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GEOTECHNICAL ENVIRONMENTAL ECOLOGICAL WATER CONSTRUCTION MANAGEMENT

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#### VIA EMAIL

February 11, 2025

Ms. Jamie Colby, P.E. Solid Waste Management Bureau New Hampshire Department of Environmental Services 29 Hazen Drive Concord, New Hampshire 03302-0095

Subject: Test Boring Work Plan Eversource X178-1 Line Rebuild Project Campton-Thornton Municipal Landfill Permit No. DES-SW-TP-94-021 Site Number 199101060

Dear Ms. Colby:

Please find attached the Work Plan developed for upcoming geotechnical test boring work to be conducted at the Campton-Thornton Municipal Landfill, located at 1629 New Hampshire Route 175, in Thornton, New Hampshire. The proposed work is associated with Eversource's X178-1 Line Rebuild Project, specifically related to replacement of Structures 47 and 49, which are located within the limits of the capped area of the landfill. Based on our discussions at the pre-application/coordination meeting held on November 13, 2024, attended by NHDES, GZA GeoEnvironmental, Inc., Eversource Energy, the Town of Thornton, and the Town's legal counsel, it is our understanding the test boring work is not a permit required activity and not subject to the permit modification required for the proposed construction. However, this notification is being submitted as a courtesy based on our discussions during the November coordination meeting.

The test boring work is currently scheduled to be completed between Wednesday, April 23 and Saturday, April 26, 2025. Personnel from GZA, New England Boring Company, Inc., Leighton A. White, Inc., and Strategic Environmental Services, working on behalf of Eversource, will be on-site conducting the subsurface investigation and temporary liner repairs, as outlined in the attached documents. The work is scheduled to be conducted during a planned electrical outage.

GZA/Eversource will be preparing a permit modification application, to be submitted by the Town of Thornton, for the proposed construction of the drilled shafts for the transmission line upgrades, which will be submitted as a separate document.



If you have any questions regarding this work, please feel free to call Jennifer Baron, GZA's Project Manager for the project at (603) 232-8758.

Sincerely,

Jennifer R. Baron Senior Project Manager

David G. Lamothe, P.E. Associate Principal

JRB/DGL/DMZ/:jrb

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Attachments: Test Boring Work Plan

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Deborah M. Zarta Gier, CNRP Consultant/Reviewer

Cc: Chris Boldt, Esq., Donahue, Tucker & Ciandella, PLLC



**TEST BORING WORK PLAN** 



Test Boring Work Plan Project 04.0190664.72 X178-1 Line Rebuild Project, Structures 47 and 49, Campton-Thornton Municipal Landfill Page | 1

#### Proposed Work Plan

#### Background Information:

As part of planned upgrades to the X178-1 transmission line, GZA will conduct a geotechnical investigation in the electrical transmission right-of-way (ROW) within the limits of the Campton-Thornton Municipal Landfill property (the "Site"), located at 1629 New Hampshire Route 175 in Thornton, New Hampshire, shown on **Figure 1, Locus Plan**. The geotechnical investigation will include the drilling of two test borings to support Eversource's design of select replacement structures along the X178-1 Line, specifically Structure 47 and Structure 49. The proposed replacement new steel transmission line structure foundations will be supported on reinforced drilled shaft foundations. Based on the results of the geotechnical investigation, GZA will provide Eversource recommendations for soil parameters to design the new foundations. Based on discussions at the pre-application/coordination meeting held on November 13, 2024, attended by NHDES, GZA, Eversource, the Town of Thornton, and the Town's legal counsel, it is our understanding that the test boring work is not a permit required activity and not subject to the permit modification required for the proposed construction.

The Campton-Thornton Municipal Landfill (Solid Waste Facility Permit No. DES-SW-TP-94-021, New Hampshire Department of Environmental Services [NHDES] Site No. 199101060) is a closed landfill that is monitored in accordance with Groundwater Management Permit No. GWP-199101060-T-006, which was issued on April 26, 2022. The landfill accepted municipal solid waste between 1969 and 1984, and demolition debris and organic waste until 1994. Final closure of the unlined landfill was completed in December 1996, when the landfill was capped with a 12-inch-thick gas transmission/geomembrane bedding layer and a 40-mil impermeable Linear Low Density Polyethylene (LLDPE) geomembrane. The geomembrane is overlain by an 18-inch-thick cap drainage layer and six inches of topsoil. A passive gas venting system allows landfill gas that accumulates beneath the LLDPE membrane to vent to the atmosphere. Currently, a transfer station operates adjacent to the landfill.

Existing conditions at the transmission line structure locations are assumed based on GZA's understanding of limited information included in an Agreement and Consent to Joint Use document between Public Service Company of New Hampshire (formerly PSNH, currently Eversource) and the Town of Thornton, dated November 2, 1990. The document indicates that "gravel pads" exist at each of the three existing transmission line structures located within the limits of the landfill. A profile plan included in the document and entitled "Gravel Excavation Limitation 115kV Construction" indicates gravel is present within the landfill around each structure, extending approximately 30 feet beyond the location of each transmission pole structure, including between pole structures, and extends down and out at a 2 horizontal:1 vertical (2H:1V) slope to an undefined depth. The plan sheet also indicates that for structures where guy wires are present (such as Structures 47 and 49), gravel limits are considered to be 30 feet beyond the location of guy anchors.

The most recent round of groundwater sampling was completed in November 2024 and was included in the 2024 Data Transmittal for the Site, prepared by Emery & Garrett Groundwater Investigations (EGGI), dated January 3, 2025. The most recent post-closure inspections and gas monitoring was completed on June 23 and December 9, 2023, and was included in the 2022 Post-Closure Monitoring Report for the Site, prepared by EGGI, dated March 29, 2023.

