloodborne pathogens and the control methods to be implemented by GEI employees. Exposure determinations are made by listing job functions impacted by potential exposure. The HASP will list job classifications or tasks in which occupational exposure could occur such as employees collecting samples or expected to provide First Aid. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Exposure determinations are made without regard to the use of personal protective equipment. When differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials. *Universal Precautions (i.e., treat all potentially infectious materials as if it were infected) will be used by GEI employees.*

1.3 Exposure Control Plan

1.3.1 Standard Procedures

A written Exposure Control Plan applicable to potential occupational exposure to blood or other potentially infectious materials will be developed as necessary based on project hazards. This plan will be accessible to each affected employee.

Sampling of materials containing potentially infectious materials will be performed in a manner that minimizes the potential for creating splashes, droplets, or aerosols. Mechanical pipetting devices will be used for manipulating sanitary sewer effluent. Mouth pipetting is prohibited.

The use of glassware or equipment with sharp or pointed edges will be kept at a minimum to reduce the potential of injury that would create a direct route of entry into the body for infectious materials.

Minor cuts, scratches, or other breaks in the skin barrier will be covered prior to the handling of infectious materials. Employees experiencing exudative lesions or weeping dermatitis will refrain from direct contact with infectious materials.

Eating, drinking, smoking, or application of cosmetics is not permitted in areas where potentially infectious materials are handled or sampled.

Employees will wash and disinfect their hands, face, or other potentially contaminated skin surfaces upon completing the handling of infectious or potentially infectious agents or after rendering first aid. Hand washing facilities are readily available at all work locations. When provision of hand washing facilities is not feasible, either an appropriate antiseptic hand cleanser used in conjunction with clean cloth/paper towels or antiseptic towelettes will be provided.

All equipment and environmental and working surfaces will be cleaned and decontaminated after contact with blood or other potentially infectious materials. Specimens of blood or other potentially infectious materials (i.e. bandages) will be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.

1.3.2 Personal Protective Equipment

When there is a potential for occupational exposure GEI will provide, at no cost to the employee, appropriate personal protective equipment (PPE). PPE will be worn to reduce the potential of exposures to splashes or aerosols. At a minimum, PPE will include safety glasses and appropriate gloves, but may also require the use of face, respiratory, foot, and full-body protection. Refer to the site-specific HASP for specific PPE requirements.

Disposable PPE used in the handling or sampling of infectious materials will be appropriately disposed of and not reused.

1.3.3 Medical Monitoring

Medical monitoring is required for an employee when a potential workplace exposure has occurred. GEI will make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident. These are made available at no cost to the employee. The employee must follow the GEI Incident Reporting procedures regarding the potential exposure as soon as possible. For infectious agents in which a medically accepted vaccination has been developed (e.g., hepatitis B virus) (HBV) potentially exposed employees will be given the option to receive an inoculation at no cost. Employees who have been exposed will be given the option to receive a confidential medical evaluation also at no cost. Required records for exposed

employees will be kept confidential. GEI will keep these medical records for at least the duration of employment plus 30 years and will be maintained for 3 years from the date on which the training occurred. All records required to be maintained shall be made available and GEI will comply with the requirements involving transfer of records set forth in 29 CFR 1910.1020(h).

1.3.4 Training

Training will be conducted at the time of initial assignment to tasks where exposure may take place and at least annually thereafter. All training for employees shall be provided within one year of their previous training. Employees with a reasonable risk for exposure must complete Bloodborne Pathogen training covering the following topics:

- An explanation of the Occupational Health and Safety Administration (OSHA) bloodborne pathogen standard.
- A general explanation of bloodborne diseases.
- An explanation of the modes of transmission of bloodborne diseases.
- Communications of hazards to employees.
- An explanation of the GEI's Bloodborne Pathogen SOP and exposure control plan.
- Appropriate methods for recognizing tasks that involve potential exposure.
- An explanation of the use and limitations of methods to prevent exposure.
- Proper types, use, handling, decontamination, and disposal of PPE.
- The availability of HBV vaccines and the procedures for obtaining a vaccination.
- Appropriate actions to take during an emergency involving bloodborne pathogens.
- Post-exposure procedures.
- An explanation of required signs and labels.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health and Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People and Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other

appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.6 Attachment

None

1.7 Reference

OSHA 29 CFR 1910.1030 – Bloodborne Pathogens

1.8 Contact

SafetyTeam@geiconsultants.com

1.9 Review History

- October 2018
- June 2016
- June 2014
- November 2013
- January 2011
- November 2010

STANDARD OPERATING PROCEDURES

SOP NO. HS-003 Container Management

1.1 Objective

This Standard Operating Procedure (SOP) has been developed to minimize the potential for injuries to GEI employees performing container and drum handling and sampling, through proper use of engineering and administrative controls, personal protective equipment (PPE), and education.

1.2 General

This SOP is intended for use by employees engaged in work with the management of containers that may contain hazardous substances or contaminated media. The site-specific health and safety plan (HASP) should include a hazard assessment and control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

Hazardous substances and contaminated media will be handled, transported, labeled, and disposed of in accordance with this paragraph. Drums and containers will meet the appropriate United States Department of Transportation (DOT), Occupational Safety and Health Administration (OSHA), and Environmental Protection Agency (EPA) regulations for the wastes that they contain.

Site operations will be organized to minimize the amount of drum or container movement. Prior to movement of drums or containers, employees exposed to the transfer operation will be notified of the potential hazards associated with the contents of the drums or containers. Unlabeled drums and containers will be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled.

Fire extinguishing equipment meeting the requirements of 29 CFR Part 1910, Subpart L, shall be on hand and ready for use to control incipient fires.

DOT specified salvage drums or containers and suitable quantities of proper absorbent will be kept available and used in areas where spills, leaks, or ruptures may occur. Where spills may occur, a spill containment program, which may be part of the HASP, will be implemented to contain and isolate the entire volume of the hazardous substance being transferred.

1.3 Opening Drums and Containers

The following procedures will be followed in areas where drums or containers are being opened:

- Employees not actually involved in opening drums or containers will be kept a safe distance from the drums or containers being opened.
- If employees must work near or adjacent to drums or containers being opened, a suitable shield that does not interfere with the work operation will be placed between the employee and the drums or containers being opened to protect the employee in case of accidental release.
- GEI employees will not handle or attempt to open bulging containers. Employees will not stand upon or work from drums or containers. GEI will contract with a hazardous waste company to handle, manage, and dispose of a bulging drum.

1.4 Material Handling Equipment

Several types of equipment can be used to move drums: (1) a drum grappler attached to a hydraulic excavator; (2) a small front-end loader, which can be either loaded manually or equipped with a bucket sling; (3) a rough terrain forklift; (4) a roller conveyor equipped with solid rollers; and (5) drum carts designed specifically for drum handling. GEI employees will not operate heavy equipment to move drums. This will be handled by an authorized subcontractor.

The following procedures can be used to maximize worker safety during drum handling and movement:

- Train personnel in proper lifting and moving techniques to prevent back injuries.
- Make sure the vehicle selected has sufficient rated load capacity to handle the anticipated loads, and make sure the vehicle can operate smoothly on the available road surface.
- Air condition the cabs of vehicles to increase operator efficiency; protect the operator with heavy splash shields.
- Supply operators with appropriate respiratory PPE when needed. Normally either a combination SCBA/SAR with the air tank fastened to the vehicle, or an airline respirator, and an escape SCBA are used because of the high potential hazards of drum handling. This improves operator efficiency and provides protection in case the operator must abandon the equipment.
- Have overpacks ready before any attempt is made to move drums.
- Before moving anything, determine the most appropriate sequence in which the various drums and other containers should be moved. For example, small

containers may have to be removed first to permit heavy equipment to enter and move the drums.

- Exercise extreme caution in handling drums that are not intact and tightly sealed.

- Ensure that operators have a clear view of the roadway when carrying drums. Where necessary, have ground workers available to guide the operator's motion.

1.5 Leaking, Open, and Deteriorated Drums

If a drum containing a liquid cannot be moved without rupture, immediately transfer its contents to a sound drum using a pump designed for transferring that liquid. Contract an approved vendor to immediately use an over pack container if the:

- Leaking drum contains sludge or semi-solids;

- Open drum contains liquid or solid waste;

- Deteriorated drum can be moved without rupture.

1.6 Radioactive Wastes

GEI does not routinely handle or manage radioactive waste. If required to do so for a project, procedures will be approved by the Corporate Health and Safety Officer (CHSO) and Regional Health and Safety Officer (RHSO).

1.7 Shock-Sensitive Wastes

GEI employees will not handle shock-sensitive waste. Shock-sensitive waste or chemicals may explode with friction, movement or heat. Some chemicals are shock-sensitive by nature-, others become shock-sensitive through drying, decomposition, or slow reactions with oxygen, nitrogen, or the container. Some chemicals that are, or can, become shock-sensitive will have that hazard noted in the safety data sheet (SDS).

- Drums and containers containing packaged laboratory wastes will be considered to contain shock-sensitive or explosive materials until they have been characterized. *Caution: Shipping of shock-sensitive wastes may be prohibited under U.S. Department of Transportation regulations. Shippers will refer to 49 CFR 173.21 and 173.50.*

1.8 Laboratory Waste Packs

It is unlikely that GEI employees work in an environment where laboratory waste packs are used. However if one is found, do not handle or open it. Complete the incident reporting form to identify finding the pack and then work with the Project Manager to find the appropriate means of disposal.

1.9 Sampling of Drum and Container Contents

Sampling of containers and drums will be done in accordance with a site-specific sampling plan that will be developed in conjunction with a site-specific HASP.

1.10 Staging Areas

Drums and containers will be identified and classified prior to packaging for shipment. Drum or container staging areas will be kept to a minimum number as approved by the client to safely identify and classify materials and prepare them for transport. Staging areas will be provided with adequate access and egress routes. Bulking of hazardous wastes will be permitted only after a thorough characterization of the materials has been completed and approved by the Client. GEI employees will not sign manifests unless a written authorization agreement is in place with the Client.

1.11 Shipment and Training

Shipment of materials to off-site treatment, storage, or disposal facilities involves the entry of waste hauling vehicles into the site. U.S. Department of Transportation (DOT) regulations (49 CFR Parts 171-178) and EPA regulations (40 CFR Part 263) for shipment of wastes must be complied with. Employees managing hazardous waste on behalf of a client must complete annual RCRA training and triannual DOT hazardous materials training. Training must be current and a manifest agreement with the client must be in place before employees can sign hazardous waste manifests on behalf of a client.

1.12 Tank and Vault Procedures

GEI employees do not routinely sample vaults and tanks. Entry procedures will be coordinated and approved by the CHSO and RHSO.

1.13 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the

potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.14 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection and appropriate training must be current

1.15 References

OSHA 1910.120 Hazardous Waste Operations and Emergency Response (j) Handling of Drums and Containers

1.16 Attachment

None.

1.17 Contact

Health&SafetyTeam@geiconsultants.com

1.18 Review History

- June 2016
- May 2014
- November 2013
- October 2011
- Initial Version Date Unknown

STANDARD OPERATING PROCEDURE
HS-004 Driver Safety

1.1 Objective

GEI has implemented a Safe Driving Program to encourage safe driving habits and promote the ongoing safety of our staff and the communities where we work. For more information, refer to the Operation of Vehicles section of GEI's Employee Handbook.

This Standard Operating Procedure (SOP) provides requirements and recommendations to minimize the potential risks while operating or riding in a motor vehicle.

1.2 General

GEI employees will adhere to the following requirements when operating a vehicle while conducting business on behalf of GEI. These requirements apply to GEI-owned, rental, and personal vehicles used to conduct GEI business:

- Employees must maintain a valid and current driver's license.
- Employees using a personal vehicle for work-related travel must have proper insurance coverage that meets the requirements in the state in which they reside.
- Employees must wear their safety belt while in a moving vehicle.
- Vehicle incidents will be reported in accordance with GEI's Incident Reporting procedures (*refer to* GEI's Safety App for smart phones or the Safety page on the GEI intranet.).
- Vehicles will be properly maintained and safely operated (*refer to* GEI's Fleet Maintenance Program).
- Employees will follow safe driving behaviors, which include limiting distractions such as manipulating radios or other equipment that may cause a distraction. Employees should not exceed the posted speed limit and should maintain a safe distance between other vehicles.
- When parking a vehicle at a job site, the employee should position the vehicle in a manner which reduces or eliminates the need to operate the vehicle in reverse. It is recommended, a safety cone should be placed at the rear of the vehicle after parking the vehicle and be removed prior to moving the vehicle. This precautionary measure makes the employee aware of other vehicles, equipment, and structures within the backup radius of the vehicle.

When driving an unfamiliar vehicle (rental or GEI-owned), it is the driver's responsibility to orient themselves to the vehicle by:

- Walking around the vehicle to observe the condition of the vehicle and hazards that could be within the travel path.
- Becoming familiar with the size of the vehicle.
- Note if the vehicle has anti-lock braking system (ABS[1]).
- Adjusting mirrors (rear and side).
- Adjust seats to be situated as far back as safely practical, away from the air bag, located in the steering wheel.
- Becoming familiar with dashboard, center console, and steering controls.
- Locating the turn signals, windshield wipers, lights, emergency flashers, and the heating, air conditioning, and defrost controls.

1.3 Driving Defensively

Driving defensively means not only taking responsibility for oneself and actions but also keeping an eye on "the other guy." Good defensive drivers may be able to anticipate what the other driver will do next. GEI recommends the following guidelines to help reduce risks while driving:

- Do not start the vehicle until each passenger and any belongings are secured in the vehicle.
- Remember that driving above or below the speed limit can increase the likelihood of a collision.
- Be aware of impaired drivers; if a car is straddling the center line, weaving, making wide turns, stopping abruptly, or responding slowly to traffic signals, the driver may be impaired or using a cellular telephone. Avoid an impaired driver by turning right at the nearest corner or exiting at the nearest exit.
    - If it appears that an oncoming car is crossing into your lane, pull over to the roadside, sound the horn, and flash the headlights.
    - If an unsafe or suspicious driver is observed, notify the police.
- Follow the rules of the road. Do not contest the "right of way" or try to race another car during a merge. Always be respectful of other motorists.

[1] ABS is a mechanism that allows the wheels on a vehicle to maintain contact with the surface of the road, based on inputs from the driver (braking), to prevent the wheels from locking up (ceasing rotation) and to avoid an uncontrolled skid.

- Allow large vehicles, including tractor trailers, extra breaking distance, turning radius, and avoid traveling in the other driver's blind spots.
- Do not follow too closely. GEI employees should use a minimum of "3-second following distance."
- While driving, be cautious, aware, and responsible.
- Use extra caution, observe road signs, and reduce speed in construction areas and school zones.
- Always be aware of pedestrians, bicyclists, and motorcyclists.

1.4 Cellular Phone Use and Other Distractions

Refer to the *Portable Communication Device Use While Driving* section of the GEI Employee Handbook for GEI's policy on the use of cellular telephones while operating a vehicle.

1.5 Drugs and Alcohol

The use of illegal drugs or alcohol is prohibited when driving a vehicle on GEI business. Be aware of the side effects of prescription and over-the-counter medications which can impair an employee's ability to drive.

1.6 Adverse Driving Conditions

When operating a vehicle, its possible adverse driving conditions may be encountered. Below is a list of possible conditions and how they can be mitigated.

1.6.1 Driving at Night

Vision maybe limited at night due to impairment of the driver's depth perception, color recognition, and peripheral vision. Another factor adding danger to night or early morning driving is fatigue. Drowsiness makes driving more difficult by dulling concentration and slowing reaction time. Effective measures to minimize these hazards by preparing the car and following guidelines:

- Check the headlights to ensure they are properly aimed. If you notice the headlights are not properly aimed, report it to the Branch Manager, or if applicable the rental car agent. Misaimed headlights blind other drivers and reduce the driver's ability to see the road.
- In addition to the known hazards of consuming alcohol prior to driving, night driving can potentially be affected because the recovery rate of glare from headlights is prolonged. Thus reducing your ability to see.

- Smoking in GEI vehicles and rentals is not permitted. When driving a personal vehicle for business, avoid smoking while driving. Nicotine and carbon monoxide may hamper night vision.
- Observe driving safety as soon as the sun goes down. Twilight is one of the most difficult times to drive, because the eyes' pupils are constantly changing to adapt to the growing darkness Always use headlights at dusk and at dawn; lights will not help the driver see better in early twilight, but they will make it easier for other drivers to see your car. Drive at a speed that allows you to see the road that is within the headlights span. Driving in a manner that prevents you from seeing hazards as they are illuminated is known as overdriving the headlights; it may be necessary for the driver to reduce speed to be prepared to brake within the illuminated area of the headlights.
- If an oncoming vehicle does not lower beams from high to low, avoid glare by watching the right edge of the road and using it as a steering guide.
- The driver should make frequent stops for light snacks and exercise. If the driver is too tired to drive, stop in a safe area and get some rest.

1.6.2 Snow/Freezing Conditions

When snow and ice are present, be prepared by following these winter driving safety tips.

1.6.2.1 Prepare the Vehicle Before a Snowstorm

- Check under the hood and take a look at the vehicles cooling system. Make sure the vehicle contains adequate antifreeze and the hoses are in good condition.
- Test heaters and defrosters ahead of time to make sure they are in good working condition.
- Test the windshield wipers and check the condition of the wiper blades. If wipers leave streaks on the windshields, replace the blades at the next possible opportunity. Keep the receipt to expense the cost with GEI or with the car rental company.
- It is recommended that a windshield washer/antifreeze solution is used during winter conditions.
- Check the lights on the vehicle and periodically clear them of snow and dirt.
- Vehicle batteries need extra power in cold conditions. Make sure the battery's terminals are clean and cables are secure.
- Determine if the vehicle has a anti-lock brake (ABS) system.
- Keep the gas tank at least half-full in the winter to help avoid gas line freeze up.

1.6.2.2 Driving During and After a Snowstorm

- Wear sunglasses to aid in limiting reflection from snow.
- Be aware of blind spots created by snow banks.
- Be extra cautious of pedestrians and other vehicles in intersections.
- Allow extra time for braking and increase the distance between your car and the car immediately in front of the car.
- Reduce speed and do not exceed the posted limit.
- If the tires starts to lose traction, remove the foot off the gas and gradually reduce speed. Accelerate slowly once traction is regained.
- If the vehicle starts to skid, and does not have anti-lock brakes, steer into the skid. This will bring the back end of the car in line with the front. Avoid using the brakes. If the vehicle does have anti-lock brakes, firmly brake as you steer into the skid.

1.6.3 Driving In the Rain

To prevent losing control of the car on wet pavement, take these preventive measures.

- Prevent skids by driving slowly and carefully, especially on curves.
- Steer and brake with a light touch.
- When necessary to stop or slow, do not brake hard or lock the wheels.
- Maintain mild pressure on the brake pedal.

Skidding
If the car begins to skid, ease the foot off the gas, and carefully steer the car in the direction you want the front of the car to go. For cars without anti-lock brakes, avoid using the brakes. This procedure, known as "steering into the skid," will bring the back end of the car in line with the front. If the car has anti-lock brake systems (ABS), brake firmly as you steer into the skid.

Hydroplaning
Hydroplaning happens when the water in front of the tires builds up faster than the car's weight can push it out of the way. The water pressure causes the car to lose contact with the road surface and slide on a thin layer of water between the tires and the road. At this point, the car can be completely out of contact with the road, making it possible for the driver to skid or drift out of the lane, or even off the road.

To avoid hydroplaning, keep the tires properly inflated and maintain good tread on the tires. If tires need to be replaced on a company vehicle, notify the branch manager or their designee. Slow down when roads are wet, and stay away from puddles. Try to drive in the tire tracks left by the cars in front of the vehicle. If the car begins to hydroplane, do not brake or turn suddenly. This could throw the car into a skid. Ease the foot off the gas until the car slows; accelerate slowly once traction is regained. If braking is needed, do so gently with light pumping actions. If the car has ABS, brake normally; the car's computer will mimic a pumping action, as necessary.

If weather conditions worsen to the point where the driver is not comfortable driving, pull the vehicle over to a safe location until conditions improve. Do not drive during severe weather conditions. Do not attempt to drive on roads with standing water or that have been flooded. Find an alternate route if these conditions exist.

1.6.4 Off Road

If operation of a vehicle is required off public or private roads or in situations where four-wheel-drive vehicles are required, the appropriate vehicle for the situation will be used.

Be sure any gear or equipment is secured inside the vehicle so it doesn't bounce around while the vehicle is off-road.

- Know the underside of the vehicle. Look under the vehicle and learn where the lowest-hanging parts are located so they are not damaged.
- Scout tricky terrain on foot. Don't hesitate to get out of the vehicle to examine, up close, the terrain and soil conditions. And be sure to scout out what's on the other side of a hill ahead of time so there are no surprises.
- Drive cautiously. Drive, "as slow as possible, as fast as necessary." Remember to use the gears to efficiently manage engine power, braking, and torque.
- Create a mental picture. Look ahead and visualize the paths to the vehicle will travel. Follow those paths.
- Drive straight up and down hills. Avoid diagonal lines that put the vehicle in a situation where it might roll.

1.7 Driver Training

GEI employees are required to complete driver safety training every 3 years. This training is managed by the People Team and will be assigned through GEI's e-learning provider.