The 2024 Data Transmittal indicated that manganese was detected in monitoring wells MW-2R (0.018 mg/L), MW-3 (1.2 mg/L), and MW-4 (0.36 mg/L), with the concentrations detected in MW-3 and MW-4 exceeding the NHDES



Ambient Groundwater Quality Standard (AGQS) of 0.30 mg/L. Arsenic was detected in monitoring well MW-4 at a concentration of 0.018 mg/L, exceeding the Ambient Groundwater Quality Standard of 0.005 mg/L. A 2023 Annual Summary Report prepared by EGGI noted the overall groundwater chemistry at the site has been reasonably stable for several years. Manganese continues to be above NHDES Ambient Groundwater Quality Standards (AGQS) in monitoring wells MW-3 and MW-4 but has generally decreased over time. Arsenic levels continue to be above AGQS in monitoring well MW-3. The 2022 Post-Closure Monitoring Report indicated that leachate was not generated at the Site and that landfill gas was not detected in any of the perimeter gas probes in 2022.

#### Description of Test Boring Work:

The proposed test boring work will be performed in accordance with the protocols outlined herein, in conjunction with the attached Health and Safety Plan (HASP).

- One test boring will be performed near each of the two existing structures, Structure 47 and Structure 49, within the transmission line ROW (X178-1 Line). The replacement structures are generally planned to be located in close proximity to the existing structures. The test borings will be completed as close to the existing structures as possible while maintaining appropriate safety measures. The test borings will be completed during a planned outage, as a result the transmission lines will be deenergized and typical Minimum Approach Distance (MAD) requirements will not be required. Should the anticipated drilling schedule change resulting in drilling of the proposed test borings outside of the planned outage (i.e. when the overhead lines are energized), the test borings will be completed at least approximately 10 feet from the existing structures to maintain the MAD required for energized conductors. A Site Plan is attached as Figure 2. Plans showing the existing and proposed transmission structure locations are attached.
- Prior to drilling the test borings, the boring locations will be marked for utility clearance by GZA personnel. Dig Safe<sup>®</sup> will be contacted for utility clearance by the drilling subcontractor. Eversource will provide GZA with utility plans, if available, for review.
- Prior to mobilizing drilling equipment, access to each of the boring locations will be matted within the limits of the landfill to limit rutting of the landfill cover materials.
- The test borings will be drilled to evaluate the thickness of landfilled waste, if present, at each structure location, the soil types below the waste, and to determine the depth to the groundwater table and refusal (if encountered). GZA's drilling subcontractor is New England Boring Contractors, Inc. (NEBC) of Derry, New Hampshire.
- The test borings will be drilled in accordance with the procedures outlined in Northeast Utilities Procurement Standard OTRM 152 Soil Boring and Testing Requirements. Standard Penetration Tests (SPT) will be obtained continuously through the landfilled material, if encountered, and at 5-foot intervals thereafter in native soil materials or structural fill. It is anticipated that the proposed test borings are located within "gravel pads" fill areas that surround each existing structure. Accordingly, GZA anticipates encountering little to no landfilled material in test borings located within the "gravel pad" fill areas. Test borings will be advanced a minimum of 30 feet into natural soils. Anticipated total boring depths on the order of 30 to 40 feet below ground surface (bgs). If bedrock is encountered prior to the maximum depth of 30 feet below landfill material, GZA will obtain 5 feet of rock core to confirm the presence of bedrock and to evaluate rock quality.



- The test borings will be completed using drive and wash methods using 3- or 4-inch-diameter steel casing, with drilling fluids recirculated within the drill casing. Effort will be made to install the required grounding rods within close proximity to the test boring to limit effort required for temporary geomembrane repair (described below). Upon completion of drilling, the boreholes will be grouted to the ground surface with cementbentonite grout.
- All soil, landfilled material, and water generated during drilling will be containerized in 55-gallon drums. Soil/waste and water samples will be collected from the drums for pre-characterization testing for disposal. In addition, limited soil samples will be collected from the native soils only for geotechnical laboratory analysis. Photographs of the landfilled soils encountered in the split spoon sampler will be obtained but no samples containing solid waste will be retained.
- A temporary storage location for the 55-gallon drums will be established at the Town's Transfer Station to safely store drums until test results are received and proper disposal can be arranged. GZA will subcontract with Strategic Environmental Services (Strategic) of Nottingham, New Hampshire to construct the temporary drum storage area. Strategic will relocate the drums from each test boring location to the temporary storage area after drilling and grouting are completed and prior to the temporary liner repair outlined in following section of this work plan.
- To complete the work within the limited outage period, two low ground pressure rubber track-mounted drill rigs will be used by NEBC to complete the test borings simultaneously. In addition, a second shift crew for each drill rig will be scheduled to complete the drilling within one calendar day within the anticipated outage period.

#### Description of Temporary Geomembrane Liner Repair:

- Upon completion of the test boring drilling and grouting, the geomembrane liner penetrations made from the casing and grounding rods at each boring location will be temporarily repaired. GZA's temporary geomembrane liner repair subcontractor is Leighton A. White, Inc. (Leighton White) of Milford, New Hampshire.
- To facilitate temporary liner repair, the landfill cover materials will be excavated to expose the geomembrane liner at each of the penetration locations. Once the penetrations have been exposed, Leighton White will patch the area using a 60-mil LLDPE geomembrane liner patch taped into place using a 60-mil moldable tape sealant (such as Tapecoat or equivalent) to provide a watertight seam. The tape will be applied to dry, clean geomembrane surfaces clear of loose surface material, soil, and dust.
- A low ground pressure mini excavator will be used by Leighton White to complete the temporary geomembrane cap repair.
- After completion of the temporary geomembrane repair, the excavated areas will be backfilled with cover material to restore the area to the original grade.
- To comply with the anticipated outage schedule, the temporary geomembrane cap repairs will be completed at both test boring locations in one calendar day or less, immediately following drilling and grouting of the boreholes.



#### HEALTH AND SAFETY PROTOCOL

A HASP was developed for the work described above, following GZA and Eversource safety guidance, protocols, and documentation, and is attached.

Based on the EGGI monitoring reports summarized above, the site has been reasonably stable for several years, leachate has not been generated, and landfill gas has not been detected. GZA will conduct air monitoring during all test boring drilling and temporary liner repair operations to monitor oxygen, methane, hydrogen sulfide, carbon monoxide, and carbon dioxide levels in the work/breathing zones.