1.8 Injury Reporting

GEI employees will report incidents involving GEI personnel or subcontractor personnel, such as: lost time injuries, injuries requiring medical attention, near miss incidents, fires, fatalities, accidents involving the public, chemical spills, vehicle accidents, and property damage. The following steps must be followed when an incident occurs:

1. In life-threatening situations, immediately call 9-1-1.
2. Stop work activity to address any injury, illness, property damage, spill or other emergency.
3. **Immediately** report any incidents to your Supervisor/Project Manager and Regional Health & Safety Officer.
4. If your injury or illness is not life-threatening, call Medcor Triage at 1-800-775-5866 to speak with a medical professional.
5. Complete an Incident Report Form **immediately** after addressing the incident. Report forms are available on GEI's Safety App (for smart phones) and on the Safety page on the GEI intranet.

For vehicle accidents involving another vehicle or damage to property, the employee will take pictures of each vehicle or property involved in the incident and obtain a police report. In some municipalities police will not be dispatched to a non-injury accident, but every effort needs to be made to try and obtain the report.

1.8.1 Injury Triage Service

If a GEI employee experiences a work-related injury that is not life-threatening, the employee will initiate a call to Medcor Triage at 1-800-775-5866. The injured employee will detail any medical symptoms or complaints which will be evaluated by a Registered Nurse (RN) specially trained to perform telephonic triage. The RN will recommend first aid self-treatment or refer the injured employee for an off-site medical evaluation by a health professional at a clinic within GEI's workers compensation provider network. GEI employees are still required to follow our Accident Reporting procedures as listed above.

1.9 Limitations

Follow safety procedures as defined in the site-specific HASP.

1.10 References

National Safety Council
Oklahoma Safety Council
GEI Consultants, Inc. Employee Handbook

1.11 Attachments

None

1.12 Contact

SafetyTeam@geiconsultants.com

1.13 Review History

- December 2017
- November 2016
- May 2014
- November 2013
- January 2011

STANDARD OPERATING PROCEDURES

HS-005a Electrical Safety

1.1 Objective

Electrical hazards are typically the most serious physical hazards GEI employees encounter when working on or near an electric substation, conducting intrusive activities such as excavation or drilling, using powered hand tools, or working near overhead utilities. This Standard Operating Procedure (SOP) has been developed to minimize the potential for exposure to energized electrical equipment while performing work activities.

1.2 General

Employees who face a risk of electric shock will be trained and become familiar with electrically-related safety practices in the GEI annual Health and Safety training. This training will include safety-related work practices that pertain to their respective job assignments and minimum approach distances.

An activity hazard analysis conducted for the project scope of work will evaluate the potential for electrical shock and be incorporated in the site-specific health and safety plan (HASP). In addition, site-specific training will be conducted by the Project Manager or their designee to discuss the project electrical hazards and include a review of the HASP requirements.

Annual health and safety training will include review of this electrical safety SOP and GEI's lockout/tagout requirements. Retraining will be required when there is a change in job assignments; a change in the energy control procedures; or a new hazard is introduced. Retraining may also be conducted through the Project Safety Briefing and documented on the Project Safety Briefing form.

Safe work practices will be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts when work is performed near or on equipment or circuits that are or may be energized. Employees may not enter spaces containing exposed energized parts unless proper illumination, protective shields, protective barriers, or insulating materials (if necessary) are provided to enable employees to work safely. If portable ladders are needed near electrical equipment, they will have non-conductive side rails.

1.3 Personal Protection

Measures to mitigate exposure to overhead and subsurface electrical transmission and distribution lines should be adhered to at all times when working adjacent to electrical hazards. These measures include:

- Electrical Hazard (EH)-rated footwear and hardhat are required when working onsite. Additional personal protective equipment (PPE) may be needed as referenced in the site specific HASP.
- Avoid carrying tools/equipment above waist height if overhead electric hazards exist.
- Maintain the minimum approach distance (MAD) from bus bars, transformer/capacitor electrodes, and overhead transmission/distribution lines.
- Stop work immediately and vacate the work area in the event lightning is observed.

Measures of protection that should be adhered to within an active substation perimeter or if work adjacent to the substation perimeter consists of intrusive activities:

- Contact utility clearance agency at least 48 hours prior to any invasive activities for mark out of underground public utilities.
- Obtain the most recent as-built drawings of the transmission/distribution line layout from the client.
- Mark out of underground transmission/distribution lines by the client survey/mark out personnel if applicable.
- Conduct work under the supervision of the client's Health and Safety representative per client requirements.
- Conductive items such as jewelry or clothing containing metals will not be worn unless they are rendered non-conductive by insulating means such as covering or wrapping with materials that specifically rated as non-conductive, or other insulating means.
- Use hand digging tools specifically designed for use on substation property (i.e., insulated digging bar, long-handled spoon shovel, etc.). In addition, rubber gloves and fire-resistant clothing are required if hand digging in a substation.
- Use insulated lineman's gloves when handling equipment that may come into contact with electrical utilities.
- EH-rated footwear is required when working onsite.
- Flame resistant clothing that meets National Fire Protection Association (NFPA) 70E standards is to be worn.

- Avoid carrying tools/equipment above waist height if overhead electric hazards exist.
- Ground vehicles or equipment **within the substation perimeter** using 4-aught gauge grounding cable. Adhere to specific client or site requirement for grounding.
- Maintain a minimum clearances on substations in accordance with 29 CFR 1910.333 and NFPA 70E standards when working near energized equipment.
- Maintain a minimum offset of 3 feet from marked underground transmission/distribution lines.
- Avoid working within or outside of a substations in conditions of high humidity, rain, or thunderstorms.
- Stop work immediately and vacate the work area in the event lightning is observed.

1.3.1 Minimum Approach Distance

According to OSHA, the MAD is "…the closest distance an employee is permitted to approach an energized or grounded object." MADs ensure that employees do not approach or take any conductive object closer to energized equipment than the allowed distances. All GEI employees conducting work onsite must follow the MADs shown below:

Nominal Voltage in Kilovolts	Minimum Approach Distance: Phase to Ground Exposure
0.05 to 1.0	Avoid Contact
1.1 to 15.0	2'1"
15.1 to 36.0	2'4"
36.1 to 46.0	2'7"
46.1 to 72.5	3'
72.6 to 121	3'2"
138 to 145	3'7"
161 to 169	4'
230 to 242	5'3"
345 to 362	8'6"
500 to 550	11'3"
764 to 800	14'11"

Reference: Table R-6 in OSHA regulation CFR 1910.269 (l) (10)

Unqualified employees must maintain a 10-foot distance from all electrical sources. Vehicular and mechanical equipment will also maintain minimum clearance distances of 10 feet.

Site personnel will assume that all electrical equipment at surface, subsurface, and overhead locations are energized until the equipment has been designated as de-energized by a client representative. Client representatives will be responsible for de-energizing and lockout/tagout of all electrical equipment. If the equipment cannot be de-energized, work will stop and the GEI Field Representative and/or the Site Safety Officer (SSO) will consult with the Project Manager and CHSO. GEI will notify the client prior to working adjacent to this equipment, and will verify that the equipment is energized or de-energized in the vicinity of the project area.

All power lines that have been indicated by the client to be de-energized must be locked out by the client or their representative, such that the lines cannot be energized when personnel are working near them. The lines will not be unlocked and re-energized until GEI notifies the client that they have completed work in the area and that all personnel are clear of the area. The client representatives will thoroughly familiarize GEI personnel with site-specific lockout/tagout procedures during the site orientation. Conductors and parts of electrical equipment that have been de-energized, but not been locked or tagged out, shall be treated as live/energized. Only qualified persons may work on electric circuit parts or equipment that has not been de-energized. Such persons will be made familiar with the use of special precautionary techniques, PPE, insulating and shielding materials, and insulated tools.

If power lines cannot be de-energized, the SSO will consult with the client to discuss how to proceed. Work tasks will only commence after determining that a safe working distance (MAD) can be maintained and all personnel working in the area have been informed of the limitation. All work performed within the substation boundaries requires the use of task-specific PPE as described in the HASP.

GEI will verify that the contractor or subcontractor has located and marked all electric, gas, water, steam, sewer, and other utility service lines before any intrusive work is started. In each case, any utility company that is involved should be notified in advance by the contractor, and its approval or services will be obtained, if necessary.

1.3.2 Ground-Fault Circuit Interrupters (GFCI)

GEI employees will use approved ground-fault circuit interrupters for personnel protection when using electrical tools and equipment. Equipment will be plugged into receptacles protected by a GFCI, extension cords with built-in GFCIs, or a GFCI adapter is to be used.

1.3.3 Equipment Inspection

Each extension cord, plug and receptacle, and any equipment connected by the cord and plug, will be visually inspected before each day's use for external defects, such as deformed or missing pins or insulation damage, and for indications of possible internal damage. Each receptacle and plug will be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor will be connected to its proper terminal.

Inspection of equipment will be performed before first use; before equipment is returned to service following any repairs; before equipment is used after any incident which can be reasonably suspected to have caused damage (e.g., when an extension cord is run over), and at intervals not to exceed 3 months. Cords and receptacles which are fixed and not exposed to damage will be tested at intervals not exceeding 6 months. Equipment found damaged or defective will not be used and will be properly tagged as "Out of Service"; notify the Branch Manager so that the equipment can be replaced or repaired. If the equipment cannot be repaired it will be disposed of properly.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or supervisor/project manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

- Follow safety procedures as defined in the site-specific HASP at all times.
- If lockout/tagout procedures are going to be performed by GEI employees or GEI subcontractors, the specific procedure will be reviewed with the CHSO and the RHSO.

1.6 References

OSHA 29 CFR 1910.147 Appendix A – The control of hazardous energy (lockout/tagout)

1.7 Attachments

None

1.8 Contact

Health&Safetyteam@geiconsultants.com

1.9 Review History

- February 2017
- May 2014
- October 2011
- August 2010 (Titled Lock Out/Tag Out)

STANDARD OPERATING PROCEDURES

SOP No. HS-006 Excavations and Trenches

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to highlight the hazards and safety procedures when work activities include excavations and/or trenches. The following guidelines will be followed when excavations or trenches are present on GEI projects.

1.2 General

This SOP is intended for use by employees engaged in work on project sites that include trenching and/or excavation operations. The site-specific health and safety plan (HASP) must include a hazard assessment for the project that identifies the potential for trenching and excavation hazards and the control methods to be implemented by GEI employees. These hazards must be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

An “excavation” is any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.

A “trench” (trench excavation) is a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet.

Do not enter a trench or excavation without consulting with the Project Manager, Corporate Health and Safety Officer (CHSO), or Regional Health and Safety Officer (RHSO).

1.2.1 Personal Protective Equipment

Employees will be provided with the personal protective equipment (PPE) necessary to help protect them from the hazards of work activities related to excavations and/or trenches. All employees will wear a hard hat, steel toe or composite toe boots, and safety glasses at a minimum. In addition, face shields, gloves, fall protection and hearing protection may be required. PPE must be maintained in good condition, kept clean and properly stored when not in use. More information regarding PPE is located in Section 6 of GEI’s Corporate Health and Safety Program.

1.3 Hazards

Hazards associated with excavations and trenches can include collapse, falls, falling objects, hazardous atmospheres, and incidents involving mobile equipment. One cubic yard of soil can weigh as much as a car.

1.4 Entry

GEI employees will not enter trenches or excavations that do not comply with OSHA 29 CFR 1926.650. If a project requires GEI employees to enter a trench or excavation, the trench or excavation must meet the following requirements described in the following sections.

Do not enter a trench or excavation without consulting with the Project Manager, Corporate Health and Safety Officer (CHSO), or Regional Health and Safety Officer (RHSO).

1.4.1 Competent Person

The excavation must be inspected prior to the start of each shift by a competent person who most likely will work for the contactor performing the work. The competent person is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to workers, soil types and protective systems required, and who is authorized to take prompt corrective measures to eliminate these hazards and conditions. GEI generally does not act as the competent person.

1.4.2 Soil Type

The competent person for the project will determine what the soil type is and what type of protective system will be implemented. The type of soil where the excavation or trench is being dug has significant influence on what type of protective system will need to be in place. There are four types of soil: stable rock, type A, type B, and type C. As you progress from stable rock to type C, the cohesive properties of the soil change the soil becomes less stable.

1.4.3 Protective System

A protective system is required for trenches or excavations greater than 5 feet in depth unless the excavation is made entirely in stable rock. In special situations the competent person may require a protection system for an excavation that is less than 5 feet deep. The competent person is responsible for assessing the soil type and the protective systems required for a specific trench when an excavation is less than 20 feet deep. If the excavation is greater than 20 feet in depth, the protection system requires a design by a registered professional engineer or based on tabulated data prepared and/or approved by a registered professional engineer.

The protective system will be designed based on soil type, depth of excavation, water level, loads adjacent to the excavation, changes in weather conditions, or other operations in the area. Protective systems can include sloping or benching of the sidewalls, shoring the sidewalls using an approved support system, or shielding workers with a trench box or other similar type of support.

The different types of protective systems include:

Benching is a method of protecting workers from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels of steps, usually with vertical or near vertical surfaces between levels. Benching cannot be done with Type C soil.

Sloping involves cutting back the trench wall at an angle inclined away from the excavation.

Shoring requires installing aluminum hydraulic or other types of support structures to prevent soil movement and cave-ins.

Shielding protects workers by using trench boxes or other types of supports to prevent soil cave-ins.

Designing a protective system can be complex because many factors must be considered: soil classification, depth of cut, water content of soil, changes caused by weather or climate, surcharge loads (e.g., spoil, other materials to be used in the trench) and other operations in the vicinity.

1.4.4 Access and Egress

Excavations and trenches greater than 4 feet in depth require a safe access and egress including ladders, steps, or ramps. These points of access and egress are to be no greater than 25 feet of lateral travel in any direction.

1.4.5 Atmospheric Hazards

Where oxygen deficiency (atmospheres containing less than 20.7% oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation will be tested before employees enter excavation.

1.5 Subcontractor Oversight

When GEI is overseeing excavation activities performed by a subcontractor, the following safety hazards should be monitored:

- Care must be taken not to create new hazards like narrow walkways along edges of an excavation.
- Heavy equipment must not be parked or working at the edge of the excavation.
- Spoils should not be stockpiled within 2 feet of the trench edges.
- Confirm with subcontractor that underground utilities have been located before any excavation or trenching activities begin (*refer to* SOP HS-014 Utility Mark-out).
- Confirm with the subcontractor that the excavation or trench has been tested for hazardous atmospheres before entering.
- Confirm with the subcontractor that the excavation or trench has been inspected by a competent person before each work shift and after any type of precipitation. If hazards are identified during this inspection, verify that the hazards are controlled prior to entering the trench or excavation.
- GEI employees will not work under raised or suspended loads.
- Excavations/trenches must be protected at the end of a work shift if they are to be left open. These trenches/excavations must be covered and a sign that reads "Hole" must be placed in a location that will notify anyone of the hazard. Or a secure barricade will need to be installed.

In circumstances where GEI employees are working on sites where a contractual agreement with the excavation contractor does not exist and we cannot confirm the above stated conditions, entry into trenches or excavations will not be conducted. Any safety concerns that arise should be communicated to the Project Manager and, if necessary, the client.

1.6 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened.

The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.7 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

Some states, including Massachusetts, require a trench permit prior to trenching or excavation activities. Verification of local requirements will be evaluated in the planning stage.

1.8 References

OSHA 29 CFR 1926.650 – Subpart P; *Excavations*
OSHA Construction eTool – http://www.osha.gov/SLTC/etools/construction/index.html
OSHA FactSheet Trenching and Excavation Safety – viewed on 9/13/2016
https://www.osha.gov/OshDoc/data_Hurricane_Facts/trench_excavation_fs.pdf

1.9 Attachments

None

1.10 Contact

Health&SafetyTeam@geiconsultants.com

1.11 Review History

- September 2016
- May 2014
- November 2013
- January 2011
- Initial Version Date Unknown

STANDARD OPERATING PROCEDURES

SOP No. HS-008a Non-Powered Hand Tools

1.1 Objective

This Standard Operating Procedure (SOP) is intended for use by employees working with non-powered hand tools. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the hazards associated with the non-powered hand tools that will be used. These hazards should be reviewed during the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

Misuse of hand tools accounts for the majority of accidents and injuries involving hand tools. Only use a tool for the task which it was designed for. If the right tool isn't available contact the Project Manager and discuss what is needed. Improper maintenance is another leading cause of injuries. Employees using hand tools may be exposed to a number of other potentially serious hazards: falling objects (i.e., objects can fall as a result of contact with tools or objects which are abrasive or splash), harmful dust, fumes mists, vapors, and gases, as well as contact with electrical power sources.

1.2.1 Condition of Tools

All hand tools, whether furnished by GEI or the employee, will be maintained in safe working condition. All hand tools must be inspected before use. Never use a tool if its handle has splinters, burrs, cracks, splits or if the head of the tool is loose. Never use impact tools such as hammers, chisels, punches or steel stakes having mushroomed (flattened) heads. Tag worn, damaged or defective tools "Out of Service" and do not use them; notify your Branch Manager or Project Manager so that the tool can be replaced or repaired. If the tools cannot be repaired they will be disposed of properly. GEI does not issue or permit the use of unsafe hand tools.

1.2.2 Personal Protective Equipment

Employees using hand tools will be provided with the personal protective equipment (PPE) necessary to protect them from the hazard of the tool as well as the associated hazards with using the tool. (i.e., projectile debris, dust, etc.). <u>All employees will wear work gloves, steel toe or composite toe boots, and safety glasses at a minimum</u>. In addition, face shields and hearing protection may be required. Most hand injures can be avoided with the proper use of PPE. PPE must be maintained in good condition, kept clean and properly stored when not in use. More information regarding PPE is located in Section 6 of GEI's Corporate Health and Safety Program.

1.2.3 General Safe Practices

Never wear sandals, open-toed or canvas shoes when working with tools. Always tie back long hair. Avoid loose-fitting clothes which might become entangled in a tool. Always remove rings and other jewelry. Make sure your grip and footing are secure when using large tools. Never carry tools up ladders; use a tool belt, hoist, or a rope. Use extra caution when using tools at heights – a falling tool could kill a co-worker. Always pass a tool to another person by the handle – never toss it to them. Never use a tool with hands are wet, oily, or greasy. Select ergonomically-designed tools for work tasks when movements are repetitive and forceful. Always make sure observers are at a safe distance. Always secure work with a vice, clamp, or other support.

1.3 Non-Power Hand Tools

Non-powered hand tools include anything from axes to wrenches. Even though the tool is powered by human inertia, injuries from improper use of non-powered hand tools often involve severe disabilities.

1.3.1 Knives

Only use a knife with a sharpened blade. Pull the knife through the object and away from your body; pulling motions are easier to manage. Never use a knife if its handle has splinters, burrs, cracks, splits or if the blade is loose. Knives should never be used as screwdrivers, pry bars, or can openers. Never pick up knives by their blades. Always carry knives with their tips/points toward the floor. Never carry knives, scissors, or other sharp tools in pockets. Never attempt to catch a falling knife. When not in use, knives should be stored in sheaths. Box cutters will be self-retracting.

1.3.2 Wrenches

Never use wrenches that are bent, cracked, badly chipped, or having loose or broken handles. Discard any wrench with spread or battered jaws; if the handle is bent; or if a wrench has broken or battered points and notify your Branch Manager so that a replacement can be made. Never slip a pipe over a single head wrench handle to increase leverage. Never use a shim to make a wrench fit. Pull on a wrench using a slow, steady motion. Do not use push force on a wrench; you could lose your balance if the wrench slips.

1.3.3 Screwdrivers

Always match the size and type of screwdriver blade to fit the head of the screw. Do not hold the work piece against your body while using a screwdriver. Never put your fingers near the tip of a screwdriver when tightening a screw. Never use a screwdriver to make a starting hole for screws. Never use a screwdriver as a chisel, pry bar, or nail puller. When performing electrical work, always use an insulated screwdriver. Never use a screwdriver to test the charge of a battery.

1.3.4 Hammers

Never use a hammer if your hands are oily, greasy or wet. Always check behind you before swinging a hammer. Use a claw hammer for pulling nails. Never strike nails or other objects with the "cheek" of the hammer. Do not strike a hardened steel surface, such as a cold chisel, with a claw hammer. Never strike one hammer against another hammer. Never use a hammer as a wedge or a pry bar.

1.3.5 Pliers

Never use pliers which are cracked, broken, or sprung. Never use pliers as a wrench or a hammer. Do not attempt to force pliers by using a hammer on them. Never slip a pipe over the handles of pliers to increase leverage. When performing electrical work, always use insulated pliers. When using diagonal cutting pliers, shield loose pieces of cut material from flying into the air by using a cloth or your gloved hand.

1.3.6 Snips

Never use snips as a hammer, screwdriver, or pry bar. Always wear safety glasses or safety goggles when using snips to cut materials. Always wear work gloves when cutting materials with snips. Keep the blade aligned by tightening the nut and bolt of the snips. Never use straight cut snips to cut curves. Always use the locking clip on the snips when you have finished using them. Never leave or store snips in the open position.

1.3.7 Hand Saws

Always keep handsaws sharp and free of rust to prevent them from binding or jumping. Never carry a saw by the blade. Always hold the work piece firmly against a work table. Keep control of saws by releasing downward pressure at the end of the stroke. Never use an adjustable blade saw such as a hacksaw, coping saw, keyhole saw, or bow saw, if the blade is not taut. Oil saw blades after each use. Never force the saw through the cut as this may cause the saw to buckle or fly out of the groove and cause injury.

1.3.8 Chisels

Only use sharpened chisels. Never use chisels having mushroomed (flattened) striking heads. Whenever possible, hold a chisel by using a tool holder. Clamp small work pieces in a vise and chip towards the stationary jaw of the vise. Chip or cut away from yourself and keep both hands in back of the cutting edge. Always wear safety glasses or a face shield.