GZA field personnel and drilling contractors will wear modified Level D Personal Protection Equipment (PPE), which includes hard hat, safety glasses, steel toe boots, and proper gloves (depending on the task, as described in the HASP). Nitrile gloves will be worn when soils at the Site require manual handling. Tasks which may involve potential contact with soils include handling drilling equipment, handling soil for field characterization, and moving drilling spoils with hand shovels. Personnel are not anticipated to be exposed to hazardous substances, hazardous materials, or oil when using the proper PPE. Soil samples of native soils below the landfill will be collected for geotechnical laboratory analysis. All soil/waste and water generated during drilling will be containerized in drums for proper disposal. Soil/waste and water samples will be collected from the drums for pre-characterization testing to determine the appropriate disposal of the soil/waste and water generated during drilling. Food, beverages, and tobacco products shall not be used in the work area. Cosmetics are not to be applied in the work area. See HASP Section 6 <u>Contaminants in Soil</u> for hazard mitigation details.

Modified Level D PPE will be worn by the on-site workers (drillers, GZA field staff, liner repair and drum handling personnel, etc.). The Site is located within the limits of the Campton-Thornton Landfill property; however, it is outside the limits of the current Transfer Station operations area, and as such the general public is not anticipated to be in the work area. Odor control is not anticipated to be required. If dust is generated during the drilling or coring of the test borings, water (supplied by NEBC) will be used for dust suppression. Excessive amounts of dust are not expected to be generated.

Section 6 of the HASP describes an overview of site-specific health and safety hazards and the safety measures to be implemented for worker safety, and are summarized below:

- Potential physical hazards include, but are not limited to, working around heavy equipment, overhead hazards, electrical hazards, lifting, elevated noise, slips, trips and falls, and weather hazards.
- Potential chemical hazards in landfill waste.
- Potential biological hazards include insect bites, poisonous plants, feral animals, ticks, and COVID-19.

See Pages 5 to 15 of the HASP for details regarding these physical, chemical, and biological hazards.

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FIGURES



Solution 2024 -cCLR red="1" green="24" blue="131"> GZA GeoEnvironmental, Inc. </CLR></BOL>, I/GZABedford/Jobs/04J



# FIGURE 2 - SITE PLAN

# Campton-Thornton Municipal Landfill Thornton, New Hampshire

# Legend

Groundwater Management Zone



- Tax Map 16, Lot 1, Sublot 6
- Gas Monitoring Well
- Honitoring Well



GZA GeoEnvironmental, Inc. 04.0190664.72 April 2024



**EVERSOURCE PLANS** 







**HEALTH & SAFETY PLAN** 

#### 1. CLIENT/SITE/PROJECT INFORMATION

#### Client: Eversource Energy

Site Address: X178-1 Transmission line ROW – within the limits of the Campton-Thornton Municipal Lanfill at 1629 New Hampshire Route 175, Thornton, New Hampshire. Two Structures (47 and 49) - Structures are located approximately 130 west and approximatley 300 feet south of the transfer station.

Site Description (be sure to list pertinent site features, chemicals used at the facility, and other potential hazard sources:

Active transmission line ROW with overhead powerlines within the limits of a closed municipal waste landfill.

Work Environment (active manufacturing, office, vacant site, undeveloped property, etc.):

115 kV Transmission Line Right of Way. ROW is through the existing Campton-Thornton Transfer Station and Municipal Landfill.

Job/Project #: 04.0190664.72	Estimated Start Date: 4/23/25	Estimated Finish Date: 4/26/25
Site is Covered by the Following Regulations:	OSHA HAZWOPER Standard	Mine Safety and Health Administration
	OSHA Construction Regulations 🔀	

2. EMERGENCY INFORMATION			
Hospital Name: Speare Memorial Hospital		Hospital Phone: (603) 536-1120	
Hospital Address: 16 Hospital Road, Plymouth, NH 03264		Directions and Street Map Attached: 🔀 Yes	
Local Fire #: 911 or: (603) 726-3300 Local Ambulance #: 911 or: (603) 726-3300		Local Police #: 911 or: (603) 726-4222	
WorkCare Incident Intervention Services:	For non-emergencies, if an employee becomes hurt or sick call 888-449-7787		
Other Emergency Contact(s): Jennifer Baron	Phone #'s: (207) 232-5832		

Site-Specific Emergency Preparedness/Response Procedures/Concerns:

#### Eversource COVID-19 Contractor Safe Work Practices

Conduct pre-job site briefing and daily tailgate meetings with project members, including subcontractors and client representatives (as applicable), to review site specific hazards, emergency procedures and responsibilities prior to start of each day's work, upon changes in scope of work, or after significant break in work (i.e. lunch break). Review emergency contact information, locations of emergency equipment (e.g. first aid kits, fire extinguishers, evacuation routes), current location and access to hospital. Ensure that cell phones are charged daily and have vehicle phone chargers on hand. Wear high-visibility vest, hard hat, and eye protection.

Anticipated emergencies on site include physical injuries and potential for heart attacks. Personnel on site will have current first aid and CPR training and will be able to respond to minor injuries and potential heart attacks while emergency response personnel are contacted for assistance.

All personnel will pay attention to drilling operations, surroundings, and overhead and underground utilities. Kill switches will be tested prior to initiating work. High tick area therefore the use of permethrin is highly recommended and frequent body checks for the presence of ticks.

Before start of each day's work a Site briefing will be conducted by the Field Safety Officer to ensure that all Site personnel are aware of the identity of the emergency coordinator on Site and that everyone is aware of the following:

- Location and proper use of fire extinguishers
- Evacuation procedures and gathering points
- Location of emergency names and numbers
- Address of nearest hospital

The following minimum emergency equipment shall be kept and maintained on Site:

• Industrial first aid kit, cell phone, soap, water

**Personal Injury:** For minor injuries, such as cuts, burns, exhaustion, heat cramps, insect stings, etc., the affected employee will be removed to an uncontaminated area for administration of appropriate first aid. If the injury warrants additional medical attention, the affected employee will be properly decontaminated, as necessary and appropriate to the situation, and transported to the nearest hospital or emergency medical facility.

For more serious injuries the Field Safety Officer (FSO) or designee will summon emergency assistance to the project site. No attempt will be made by GZA personnel to move the victim, unless in imminent danger, without the aid and/or instructions of qualified emergency response personnel.

Site Contaminants of concern:

Landfill/Methane Hazards. Fire and explosion should be regarded as one of, if not the, most significant potential hazards associated with intrusive work conducted at a landfill. Accordingly, all sources of ignition must be fully controlled. Failure to control ignition sources could result in fire or explosion and pose a serious threat to life and health. Control methods may include forced ventilation. If forced (mechanical) ventilation is to be used, all such equipment must be approved for Class I, Division I hazardous atmospheres. The blower must be positioned to blow across the top of the sampling location so that gases and vapors may be diluted as they exit the sampling area. Do not attempt to suck out the gases or vapors. Blowers, all other mechanical equipment, and tools which could release sparks or static electricity must be bonded and grounded.

Regardless of the gas/vapor control method used, the atmosphere must be frequently monitored using direct reading instruments approved for Class I, Division I hazardous atmospheres. Monitoring should be conducted within 1 to 2 feet of the top of the sampling location. Do not insert sampling devices into the hole. Regardless of actual instrument readings, if all sources of ignition cannot be controlled, operations should be immediately shut down if readings equal or exceed 10% of LEL and the area evacuated until ignition sources have been eliminated. Ignition sources include, but are not limited to: smoking, static electricity, lighting, open flames, spontaneously ignitable substances, frictional heat or sparks, hot surfaces, radiant heat, electrical sparks, stray currents, cutting and welding, and ovens, furnaces and heating equipment.

- Hydrogen Sulfide (H2S). Hydrogen sulfide, characterized by its "rotten egg" odor, is produced by the decomposition of sulfur-containing organic matter. It is found in many of the same areas where methane is found such as landfills, swamps, sewers, and sewer treatment facilities. An important characteristic of H2S is its desensitizing property causing a decrease in one's ability to detect its presence by smell. So although one may no longer be able to smell it, it could still be present in harmful concentrations. The symptoms of over exposure include headache, dizziness, staggering, and nausea. Severe over exposure can cause respiratory failure, coma, and death. The current OSHA PEL is 10 ppm as an 8-hour TWA. The ACGIH TLV is the same.
- Personnel are advised to approach monitoring wells from the upwind side to remove the well cap. Extend to remove the well cap keeping the breathing zone as far as possible to the upwind side.

Arsenic. Potential Health Effects: Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, and hyperpigmentation of skin.



• In the event of a chemical release greater than 5 gallons, site personnel will evacuate the affected area and relocate to an upwind location. The GZA Field Safety Officer and client site representative shall be contacted immediately.

• Site work shall not be conducted during severe weather, including high winds and lightning. In the event of severe weather, stop work, lower any equipment (drill rigs), and evacuate the affected area.

All EHS Events MUST BE reported to Eversource site contact please see the list below for your first contact. If listed contact is unavailable please follow the chain until all parties have been notified and have acknowledged the EHS event.

1<sup>st</sup> EVERSOURCE SITE CONTACT (Eversource Construction Representative): Greg Belanger, (603) 345-4852 (Cell)

2<sup>nd</sup> EVERSOURCE SITE CONTACT (Eversource Safety Coordinator): Josh Scott, (603) 848-7759 (Cell)

• 3<sup>rd</sup> EVERSOURCE SITE CONTACT (Eversource Project Manager): Almir Memic, (603) 660-6867 (Cell)

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Electrical Safety Personal Protective Equipment (PPE) Requirements			
PPE	Components & Requirements	Required Activity	
"Standard" PPE	<ul> <li>Hardhat, ANSI Z89.1 Type 1, class G or E</li> </ul>	At all times working on the project and out of the vehicle.	
	• Safety shoes, ASTM 2413, impact & compression		
	rating of 75, EH-rated		
	<ul> <li>Eye protection, ANSI Z87.1 wrap-around or with</li> </ul>		
	side shields		
	Safety vest / clothing, ANSI 107 Class 3 hi-visibility		
Safety gloves	ANSI 105 Class A3 cut-resistant	At all times with the exception of time periods requiring	
		sensitive finger dexterity to complete a task (i.e. writing,	
		etc.)	
FR (Flame resistant)	HRC2: Min. 8 cal/cm <sup>2</sup> pants and shirt or coveralls over	• At all times working out of the vehicle and inside	
Outerwear	natural fiber (cotton, wool) or FR undergarments	of energized substation fence or within energized	
		ROW.	
		Grounding the drill rig	
FR outerwear <u>AND</u>	HRC2 outerwear	Grounding the drill rig	
rubber gloves	Rubber gloves ASTM D120 Class 2, air tested daily	<ul> <li>Pre-Excavation within energized right-of-way</li> </ul>	
		• Staking or probe installation within energized	
		right-of-way	

3. SCOPE OF WORK	
General project description, and phase(s) or work to which this H&S Plan applies.	Drill two test borings within the existing transmission line ROW. Temporary geomembrane liner repair at each boring location.
Specific Tasks Performed by GZA:	Observation of test borings, including drumming of all soil and water generated during drilling activities. Observation of temporary geomembrane liner repair.
Concurrent Tasks to be Performed by GZA-hired Subcontractors (List Subcontractors by Name):	New England Boring Contractors, Inc. will perform the drilling and coordinate utility clearance.
	Strategic Environmental Services will handle drums of soil/water and set up a temporary storage area at the Transfer Station.
	Leighton White Inc. will perform temporary geomembrane repair.
Concurrent Tasks to be Performed by Others:	

Any OSHA PERMIT-REQUIRED CONFINED SPACE entry?	Any INDOOR fieldwork? YES NO
IF YES, ADD CONFINED SPACE ENTRY PERMIT FOR THAT PORTION OF THE WORK	