1.3.9 Vise and Clamps

Never use a vise having worn or broken jaw inserts, or having cracks or fractures in the body of the vise. Position the work piece in the vise so the entire face of the jaw supports the work piece. When clamping a long work piece in a vise, support the far end of the work piece by using an adjustable pipe stand or saw horse. Never slip a pipe over the handle of a vise to increase leverage. Never use a C-clamp for hoisting materials. Never use a C-clamp as a permanent fastening device.

1.3.10 Jacks

A manufacture's rated capacity must be clearly marked on all jacks and all jacks must have a stop indicator. When using a jack, never exceed the capacity of the stop indicator. Jacks should be lubricated and inspected regularly. When setting up a jack, ensure the base is centered on a firm, level surface. The jack head should also be placed against a level surface. Lift force should be applied evenly. Put a block under the base of the jack when the foundation is not firm. If it seems likely the cap could slip, place a block between the jack cap and load. Immediately block the load after it is lifted.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or supervisor/project manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

Follow safety procedures as defined in the site-specific HASP or in the manufacturer's specifications. Appropriate PPE must be worn correctly to provide the intended level of protection. If a hand tool is being used that is not identified in this SOP consult the manufacturer's literature and contact the Safety Team so we can include the information in a future version of this SOP.

1.6 References

OSHA Standards for the Construction Industry, Subpart I
Risk Analytics, LLC Hand Tools Training, 2006

1.7 Attachments

None

1.8 Contact

Health&SafetyTeam@geiconsultants.com

1.9 Review History

- July 2016
- May 2014
- August 2011
- October 2010
- One revision date unable to be found

STANDARD OPERATING PROCEDURES

SOP No. HS-008b Powered Hand Tools

1.1 Objective

This Standard Operating Procedure (SOP) is intended for use by employees working with powered hand tools. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the hazards associated with the powered hand tools that will be used. These hazards should be reviewed during the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

Misuse of hand tools accounts for the majority of accidents and injuries involving hand tools. Only operate power tools according the manufacturer's instructions. Employees using power tools may be exposed to a number of potentially serious hazards including being hit by flying material from the work piece; hit by a flying part of a broken tool; explosion or fire resulting from sparks from a tool igniting combustible materials; electric shock from a broken tool, frayed or defective power cord, or improper grounding; exposure to harmful dust, fumes mists, vapors, and gases. Hazards are usually caused by misuse, improper maintenance, improper or inefficient training, and complacency.

1.2.1 Condition of Tools

All hand tools, whether furnished by GEI or the employee, will be maintained in safe working condition with regular maintenance. Always inspect each tool, as well as power cords and attachments, for damage before use. Make sure the power is off and locked out before inspecting. Insure the tool guards are in place and functioning. Ensure that blades, bits, and other attachments are securely fastened. Tag worn, damaged, or defective tools "Out of Service" and do not use them; notify your Branch Manager or Project Manager so that the tool can be replaced or repaired. If the tools cannot be repaired they will be disposed of properly. GEI does not issue or permit the use of unsafe hand tools.

1.2.2 Personal Protective Equipment

Employees using hand tools will be provided with the personal protective equipment (PPE) necessary to help protect them from the hazards of the tool as well as the associated hazards with using the tool. (i.e., projectile debris, dust, etc.). All employees will wear work gloves, steel toe or composite toe boots, and safety glasses at a minimum. In addition, face shields and hearing protection may be required. Most hand injures can be avoided with the proper use of PPE. PPE must be maintained in good condition, kept clean and properly stored when not in use. More information regarding PPE is located in Section 6 of GEI's Corporate Health and Safety Program.

1.2.3 General Safe Practices

Never wear sandals, open-toed or canvas shoes when working with tools. Always tie back long hair. Avoid loose-fitting clothes which might become entangled in a tool. Always remove rings and other jewelry. Never use a tool without its guard in place. Make sure your grip and footing are secure when using large tools. Never carry tools up ladders; use a tool belt, hoist, or a rope. Use extra caution when using tools at heights – a falling tool could kill a co-worker. Always pass a tool to another person by the handle – never toss it to them. Select ergonomically-designed tools for work tasks when movements are repetitive and forceful. Always make sure observers are at a safe distance. Always secure work with a vice, clamp, or other support. Moving work surfaces can cause the tool to "kick back." Use extra caution when using power tools around flammable materials. Use fire curtains when appropriate and keep a properly charged fire extinguisher within a reasonable distance. Never surprise someone using a power tool. Check above, underneath, and behind solid surfaces if possible, to make sure it's safe to proceed and there isn't another person working on the other side.

1.2.4 Guarding

When power tools are designed to accommodate guards, they will be equipped with such guards prior to, and at all times during use. All guards will be in good condition and be adequate to provide protection to the employee. Regulations stipulate that the following parts of a power tool must be guarded: gears, sprockets, chain drives, belts, pulleys, drums, revolving or reciprocating parts, exposed shafts and projecting shaft ends, collars, clutches, and couplings.

1.2.5 Safety Switches

Safety switches allow the tool to be turned "off" quickly. Hand-held power tools must be equipped with a positive on-off, a momentary on-off, or a constant pressure switch. A positive on-off is a standard on-off switch. Platen sanders, disc sanders, scroll saws, and grinders with less than 2-inch-diameter discs may have a standard on-off switch. A momentary on-off can be turned "off" by a single motion of the same finger or fingers that turn it on. Drills, reciprocating and saber saws, grinders, and belt sanders may have a momentary on-off switch. A constant pressure switch shuts off power upon release. Circular saws and chain saws may have a constant pressure switch. Always test switch to insure it is functioning properly.

1.2.6 Blind Operations

A "blind" operation is any circumstance using any type of saw, drill, or other cutting or penetrating tool where you can't see behind what is being cut. When making a blind cut or drilling operation, be sure that hidden electrical wiring, water pipes, or any mechanical hazards are not in the blade path. If wires are present, they must be disconnected at the power source by a qualified person or avoided. Contact with live wires could cause lethal shock or fire. Water pipes should be drained and capped. Always hold the tool by the insulated grasping surfaces.

1.2.7 Kickback

Kickback is a sudden, uncontrolled reaction to a pinched blade, causing the tool to lift up and out of the work piece toward the operator. Misuse, buildup of sap or dirt on the blade, insufficient *set*, dullness, and unguided cuts, can all cause kickback. Avoid kickback by keeping saw blades sharp, having proper amount of *set* in the teeth, keeping saw blades clean, and support large panels so they will not pinch the blade. Set blade depth to no more than 1/4 inch greater than the thickness of the material being cut. Release the switch immediately if the blade binds or the saw stalls.

1.2.8 Power Tool Accessories

The choice of a wrong accessory or incorrect use can result in serious injury. Read and understand the recommendations in the owner/operators manual for the tool and the accessory literature. Don't use an accessory or attachment unless: the power tool manufacturer recommends its use on their product; the accessory's limitations and specifications match the limitations and specification of the power tool; the use of the accessory does not require the removal of any guards; and you understand the instructions that describe the safe use of the accessory or attachment. Always unplug tools before installing, adjusting, and changing any accessory or attachment of any kind.

1.3 Types of Power-Operated Hand Tools

Power tools include electric, battery-powered, liquid fuel, hydraulic, pneumatic (air), and powder-actuated. Power tools operate at high speeds; when things go wrong, it happens fast.

1.3.1 Electric Power-Operated – Corded

Electric power-operated tools that use a cord will either be double-insulated type or have a three-wire cord plugged into a grounded receptacle, grounded according to Occupational Safety and Health Administration (OSHA) regulations. A ground fault circuit interrupter (GFCI) will be used between the power operated tool and the power source. Test the GFCI before each use and use a portable GFCI if necessary. Power tools should always be stored in a dry place when not in use. Never use a tool in wet/damp conditions unless designed to be used in such an environment. Never carry power tools by the cord or yank the cord to disconnect it. Always keep tools and cords away from heat, oil, and sharp edges. Always disconnect power tools when not in use and when changing accessories such as blades and bits.

1.3.2 Electric Power-Operated – Battery (Cordless)

Electric power-operated tools that run on batteries should be charged in a dry location and away from all combustible materials. Do no operate cordless tools in or near flammable liquids or explosive atmospheres. Motors in these tools may spark and ignite fumes. Always recharge a cordless tool and its battery with its own specified charging unit. Never attempt to recharge a cordless tool in a recharging unit not specifically recommended for that tool. Remove batteries or lock the switch in its “OFF” position before changing accessories, adjusting or cleaning tools. This removes the power supply while hands are in vulnerable

locations such as near switches, bits, or blades. Do not store the battery pack in a container with metal objects such as wire, nails, or coins as it could short the battery. Do not expose the battery pack to moisture, frost, or temperature extremes of over 110 degrees Fahrenheit or under -20 degrees Fahrenheit.

1.3.3 Liquid Fuel Power Tools

Liquid fuel power tools will be stopped, turned "off," and cooled while being refueled, serviced, or maintained. Fuel will be transported, handled, and stored in accordance with federal regulations. Safety Data Sheets (SDS) for fuel or chemicals will be accessible during use of the tools. The tool must be used in a well-ventilated area as the carbon monoxide generated can displace or deplete oxygen. Before refilling a fueled powered tool fuel tank, shut down the engine and allow it to cool as fuel fumes, combined with the heat from the tool, can cause an explosion. Use only Type 1 or Type 2 approved flammable liquid containers. Properly clean any spills from the refueling process.

1.3.4 Hydraulic Power Tools

The fluid used in hydraulic power tools will be fire-resistant and approved for use with the hydraulic powered tool as specified by the manufacturer. The purpose of the specialized fluid is to allow the tool to be safely used in extreme temperatures."

1.3.5 Pneumatic Power Tools

Pneumatic (air) power tools will be properly maintained and operated according to the manufacturer's safe operating procedures. Make sure air hose connections are secure. Use a short wire or positive locking coupler to attach the air hose to the tool. Check hoses regularly for cuts, bulges, and abrasions (tag and replace if defective). Ensure the safety clip for attachments is installed and secure. Ensure the muzzle is in contact with the surface. Never point the tool at anyone. Avoid using on easily penetrated materials unless they are backed by material that will prevent fastener from passing through. Don't drive fasteners into very hard or brittle material that could chip, splatter, or make the fasteners ricochet. Avoid using compressed air for cleaning.

1.3.6 Powder-Actuated Tools

Only employees who have been trained in the operation of the particular tool in use will be allowed to operate a power-actuated tool. Never use in an explosive or flammable atmosphere. Never load the tool unless it will be used immediately. Never leave a loaded tool unattended. Never point the tool at anyone. Always keep hands and feet clear of the barrel end. Always select a powder level that will do the work without excessive force. Avoid using on easily penetrated materials unless they are backed by material that will prevent fastener from passing through. Don't drive fasteners into very hard or brittle material that could chip, splatter, or make the fasteners ricochet.

1.4 Powered Hand Tools

1.4.1 Drills

Be sure the trigger switch actuates properly. If equipped with a lock-on, be sure it releases freely. Be sure the chuck is tightly secured to the spindle. Tighten the drill bit securely as prescribed by the manual. Check auxiliary handles to be sure they are securely installed. Never force a drill; apply only enough pressure to keep the drill bit cutting smoothly. If the drill binds in the work, release the trigger immediately. Unplug the drill from the power source and then remove the bit from the work piece. Never attempt to free a jammed bit by starting and stopping the drill. Review the manufacture's manual for how to unjam the equipment. Unplug the tool before changing bits, accessories, or attachments.

1.4.2 Saws

Circular Saws

Always use sharp blades. Dull blades can cause binding, stalling, and possible kickback. Check blades carefully before each use for proper alignment and possible defects. Be sure all cords are out of the blade path and are sufficiently long to freely complete the cut. Clamp materials whenever possible. Never hold a work piece in your hand when sawing.

Set blade depth to no more than 1/4 inch greater than the thickness of the material being cut. Always allow the blade to reach full speed before the work piece is contacted. Never overreach and never reach under the saw or work piece. Never use a circular saw for cutting logs or roots, trimming trees, or shrubs.

Reciprocating Saws

Always use sharp blades. Dull blades cause binding, stalling, and possible kickback. Only use the blade specifically recommended for the job being done. Be sure all cords are out of the blade path and are sufficiently long to freely complete the cut. Position yourself to maintain full control of the tool and avoid cutting above shoulder height. The work piece must be clamped securely and the shoe of the saw held firmly against the work. When making anything other than a through cut, allow the tool to come to a complete stop before removing the blade from the work piece. Remember that the blade and blade clamp may be hot immediately after cutting. Avoid contact until they have cooled.

Jig/Saber Saws

Check that the blades are secured in position before plugging in. Make sure the cord is not in the line of cut. Firmly position the tool's base plate/shoe on the work piece before turning on the tool. Keep your hands and fingers well clear of moving parts. After making partial cuts, turn "off" and remove the blade from the work piece only after the blade has fully stopped. Maintain firm contact between the base and the material being cut, throughout cutting procedures. Remember that the blade and blade clamp may be hot immediately after cutting. Keep your hands away until cooled down and never overreach.

1.4.3 Abrasive Wheels and Tools

Sanders

Sanding dust can be highly explosive if the concentration becomes too great. Ensure the work area has adequate ventilation. Always use of exhaust type systems or bag collection. Check the power supply to be sure the switch and switch lock are in the "off" position. Always use the appropriate size disk or belt. Use jigs or fixtures to hold your work piece whenever possible. When sanding, always be aware of the cord location.

Never force a sander – the weight of the tool applies adequate pressure. Do not expose the tool to liquids, or to use in wet locations. When adjusting the tracking of the belt, be certain to avoid accidental contact with yourself or other objects.

Grinders

Test grinding wheels before mounting by tapping the wheel lightly with a nonmetallic implement. If it produces a ringing sound, it is in good condition. If it sounds dull, replace the wheel, Never use a cracked wheel. Use only those wheels and discs marked with a rated speed at or above the speed rating on the nameplate of the tool. Never operate a grinder without the proper guards in place. Always allow the wheel to come up to full speed before you contact the work piece. Do not apply excessive pressure to the wheel or disc. Use grinding wheels when working with hard materials, and use rotary files for soft materials such as aluminum, brass, copper, and wood. Using grinding wheels on soft materials will excessively load the wheel and could cause the wheel to shatter or disintegrate.

Power

Grinding machines will be supplied with sufficient power to maintain the spindle speed at safe levels under all conditions of normal operations. Follow manufacturer recommendations for sufficient power supply.

Guarding

Grinding machines will be equipped with safety guards in conformance with the requirements of the American National Standards Institute (ANSI) B7.1-1970.

Routers

Always disconnect the plug from the electrical outlet before changing bits or making any adjustments. Install router bits securely. Make certain that the cutter shaft is engaged in the collet at least ½-inch. Always face the cutter blade opening away from your body. The switch should be in the “off” position before plugging into the power outlet. Always allow the motor to reach full speed before feeding the router into the work. Never attempt to remove debris while the router is operating. Secure clamping devices on the work piece before operating router. When removing a router from your work piece, always be very careful not to turn the base and bit toward you.

1.4.4 Woodworking Tools

Disconnect Switches

Fixed power driven woodworking tools will be provided with a disconnect switch that can either be locked or tagged in the "off" position.

Speeds

The operating speed will be etched or otherwise permanently marked on all circular saws over 20 inches in diameter or operating at over 10,000 peripheral feet per minute. Blades used on these types of saws must be rated to operate at or below the operating speed of the saw.

Self-feed

Automatic feeding devices will be installed on machines whenever the nature of the work will permit. Feeder attachments will have the feed rolls or other moving parts covered or guarded so as to protect the operator from hazardous points.

Guarding

Portable, power-driven circular saws will be equipped with guards above and below the base plate or shoe.

Personal Protective Equipment

Project-specific PPE will be identified in the HASP based on the hazards present during work tasks. Required PPE must be worn when operating power tools. More information regarding PPE is located in Section 6 of GEI's Health and Safety Program.

Other Requirements

Woodworking tools and machinery will meet other applicable requirements of ANSI 01.1-1961, Safety Code for Woodworking Machinery.

1.4.5 Jacks – Lever and Ratchet, Screw, and Hydraulic

General Requirements

The manufacturer's rated capacity will be legibly marked on all jacks and will not be exceeded. All jacks will have a positive stop to prevent over-travel.

Blocking

When the working area does not have a solid working surface and it is necessary to provide a firm foundation, the base of the jack will be blocked or cribbed.

Operation and Maintenance

Hydraulic jacks exposed to freezing temperatures will be supplied with adequate antifreeze liquid. Jacks will be properly lubricated at regular intervals. Jacks will be thoroughly inspected, before each use. Repair or replacement parts will be examined for possible defects. Tag worn, damaged or defective jacks "Out of Service" and do not use them; notify your

Branch Manager so that the jack can be replaced or repaired. Parts subjected to wear will be inspected on a regular basis and repaired or replaced as needed.

1.5 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.6 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection. Read and understand the recommendations in the owner/operators manual for the tool, and the accessory literature.

1.7 References

OSHA Standards for the Construction Industry, Subpart I

Risk Analytics Power Tool Safety Training, 2006

1.8 Attachments

None

1.9 Contact

Health&SafetyTeam@geiconsultants.com

1.10 Review History

- July 2016
- May 2015 – Separated from SOP HS-008

STANDARD OPERATING PROCEDURES

SOP NO. HS-009 Hazardous Substances Exposure Management

1.1 Objective

This Standard Operating Procedure (SOP) is intended to outline the steps GEI employees will take to identify potential hazards associated with exposure to hazardous substances, the risks associated with these hazards, and the proper controls to use to minimize exposure. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential of encountering a hazardous substance and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

A hazardous substance is any substance that has one or more of the following intrinsic properties:

- Explosiveness
- Flammability
- Ability to oxidize
- Human toxicity (acute or chronic)
- Corrosiveness (to human tissue or metal)
- Ecotoxicity (with or without bioaccumulation)
- Capacity, on contact with air or water, to develop one or more of the above properties

1.3 Hazard Identification

An initial identification of hazards should be done based on a review of available documents including lists of chemicals used on site, analytical data from soil, surface water, groundwater, air, spill history, site history, equipment on site, maps, photos, and a preliminary survey.

Once hazardous substances are identified the regulated exposure limits need to be identified. Each substance may have a state/federal exposure value for each of the following (if applicable):

Action Level – An airborne level, typically one-half of the permissible exposure limit (PEL) designated in Occupational Safety and Health Administration's (OSHA's) substance-specific standards, 29 CFR 1910, Subpart Z, calculated as an

8-hour time weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

Ceiling Limit – The exposure limit a worker's exposure may never exceed.

Sampling and Analytical Error – A statistical estimate of the uncertainty associated with a given exposure measurement.

Short-Term Exposure Limit (STEL) – The average exposure to a contaminant to which a worker may be exposed during a short time period (typically 15-30 minutes).

Time Weighted Average (TWA) – The average exposure to a contaminant over a given period of time, typically 8 hours.

1.4 Risk Identification

Once the presence and concentrations of specific hazardous substances and health hazards have been established, the risks associated with these substances will be identified. GEI employees and GEI subcontractors who will be working on the site will be informed of risks that have been identified.

Risks to consider include, but are not limited to:

- Potential exposures exceeding the permissible exposure limits and published exposure levels
- Potential Immediately Dangerous to Life and Health (IDLH) concentrations
- Potential skin absorption and irritation sources
- Potential eye irritation sources
- Potential hazardous atmospheres, including oxygen deficiency and fire and explosion hazards

1.5 Engineering Controls, Work Practices, and Personal Protective Equipment for Employee Protection

Engineering controls, work practices, and personnel protective equipment (PPE) for substances regulated in OSHA Subpart G (Occupational Health and Environmental Control) and Subpart Z (Toxic and Hazardous Substances) will be implemented in to protect employees from exposure to hazardous substances and safety and health hazards.

1.5.1 Elimination/Substitution

The first control method should be to try and eliminate or substitute the hazards with a safer alternative. This is the most effective solution as shown is Figure 1 below. If you can remove the hazard than you no longer need to find a way to protect the employee

from it. Or you can substitute a different piece of equipment or chemical to use that doesn't pose the same hazard and doesn't create a new one.