Will subsurface explorations be conducted for this work (drilling)?       Yes       No         Have GZA project-related files been searched for existing private utility drawings?       Yes       No       N/A         Has GZA requested utility drawings from our Client, property owner, and others?       Yes       No       N/A         Have existing drawings been reviewed for possible conflicts with planned work?       Yes       No       N/A         Will GZA personnel be required to use a hand-auger as part of this work?       Yes       No       N/A         Site property ownership where underground explorations will be conducted on:       Dublic Access Property       Yes       No			
Will GZA personnel be required to use a hand-auger as part of this work? Yes No N/A			
Site property ownership where underground explorations will be conducted on:			
Campton-Thornton Municipal Landfill     Private Property     Yes     No			
Have Necessary Underground Utility Notifications for Subsurface Work Been Made?			
Specify Clearance Date & Time, Dig Safe Clearance I.D. #, And Other Relevant Information: Dig Safe ticket #: clears on X/X/25 @ XX:XX			
IMPORTANT! For subsurface work, prior to the initiation of ground penetrating activities, GZA personnel to assess whether the underground utility clearance (UUC) process has been completed in an manner that appears acceptable, based on participation/ confirmation by other responsible parties (utility companies, subcontractor, client, owner, etc.), for the following:			
Electric: 115kV Overhead Transmission       Yes       No       NA       Other			
Comments: GZA is relying upon NEBC contractors to complete Dig Safe notifications. Penetration activities shall not proceed until utility locations are marked and verified.  Prior to any site work all GZA employees and any GZA SUBCONTRACTORS MUST read EVERSOURCE Appendix H (Contractor Work Rules) and SIGN Appendix I signature page. Daily check list (as appropriate):  Conduct Tailgate Safety Meeting (each day on site).  Equipment inspection sheets. (if applicable, each day on site).			

#### 5. HAZARD ASSESSMENT (CHECK ALL THAT APPLY AND ADDRESS EACH HAZARD IN SECTION 6)

#### A. GENERAL FIELDWORK HAZARDS

**Compressed Gases** 

Flammable/Combustible Liquids

ultra violet, infrared, radio-frequency, etc.)

Confined Space Entry (Add Confined Space Entry Permit)	Overhead Hazards (i.e. falling objects, overhead power lines)		
Abandoned or vacant building/Enclosed Spaces	Portable Hand Tools or Power Tools		
Significant Slip/Trip/Fall Hazards	Significant Lifting or Ergonomic Hazards		
Unsanitary/Infectious Hazards	Electrical Hazards (i.e. Equipment 120 Volts or Greater, Work		
Poisonous Plants	Inside Electrical Panels, or Maintenance of Electrical Equipment)		
Biting/Stinging Insects	Other Stored energy Hazards (i.e. Equipment with High Pressure or Stored Chemicals)		
Feral Animal Hazards	Fire and/or Explosion Hazard		
Water/Wetlands Hazards	Elevated Noise Levels		
Remote Locations/Navigation/Orientation hazards	Subsurface Work (Drilling/Excavations/Test Pits)		
Heavy Traffic or Work Alongside a Roadway	Explosives or Unexploded Ordinance/MEC		
Weather-Related Hazards	Long Distance or Overnight Travel		
Motor vehicle operation Hazards	Personal Security or High Crime Area Hazards		
Heavy Equipment Hazards	Working Alone		
Structural Hazards (i.e. unsafe floors/stairways/roof)	Inizing Radiation or Non-Ionizing Radiation		
Demolition/Renovation	Chemical/Exposure Hazards (See Part B for Details)		
Presence of Pedestrians or the General Public	Other:		
B. CHEMICAL/EXPOSURE HAZARDS (CONTAMINANTS ARE CONTAINED IN X SOIL, X WATER, X GROUNDWATER)			
No chemical hazards anticipated	Methane		
Hydrogen Sulfide (H2S)	Chemicals Subject to OSHA Hazard Communication (attach Safety		
Cyanides, Hydrogen Cyanide (HCN)	Data Sheet for each chemical GZA brings to the site)		
Carbon Monoxide	Containerized Waste, Chemicals in Piping & Process Equipment		
Herbicides, Pesticide, Fungicide, Animal Poisons	Similar Equipment		
Metals, Metal Compounds: arsenic, manganese	General Work Site Airborne Dust Hazards		
Corrosives, Acids, Caustics, Strong Irritants	Volatile Organic Compounds (VOCs), BTEX		
Polychlorinated Biphenyls (PCBs)	Chlorinated Organic Compounds		
Polycyclic Aromatic Hydrocarbons (PAHs)	Eucl Oil Casoling Potroloum Products Waste Oil		

	Fuel OII, Gasoline, Petroleum Products, Waste Oli
	Asbestos

Oxygen Deficiency, Asphyxiation Hazards

Radiation Hazards (i.e. radioactive sealed/open source, x-rays, Other: Landfilled municipal solid waste, demolition debris.

#### 6. SITE-SPECIFIC OVERVIEW OF H&S HAZARDS/MITIGATIONS (NOTE: Based on Hazard Assessment, Section 5)

Describe the major hazards expected to be present at the jobsite, and describe the safety measures to be implemented for worker protection (refer to items checked in Section 5 above). Use brief abstract statements or more detailed narrative as may be appropriate.

ON-SITE HAZARDS:	HAZARD MITIGATIONS:		
Task Hazard Analyses	See attached Job Hazard/ Task Hazard Analysis:		
	Task 4.01 Drilling observations, monitoring well installation observations, and soil sampling		
	Task 4.02 Groundwater Sampling		
	Task 21.01 General outdoor field work		
	GZA Policy 03-0003 Stop Work Authority		
	GZA Policy 03-3002 Motor Vehicle Safety		
	GZA policy 03-3003 Electrical Safe Work Practices		
	GZA Policy 03-3004 Tool Safety		
	GZA Policy 03-3007 Site Security for Field Operation		
	GZA Policy 03-3008 Heat Illness Prevention		
	GZA policy 03-3009 Manual Lifting Safety		
	GZA policy 03-3019 Lyme Disease Prevention		
Electrical Hazards (i.e. Equipment 120 Volts or Greater, Work Inside	Follow all Client protocols while working in / near energized transmission line rights-of-way.		
Electrical Panels, or Maintenance of Electrical Equipment)	GZA employees are non-electrically qualified. Maximum voltage of any conductor is assumed to be 115 kV. Check in with Client representative to receive guidance for access to areas and work being conducted. Identify location of electrical conductors and maintain minimum approach distance (MAD) of 25 feet from all energized conductors. Be aware of on-site activities and maintain appropriate distance from electrical and construction work. Drilling equipment should be grounded by a qualified electrical safety spotter when working in the vicinity of energized electrical equipment.		
	When working near the overhead 115 kV lines, site staff shall wear FR clothing (meeting or exceeding 8 cal/cm2, HRC 2) as the outermost layer of clothing. In addition, employees will wear natural fiber (cotton) garments underneath the FR coveralls. Additional PPE shall include EH [electrical hazard] rated boots. Drilling equipment should be grounded by a qualified electrical safety spotter when working in the vicinity of energized electrical equipment.		
	• Deactivation of utilities, when necessary, should be certified by the proper utility company personnel and the certification record retained.		
	• Verify, mark and discuss located utilities at the daily safety meeting prior to beginning work for the day.		
	Electricity is a strong, invisible force that gives power to tools, machinery, lights, heaters, and many other forms of equipment that can be used at the site. Electricity can be very dangerous. Accidental contact with electrical currents can cause injury, fire, extensive damage, and even death. It is very important to remember that working with and around electricity requires the full attention and respect of all workers. Follow these guidelines to avoid contact with electricity:		
	• Wear rubber gloves and rubber-sled shoes or boots, especially if you are working around electricity in a damp environment.		
	Equipment Grounding		
	• All equipment that has the potential to contact energized components or encroach on safe work boundaries shall be grounded in accordance with the grounding procedure.		
	• Equipment must be grounded directly to the substation facility grounding grid utilizing appropriate grounding clamps.		
	• If the work is not performed within a substation, ground rods should be used.		

	<ul> <li>Ground rods should be located as far as possible from workers.</li> </ul>
	• Equipment should be installed in accordance with the manufacturer's recommendations.
	<ul> <li>Always connect the ground end first.</li> </ul>
	<ul> <li>When removing, take the equipment side off first then the ground.</li> </ul>
	• When installing or removing a ground, required PPE includes 20 kV high-voltage gloves, 15 kV dielectric overboot footwear, fire-retardant (FR) suit (ATPV Rating 1:8 cal/cm2), safety glasses, and face shield.
	If operation near overhead lines is necessary, the following tables provide minimum clearance required for specific lines:
	MINIMUM APPROACH DISTANCE CRANES*
	PHASE TO PHASE VOLTAGES (kV) MINIMUM CLEARANCE DISTANCE (FEET)
	Up to 50 10 ft. 0 in.
	50 to 200 15 ft. 0 in.
	200 to 350 20 ft. 0 in.
	350 to 500 25 ft. 0 in.
	500 to 750 35 ft. 0 in.
	* Table A – Minimum Clearance Distances 1926.1408(a)2(iii).
	Determine if any part of equipment, load line, or load could get closer than 20 feet for less than 350 kV or 50 feet for greater than 350 kV if operated up to the equipment's maximum working radius.
	MINIMUM CLEARANCE DISTANCES WHILE TRAVELING WITH NO LOAD+
	Voltage (nominal kV alternating current) While traveling – minimum clearance distance (feet)
	Lin to 0.75.4
	Over 0 75 to 50 6
	Over 50 to 345 10
	Over 345 to 750 16
	Over 750 to 1 000 20
	Over 1,000 (as established by the utility owner/operator or registered professional engineer who is a
	qualified person with respect to electrical power transmission and distribution)
	+ Table T under 1926.1411(b)(2).
	Note: kV = kilovolts
	Review GZA's electrical safe work practices program 03-3003 and Eversource safety requirements while working in a substation.
Owning Zero	Ensure all GZA personnel on-site have downloaded the People-Based Safety app to their mobile phones and are familiar with using it to report safety events. Prior to work each day, review Owning Zero rules with all on-site during the morning safety meeting.
Motor vehicle operation Hazards	Ensure vehicle is operating properly prior to leaving office. Review directions and check air pressure in vehicle tires prior to departure. Plan to take periodic breaks while driving long distances. Do not use cell phone (handheld or hands-free) while vehicle motor is running. While driving, be observant of other drivers and potential for severe weather conditions. Maintain appropriate speeds for the road conditions.
Drilling Rig/Heavy Equipment, Overhead Hazards, Utility-related Hazards	Prior to mobilization to the project site, all known underground utilities will be located and properly marked. All personnel working in proximity to heavy equipment will be familiarized with the location and operation of emergency kill switches prior to equipment start-up. A first aid kit and fire extinguisher will be available at all times. No loose clothing, jewelry or unsecured long hair is permitted near equipment. Keep hands and feet AWAY from all moving parts while excavation is in progress. Watch for moving vehicles and equipment. Stay out of equipment swing radius while work is in progress. Maintain visibility and eye contact with operators when walking around rig. Wear high visibility vest.