1.5.2 Engineering Controls

Engineering controls implement physical change to the workplace, which eliminates/reduces the hazard on the job/task. Examples include:

- Change the process to minimize contact with hazardous chemicals
- Isolate or enclose the process
- Use of wet methods to reduce generation of dusts or other particulates
- General dilution ventilation
- Use of fume hoods

1.5.3 Administrative Controls (Work Practices)

Administrative controls establish efficient processes or procedures to help protect the employee. Examples of these are:

- Rotate job assignments
- Adjust work schedules so that workers are not overexposed to a hazardous chemical

1.5.4 Personal Protective Equipment

The use of PPE to reduce exposure to risk factors is the last line of defense. All other options should be exhausted before use of PPE. Examples of PPE are:

- Chemical protective clothing
- Respiratory protection
- Gloves
- Eye or hearing protection
- Steel toe boots

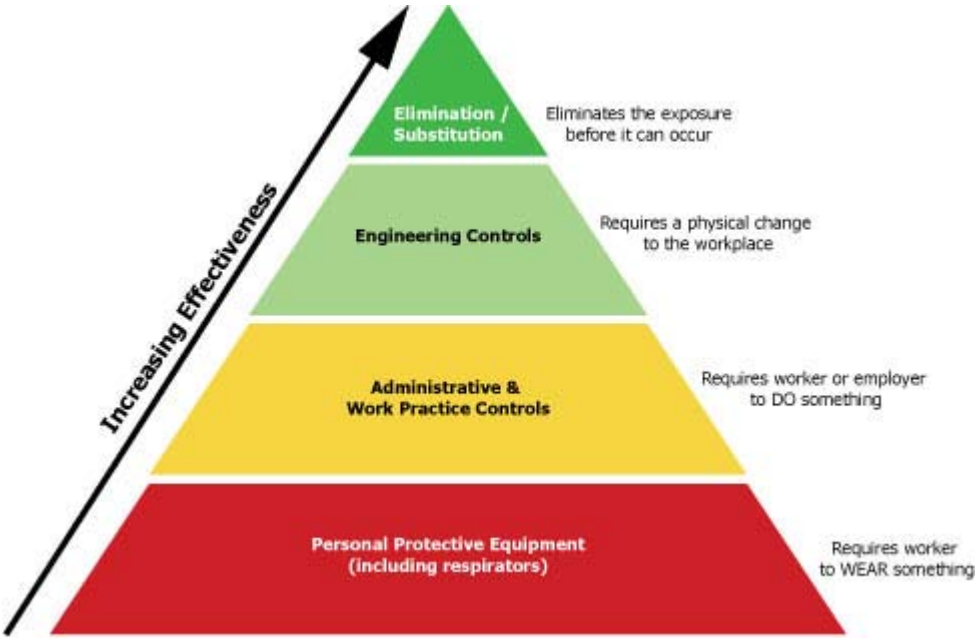


Figure 1: Hazard Mitigation Effectiveness Pyramid

1.5.5 Engineering Controls, Work Practices, and PPE for Substances Regulated in Subparts G and Subpart Z

Engineering controls and work practices will be instituted to reduce and maintain employee exposure at or below the PELs for substances regulated by 29 CFR Part 1910.

Engineering controls that may be feasible include the use of pressurized cabs or control booths on equipment, and/or the use of remotely operated material handling equipment. Work practices may include removing non-essential employees from potential exposure during opening of drums, wetting down dusty operations, and positioning employees upwind of potential hazards.

If engineering controls and work practices are not feasible, or not required, a reasonable combination of engineering controls, work practices, and PPE will be used to reduce and maintain at or below the PELs or dose limits for substances regulated by 29 CFR Part 1910, Subpart Z.

GEI will not implement a schedule of employee rotation as a means of compliance with PELs or dose limits except when there is no other feasible way of complying with the airborne or dermal dose limits for ionizing radiation.

The provisions of 29 CFR, subpart G, will be followed.

1.5.6 Engineering Controls, Work Practices, and Personal Protective Equipment for Substances Not Regulated in Subparts G and Subparts Z

An appropriate combination of engineering controls, work practices, and PPE will be used to reduce and maintain employee exposure to or below published exposure levels for hazardous substances and health hazards not regulated by 29 CFR Part 1910, Subparts G and Subparts Z. GEI will use published literature and Safety Data Sheets (SDS) as a guide in making the determination of what level of protection is appropriate for hazardous substances and health hazards for which there is no permissible exposure limit or published exposure limit.

1.5.7 Decontamination Procedures

Decontamination procedures will be developed, communicated to employees, and implemented before employees or equipment enter areas on site where potential for exposure to hazardous substances exists. Procedures will be developed to minimize employee contact with hazardous substances or with equipment that has contacted hazardous substances.

GEI employees leaving a contaminated area will be properly decontaminated; contaminated clothing and equipment leaving a contaminated area will be properly disposed of or decontaminated.

Decontamination procedures will be monitored by the site safety officer (SSO) to determine their effectiveness. When such procedures are found to be ineffective, the site safety officer will contact the Corporate Health and Safety Officer and appropriate steps will be taken to correct deficiencies.

Location
Decontamination will be performed in areas that will minimize the exposure to employees, equipment, and the environment.

Equipment and Solvents
Equipment and solvents used for decontamination will be decontaminated or disposed of properly.

Personal Protective Clothing and Equipment
Protective clothing and equipment will be decontaminated, cleaned, laundered, maintained, or replaced as needed to maintain their effectiveness.

Employees whose clothing comes in contact with hazardous substances will immediately remove that clothing and follow the directions on packaging or SDS sheet for how to properly clean the exposed area. The clothing will be disposed of or decontaminated before it is removed from the work zone.

Commercial Laundries or Cleaning Establishments
Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment will be informed of the potentially harmful effects of exposures to hazardous substances.

Showers and Changing Rooms
Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, these will be provided and meet the requirements of 29 CFR 1910.141 (Sanitation). If temperature conditions prevent the effective use of water, then other effective means for cleansing will be provided and used.

1.6 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health and Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.7 Limitations

None

1.8 References

OSHA 1910.120 Hazardous Waste Operations and Emergency Response
OSHA 1910 Subpart G Occupational Health and Environment Control
OSHA 1910 Subpart Z Toxic and Hazardous Substances
OSHA 1910.141 General Environmental Controls – Sanitation
http://www.business.govt.nz/worksafe/information-guidance/legal-framework/hsno-act-1996/defining-hazardous-substances/ (Viewed 7/8/2016)
https://www.osha.gov/SLTC/hazardoustoxicsubstances/ (Viewed 7/8/2016)
https://www.osha.gov/SLTC/hazardoustoxicsubstances/control.html (Viewed 7/11/2016)

1.9 Attachments

None

1.10 Contact

Health&SafetyTeam@geiconsultants.com

1.11 Review History

- July 2016
- May 2014
- November 2013
- August 2011 known as Hazard Identification and Management
- February 2011 known as HS-008 Contaminant Properties

STANDARD OPERATING PROCEDURES

SOP No. HS-010 Inclement Weather

1.1 Objective

This Standard Operating Procedure (SOP) is intended for use by employees engaged in work with the potential to be affected by inclement weather. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for working in inclement weather and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

Employees should be aware of local weather conditions and monitor advisories issued by the National Weather Service and other local reporting services. Depending on location and season, storms are capable of producing heavy rain, floods, extreme temperatures, high wind conditions, lighting, tornados, and/or snowfall.

1.2.1 Heavy Rain

If working or driving in a rain storm, use extreme caution. When driving, turn your low beam lights on when the rainfall becomes heavy. Employees should be aware of the following:

- Heavy rain decreases visibility, especially when driving.
- Surfaces and tools become slippery.
- If you are working in the rain and your clothes become wet there is a risk of hypothermia when exposed to winds, even in warm temperatures.
- If the storms are going to produce thunder and/or lightning, leave the work area immediately and move to a safe area.
- Use your best judgment to determine if the rainfall becomes too heavy to continue working safely.

1.2.2 Lightning

Lightning can strike as far as 10 miles from the area where it is raining. That's approximately the distance you can hear thunder. **If you can hear thunder, you are within striking distance. Seek safe shelter immediately.** This can be within a building or vehicle. Wait 30 minutes after the last clap of thunder or flash of lightning before going outside again.

1.2.3 Flooding

Flooding may occur as a result of heavy rain in a short period of time. Flooding can be particularly acute in canyon areas where dry creek beds can turn into raging rivers from rainfall in distant or higher elevation areas. Be aware of this and your surroundings and move to a safe place if you begin to see signs that flooding may occur. Signs of potential flooding include sudden appearance of water in dry creek beds, increased water flow in rivers or streams, or quick rise in water levels.

Do not attempt to drive through areas or streets that are flooded. Seek alternate routes. Be particularly cautious at night when flooded areas are difficult to see. Urban flooding can stop traffic; increase the potential for traffic accidents; and can trap people in vehicles.

1.2.4 Extreme Temperatures

Work activities may take place in extreme heat or cold. Be prepared if these conditions are anticipated. Have the appropriate personal protective equipment (PPE) available; exercise proper fluid intake; and take breaks to prevent heat and cold stress. For more information about these conditions see the heat stress and cold stress programs found in GEI's Health and Safety Program.

1.2.5 High Winds, Tropical Storms, and Tornados

High Winds can be extremely dangerous. Appropriate measures will be taken to secure equipment and loose items when working in windy conditions. The project manager should be contacted about the weather conditions and, if necessary, work should be postponed.

Tropical storms are described as storms with sustained winds ranging from 39 to 73 miles per hour (mph) and hurricanes produce sustained winds that exceed 74 mph. When winds approach 40 mph (gale force winds) twigs begin to break off of trees and vehicles will veer off of the road. When winds approach 40 mph or the GEI employee feels unsafe based on the activities being performed, stop work and seek shelter as soon as possible. Blowing or falling debris and overhanging limbs/signs can be a significant hazard. If possible, avoid driving in these conditions; 70 percent of injuries during hurricanes are a result of vehicle accidents. Note that tall or elevated equipment will have manufacturer's safe operating wind speeds defined that could be less than 40 mph. The operator's manual should be consulted prior to operation of the equipment.

A tornado is a violent, dangerous, rotating column of air that is in contact with both the surface of the earth and a cumulonimbus cloud or, in rare cases, the base of a cumulus cloud. The Fujita Scale is used to rate the intensity of a tornado by examining the damage caused by the tornado after it has passed over a man-made structure. Based on the Fujita Scale, or F-Scale, numbers begin at F0: 40-72 mph and go to F6: 319-379 mph (F6 is

generally theoretical). Nearly three-fourths of tornados are on the weak F0-F1 scale with just over two-thirds of deaths resulting from the violent F4-F5 tornados.

If a tornado is seen, stop work and seek shelter immediately. If a tornado siren is sounded move immediately to safety indoors and then move to a windowless interior space, basement, stairwell, or designated fall-out shelter. Windows should not be opened before an oncoming tornado. If there is no shelter available, seat belt yourself into your stationary vehicle or seek a depression or low spot on the land surface.

1.2.6 Snowfall and Ice Conditions

Working in the winter months may result in activities taking place during periods of snowfall or icy conditions. If you are working during or after snow has fallen, dress appropriately for the conditions. Snow and ice can cause working surfaces to become slippery. Clear snow and ice from work areas to prevent slip hazards. Use caution when performing snow or ice removal activities to prevent injuries. Driving in snowy and icy conditions is also hazardous. Reduce speed and use caution if you must drive in these conditions.

If the weather conditions deteriorate and you do not feel safe working in these conditions, stop work, move to a safe indoor location, and contact your project manager to let them know the weather, work conditions, and your location.

1.3 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.4 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection. Protection in extreme weather conditions can best be accomplished if the conditions are anticipated and actions are taken. Monitor local weather conditions prior to starting work.

1.5 References

Center for Disease Control and Prevention – Natural Disasters and Severe Weather
http://www.bt.cdc.gov/disasters/

National Lightning Safety Institute

NOAA, National Weather Service

Office of Climate, Water, and Weather Services

1.6 Attachment

None

1.7 Contact

Safety Team
Health&SafetyTeam@geiconsultants.com

1.8 Review History

- Previous revision dates were not documented
- May 2014
- July 2016

STANDARD OPERATING PROCEDURES

SOP No. HS-012 Noise Exposures

1.1 Objective

This Standard Operating Procedure (SOP) is intended for use by employees engaged in work with elevation noise levels. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for work in loud environments and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

Working in loud environments can cause hearing damage and loss if the proper protection is not in place. The following procedures describe methods to mitigate unhealthy noise levels and protect hearing.

1.3 Hazard Identification

If projects involve noise levels above OSHA regulations, employees should take steps to remove the noise exposure. Common sources of elevated noise levels are heavy equipment, power tools, pumps, and generators. GEI has an established Hearing Conservation Program located in the GEI Health and Safety Program.

1.4 Risk Identification

Hearing protection is required if noise levels in a work area are known to be above 85 decibels (dB), which can be measured with a noise meter. When decibel levels are not known, hearing protection is required if you need to raise your voice to talk to someone standing within a normal speaking distance from you.

1.5 Mitigation

There are three options that can be used to help mitigate a noise hazard:

1.) Remove the hazard by taking away the source of the noise.

2.) Remove the employee from the source of the noise.

3.) Provide the employee with appropriate personal protective equipment (PPE).

The first option for employee protection is to remove the hazard by taking away the source of the noise or using engineering controls to reduce the level.

If this cannot be accomplished, the next control measure is to remove the employee from the source. This can be done by moving the work area to a quieter location or distancing the employee from the noise source. For example, GEI employees do not need to be standing next to an operating drill rig or other heavy equipment. By distancing themselves from heavy equipment or other noise sources the need for hearing protection can be eliminated/reduced.

The final option, if the above two options aren't feasible, disposable ear plugs that are made available to GEI employees are to be used. Additional means of hearing protection will be provided, such as ear muffs, if the disposable ear plugs are not adequate.

When using hearing protection, employees will need to make a greater effort to be aware of the surroundings which may include moving equipment, traffic, and other site hazards.

1.6 Proper Use of Hearing Protection

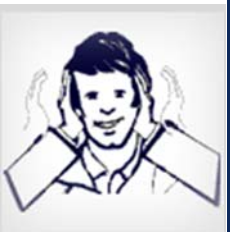
DISPOSABLE EAR PLUG FITTING INSTRUCTIONS

Before fitting any ear plugs, make sure your hands are clean.
Foam ear plugs are disposable and not intended for reuse.

Hold the ear plug between your thumb and forefinger. Roll and compress the entire ear plug to a small, crease-free cylinder. While still rolling, use your other hand to reach over your head and pull up and back on your outer ear. This straightens the ear canal, making way for a snug fit.

Insert the ear plug and hold for 20 to 30 seconds. This allows the ear plug to expand and fill your ear canal.

Test the fit. In a noisy environment, and with earplugs inserted, cup both hands over your ears and release. You should not notice a significant difference in the noise level. If the noise seems to lessen when your hands are cupped over your ears, your ear plugs are not fitted properly. Carefully remove the earplugs (see instructions below) and refit following instructions, above.



Always remove ear plugs slowly, twisting them to break the seal. If you remove them too quickly, you could damage your ear drum.

REUSABLE EAR PLUG FITTING INSTRUCTIONS

Before fitting any ear plugs, make sure your hands are clean.

Reusable ear plugs should be inspected and cleaned often in soapy water. If they become hard, torn, or deformed they should be discarded and replaced.

Reach around your head and pull up and back on your outer ear. This straightens out the ear canal, making way for a snug fit. Hold the stem end of the ear plug and insert it well inside your ear canal until you feel it sealing and the fit is comfortable.

Test the fit. In a noisy environment, and with ear plugs inserted, cup both hands over your ears and release. You should not notice a significant difference in the noise level. If the noise seems to lessen when your hands are cupped over your ears, your ear plugs are not fitted properly. Carefully remove the ear plugs (see instructions below) and refit following instructions, above.

Always remove ear plugs slowly, twisting them to break the seal. If you remove them too quickly, you could damage your ear drum.

1.7 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety

Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, People Team, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.8 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.9 References

OHSA 29 CFR 1910.95 – Occupational Noise Exposure

OHSA 29 CFR 1926.101 – Hearing Protection

Texas American Safety Company (TASCO)

1.10 Attachments

None

1.11 Contact

Health&SafetyTeam@geiconsultants.com

1.12 Review History

- June 2016
- May 2014
- November 2013
- February 2011
- November 2010

STANDARD OPERATING PROCEDURE

SOP HS-014 Utility Mark-out

1.1 Objective

This Standard Operating Procedure (SOP) provides guidance for utility mark-out procedures related to drilling, excavation, or other sub-surface or intrusive activities to avoid injury to GEI employees or property damage. This SOP is applicable when GEI is responsible for its operation or our subcontractor's operation for utility mark-out. A utility mark out is when paint, flags or other markers are put in place to identify the location of an underground utility.

Clients or local agencies may have additional requirements or procedures to mark out of utilities. If local utility mark-out procedures differ from those described within this SOP, applicable state or municipal regulations should be followed.

1.2 General

This SOP is intended for use by employees engaged in work with sub-surface or intrusive activities. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for subsurface hazards and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2.1 Contractor/GEI Responsibilities

- The contractor or GEI employee will pinpoint each exploration area with white paint, flags, or stakes. personal protection equipment (PPE), including eye protection when using spray paint will be worn.
- Exploration locations should be marked-out with sample identification number(s) and type of sample (e.g., boring, test-pit, or monitoring well).
- The contractor compiles information about the work areas on a request form specified by the state utility mark-out program and submits it. Work area location maps can be sent to the utility mark-out program to clarify locations.
- The mark-out program customer service representative will provide a mark-out ticket number and a list of utilities notified upon receipt of the request information. This information will be recorded on the GEI documentation form in Appendix B and/or in other project documents.
- If known, the contractor or GEI employee will also notify non-member utility operators (e.g., apartment complexes, commercial complexes, railroads with communication cables, etc.).

1.2.2 Utility Mark Outs

- Utility companies or their sub-contractors will only mark-out, or clear, utilities under their responsibility. Generally, this means that they will only mark-out utilities within the public right-of-way up to private property boundaries. Information needed to determine the location of utilities on private properties will be requested from the property owner. This may include available property drawings or as-built figures. If this information is not available, additional non-intrusive surveys of the property may be required by a private utility locator to find underground utilities by using techniques such as ground penetrating radar (GPR).
- American Public Works Association (APWA) Uniform Color Code For Marking Underground Utility Lines are:
    1. **White** – Proposed Excavation
    2. **Pink** – Temporary Survey Markings
    3. **Red** – Electric Power Lines, Cables, Conduit and Lighting Cables
    4. **Yellow** – Gas, Oil, Steam, Petroleum, and Gaseous Material
    5. **Orange** – Communications, Alarm, Signal Lines, Cables or Conduit
    6. **Blue** – Water
    7. **Purple** – Radioactive Materials
    8. **Green** – Sanitary and Storm Sewers and Drain Lines

1.2.3 Utility Mark Out Review

- Before the intrusive work activities begin, the contractor or GEI employee will verify that each utility company has completed a utility location for the work area or the location has been cleared by a private locator and record this on the mark-out request information sheet.
- A visual survey of the project area will be done prior to the start of intrusive activities. This visual inspection will be done to identify signs, manholes, utility boxes, or other evidence of an underground utility is present and has been considered.
- The contractor or GEI employee can begin work on the scheduled work date and time if the utility operators have responded, taking care to find and preserve markings that have been made.
- Completed clearance documentation will be located on the excavation site during excavation activities and kept in project files.

1.2.4 Excavations

- When excavating near a buried utility, observe the approximate location around that utility.
- If exposing a utility, proper support and protection must be provided so that the utility will not be damaged.
- If the excavation work requires significant spans of the utility to be exposed, it is the contractor's responsibility to support the infrastructure (to prevent sagging or collapse) as needed. Contact the utility operator for support, guidance, or assistance.
- When the excavation is complete, provide proper backfill for utilities that have been exposed.
- Take care not to damage the conduit or protective coating of a utility. If the damage occurs, leave the damaged utility exposed and immediately call the utility owner.
- If a gas line is encountered, everyone will be evacuated according to the site evacuation procedures and the contractor must notify police, fire, and emergency personnel. No attempt should be made to tamper with or correct the damaged utility. All site personnel are to evacuate to the site's predetermined meeting point or a location a minimum of 300 feet away from the incident location.
- If the contractor needs to dig within the approximate location of a combustible, hazardous fluid, or gas line (natural gas, propane or gasoline), soft digging is required (hand digging, vacuum extraction) to a maximum depth of 5 feet. The approximate location is defined as 24 inches on either side of the designated center line of the utility if the diameter is not provided or 24 inches from each outside edge if the diameter is provided.

1.3 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification and/or the receipt of the Incident Report Form, RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.4 Limitations

- Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.
- Mark-out notification time usually does not include holidays. Make sure holidays are considered and mark-out time is scheduled accordingly. Under no circumstances are intrusive activities allowed to be performed prior to the required mark-out.
- Do not use white paint if precipitation is eminent. Consider using stakes if snow is predicted.

1.5 References

Reference the website for the "Call Before You Dig – 811" for the utility mark-out agency for the state you working in prior to site work. If you have issues locating the appropriate agency, contact the Safety Team for assistance.