	Keep rig at least 25 feet from all overhead power lines; use spotters to assist driver in to positioning rigs when overhead power lines or other obstructions are near.
	All excavations will be adequately backfilled and/or barricaded if left unattended for any period of time to prevent injury.
	Stay clear of equipment at all times. Operators must be aware of your position on the site at all times. Wear high visibility reflective vests at all times while on site. Heed back up alarms of all equipment. Do not approach operating heavy equipment until eye contact is made with operator and equipment operation is stopped. Be especially aware of and clear of the swing radius of all heavy equipment. Confirm that underground utility clearance procedures have been completed. Confirm with contractor that safe distance from utilities, above ground piping and equipment are being maintained. Have contractor hand excavate where required to expose utilities.
	When water is used, care must be taken to avoid creating muddy or slippery conditions. If slippery conditions are unavoidable, barriers and warning signs must be used to warn of these dangers. Never turn your back to operating machinery. Never wear loose clothing, jewelry, hair, or other personal items around rotating equipment or other equipment that could catch or ensnare loose clothing, JEWELRY, HAIR, OR OTHER PERSONAL ITEMS. ALWAYS STAND FAR ENOUGH AWAY FROM OPERATING MACHINERY TO PREVENT ACCIDENT CONTACT WHICH MAY RESULT FROM MECHANICAL OR HUMAN ERROR.
	SEE ATTACHED JOB HAZARD ANALYSIS – TASK 4.01 DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, AND SOIL SAMPLING
Struck by, caught by, run over by equipment	Do not stand near or where equipment operators cannot see you. Always be in line of sight. Do not make sudden moves and always let the operator know of your intentions. Wear high-visibility safety vest, hard hat, eye protection, steel toe boots and use common sense and good housekeeping practices to avoid injury. Stay within sight of rig/excavator operator but at least 6-10 feet away from rig and excavator swing area. Maintain clear lines of communication (verbal and/or visual) with the operator. Stand clear of exhaust from operating equipment and stay out of the swing radius of heavy equipment. Be aware of overhead equipment and potential for falling objects (i.e. tree branches). Avoid any "pinch points" where one could become trapped between the equipment and other objects. Maintain awareness of general rig
	directly adjacent to the drill rig.
	Hearing protection shall be worn when working near operating equipment.
	Equipment should be situated so that at full extension of bucket arm, the equipment is at least 10 feet away from overhead lines.
Observation of Drill Rig Mobilization	Before drilling begins, confirm that drill rig has been parked properly and securely by the drilling contractor.
	Wear high visibility vests. Make sure that the driver can see you and is aware of your location at all times.
	Inform the driller if it is observed that the rig is being moved with the mast raised and/or tools and other equipment on the rig are not secured and can fall over and potentially hurt personnel.
Landfill Sampling	The possibility of flammable materials being encountered during field activities must be recognized and the appropriate steps necessary to minimize fire and explosion must be observed. This includes situations where excessive organic vapors or free product are encountered. When this occurs, monitoring with a combustible gas indicator (CGI) is required. Excessive organic vapors, for the purposes of initiating the use of a CGI, are defined as sustained readings (i.e., continuous for at least five minutes) at or above 250 units or as an instantaneous reading at or above 1,000 units on the PID or FID, in close proximity (within 1 foot or less) of the sampling location or other area of potential exposure. Discontinue activities and terminate ignition sources if greater than 10% of LEL detected.
	Using four gas meter monitor for hydrogen sulfide, carbon monoxide, lower explosion limit, and oxygen concentrations. Follow precautions in Section 2 and the attached JHAs. Personnel are advised to approach monitoring wells from the upwind side to remove the well cap. Extend to remove the well cap keeping the breathing zone as far as possible to the upwind side. Monitor for LEL/O2, methane, and other landfill related contaminants at landfill vents. Do not place a source of ignition close to any landfill vent. If leachate is observed, avoid contact.
Landfill Gas Hazards	Fire and explosion should be regarded as one of, if not the, most significant potential hazards associated with work conducted at a landfill. Accordingly, all sources of ignition must be fully controlled. Failure to

	control ignition sources could result in fire or explosion and pose a serious threat to life and health. Control methods may include forced ventilation. If forced (mechanical) ventilation is to be used, all such equipment must be approved for Class I, Division I hazardous atmospheres. The blower must be positioned to blow across the top of the sampling location so that gases and vapors may be diluted as they exit the sampling area. Do not attempt to suck out the gases or vapors. Blowers, all other mechanical equipment, and tools which could release sparks or static electricity must be bonded and grounded. Regardless of the gas/vapor control method used, the atmosphere must be frequently monitored using direct reading instruments approved for Class I, Division I hazardous atmospheres. Monitoring should be conducted within 1 to 2 feet of the top of the sampling location. Do not insert sampling devices into the hole. Regardless of actual instrument readings, if all sources of ignition cannot be controlled, operations should be immediately shut down if readings equal or exceed 10% of LEL and the area evacuated until ignition sources have been eliminated. Ignition sources include, but are not limited to: smoking, static electricity, lighting, open flames, spontaneously ignitable substances, frictional heat or sparks, hot surfaces, radiant heat, electrical sparks, stray currents, cutting and welding, and ovens, furnaces and heating		
Arsenic	Exposure to arsenic above the OSHA PELs may produce skin irritation, abdominal pain diarrhea, vomiting, and respiratory distress. Chronic exposures may result in arsenical keratinosis, skin lesions, acne, and an increased risk of skin, lung, liver, bladder and kidney cancers, and cardiovascular disease. The use of gloves during soil excavation and handling operations where contact with soil is possible will reduce exposure due to direct contact. Good hygiene practices such as washing of hands will be instituted prior to eating and drinking to minimize accidental ingestion of metals including arsenic.		
Noise	<ul> <li>The primary source of noise is anticipated to be the drill rigs / excavator. Hearing protection in the form of disposable ear plugs shall be sufficient to reduce noise levels to acceptable levels.</li> <li>In accordance with 29 CFR 1910.95(b)(1) When employees are subjected to sound exceeding those listed in Table G-16, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table G-16, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.</li> <li>TABLE G-16 - PERMISSIBLE NOISE EXPOSURES (1)</li> <li>Duration per day, hours   Sound level dBA slow response</li> </ul>		
	8	90	
	6  4	92 95	
	3	97	
	1 1/2	100	
	1	105	
	1/2	110	
	1/4 or less	115	
	Hearing protection in the form of disposable ear plugs will be worn during field work with sound levels anticipated above those listed in Table G-16. Use sound meter app on phone to assess required PPE. Be aware that hearing protection can diminish warning sounds - do not stand with back to operating equipment and be alert for changing conditions. See attached Job Hazard Analysis – Task 4.1 Drilling observations		
General Hazards (Housekeeping, Lifting, Portable Hand Tool)	Lift and transport hand tools using proper lifting techniques and keep a clean and orderly workspace. Use a team lift for lifting objects that are bulky, over 50 lbs, or in awkward starting positions. Feet should be planted flatly and a proper lifting technique should be performed to prevent injuries.		
Slin trins and falls	See attached GZA policy U3-3009 Manual Lifting Safety		
	Personnel will be wearing appropriate boots with good tread to prevent slips and falls. Maintain one free hand to break falls. Watch for equipment on ground, changing ground contour and slippery surfaces. Keep		