1.6 Attachments

Attachment A – Standard Utility Color Codes

Attachment B – GEI Utility Clearance Documentation Form

1.7 Contact

Health&SafetyTeam@geiconsultants.com

1.8 Review History

- June 2016
- May 2014
- November 2013
- February 2011
- November 2010

ATTACHMENT A

COLOR CODE FOR UTILITY MARKING

(BASED ON 'THE AMERICAN PUBLIC WORKS ASSOCIATION' RECOMMENDATIONS AND THE ANSI STANDARD Z-53.1 FOR SAFETY COLORS)

UTILITY	COLOR
PROPOSED EXCAVATION	WHITE
ELECTRIC POWER LINES, CABLES, CONDUIT AND LIGHTING CABLES	RED
POTABLE WATER	BLUE
STEAM, CONDENSATE, GAS OR OIL COMPRESSED AIR	YELLOW
TELECOMMUNICATIONS, ALARM OR SIGNAL LINES, CABLES OR CONDUIT	ORANGE
TEMPORARY SURVEY MARKINGS	PINK
SEWER AND STORM DRAINS	GREEN
CHILLED WATER, RECLAIMED WATER, IRRIGATION AND SLURRY LINES	PURPLE
OTHER	LIGHT BLUE

ATTACHMENT B

Utility Clearance Documentation

Please print clearly. *For more room, use back of page.*

Client: _____

GEI Project Name & Number: _____

Site: _____

Excavation/Drilling Location ID: _____

Excavator/Driller: _____

GEI PM: _____ GEI Field Team Leader: _____

Utility Drawings Reviewed: _____

Provided By: _____ Reviewed By: _____

Utility Clearance Call Date: _____ Name of Utility: _____

Utility Clearance Call Date: _____ Name of Utility: _____

Utility Clearance Received from (utility & rep name): _____ Date: _____

Utility Clearance Received from (utility & rep name): _____ Date: _____

Company that completed clearance: _____ Date: _____

GEI Staff Responsible for Oversight: _____

Metal Detector Survey (yes/no): _____ Drilling Location Cleared by: _____

Contractor Name: _____ Company Name: _____

Contractor Signature: _____ Date: _____

GEI Staff Responsible for Oversight: _____

Private Location Clearance Required (yes/no): _____ Date: _____

Contractor Name: _____ Company Name: _____

Contractor Signature: _____ Date: _____

Methods used for utility location (i.e. GPR, electronic pipe location) _____

GEI Staff Responsible for Oversight: _____

Hand clearing Performed (yes/no): _____ Methods: _____ Date: _____

Contractor Name: _____ Company Name: _____

Contractor Signature: _____ Date: _____

GEI Staff Responsible for Oversight: _____

GEI Consultants, Inc. Representative (name & title): _____

GEI Consultants, Inc. Representative Signature: _____ Date: _____

Based upon the best available information, appropriate utility clearance procedures were performed for the invasive work specified. If client ordered site specific deviations from existing GEI utility clearance procedures, they are approved by the client signature below:

Client Representative (name & title): _____

Client Representative Signature: _____ Date: _____

Notes:

STANDARD OPERATING PROCEDURES

SOP No. HS-015 Respirator Fit Test Procedure

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to standardize the respirator fit testing procedures performed by the GEI Safety Team members or their designees. Respirator fit testing will be performed in accordance to OSHA 29 CFR 1910.134(f)(1) – (8) and OSHA 29 CFR 1910.134 Appendix A. This SOP is not intended to fit test employees that will be using GEI supplied air respirators.

1.2 General

Based on an employee's role at GEI there might be times when the use of a full or half-faced air purifying respirator is required. These types of respirators have filters, cartridges, or canisters that remove contaminants from the air by passing the ambient air through the air-purifying element before it reaches the user. Information about respiratory protection at can be found in GEI's Respiratory Protection Program, which can be found on the Safety page of the intranet.

Prior to GEI employees being required to use a respirator with a negative or positive pressure tight-fitting face piece, the employee must be medically cleared by a GEI-contracted occupational health physician. When an employee is cleared, the physician will provide a copy of the clearance form to the Corporate Health and Safety Officer (CHSO) who in turn will provided it to the employee. The employee must also be fit tested to determine the make, model, style, and size respirator that will be issued for use. GEI employees performing respirator fit testing procedures must be trained and approved by the CHSO and/or a Regional Health and Safety Officer (RHSO).

1.3 Required Equipment

The following equipment will be needed to perform respirator fit testing:

- A copy of this written GEI fit testing procedure.
- A fit testing kit consisting of a test hood, an accepted testing agent (i.e., saccharin, bitrex, isoamyl acetate [banana oil], and irritant smoke), nebulizers (device for producing a fine spray of liquid) to administer the test agent, and a copy of the Rainbow Passage or other reading material.
- A sufficient number of respirators and sizes. High Efficiency Particulate Air (HEPA) filters will be used for tests using saccharin, bitrex, or irritant smoke. A combination of organic vapor and HEPA filter will be used for tests using isoamyl acetate.
- A Respirator Fit Test Form (Attachment A).

1.4 Execution

1.4.1 Pre-Test Screening

Before an employee can be fit tested the following questions will be asked to make sure that the employee is able to wear a respirator:

- Certificate for Respirator Use. After an employee's annual physical they will be presented with a certificate for respirator use if they are deemed to have the necessary fitness level to don a respirator by the exam physician. Once an employee has this certificate they can be fit tested.
- Does the employee have medical conditions that may be aggravated by taking part in this fit test? Conditions may include allergies to the test agent(s) being used; neck or shoulder injuries; respiratory allergies; or a cold symptoms.
- Is the employee taking medications that are inhibiting their sensitivity to taste or smell?
- Has the employee had anything to eat, drink, or smoke within 30 minutes of the fit test? If so, delay the testing for 30 minutes.
- Can the employee demonstrate proper donning and doffing of the respirator and perform the user seal check? If not, the fit test examiner will demonstrate and review these actions.

After the user seal check has been completed, have the employee continue to wear the respirator for a 5-minute comfort assessment period.

If the employee passes the pre-test screening, proceed to the fit test.

1.4.2 Fit Testing

- With the respirator removed, check to see if the employee has sensitivity to the test agent being used. This is done by choosing one sensitivity test agent (saccharin, bitrex, or isoamyl acetate), and spraying (with a nebulizer) a mist onto the employee's tongue. If the agent can be detected, proceed with the fit test. If the employee cannot detect the test agent, a different agent may be needed. If the employee has an existing condition that does not allow them to detect a type of agent, a quantitative test may be required.
- Have the employee don the respirator and perform the user seal check.
- Place the test hood on the employee being tested.
- Using the nebulizer with the test solution, maintain an adequate concentration of aerosol inside the test hood by injecting 10-15 squeezes every 30 seconds.
- Instruct the employee to indicate if they can detect the testing agent at a point during the testing process.

- After the initial aerosol is injected into the test hood, instruct the employee to perform the following exercises for 60 seconds each.
    - Normal Breathing.
    - Deep Breathing; breathe slowly and deeply.
    - Turning Head from Side to Side; inhale at extreme positions at each side.
    - Moving Head Up and Down; inhale at the "up" position.
    - Jog in Place.
    - Normal Breathing.
    - Talking – Recite the Rainbow Passage, count backward from 100, or recite a memorized poem or song.
- Finally, remove the test hood from the employee and use irritant smoke to verify that the respirator seal is a good one. Introduce a small amount of irritant smoke around the seal of the face piece while the employee breathes normally to verify that the employee does not react to the smoke.
- If all of the above exercises were completed without the employee detecting the test agent, the test is successful. If the employee indicates that they detected the test agent, a different respirator must be tried and the entire procedure repeated.

1.5 Documentation

The attached fit test form will be used to document the fit testing; a copy will be given to the employee and a copy sent to Health&SafetyTeam@geiconsultants.com

1.6 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential

for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.7 Limitations

Only trained employees designated by the CHSO or RHSO may conduct respirator fit testing.

1.8 References

Occupational Safety and Health Administration Training Institute Education Center Respiratory Protection Course Manual, May 2003

Occupational Safety and Health Administration Respiratory Protection Standard (29 CFR1910.134 (f)(1) –(8) and Appendix A

Allegro Industries Qualitative Fit Test Kit Instructions, Part No. 2040

1.9 Attachments

Respiratory Fit Test Form

The Rainbow Passage

1.10 Contact

Health&SafetyTeam@geiconsultants.com

1.11 Review History

- June 2016
- May 2014
- November 2013
- August 2011
- June 2009 at this time it was HS-024

Respiratory Fit Test Form

Name:
Respirator Manufacturer & Type:
Respirator Size:
Date:
Name of Tester:

Respirator Fit Testing

This fit testing has been conducted in compliance with OSHA 29 CFR 1910.134(f)(1)-(8) and OSHA 29 CFR 1910.134. Respirators are an effective method of protection against designated hazards when properly selected and worn. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the employee. Sometimes, employees may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. You should do the following:

1. Read and heed instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

2. Choose cartridges certified for use to protect against the contaminant of concern. The National Institute for Occupational Safety and Health (NIOSH) or Mine Safety and Health Administration (MSHA) label or statement of certification should appear on the respirator or respirator packaging. Contact the RSHO or CHSO for new cartridges.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against or in atmospheres with less than 20.5% oxygen. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.

4. Keep your respirator in the storage bag supplied to you from the RHSO and put your name on the bag so that you do not mistakenly use someone else's respirator. Inspect your respirator daily when in use.

The Rainbow Passage

When the sunlight strikes raindrops in the air, they act as a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(Source: *The Rainbow Passage*, a public-domain text, can be found on page 127 of the 2nd edition of Grant Fairbanks' *Voice and Articulation Drillbook*. New York: Harper & Row.)

STANDARD OPERATING PROCEDURES

SOP No. HS-016 Traffic Hazard Management

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to prevent or limit the potential for GEI personnel to encounter traffic hazards during field activities.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for traffic hazards. The site-specific health and safety plan (HASP) will include a hazard assessment for the project that identifies the potential for exposure to traffic hazards and the control methods to be implemented by GEI employees, including review or attainment of necessary permits, traffic control plans, and flagger/police detail requirements for the local jurisdiction. Routine checks of the work zone will be made to ensure there are adequate levels of protection. These hazards will be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Traffic Hazard Management

Traffic Hazard Management is the process of identifying and managing the potential risks associated with the movement of traffic through, around, or past a work area. This Traffic Hazard Management SOP is designed to assist employees in identifying and managing these hazards. Work areas should be as safe as possible. It is the responsibility of GEI employees to follow the Traffic Hazard Management SOP and adhere to these safety standards. Safety is not negotiable.

Under no circumstances are GEI employees permitted to commence work in a situation that the employee believes or knows their health and safety, or the health and safety of others, is at risk.

Major risk factors for work site Traffic Hazard Management include:

- The speed of traffic moving through a work site.
- The distance and clearance between moving traffic, workers, vehicles and equipment, and over-head power lines.
- Traffic volume and vehicle composition.
- Nature and conditions at the work site and approaches to the work site.

- Other factors such as the time of day, sight distance, weather, presence of pedestrians, or cyclists, and the type of work being carried out.
- Other hazards in proximity to the work site (e.g., power lines, open excavations) that may have conflicting safety management measures that need to be considered when developing the HASP.

1.4 Site Preparation

The following management measures will be considered whenever working in traffic areas. In addition, remain aware of the amount of traffic around the working area. The work space should be large enough for the job to be completed safely. Check permit, traffic control plans, and flagger/police detail requirements for the local jurisdiction. Perform routine checks of the work zone to make sure there are adequate levels of protection.

1.4.1 Traffic Barriers and Warning Signs

GEI employees will comply with the U.S. Department of Transportation's (DOT) Manual on Uniformed Traffic Control Devices (MUTCD) and/or state regulations for temporary traffic barriers (cones, barriers) and sign placement when required for working in traffic areas. Clearly define the work site by placing traffic barriers around the work space to indicate the space that is needed to safely perform the work. The traffic barrier will help make the work site more visible to other workers, pedestrians, cyclists, and moving vehicles. Place traffic barriers in such a way as to give yourself and equipment adequate space to work within the barriers. OSHA suggests placing the first warning sign at a distance calculated to be 4 to 8 times (in feet) the speed limit (in MPH).

1.4.2 Adequate Light

Requirements for night conditions and work areas with poor visibility are similar to day requirements. However there are a number of additional things to consider, such as visibility of the work site to advancing traffic and sufficient lighting. OSHA requires lighting for workers on foot and equipment operators to be at least 5-foot-candles or greater.

Visibility of the work area can be increased by employing the following measures:

- Using parked vehicles hazard and flashing lights.
- Wearing reflective personal protective equipment (PPE), such as a safety vest, in good condition.
- Providing adequate lighting to illuminate the work area with lights positioned so that there is no glare to approaching drivers.
- Placing reflective advance warning signs and traffic barriers so that they are visible to road users.

1.4.3 Distance from the Nearest Traffic Lane

Work areas located along roadsides will have a minimum clearance as defined by DOT's MUTCD and/or state or local DOT regulations for traffic barrier and sign placement.

1.4.4 PPE

The proper PPE, as outlined in the project HASP, will be worn when appropriate. The color/type of safety vest will comply with site regulations.

1.5 Equipment Operation

Vehicles and heavy equipment operators should use a spotter when possible if it is necessary to drive in reverse to reduce risk of collision with oncoming traffic. If it is necessary to drive against the flow of traffic make sure this area is within the work zone and properly blocked off from oncoming traffic.

1.6 Pedestrian Safety

When working near pedestrian traffic, a safe alternate pedestrian route will be established. Refer to local regulations when establishing pedestrian walkways.

1.7 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.8 Limitations

Follow safety procedures as defined in the site-specific HASP, federal DOT, and local jurisdictions. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.9 References

DOT's Manual on Uniformed Traffic Control Devices (2009 Edition)

Hazard Exposure and Risk Assessment Matrix for Hurricane Response and Recovery Work: https://www.osha.gov/SLTC/etools/hurricane/work-zone.html

1.10 Attachments

None

1.11 Contact

Health&SafetyTeam@geiconsultants.com

1.12 Review History

- November 2016
- May 2014
- November 2013
- August 2011
- October 2010 Initially HS-027 Traffic Hazards

STANDARD OPERATING PROCEDURES

SOP No. HS-018 Working Around Heavy Equipment

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to prevent or limit the physical hazards when working around heavy equipment.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for working near heavy equipment. The project site-specific health and safety plan (HASP) should include a hazard assessment for working near heavy equipment to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Heavy Equipment Precautions

Heavy equipment (e.g., excavators, backhoes, drill rigs, etc.), can present many physical hazards that can result in serious injury or death if the proper safety precautions are not followed. The following is a list of precautions to be aware of when working around heavy equipment:

- Wear appropriate personal protective equipment (PPE), including at a minimum reflective, high-visibility safety vest, hard hat, safety glasses, and steel/composite toe boots.
- Always keep your distance from moving equipment.
- Do not assume the operator knows where you are or where you are going.
- Make sure to make eye contact and receive acknowledgement of your presence with the operator.
- Avoid working near heavy equipment, but if unavoidable, communicate your location with the operators. If using hand signals, discuss the signals with the equipment operator prior to starting work.
- Watch for moving equipment. Construction sites can have a lot of activity and equipment may be moving in an unpredictable manner.
- Do not rely on back-up or other alarms. They may not be working or you may not hear them with the noise of other activities taking place in the area.
- Stay out of the swing radius of cranes, excavators, or other equipment that swings or rotates.
- Do not walk beside a moving vehicle, the vehicle may turn, slip, or the load may shift causing the vehicle to go off course.
- Do not ride on the outside of a moving equipment.

- Never walk under or stand too close to a load suspended by cranes or hoists.
- Do not walk behind a piece of equipment that is backing up without acknowledgment from the operator it is safe to proceed. If working next to heavy equipment is unavoidable, be aware of the hazards including pinch points and moving parts. Use a spotter to watch the work area for moving equipment.
- If necessary, ask the operator to stop equipment operation to perform your work tasks.
- Verify the location and operation of emergency shut-off devices on the equipment.
- Be aware of the fuels and chemicals associated with the equipment. Have a spill prevention and response plan in place that includes the appropriate containment materials (i.e., spill kit).
- Do not wear loose fitting clothing when working around moving equipment (i.e., drill rig augers).
- Do not operate heavy equipment.
- Do not use cellular telephones near operating equipment.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.6 References

OSHA 29 CFR 1926.600 – Subpart O; Motor Vehicles, Mechanized Equipment, and Marine Operations.

www.toolboxtopics.com/Construction/ (Viewed 10/16)

Caterpillar Safety – http://safety.cat.com/ (Viewed 10/16)

1.7 Attachments

None

1.8 Contact

Health&SafetyTeam@geiconsultants.com

1.9 Review History

- October 2016
- May 2014
- November 2013
- August 2011
- October 2010

STANDARD OPERATING PROCEDURES

HS-021 Mobile Equipment Operation

1.1 Objective

This program outlines safety requirements for GEI employees when operating mobile equipment.

1.2 General

This Standard Operating Procedure (SOP) is specific to mobile equipment that can be used by personnel to access environments that require an alternate vehicle to an automobile. Mobile equipment is defined as vehicles that are principally used off public roads. In other words, a type of vehicle that cannot be classified as an automobile. Examples of mobile equipment that employees currently use at GEI are mobile carts and all-terrain vehicles (ATV); other examples of mobile equipment are forklifts, earthmoving equipment, snow mobiles, etc.

The site-specific health and safety plan (HASP) will include a hazard assessment for the project that identifies the potential hazards for employees using mobile equipment and the control methods to be implemented by GEI employees. These hazards will be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 GEI Owned Mobile Equipment

When new mobile equipment is acquired by the company, the office in which it resides will be responsible for the care and maintenance. The branch manager will be responsible for verifying that a safety inspection check list is generated for the mobile equipment and that it is accessible to all employees. An initial safety check and test drive will be performed to make sure that the equipment is operating properly.

1.4 Third-Party Owned Mobile Equipment

If mobile equipment will operated by a GEI employee that is leased/rented from a third party or owned by a client, all available safety information will be reviewed. The equipment will be inspected upon receiving and the employee will follow, at a minimum, the safety requirements specified in this SOP. If the third party of client has additional safety training or requirements those will be included and reviewed, as an addendum, to the site specific HASP.

1.5 Safety Requirements

1.5.1 Inspection/Maintenance

At the beginning of each shift, the GEI operator will inspect the equipment and complete the safety inspection check list. Any malfunctioning of the equipment will be reported to the employees' supervisor and branch manager, and documented on the inspection sheet. If

equipment does not pass inspection, it will be tagged “Out of Service” and the branch manager will be notified so that it can be repaired or replaced.

1.5.2 Other Restrictions

Unauthorized personnel will not be permitted to ride on equipment unless it is equipped to accommodate passengers safely. The GEI operator will make sure the warning signal (if applicable) is operating when the equipment is backing up. The GEI operator will not operate mobile equipment without the protection of an enclosed cab or roof safety railing system. If neither of those are applicable approved eye protection will be worn. Before starting the engine, the GEI operator will ensure that all passengers have engaged their seatbelts (if available)...

1.5.3 Carrying Loads

The GEI operator will not use, or attempt to use any vehicle in any manner or for any purpose other than for which it is designated. The GEI operator will not load the vehicle/equipment beyond its established load limit and will not move loads which, because of the length, width, or height, have not been centered or secured for safe transportation.

1.5.4 Fuel Powered

The GEI operator of a gasoline or diesel vehicle will shut off the engine before filling the fuel tank and will verify that the nozzle of the filling hose makes contact with the filling neck of the tank. No one will be on or in the vehicle during fueling operations except as specifically required by design. Smoking or open flames will not be allowed in the immediate area during fueling operation.

1.5.5 All-Terrain Vehicle

Use caution when operating an ATV and follow the following recommendations:

- All ATV operators must complete a certified training program prior to riding. Most ATV manufacturers and the ATV Safety Institute offer training courses. When completed, a copy of the training certificate will be emailed to the People & Safety Team.
- At the beginning of each shift, the GEI operator will inspect the equipment and complete the safety inspection check list. Repair any defects noted during the inspection.
- All riders must ride within the limits of their skills and abilities. If there is any question whether a route can be safely traversed, find a safer route.
- Ride with others when possible. If you must ride alone a trip plan must be completed and left with the project manager. The trip plan will include at a minimum where you will be and for how long. If possible provide a map with your route. If cell phone coverage is not available or spotty, have a satellite phone, rescue beacon, and/or SPOT GPS device (contact your RHSO to borrow these) with you so that you can summon help if you need it.

- Read the operators manual provided by the manufacture before you ride and comply with its recommendations.
- Do not exceed the manufacturer's recommended maximum weight capacity for the ATV rack(s) and tow hitch.

1.6 Personal Protective Equipment

At a minimum personal protective equipment (PPE) for employees operating mobile equipment will includes safety glasses and high visibility reflective clothing. Additional PPE might include hard hat, gloves, and steel toed/shank safety boots. Clients might also have specific requirements for color of hard hats, types of reflective clothing. These requirements will be incorporated into the site-specific HASP.

1.7 Training Requirements

Only authorized employees will be allowed to operate mobile equipment. Authorization to operate mobile equipment will be issued to employees qualifying under appropriate training and proficiency testing. Training courses must be approved by the Corporate Health and Safety Officer (CHSO). Copies of certificates at the completion of the training will be emailed to the People & Safety Team.

When operating mobile equipment on a project site, copies of the training certificates for the operators will be maintained in an appendix of the site specific HASP.

1.8 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or supervisor/project manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The CHSO will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.9 Limitations

Not every type of equipment that can be classified as mobile equipment is identified specifically in this SOP. The safety information provided by the manufacture will be reviewed and followed. Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.10 References

29 CFR 1926.20 (General Safety and Health Provisions)

29 CFR 1926.21 (Safety Training and Education)

29 CFR 1926.602 (Material Handling Equipment)

International Risk Management Institute, Inc. (IRMI) Craig F. Stanovich December 2002, viewed on 11/8/2016:
https://www.irmi.com/articles/expert-commentary/auto-versus-mobile-equipment-in-the-cgl

1.11 Attachments

None

1.12 Contact

Health&SafetyTeam@geiconsultants.com

1.13 Review History

- November 2016
- May 2014
- November 2013
- July 2012

STANDARD OPERATING PROCEDURES

SOP No. HS-025 Manual Lifting

1.1 Objective

The purpose of this Standard Operating Procedure (SOP) is to identify and reduce potential work-related musculoskeletal disorder (WMSD) hazards. The SOP is intended to comply with state regulations and safe work practices developed by the Occupational Safety and Health Administration (OSHA). Modifications to meet these requirements will be made to this program as changing laws or regulations dictate.

1.2 General

Lifting heavy items is one of the leading causes of injury in the workplace. Overexertion and cumulative trauma when lifting are significant factors for injuries. When employees use smart lifting practices and work in their “power zone”, they are less likely to suffer from back sprains, muscle pulls, wrist/elbow/spinal and other injuries caused by lifting heavy objects. Common things to consider prior to lifting an object are: weight of the object, awkward postures, high-frequency and long duration lifting, inadequate handholds, and physical/environmental factors.

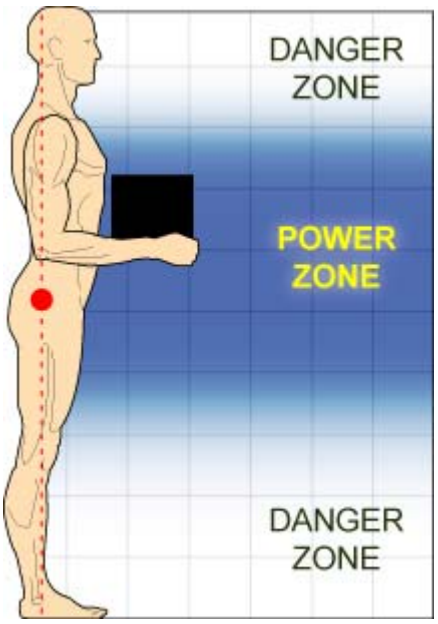


Figure 1: Lifting Power Zone

1.3 Safe Lifting Guidelines

The following safe lifting guidelines will be followed by employees involved in manual lifting activities:

- Before manual lifting is performed, a hazard assessment must be completed. The assessment must consider size, bulk, and weight of the object(s), if mechanical lifting equipment is required, if two-man lift is required, whether vision is obscured while carrying and the walking surface and path where the object is to be carried.
- Get a co-worker to help if equipment or other item is too heavy to lift.
- If possible, use powered equipment instead of manually lifting heavy materials. Lifting equipment such as dollies, hand trucks, lift-assist devices, jacks, or carts can be provided for employees.
- Reduce lifts from shoulder height and from floor height by repositioning the shelf or bin to closer to the power zone.
- Make sure walkways are clear of tripping hazards before moving materials.
- Use your legs and keep your back in a natural position while lifting. Keep the load close to your torso.

- Test the load to be lifted to estimate its weight, size, and bulk and to determine the proper lifting method.
- Do not twist while carrying a load. Instead, shift your feet and take small steps in the direction you want to turn.
- Make sure there are appropriately marked and sufficiently safe clearances for aisles and at loading docks or passageways where mechanical-handling equipment is used.
- Properly stack loose or unboxed materials which might fall from a pile by blocking, interlocking, or limiting the height of the pile to prevent falling hazards.
- Bags, containers, bundles, etc. should be stored in tiers that are stacked, blocked, interlocked, and limited in height so that they are stable and secure to prevent sliding or collapse.

- Storage areas should be kept free from accumulation of materials that could lead to tripping, fire, or explosion.
- Work methods and stations should be designed to minimize the distance between the person and the object being handled.

Supervisors should periodically evaluate work areas and employees' work techniques to assess the potential for and prevention of injuries. New operations should be evaluated to engineer out hazards before work processes are implemented.

1.4 Regulations

OSHA does not have a standard which sets limits on how much a person may lift or carry. They do however state that lifting loads heavier than about 50 pounds will increase the risk of injury.

The National Institute for Occupational Safety and Health (NIOSH) has developed a mathematical model that helps predict the risk of injury based on the weight being lifted and other criteria. The NIOSH model is based on previous medical research into the compressive forces needed to cause damage to bones and ligaments of the back. The mathematical model is incorporated in the *Applications Manual for the Revised NIOSH Lifting Equation*, which can be found on the NIOSH website (http://www.cdc.gov/niosh/docs/94-110/). It should be noted, however, that this NIOSH document provides only voluntary guidelines.

If there is a situation that arises where an employee is required to perform manual lifting on a reoccurring basis, the NIOSH Lifting Equation will be used to determine the appropriate weight that employee can safely lift. The lifting equation establishes a maximum load of 50 pounds for employees that are less likely to have to lift something, and don’t have to do any long distance travel or maneuvering of the item. This 50 pounds is then adjusted to account for:

- how often the employee is lifting
- twisting the back during lifting
- the vertical distance the load is lifted
- the distance of the load from the body
- the distance the employee must move while lifting the load
- how easy it is to hold onto the load

GEI uses 50 pounds as a standard. However each individual should not attempt to carry loads heavier than they can safely manage.

1.5 Training

Training will include general principles of ergonomics, correct manual lifting techniques to avoid musculoskeletal injuries, recognition of hazards and injuries, procedures for reporting hazardous conditions, and methods and procedures for early reporting of injuries.

1.6 Lifting Assistance

If employees are assigned a task that involves repetitive lifting and carrying of equipment the Safety Team and Project Manager should be contacted to conduct an ergonomic evaluation. The task should be discussed to determine if there is an alternative method that can be used. The alternative method should institute an engineering or administrative control to reduce/limit the amount of lifting that is required of the employee. Some examples include providing smaller containers to reduce the weight of what needs to be lifted; providing a device that helps carry awkwardly-shaped objects easier; or using a winch, fork lift, or other device to lift the item(s) for the employee.

1.7 Injury Reporting

Injuries experienced during manual lifting activities should receive prompt medical attention. If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health and Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future musculoskeletal injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.8 Limitations

Follow safety procedures for manual lifting.

1.9 References

OSHA Technical Manual (OTM), Section VII: Chapter 1 - Back Disorders and Injuries
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=29936 (Viewed 7/12/2016)
https://www.osha.gov/SLTC/etools/electricalcontractors/materials/heavy.html (Viewed 7/12/2016)

1.10 Attachments

None

1.11 Contact

Health&SafetyTeam@geiconsultants.com

1.12 Review History

- July 2016
- August 2014

STANDARD OPERATING PROCEDURES
SOP NO. HS-026 Hazard Identification and Management

1.1 Objective
This Standard Operating Procedure (SOP) is intended to outline the steps GEI employees will take to identify potential hazards on site, the risks associated with these hazards, and the proper engineering controls, work practices, and personal protective equipment (PPE) to use to minimize the associated risks.

1.2 Hazard Identification
Establishing proper work procedures by conducting a job hazard analysis will should be performed for all projects involving field work. An initial identification of hazards will be completed based on past and current property usage of the site, what tasks are required to perform the job, what equipment is needed to complete the assigned tasks, what hazards are in the working area etc.

The site-specific health and safety plan (HASP) will include a hazard assessment for the project that identifies the potential hazards and how to alleviate the hazard. These hazards will be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Risk Assessment
A risk assessment will be performed for all aspects of field work. This analysis is to determine the quantitative or qualitative value of risk related to a tangible situation and a recognized hazard. Identification, studies, and monitoring of any hazard to determine its potential, origin, characteristics, and behavior are examples of what could be included and performed during a risk assessment. The assessment will increase awareness of workplace hazards and provide an opportunity to identify and control workplace hazards.

1.3.1 Assessment Guidelines
It is necessary to consider certain general guidelines for assessing the foot, head, eye and face, and hand hazard situations that exist in an occupational operation or process, and to match the protective devices to the particular hazard.

Assessments should be conducted:

- Prior to starting any work at the site
- As conditions change
- Workplace layout changes
- Environmental changes
- Process changes

- Yearly or other pre-determined interval

1.3.2 Hazard Sources

Some examples of hazard sources include but are not limited to:

- Items, materials, or machinery in motion
- Extreme temperatures
- Chemical exposures
- Harmful dust
- Light radiation
- Falling objects or potential from dropping objects
- Sharp objects
- Rolling or pinching objects
- Layout of workplace and location of co-workers
- Electrical hazards
- Noise exposures
- Confined spaces
- Working near or on water
- Fall hazards
- Traffic or other activities taking place on the site
- Air quality issues

1.4 Prevention – Control Methods

Control methods should be considered in the following hierarchy:

- Elimination
- Substitution
- Engineering Controls
- Administrative Controls
- Personal Protective Equipment

1.4.1 Elimination and Substitution

Elimination and substitution, while most effective at reducing hazards, also tend to be the most difficult to implement in an existing process. If the process is still at the design or development stage, elimination and substitution of hazards may be inexpensive and

simple to implement. For an existing process, major changes in equipment and procedures may be required to eliminate or substitute for a hazard. Employees should work with the Safety Team to find solutions.

1.4.2 Engineering Controls

Engineering controls are used to remove a hazard or place a barrier between the work and the hazard. It's implemented to control the hazard at the source. Examples may include machine guards, sound deading/dampening panels, traffic barriers, guardrails, and shields.

1.4.3 Administrative Controls

Administrative controls change the work procedures such as programs, schedules, and supervision to reduce employee exposure to hazards. The controls are frequently used with existing processes where hazards are not particularly well controlled. Examples of administrative controls are requiring frequent breaks or implementing a specific method to perform a task.

1.4.4 Personal Protective Equipment Selection

To select the proper PPE, the potential hazards must be known. The protective equipment selected must ensure a level of protection *greater than* the minimum required in order to help protect employees. The user must be supplied with a properly fitting protective device and given instructions on care and use. Users must be aware of all warning labels for and limitation of the PPE. Employees must be aware that the PPE does not eliminate the hazard.

1.4.5 Hazard Re-Assessment

As necessary, the workplace should be re-assessed for hazards by identifying and evaluating new equipment and processes, reviewing accident records, and re-evaluating the suitability of previously selected PPE. Re-assessment should occur at a defined regular schedule interval.

1.5 Job Safety Analysis

A job safety analysis (JSA) sometimes referred to as a job hazard analysis (JHA) or an activity hazard analysis (AHA) is the breaking down of any method or procedure into its component parts to determine the hazards connected with each key step and the requirements for performing it safely.

When a JSA is being created, make sure it isn't too general where the resulting information is not enough to assess the hazard and select proper controls, and be careful not to add unnecessary steps.

1.6 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHS) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.7 Limitations

Limitations may arise on a project specific basis and will be addressed as they arise.

1.8 Attachments

None.

1.9 References

Risk Analytics, LLC Hazard Assessment Training Program, January 2011

1.10 Contact

Health&SafetyTeam@geiconsultants.com

1.11 Review History

- November 2016
- June 2015

Appendix F

GEI COVID-19 Field Work Guidance and National Grid COVID-19 Health & Safety Plan

Coronavirus COVID-19 Preparedness for Field Work & Project Sites

TO ACCOMPANY PROJECT HASPs and DISCUSS WITH PROJECT TEAMS

Field work will continue to be performed so long as project sites are accessible, and the work can be performed safely. If you have a question about project or site accessibility, ask the GEI project manager and/or client contact about whether there are any access restrictions in place. If your project is suspended, contact your project manager and branch manager to discuss other assignments.

While working in an outdoor environment is better than enclosed areas, the primary precautions we need to continue to take are distancing and good hygiene.

1.0 COVID-19 and Symptoms

DO NOT report to work if you are sick.

- If you experience a fever or symptoms associated with COVID-19 (fever, cough, shortness of breath), stay at home and contact your licensed healthcare provider.
- If you, a household member, or someone you have come into first-hand contact with someone who has a confirmed COVID-19 diagnosis, **DO NOT** come to work.
- If you have tested positive for COVID-19, **DO NOT** come to work even if you are not experiencing any symptoms of illness.

2.0 Reporting

GEI has developed two reporting applications (APPs) for employees to use when reporting COVID-19 symptoms, exposures, or positives tests and for completing daily COVID-19 screening when working in a GEI office or project location. These APPs are available to download to your smartphone (instructions can be found on the GEI COVID-19 Response Page) or can be used from the GEI COVID Response SharePoint and MS Teams platforms.

2.1 COVID-19 Reporting

If you experience COVID-19 related symptoms, have been in close contact with someone with COVID-19 or have tested positive for COVID-19 yourself, complete the COVID-19 Reporting APP after you have contacted your licensed healthcare provider. After submitting information into the reporting app, you will be contacted by a member of the Contact Tracing Team to discuss your situation and provide direction on where to locate appropriate care or testing facilities and discuss return to work timeframes based on the recommendations from the licensed healthcare provider, the continued monitoring of your health, results of COVID-19 tests (if administered), and the information described in Section 3.5. If your project has specific COVID-19 reporting requirements, these will need to be followed in addition to GEI's reporting.

When an employee tests positive for COVID-19 and has been in an office space, deep-cleaning procedures will be triggered.

Employees who have been in direct or indirect contact with and individual who has tested positive for COVID-19 a member of the People Team will be in contact to notify you of the potential exposure and provide guidance.

2.2 Daily Screening/Check In

If you will be working at a GEI office, project location, or another location other than you home you must complete GEI's Daily Check In screening. This is done using the Check In APP and is to be done each day before you enter the work location.

The Check In APP will require you to respond to three screening questions:

- Do you have a cough, shortness of breath or difficulty breathing OR a fever above 100 degrees?
- Do you have any TWO of the following symptoms: chills, repeated shaking with chills, muscle pain, headache, sore throat, or new loss of taste or smell?
- Have you been exposed to, or tested positive for COVID-19?

Answering yes to any of these questions will prompt you to not enter the workplace and contact your healthcare provider. A member of GEI's Contact Tracing Team will contact you following this submission. Answering no to all of these questions will allow you to safely proceed to work.

The APP automatically will check you into the home office location you are assigned. If you are entering a place other than this office, type in the location and click submit.

2.3 Project-Specific Monitoring/Screening

Clients, general contractors, or projects may have screening procedures in addition to those provided in this document. Understand what these are and what you will need to be able to follow them before arriving at the project site and performing work. In addition to understanding these procedures, plan for the additional time that may be needed to meet these requirements.

If you observe a person on a project site showing COVID-19 symptoms, regardless of whether it is the client, a contractor, or a visitor onsite, **immediately** notify the site manager and your project manager/supervisor.

3.0 Distancing & PPE

COVID-19 spreads from person-to-person primarily through droplets that are emitted from the initial person to a distance of 6 feet.

- Maintain a distance of at least ***6 feet (2 meters)*** from others. This includes during site meetings and breaks and while performing work tasks. Meetings should be held outside or by phone/video.
- Minimize the number of employees in one location to the extent possible. Follow local restrictions for maximum number of people congregated in one location at a time.
- If tasks need to be performed close to others (within 6 feet) and that cannot be avoided, wear appropriate PPE including a face mask (surgical or cloth), gloves, and eye protection.

  NOTE: Face masks are not a substitute for distancing. Masks are meant to protect others in case you are infected. Contact the Safety Team (safetyteam@geiconsultants.com) to discuss any special circumstances and the PPE needed.
- Wear nitrile gloves as much as practicable and change them frequently. As practicable, wash your hands or use sanitizer between glove changes. Wash your hands after wearing gloves.
- Minimize and stagger time in office spaces to performing essential duties such as picking up and dropping off equipment and samples. If you need to spend more time in a project office (e.g., a construction trailer), it's important that the workspace allows for proper social distancing.
- When traveling to project sites, travel in separate vehicles. Do not travel in the same vehicle.

4.0 Hygiene Practices

Practice the following:

- Frequent hand washing with soap and warm water for 20 seconds, especially after being in a public place, or after blowing your nose, coughing or sneezing. Bringing containers of water and soap with you is a good solution if it isn't present at the project site. If soap and water are not readily available, use hand sanitizer (containing 60% alcohol) until soap and water can be used.

- Cover coughs or sneezes with a tissue, then dispose of the tissue in the trash and wash hands. Cough/sneeze into your elbow if a tissue is not available.
- Avoid touching your face with your hands.
- Restroom availability may be limited. Many public locations are now closed or do not allow access into buildings. Identify accessible restrooms prior to beginning work. If unavailable, portable restrooms should be considered.
- When filling water bottles (for drinking or hand washing) keep the bottle away from the spigot to avoid transfer of germs or contaminants. Do not share water bottles.
- Wipe down surfaces with disinfectant routinely (at least once per day). This includes field equipment and other items that may have been used by others. This is especially important while working in construction trailers. When using company and personal vehicles, wipe surfaces including the steering wheel, gear shifter, controls, and door handles ***before and after*** use.
- Handshaking, hugging, or other personal contact to greet others is prohibited. Use greeting from a distance such as a wave.
- Avoid sharing field equipment and other materials with others. Before using field equipment or putting it away, wipe it down with disinfectant or wash it with soap and water. Take extra caution using disinfectants while collecting environmental samples to ensure that the samples are not compromised.
- Do not share PPE including personal hand sanitizer dispensers. Use best practices to minimize contact when using publicly shared dispensers.

More detail on ways to protect yourself through distancing and hygiene can be found at MIT Medical's website: https://medical.mit.edu/three-ways-to-protect

5.0 Use of Public Places

- If your project requires you to stay in a hotel, practice the disinfecting precautions described above.
- If you will be eating food/drinks, order take-out or use delivery services at restaurants. Wash your hands before eating.
- Minimize the use of public transportation traveling to and from project sites. Use your personal vehicle (preferred), GEI vehicle, or a ride service such as Lyft.
- If you have concerns, discuss them with the project manager, your supervisor, branch manager, and/or with your Regional Safety Manager (RSM) or with Steve Hawkins, Safety Director.

6.0 Resources

Additional information can be found through the resources below:

- Centers for Disease Control and Prevention (CDC) https://www.cdc.gov/coronavirus/2019-ncov/index.html
- Public Health Agency of Canada https://www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19.html
- Provincial and Local Agency Resources https://www.ontario.ca/page/2019-novel-coronavirus#section-0
- World Health Organization https://www.who.int/emergencies/diseases/novel-coronavirus-2019

7.0 Notifications and Concerns

The precautions included in this guidance and in other GEI's employee communications should be practiced at all project site locations and offices. While COVID-19 related information is not expected to be reported through GEI's incident reporting process, the expectation is that all employees will communicate any inconsistencies or concerns with practices at project sites to their project manager, supervisor, branch manager, and RSM. This will allow us to make corrections/updates and provide proper protective measures.

Information about preventing COVID-19 exposure is changing regularly. The information included in this guide are general steps we can take while performing field assignments and should be included in HASPs and safety briefings. If you have specific situations, questions, or concerns please discuss them with the Project Manager, your RSM, or Steve Hawkins.

FORWARD

National Grid's vision is to be a world-class safety organization, with zero injuries every day. A critical component of achieving this vision is the careful development, implementation and maintenance of safety procedures. This guidance document, COVID-19 Health and Safety Plan, describes pandemic response measures, taken by National Grid, to help prevent the spread of COVID-19.

Questions regarding this guidance should be referred to National Grid's Safety Department.

Record of Change

Revision	Date	Description
Initial	4/28/2020	Initial creation
1	5/06/2020	Updated Job Brief Checklist to reflect current face covering requirements, vehicle cleaning guide correction
2	6/18/2020	Updates made to add the daily symptom check process, removed the job brief checklist, updated face covering requirements, and state requirements.

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1.0 SCOPE OF HEALTH & SAFETY PLAN

National Grid has developed the following Health & Safety Plan to uniformly apply pandemic response measures to help prevent the spread of the COVID-19 virus. National Grid field personnel and crews have been provided the included information and communications.

2.0 PROJECT PERSONNEL

2.1 Roles and Responsibilities:

National Grid shall be responsible for the safety of all its employees and will ensure COVID-19 pandemic measures are in place. Key National Grid personnel are as follows:

Incident Command Structure

The National Grid Incident Command Structure (ICS) was activated within all Business Units of National Grid's US Operations to respond to the COVID-19 pandemic in March 2020. Members of the ICS reviewed and approved all operational decisions, with the Incident Commander ultimately responsible for these decisions. The Incident Commander relied upon subject matter experts within the ICS, including the Operations Officer, the Safety and Health Officer, to help set standards and guidance for protective measures to be used to limit the spread of the COVID-19 virus. These Officers, in turn, utilized the expertise of other members of the organization within Operations, Safety, and Health, to assess risks associated with the work being performed and provide guidance on the most effective measures to be used by employees to protect themselves, their coworkers, our customers, and members of the public.

Oversight responsibilities of the Incident Command Structure (ICS) were transitioned to the Plan Forward team upon ICS dissolution in May 2020. Responsibility for recommendation of standards and guidance was transferred to the Safety and Health teams at National Grid, in conjunction with input from Operations and Support Services teams, as necessary.

Field Supervisor

The Field Supervisor shall have the responsibility for monitoring and enforcing National Grid COVID-19 pandemic measures and shall ensure that all employees have received and reviewed this Health & Safety plan.

- Serve as the appointed supervisor to oversee field personnel and ensure pandemic measures are being followed
- Ensure field personnel have the appropriate pandemic supplies

- Disseminate all new National Grid COVID-19 communications to all field employees
- Where non-compliance is observed, take prompt corrective action; and
- Have the authority to order a safety stop in the event of a serious safety issue.

Crew Leader

The National Grid crew leader shall be in charge of the day-to-day details of the work to be performed, effectively acting as COVID-19 Safety Officer for the site; they shall ensure that work is performed in accordance with National Grid COVID-19 pandemic measures.

- Walk the job site at the start of each day to ensure a safe work environment;
- Where non-compliance is observed, take prompt corrective action; and
- Have the authority to order a safety stop in the event of a serious safety issue.
- Perform the daily job safety briefing before commencing work, whenever a visitor arrives to the job site and if there is a significant change in the work or extended break.

Employees

National Grid employees are responsible for following all COVID-19 pandemic measures;

- Each employee is responsible for reporting to supervision any symptoms of COVID-19, any direct contact with an individual confirmed to have COVID-19 or is in quarantine.
- Each employee is obligated to call a safety stop when a hazardous condition is observed.
- All workers shall conduct a self-assessment utilizing the COVID-19 daily symptom checklist (App A) and adhere to the guidance outlined in this plan.

National Grid Field Safety Representative

National Grid Field Safety Representative's conduct routine and random crew visits to National Grid job sites. The National Grid Field Safety Department shall act as a resource for National Grid Field Personnel to effectively implement this COVID-19 Health & Safety Plan and will be available on an as needed basis for inquiries related to this plan.

3.0 COVID-19 PANDEMIC RESPONSE MEASURES

3.1 COVID-19 Symptoms

COVID-19 Symptoms may include the following:

- Cough, shortness of breath, of difficulty breathing
- Chills, feverish or fever of 100.3 or greater
- Generalized muscle pain or aches, fatigue or headaches

Other possible symptoms include; sore throat, runny/stuffy nose, or recent loss of taste or smell, nausea, vomiting, or diarrhea.

ZERO Tolerance for sick employees:

If you, or a person in your home, is experiencing any of the above symptoms or are feeling sick please do not come to work.

3.2 Hygiene and Social Distancing

- Wash your hands often with soap and water for at least 20 seconds, especially after using the restroom, before eating, and after blowing your nose, coughing, or sneezing. Hand washing is the best way to prevent the spread of viruses.
- If soap and water are not readily available, use an alcohol-based hand sanitizer with at least 60% alcohol. Always wash hands with soap and water if hands are visibly dirty.
- If drying of hands is necessary, single use disposable towels or rags shall be used. No sharing of these drying materials should be allowed amongst crew members and used materials should be disposed immediately after use.
- Proper hand washing/sanitizing products will be provided to all employees.
- Maintain a minimum of 6’ social distance from other employees on site while performing work and during routine breaks. When work tasks prevent this ensure proper face coverings are continued to be worn and proper hygiene.
- During routine breaks, when face coverings are removed for eating and drinking, maintaining 6’ social distance will be enforced by crew members.
- Be sure to use your own water bottle. Do not share. Avoid touching your eyes, nose, and mouth.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash.
- Clean and disinfect frequently touched objects and surfaces, including vehicles and equipment, using a disinfecting cleaning spray or wipe, if not available use soap and water solution.
- All cleaning product trash and potentially contaminated PPE will be stored in a trash bag and immediately disposed of at a National Grid facility at the end of each shift, trash should not accumulate in any National Grid vehicle. Immediately

wash hands upon disposing of trash bag.

3.3 COVID-19 PPE and Face Coverings

- Face coverings are a requirement for all National Grid employees. Face coverings must be worn by all employees:
    - When working in public/outdoor places face coverings must be worn when 6-ft social distancing cannot be maintained at all times. (Unless required by a local mandate)
    - Even when maintaining social distancing is possible, a face covering must always be in your possession. (your hand, pocket, around your neck, etc.)
    - When working in a customer's premises.
    - When 6-ft social distancing is not able to be maintained with a co-worker, customer or member of the public in a National Grid facility, barn/yard, work location or company vehicle.
- Non-Fire-Retardant/Arc Rated Face Covering– use when there is no potential for a gas ignition or electric arc flash (company supplied or personal face covering)
- Fire Retardant Face Covering – use when there is potential for a gas ignition or electric arc flash
- Additional COVID-19 PPE guidance is provided in the attached Premise Entry Guidelines
- Massachusetts Only: All construction workers will be required to wear cut-resistant gloves or the equivalent, except where state or safety mandates state otherwise

3.4 COVID-19 Virus Risk Assessment and Adopted Measures

National Grid's prescribed measures (work practices, PPE, hygiene) were selected based upon the risk assessments completed by subject matter experts and reported up through the ICS for approval. They are based upon CDC and OSHA guidance, as well as input from Operations, Safety, and Health team members, and are believed to address all risks posed to our workforce, as well as to our customers and members of the public, when jobs are conducted in public places. These measures are reviewed on a continuous basis, for both effectiveness and to ensure the latest guidance is incorporated, with changes made, as necessary, after these reviews.

3.5 Worksite Travel

Employees should attempt to travel to and from worksites in separate vehicles if practical and sufficient parking exists.

When separate travel is not an option employees should:

- Limit to 2 people in a vehicle if possible

- Be seated as far apart as possible
- Must wear face coverings
- Drive with open windows if possible

4.0 COVID-19 REPORTING PROCESS

4.1 COVID-19 Daily Symptom Checklist

All employees shall utilize the daily COVID-19 symptom check via myCority or IVR, which replaces the existing similar review (job briefs) that had been taking place. All visitors to the job site will likewise be required to complete a COVID-19 symptom check prior to entry on the job site. Please refer to the COVID-19 Daily Symptom Check guidance document in App A.

4.2 COVID-19 Incident Reporting

To ensure the safety of all employees and the public any employee shall immediately contact their Supervisor and National Grid Employee Services if one of the following conditions occur:

- Employee is exhibiting symptoms of COVID-19
- Employee has been in close contact of another individual with COVID-19
- Employee has been in close contact of another individual who is currently being quarantine for a suspected case of COVID-19

Close contact is defined as being within 6' of a sick individual for more than 15 minutes.

Please refer to the COVID-19 Suspected/Confirmed Positive Process guidance document in App A.

Appendix A – National Grid COVID-19 Communications

COVID-19 Daily Symptom Check

All employees who are not working from home, must undergo a daily symptom checking protocol to monitor potential symptoms and/or exposure to COVID-19. Employees working from home, must identify themselves as such daily. Visitors, contracted employees and contractors working at our facilities must also perform symptom checks.

In addition to state mandates and CDC guidance regarding symptom checks, scientific evidence shows that adherence to daily monitoring can be highly effective in promoting individual awareness of mild symptoms and help ill individuals prevent the spread of the virus to others. As a community, daily adherence by all will also provide a level of assurance to all employees regarding their welfare in the workplace.

If you have a network sign-on and have access to a company device:			
And today you are working….	Is a daily symptom check required?	Symptom Check Method	Additional Time Entry Instructions
At home	No	N/A	**(1) Each day you work at home, you must enter "home" in the comments section of your time entry**
At a NG office, or entering a NG office for any length of time or working at a NG facility, jobsite or field location	Yes	**(2) Web-based questionnaire**	N/A
If you do not have a network sign-on or do not have access to a company device:			
And today you are working….	Is a daily symptom check required?	Symptom Check Method	Additional Time Entry Instructions
At a NG office, or entering an NG office for any length of time or working at a NG facility, jobsite or field location	Yes	**(3) Phone questionnaire (IVR)**	N/A

Symptom-checks must be performed either before leaving home or immediately upon arrival at the workplace. Self-checks are only required once per day and do not need to be repeated if you are called back to work, unless you develop symptoms.

If you answer yes to any questions, stay home or leave the workplace, notify your supervisor and call Employee Services at **888-483-2123** to be referred to a company Nurse Practitioner.

It is important that every employee perform their applicable activity (either a symptom check or time entry with comments of "home") each and every work day.

COVID-19 Daily Symptom Check – IVR

To Complete the COVID-19 symptom check by phone (IVR), have your Employee ID number ready and follow the instructions below. If you don't know your Employee ID number, please contact your supervisor.

- Call 833-986-1441
- When prompted enter your Employee ID number. Once your Employee ID number is verified, you will be prompted to answer the questions below. Please note, that these questions may change in response to scientific or government guidance.
- If your Employee ID number is not verified, you will be prompted to re-enter your Employee ID number. If still not verified, you will be instructed to contact your Supervisor to obtain a valid Employee ID number and the call will disconnect.
- You must answer all questions by:
    - ***Saying Yes or pressing 1***
    - ***Saying No or pressing 2***

In the past 14 days: *1. Have you been experiencing any cough, shortness of breath, or difficulty breathing?* *2. Have you been experiencing any chills, felt feverish, or had a fever of 100.3 or greater?* *3. Have you been experiencing any (generalized) muscle pain/aches, fatigue, or headaches?* *4. Have you been experiencing any sore throat, runny/stuffy nose, or recent loss of taste or smell?* *5. Have you been experiencing nausea, vomiting, or diarrhea?*
6. Have you tested positive for COVID-19 in the past 14 days?
7. Have you been in close or proximate contact (less than 6 feet) in the past 14 days with anyone who has tested positive for COVID-19 or who has or had symptoms of COVID-19?
8. Have you been directed to quarantine or isolate by the any Department of Health or a healthcare provider in the past 14 days?
9. For Rhode Island Employees - Have you returned to Rhode Island from an area still under a stay-at-home order or another similar type of restriction in the past 14 days?

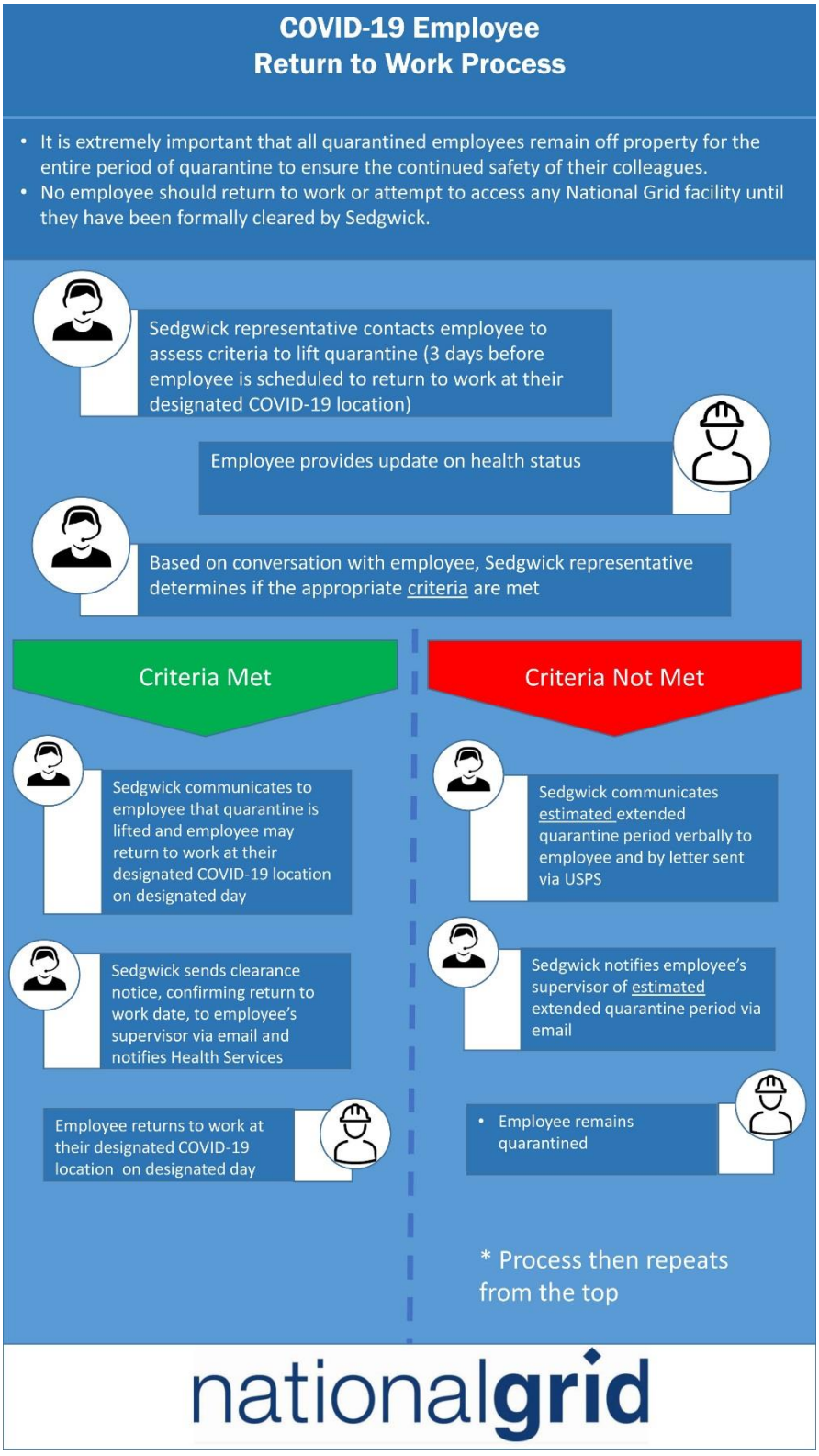
Once complete you will hear the following message:

If you answer “Yes” to any of the questions, please leave the work location, contact your supervisor and call Employee Services at (888) 483-2123. If you feel that you have symptoms related to COVID-19 please contact your healthcare provider. Thank you and have a nice day. (The call will then disconnect).

All responses collected will be maintained in a secure and confidential manner in accordance with applicable laws.

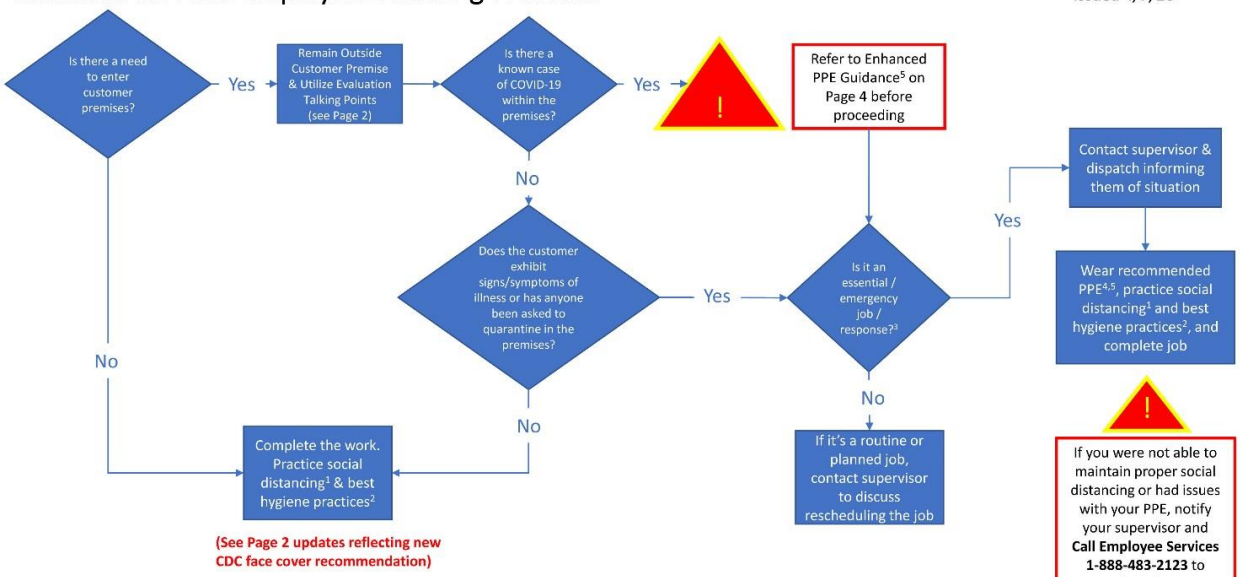
For technical issues, please check the IT Portal visit the Virtual Techbar, or call the

IT Service Desk at 1-877-373-1112


COVID-19 Employee
Return to Work Process
It is extremely important that all quarantined employees remain off property for the entire period of quarantine to ensure the continued safety of their colleagues.
No employee should return to work or attempt to access any National Grid facility until they have been formally cleared by Sedgwick.
Sedgwick representative contacts employee to assess criteria to lift quarantine (3 days before employee is scheduled to return to work at their designated COVID-19 location)
Employee provides update on health status
Based on conversation with employee, Sedgwick representative determines if the appropriate criteria are met
Criteria Met
Criteria Not Met
Sedgwick communicates to employee that quarantine is lifted and employee may return to work at their designated COVID-19 location on designated day
Sedgwick sends clearance notice, confirming return to work date, to employee's supervisor via email and notifies Health Services
Employee returns to work at their designated COVID-19 location on designated day
Sedgwick communicates estimated extended quarantine period verbally to employee and by letter sent via USPS
Sedgwick notifies employee's supervisor of estimated extended quarantine period via email
Employee remains quarantined
* Process then repeats from the top
nationalgrid

Guidance for Field Employees Entering Premises

Issued 4/7/20



See Page 2 for additional information on Talking Points, CDC Recommendations for (1) Social Distancing and (2) Best Hygiene Practices
See Page 3 for National Grid (3) Emergency Work at a Premises and (4) Standard PPE Guidance
See Page 4 for National Grid (5) Enhanced PPE Guidance

Issued 4/8/20

Talking Points - Engage Customer

Prior to entry, engage the customer and advise of social distancing practices. Here are some questions and statements.

- Does someone within the premises have a known case of COVID-19? Has someone within the premises tested positive for the COVID-19 virus?

(IF ANSWER IS 'YES' TO EITHER OF THE ABOVE QUESTIONS, REFER TO ENHANCED PPE GUIDANCE ON PAGE 4)

- Do you mind if I follow the social distancing practice today?
- Is anyone currently sick inside the premises?
- If you are feeling sick, would you mind remaining in another room while I am working This is a best practice policy my company is recommending. Can you tell me where your equipment is located?
- I will do my job, keep you updated and tell you when I am done

(1) Social Distancing

- Maintain at least 6 feet distance between yourself and the customer at all times
- Where social distancing measures cannot be maintained, face cover can be worn to help limit the spread of the virus (see National Grid's Face Cover Guidance for details)

(2) Best Hygiene Practices

- Face covering can be worn in public settings where social distancing measures cannot be maintained (see National Grid's Face Cover Guidance for details)
- Use alcohol-based hand sanitizer (at least 60% alcohol), before and after each home visit; OR wash hands using soap and water for 20 seconds

Issued 4/8/20

(3) Emergency Work at a Premises

On arrival, assess the premise/situation in its entirety and consider these questions.

- Is it a multi-unit building?
  - Is the unit where work is required affected?
- What work can be done without interaction/entry?
- Is entry through a side or back door possible to limit exposure?
- Can make safe actions be taken without interaction/entry?
  - Securing Outside Meter/Curb Valve
- Would a hardship be caused by isolating the service?

Note: These questions and considerations are meant to help guide in the decision making process. There may be instances where access to a premise cannot be avoided in order to address immediate public safety concerns. Please reference the Social Distancing and applicable PPE Guidance in all situations.

(4) Standard PPE Guidance for Entering a Premises (No Known COVID-19 cases are present)

- Avoid touching ANYTHING in customer premises other than company equipment and customer equipment related to the job
- Wear disposable latex or nitrile gloves to prevent touching contaminated surfaces
- Latex or nitrile gloves should be donned before entering the home
  - If work gloves are needed to perform the task, remove disposable latex or nitrile gloves and dispose of them. Don work gloves and perform task. Once task is complete remove work gloves and store them. Don a new pair of disposable latex or nitrile gloves to exit the home.
- Remove latex or nitrile gloves and dispose in way that won't create other opportunities for exposure
- Immediately wash / sanitize hands after removing latex or nitrile gloves
- All other PPE normally required for the work being performed should be used

3

Issued 4/8/20

(5) Enhanced PPE Guidance for Entering a Premise (Where a Known COVID-19 Case is Present)

The most effective way to protect the employees from contracting the virus is physical distance; if at all possible, the customer diagnosed with COVID-19 should be asked to move to a separate room before premises entry. When available and practicable, the following PPE items may be used at the premises with a known COVID-19 case present. These PPE items can be used in combination with our Social Distancing and Best Hygiene Practices to limit the spread of the virus.

- N-95 / KN-95 mask (see Page 5 for pictures of typical N-95 / KN-95 masks available)
- Reusable Face Shield
- Disposable Surgical Gloves (nitrile or latex)
- All other PPE required for doing the work (i.e. safety glasses, hard hat, etc.)
- If desired, FR-rated balaclava may be worn to provide additional protection while working

The following steps should be taken while conducting work in the premises:

- Prepare a paper or plastic bag for disposal of used PPE prior to entering the premises.
- Avoid touching ANYTHING in customer premises other than company equipment and customer equipment related to the job.
- Wear disposable latex or nitrile gloves to prevent touching contaminated surfaces.
- Any PPE should be donned before entering the home.
- If a mask is in use, avoid touching your face or adjusting the mask.
- If work gloves are needed to perform the task, remove disposable latex or nitrile gloves and dispose of them. Don work gloves and perform task. Once task is complete remove work gloves and store them. Don a new pair of disposable latex or nitrile gloves to exit the home.

Once work is completed in the home, follow these steps to safely remove the PPE items

- Remove face shield, taking care to avoid touching your face. Clean / disinfect and store properly.
- Remove mask from the back of the head first, taking care to avoid touching your face. Place used mask in a bag and dispose in normal trash.
- If balaclava has been worn, remove covering from back of head, similar to removal of mask.
- Remove latex or nitrile gloves (turn inside out while removing) and place in a bag. Dispose of bag in normal trash.
- Immediately wash / sanitize hands after removing latex or nitrile gloves, following Best Hygiene Practices.

4

Issued 4/8/20

Typical N-95 / KN-95 masks

5

**Where N-95 face coverings are mandated, training will be provided in accordance with OSHA guidelines.

Safeguarding your Vehicle

Now, more than ever, with COVID-19, precautions to safeguard your vehicle when transferring the vehicle to another employee, or when taking your vehicle in for maintenance, is very important.

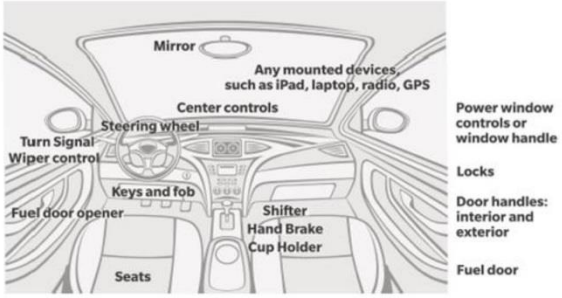
Here are some high-touch areas that should **never** be missed:

• Mirror • Center controls • Keys and fob • Wiper control • Climate control • Audio controls • Hand brake • Seats *(driver/passenger)*/Seatbelts • Fuel door opener • Windows • Headrests • Armrests	• All mounted devices *(any and all electronic devised used - i.e. iPad, laptop, radio, GPS, phone chargers)* • Steering wheel • Headlight • All cabin lighting controls • Shifter • Cup holder • Door handle*(inside and out)*/Window control/locks • Air vent • Sun visors

Use disinfectant wipes, diluted bleach solution, or damp soapy water wipes when cleaning all hard surfaces throughout the vehicle.

To guide your efforts when cleaning the vehicle, think about where droplets would fall when you sneeze or cough (*for example: do you turn your head to the side?) and remember to think about your own personal safety:*

- Be sure to wash your hands for **20 seconds** after completing the cleaning process.
- If you take your vehicle home at night, be sure to lock it to prevent it from being compromised.
- Make sure you have a mask and gloves (when/where appropriate).



Before you leave or enter the vehicle – here's a checklist to keep you safe and your team members safe as well:

Activity to Safeguard	☑
Keys / Fob	
Door Handles (interior/exterior)	
Steering Wheel, Shift Lever, Brake Lever, Wiper Stalk, Turn Signal Stalk	
Air Vents, Console, Dashboard, Cup Holder	
Exterior and Interior Fueling Latch, Cover, Cap	
Seats, Seatbelts, Headrests	
Mirrors, Windows, Window Controls	
Interior Lights	
Sun Visors	
Passenger and Driver Door Armrests, Grab Handles, Seat Adjusters	
All Electronic Devices used while in vehicle (iPads, Navigation Systems, Phone Chargers, Laptops, etc.)	

Additional considerations for crew trucks:

Handles on bin doors	
Equipment controls within Bucket (lower / upper) or Digger	

**** Please consider any other touch point identified by a crew member but not listed***

Safety Health Environmental nationalgrid

Contract Employees COVID-19 Reporting Process

Health Services does not typically manage the absences of our contract employees, "contractors". However, to protect our employees, we are screening sick/exposed contractors to determine if they have come into contact with National Grid employees, or if a facilities/vehicle deep cleaning is required. Contract employees are required to call Employee Services (ES) (888) 483-2123 directly. If the contractor does not call Employee Services, the National Grid supervisor may call ES to report the contractor out of work and to initiate contact tracing.

Contractors must be cleared to return to work (RTW) at National Grid by their employer. Per National Grid best practices, we are recommending a 14-day quarantine beginning on the date of notification for all contractors who are sick or believe they have been exposed to COVID-19.

Reporting Process:

1. Contractors call Employee Services **(888) 483-2123** for screening
2. Nurse Practitioner (NP) screens the contractor to determine National Grid close contacts, or if a National Grid facility or vehicle requires deep cleaning. NP obtains employer name and contact email from contractor
3. NP advises contractor to contact their doctor and their employer
4. An email will be sent to National Grid supervisor and the contractor's employer with quarantine start and end date (see email below)
5. Contractor must follow employer's RTW process and complete recommended quarantine (and be symptom free for 3 days)
6. NP will notify any National Grid close contacts to quarantine for 14 days and email National Grid supervisor(s)
7. After 14 days have elapsed, the contractor's employer must send an email to NP confirming that the contractor has returned to work, i.e., all RTW notifications and documentation must be forwarded to Mary Brown, NP Mary.Brown2@nationalgrid.com

Supervisor:

If you are calling Employee Services to report a contractor out of work so that we may initiate contact tracing, or a facilities deep cleaning, please be prepared to answer the following questions when speaking with the NP regarding your contractor:

- Contract employee name
- Contract Employer
- Contract Employer supervisor and email address
- Last date contractor was on National Grid worksite
- National Grid employees the contractor has been in close contact with
- Facilities/vehicle deep cleaning required

email sent to supervisor when contractor is taken out of work for quarantine:

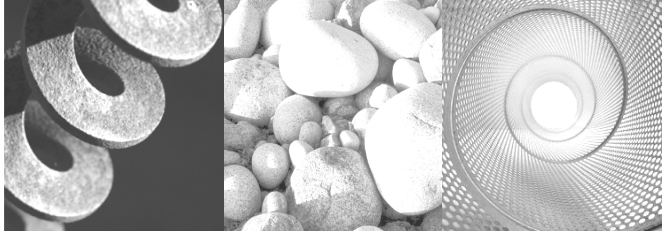
RE: Quarantine **Confidential**

The contract employee "contractor" listed below has been quarantined and cannot report to a National Grid worksite until they have completed the recommended quarantine. This contractor will follow their employer's process for return to work. After the recommended quarantine has elapsed, and the contractor has been cleared to return to work by their employer, please send email to (Mary.Brown2@nationalgrid.com) to let us know the contractor is back on site.

Contract Employee Name:
Department/Contractor company:
National Grid Supervisor:
Quarantine start date:
End Date:

Attachment B

Community Air Monitoring Plan (CAMP)



GEI Consultants

Consulting
Engineers and
Scientists

Community Air Monitoring Plan

Canastota Non-Owned Former MGP
Canastota, New York
NYSDEC Site #: V00477
Index #: D0-0001-0011

Prepared for:
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March 2022
Project 034390

Daniel Kopcow, P.E., PMP
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Christopher T. Gordon, PMP
Air Monitoring Practice Leader

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Abbreviations and Acronyms

CAMP	Community Air Monitoring Plan
DPW	Department of Public Works
GEI	GEI Consultants, Inc.
HASP	Health and Safety Plan
MGP	Manufactured Gas Plant
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PAH	Polycyclic Aromatic Hydrocarbons
PDI	Pre-Design Investigation
PID	Photo-ionization Detector
ppm	Parts per Million
PM_{10}	Particulate Matter of 10 Microns in Diameter or Less
SVOC	Semi-Volatile Organic Compounds
TVOC	Total Volatile Organic Compounds
$\mu g/m^3$	Micrograms per cubic meter

1. Introduction

This document presents the Community Air Monitoring Plan (CAMP) that will be implemented during the Pre-Design Investigation (PDI) of the Canastota Non-Owned Former manufactured gas plant (MGP) site, located in the Village of Canastota, New York (the Site). A CAMP is required by the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH) at sites where ground-intrusive activities may result in airborne release of contaminants. Towards that end, community air monitoring will be performed for total volatile organic vapors (TVOCs), and for particulates (dust).

The Site is located on East North Canal Street in the Village of Canastota, New York. The former MGP operations on-Site were conducted within a parcel of land that is currently owned by the Village of Canastota. This parcel is currently used by the Village of Canastota Department of Public Works (DPW) for its garage and equipment facility, and is covered by the garage building, a parking lot, and gravel- or grass-covered areas.

This CAMP specifically applies to the PDI phase of work for the Site. The PDI fieldwork involves the excavation of test pits, the advancement of subsurface soil borings, the installation of monitoring wells, and the collection of soil and groundwater samples. Community air monitoring will be performed during the excavation and backfilling of the test pits, and during the drilling of soil borings and monitoring wells.

The objectives of this CAMP are to:

- Minimize the emission of TVOCs and particulates during ground-intrusive activities.
- Provide an early warning system so that potential emissions can be controlled on Site at the source.
- Document the measurements of TVOCs and particulates during working hours.

This CAMP is a stand-alone document of GEI's site-specific Health and Safety Plan (HASP). The HASP is directed primarily toward protection of on-Site GEI employees within the designated work zones.

2. Air Monitoring Equipment and Methods

This section provides instructions for conducting the CAMP. Discussed are the equipment to be used and what monitoring is to be performed. For the Site, TVOCs and particulates (dust), in the form of 10 microns or less (PM_{10}), will be measured during the excavation and backfilling of test pits, and during the drilling of soil borings and monitoring wells.

In addition to the CAMP, work/exclusion zone monitoring will be performed during work activities where impacted soil or groundwater may be encountered. GEI personnel will be responsible for providing work/exclusion zone air monitoring for GEI staff, and the contractor will be responsible for their own air monitoring. The exclusion zone air monitoring requirements, equipment, and action levels are described in the site-specific HASP for this project. When work zone TVOC or PM_{10} readings are found to exceed the downwind CAMP limits, the field staff will check the upwind and downwind air monitoring instruments to assess whether control measures will be required. These control measures are further described in Section 3.

2.1 Monitoring Locations

Two community air monitoring locations will be established at the start of each workday: one location that is upwind of the work area, and one location that is downwind of the work area/exclusion zone. The purpose of the upwind station will be to assess the background concentration of TVOCs and PM_{10} at the Site. The downwind monitoring station will be used to assess compliance with the NYSDEC/NYSDOH specified Action Levels for VOCs and PM_{10}. The upwind TVOC and PM_{10} measurements will be subtracted from the downwind measurements to compare the downwind instrument readings to the CAMP Action Levels.

The location of each monitoring station will be noted on the CAMP Daily Field Report Form along with the start and stop time of the monitoring. A sample form is provided in Attachment A. The locations of the instruments may be changed during the day to adapt to changing wind directions.

If the work zone is less than 20 feet from the nearest occupied building, the downwind air monitoring station will be positioned at the air intake for the building or at the most sensitive exposure point for the downwind receptors. Background measurements inside the building will be made prior to the start of work. If exceedances of the action levels are measured at the outside wall of the building, additional measurements will be made inside the building using portable meters.

If necessary, precautions to minimize the release of VOCs and particulates will be taken at the work zone, and engineering or work controls used to protect the downwind receptor. These controls for minimizing releases from the work zone are discussed in Section 3.

2.2 Air Monitoring Equipment

Each monitoring location will include a photo-ionization detector (PID), particulate meter, and a data logging device with modem communication for data transmittal and alerting. Equipment will be mounted on a tripod in a vented protective case and programmed to record 15-minute averages. The monitoring instruments will be calibrated at the start of each workday and again during the day if the performance of an instrument is in question. The time and method of calibration will be noted on the Daily Report Form (Attachment A). Real-time TVOC and PM_{10} measurements will be transmitted to a centralized data logger system. GEI personnel will check the instrumentation at each location regularly during the workday to ensure that they are operating properly.

2.2.1 TVOC Monitoring Equipment

TVOC monitoring will be performed using PIDs (RAE Systems™ MiniRAE 3000 or equivalent) equipped with a 10.6 eV bulb. The PIDs will be connected to a data logger in each monitoring station. The data logger will use recorded 1-minute data to calculate 15-minute running average concentrations. An email or text alert will be sent to GEI field personnel if the measured 15-minute average TVOC concentration exceeds 5 ppm.

2.2.2 Particulate (Dust) Monitoring Equipment

Particulate monitoring will be performed using MetOne ES-642 aerosol (dust) meters affixed with cyclone inlets that are set to measure PM_{10}. The equipment used will be set to record 15-minute running average concentrations for comparison to the Response and Action Levels.

In addition to the instrument readings, fugitive dust migration will be visually assessed during all work activities, and observations will be recorded in the field book. Per NYSDEC requirements, visible dust migration is not permissible. If visible dust is observed to be migrating from the work zone, the work will be stopped, and dust control measures implemented.

2.2.3 Data Logger Equipment

All TVOC and PM_{10} data will be stored in data loggers located at each monitoring station. Real-time data from each station will be sent via cellular modem, to a central computer system for monitoring and analysis. In the event of severe weather or power loss at the Site,

data recording and/or recovery may be affected. GEI personnel will discuss whether or not monitoring should continue during severe weather events.

All data will be downloaded to a computer system and saved for review. The data will be provided to the NYSDEC and/or the NYSDOH upon request at any stage of the project.

If TVOC or PM_{10} Response and Action Levels are exceeded during the workday, observed construction activities and the implemented mitigation control measures will be recorded on the Daily Field Report and reported to the on-Site NYSDEC representative. If an on-Site representative is not present, exceedances will be noted in the daily report to the NYSDEC project manager within one business day.

Table 1. Emergency Contacts and Telephone Numbers

Fire, Police, Ambulance		911
NYSDEC Contact	Justin Starr: Project Manager	(518) 402-9662 (office) (585) 943-1228 (cell)
GEI Contacts	Dan Kopcow: Project Manager Chris Gordon: Air Monitoring Practice Leader	(607) 206-9075 (cell) (860) 625-0633 (cell)
National Grid Contact	Steven Stucker: Project Manager	(315) 428-5652 (office) (315) 247-6490 (cell)

2.3 Odor Monitoring

The field investigation personnel will record observations of odors generated during the implementation of the PDI Work Plan. If odors attributable to the exposing of impacted media are observed in the work area during intrusive activities such as soil borings or excavation of test pits, observations will also be made at the downwind limit of the Site. The observations will be made to assess the potential for significant odors reaching onsite receptors or being transmitted off site. Downwind odor monitoring will be performed in conjunction with the PID, and dust monitoring program described in this CAMP.

Upon detection of odors at the Site perimeter, site controls, starting in the work area, will be implemented. The mitigation control measures described in Section 3 will be used to abate the odors. Note that the goal of the Odor Mitigation Plan is to minimize and to prevent, where practicable, the off-site migration of odors. Due to the short distances between any work area at the site and the on-site receptors property line, site controls will be implemented proactively when odors are detected in the breathing zone at any work area.

There is no Action Level specified for odors. In the event that odors persist at the downwind receptors or property line after control measures are carried out, the odor conditions will be discussed with the National Grid and NYSDEC project managers. If necessary, the odor conditions and significance will be discussed with the DPW site staff or neighbors.

3. Threshold Levels and Mitigation Control Measures

This section outlines the monitoring threshold levels and procedures to be used to control TVOCs, odors, and particulates that may be generated during the PDI field activities. The primary actions that may generate odors are test pit excavations and subsurface soil borings. The remainder of this section is intended to provide Site managers, representatives of NYSDEC and NYSDOH, and the public with information summarizing typical odor control options, and to provide some guidance for their implementation. A description of potential sources of odors and methods to be used for odor control are presented in the following sections.

3.1 Potential Sources of Odors and TVOCs

Generally, the residuals encountered at former MGP sites are well defined. They are related to residual coal tar-like materials and petroleum, and principally contain VOCs, polycyclic aromatic hydrocarbons (PAHs), and several inorganic constituents, including metal-complexed cyanide compounds, and metals. Constituents of MGP tar or petroleum products can produce odor emissions during investigation activities when they are unearthed during backhoe test pits and soil borings. When this occurs, VOCs and light-end semi-volatile organic compounds (SVOCs) can volatilize into the ambient air. Some MGP residuals can cause distinctive odors that are similar to mothballs, roofing tar, or asphalt driveway sealer. It is important to note that the CAMP will provide for continual monitoring of VOCs and particulates during the fieldwork to monitor for any potential release of constituents which may exceed the exposure limits for downwind receptors.

3.2 Monitoring Threshold Levels and Mitigation Control Measures

The air monitoring threshold levels and mitigation control measures for TVOCs and PM_{10} are presented in Table 1 below:

Table 2. Air Monitoring Threshold Levels and Mitigation Control Measures

TVOCs	
Threshold Level	**Mitigation Control Measures**
Alert >1 ppm at the wall of an occupied structure or at an air intake	• Check the indoor air concentration and compare with background measurements taken previously

Response >5 ppm above background for 15-minute average	• Temporarily halt work activities • Continue monitoring, especially inside of occupied structures • If VOC levels decrease (per instantaneous readings) below 5 ppm over background, work activities can resume
Action Persistent levels >5 ppm over background but <25 ppm	• Halt work activities • Identify source of vapors • Corrective action to abate emissions • Continue monitoring • Resume work activities if TVOC levels 200 feet downwind of the property boundary or half the distance to the nearest potential receptor is <5 ppm for a 15-minute average
Stop-Work >25 ppm at the perimeter of the work area	• Shut down work

PM_{10}	
Threshold Level	**Mitigation Control Measures**
Response >100 µg/m^3 above background for 15-minute average or visual dust observed leaving the site	• Apply dust suppression • Continue monitoring • Continue work if downwind PM_{10} particulate levels are <150 µg/m^3 above upwind levels and no visual dust leaving site
Action >150 µg/m^3 above background for 15-minute average	• Stop work • Re-evaluate activities • Continue monitoring • Continue work if downwind PM_{10} particulate levels are <150 µg/m^3 above upwind levels and no visual dust leaving site

Sources:

- NYSDOH Community Air Monitoring Plan, as published in NYSDEC DER-10, Appendix 1A, 2010.
- Fugitive Dust and Particulate Monitoring, NYSDEC DER-10, Appendix 1B, 2010.
- Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures, NYSDOH.

3.3 General Site Controls

Several general excavation or drilling procedure site controls that will be implemented include:

- Every effort will be made to minimize the amount of time that impacted material is exposed to ambient air at the site.
- For the test pit excavations, it may be possible to move some amount of soil around within the footprint of the test pit excavation in order to minimize the amount of soil removal and subsequent stockpiling of impacted soil at the ground surface. The use of in-excavation stockpiling of test pit soil will be evaluated on a

case-by-case basis and will only be performed with the approval of the NYSDEC field representative and will be completed only if it does not impede the collection of subsurface soils or the full delineation of the subsurface features being investigated.

- Drill cuttings from the borings will be containerized or backfilled as soon as possible during completion of each soil boring.
- Loading of excavated debris or soil that has been found by the site manager to be unsuitable material to return to test pits may generate VOCs and odors. Every effort will be made to complete this work as quickly as possible and to keep these materials covered at all times.
- Meteorological conditions are also a factor in the generation and migration of odors. Some site activities may be limited to times when specific meteorological conditions prevail, such as when winds are blowing away from a specific receptor.

3.4 Secondary Site Controls

If substantial TVOCs or odors still present an issue following implementation of the above procedures, secondary controls will be enacted. GEI personnel will work through the applicable list of secondary controls with National Grid and NYSDEC until the perimeter odor issues are resolved. Final selection of controls will be dependent on field conditions encountered. Secondary controls include the following:

- For stockpiled impacted soil, temporary tarps or polyethylene covers will be used to control odors, VOCs, and dust.
- Water may be sprayed onto dry soils to minimize the generation of dust.
- The placement of portable barriers close to small active source areas (test pits) can elevate the discharge point of emissions to facilitate dispersion and minimize the effect on downwind receptors. The barriers can be constructed using materials such as plastic “Jersey barriers”, or fence poles and visual barrier fabric/plastic. The barriers are placed as temporary two or three-sided structures around active test pits or other intrusive investigation areas, oriented such that the barriers are placed on the upwind and downwind sides of the source. If only one side of the source can be accessed, then the barrier should be placed on the downwind side.
- Two agents that can be sprayed over impacted soil have been determined to be effective in controlling emissions. They include odor suppressant solution (BioSolve™), and hydro mulch. These agents may be used where tarps cannot be effectively deployed over the source material, or where tarps are ineffective in controlling odors:

- BioSolve™ can provide immediate, localized control of odor emissions.
- Hydromulch - Although it is unlikely that it will be necessary, modified hydromulch slurry may be used to cover inactive sources for extended periods of time (up to several days). The hydromulch, typically cellulose fibers (HydroSeal®), is modified by mixing a tackifier (glue) with the mulch and water to form a slurry. It is applied using a standard hydroseed applicator to a thickness of ¼-inch. The material forms a sticky, cohesive, and somewhat flexible cover. Reapplication may be necessary if the applied layer becomes desiccated or begins to crack.

3.5 Building Controls

Controls for minimizing the impacts to occupied buildings include temporary shut-down and/or closure of air intakes within the downwind zone, or deferral of work to times when building occupants are not present.

4. Documentation and Reporting

The attached Daily Field Report Form will be filled-out each day to record all the details of the CAMP work. The form will be used to record the following information:

- Date and weather, with significant changes noted which may affect the positioning of the meters or recording of the data.
- Calibration results for the instruments.
- Locations of the upwind and downwind monitoring stations, and any changes made to the locations during the day to adjust for changing work locations or wind directions.
- General Site observations such as daily construction activities, and documentation of any exceedances.

Additional information will be noted within the project field book(s), as necessary.

The electronic measurements from the PIDs and dust meters will be reviewed daily and archived. Exceedances of the Response and Action Levels, if any, and the actions to be taken to mitigate the situations, will be discussed immediately with the on-site representatives, or reported within one business day to the NYSDEC project manager (if on-site NYSDEC oversight is not provided). The results of the daily CAMP monitoring will also be discussed in the daily written report to the NYSDEC project manager. Summaries of all air monitoring data will be provided to the NYSDEC or the NYSDOH upon request.

CAMP odor monitoring results will be recorded in the field book and/or the Daily CAMP Field Report and will also be available for review by the state agencies.

Appendix A

Community Air Monitoring Daily Field Report Form

Daily Field Report

System Operations		**General Observations**
Sampling Date		General Weather Conditions
System Start Time		
System Stop Time		
Total Hours Monitored		General Description of Site Activities:
System Calibrations		
(Time/Status)		

System Alarm Log

Time	Alarm Level (P, V)	Station No.	Alarm (Dust, VOC)	Location (UW, CW, DW)	Dust/TVOC/Odor 15-min. avg.	Dust/TVOC/Odor 15-min avg conc. range	Total # of Alarms	[TVOC] Instant.	GC Exceed?	GC compounds(s)	Site Person/Time Notified

Notes:

	Particulate (15-min)	TVOC (15-min)	Odor (15-min)
Alert Limit:			
Response Limit:			
Action Limit:			

Notes:

SC - Site Condiution	P - Particulate/ Dust	B - Benzene
UW - Upwind	Particulate recorded in ug/m^3	T - Toluene
CW - Crosswind	V - Total VOC	E - m,p-XyleneEthylbenzene
DW - Downwind	Total VOC measured in ppm	X - o-Xylene

Field Representative:

Date: ____________________

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