	work area clean, no running, be mindful of changing weather conditions that may change footing conditions. All borings and openings will be adequately covered and/or barricaded if left unattended for any period of time to prevent injury.
Weather-Related Hazards	Assess weather conditions prior to on-site work and examine forecast for anticipated period of work. Dress appropriately for weather conditions (e.g., precipitation, temperature ranges over anticipated duration of field work). Be sure to consume plenty of liquids even when temperatures are colder. Use protective ointments such as sunscreen and chap stick, as appropriate to the field conditions.
	Be aware of the anticipated weather conditions prior to mobilization to the site. Unacceptable field work conditions are not precise, but may include site specific conditions, general location, extreme weather conditions (e.g., lightning, excessive heat/cold, heavy snow, heavy rain), travel conditions, and other factors. Professional judgment is required, and personal assessment of safety must always be individually assessed. See attached Job Hazard Analysis – Task 21.01 General Outdoor Field Work
Biting/Stinging Insects, Spiders, Lyme Disease	Ticks carry risk of Lyme and other Diseases. Tick season is basically any field day above 40 degrees F. Tuck pants into long socks and apply DEET (or permethrin pre-treatment) to clothing in season to control exposure to ticks. Check clothing for ticks frequently. Check whole body immediately upon returning from field and shower. Be aware of intermittent seasonal reports of mosquito borne diseases, such as West Nile disease and Eastern Equine Encephalitis (EEE), and their locations relative to your field site. Use DEET or other mosquito repellant. Be aware of potential cavity, suspended or ground nesting bee/wasp/hornet nests. Avoid undue disturbance or approach with appropriate safety clothing protection and netting.
	Wear appropriate PPE (long pants/ sleeves, sturdy boots, safety glasses, high visibility vests). Tuck pants into long socks. Apply DEET (or permethrin pre-treatment) to clothing in season to control exposure to biting insects is recommended. Conduct tick checks at regular intervals. See attached GZA policy 03-3019 Lyme Disease Prevention
Overhead Hazards	Check for overhead lines at each work location. Wear steel toed boots, hardhat and safety glasses/goggles – EH rated as necessary. Stand clear of stored materials. If stack appears unstable inform site representative. Awareness while equipment is advancing into soil / sediment. Do not stand directly in immediate vicinity of equipment in case malfunction occurs. Maintain safe work distance and maintain eye contact and communication with operator. Never stand under elevated loads or equipment. Keep equipment at least 25 feet from overhead utilities.
	Overhead hazards can include low hanging structures which can cause injury due to bumping into them. Other overhead hazards include <i>falling objects, suspended loads, swinging loads and rotating equipment</i> . Hardhats must be worn by personnel in areas were these types of physical hazards may be encountered. Electrical wires are another significant overhead hazard. According to OSHA (29 CFR 1926.550), the minimum clearance which must be maintained from overhead electrical wires is 10 feet from an electrical source rated < 50 kV. Sources rated > 50 kV require a minimum
	clearance of 10 feet plus 0.4 inch per kV above 50 kV. According to Eversource Contactor Safety Requirements, until a qualified electrical worker confirms the MAD, all equipment and loads shall maintain a 20 foot minimum approach distance. A lift plan needs to be prepared and discussed before lifting a load – as applicable. A safety observer shall be present to assist with lifts and excavation work.
	Equipment shall be grounded when working within Minimum Approach Distances of energized equipment by NEBC.
	Check for overhead lines at each boring location and between locations. Wear steel toed boots, hardhat and safety glasses/goggles. Stand clear of stacked drill rods. Do not stack NW or AW drill rods greater than 1.5 times the drill rigs mast height. Watch for DROPPED (fallen) objects when lifting with the drill rig wireline and cable systems. When drilling with sonic drill rigs stand a minimum of 10-20 feet aways from the drill rig to avoid potential failure of pressurized hydraulics lines along drill mast.
Utilities	Dig Safe/One Call must be contacted prior to drilling, look for utility markings, new road cuts, signs of underground utilities. Scan area and be aware of overhead utilities. Look for Eversource and contractor to provide guidance on safe dig locations. GZA employees maintain safe working distance from equipment to prevent exposure to electrical hazards should contact be made.
Poisonous Plants	Know the appearance of poison ivy and poison sumac in all seasons, and if sensitive to these toxins, carry and use special cleaning soaps/solutions when thought to be exposed. Stock first aid kit with poison ivy/sumac cleaning soaps/solutions.
Feral Animals	Be aware of feral animals along the banks of the water or on the wooded portion of the Site. Do not work at the Site alone. Do not approach if you encounter animals.

Utility Hazards/ Electrical Hazards	Check in with EVERSOURCE personnel to receive guidance for access to areas and work being conducted. Identify locations of electrical conductors and maintain minimum approach distance of 20 feet. Be aware of on-site activities and maintain appropriate distance from electrical and construction work. Additional PPE shall include EH [electrical hazard] rated boots and FR clothing when inside an energized substation or active right-of-way.
Electrical arcing	Check in with EVERSOURCE personnel to receive guidance for access to areas and work being conducted. Identify location of electrical conductors and maintain minimum approach distances as provided by electric utility. Be aware of on-site activities and maintain appropriate distance from electrical and construction work. Site staff shall wear FR clothing (consisting of coveralls 8 cal/cm2, hrc 2) to wear on the outermost layer of clothing during work adjacent to energized transmission lines. During periods on inclement weather, arc-resistant rain gear will be provided where FR clothing is required. In addition, employees will wear natural fiber (cotton) garments underneath the FR coveralls. Additional PPE shall include EH (electrical hazard) rated boots when working within proximity of energized lines and conductors.
	When operating equipment energized right-of-way OR within the security fence of an energized substation, ground equipment:
	C-Clamps, 20,000 V capacity
	Min AWG 4/0 copper cable, not coiled
	• Connect to station ground, water hydrant, tensioned guy, common neutral wire, or structure ground cable at the discretion of the safety observer.
	Alternatively, install and connect to $\frac{1}{2}$ " dia., 8-ft long ground rod, min. 6 ft embedded in ground.
	In general, when working within 25 feet of conductors, Site staff shall wear FR clothing (meeting or exceeding 8 cal/cm2, HRC 2) on the outermost layer of clothing. During periods of inclement weather, arc-resistant rain gear will be provided where FR clothing is required. In addition, employees will wear natural fiber (cotton) garments underneath the FR coveralls. Additional PPE shall include EH [electrical hazard] rated boots when the line work is energized. Work outside the 50 foot range does not require FR to be worn.
Electrical Shocks	Follow all Eversource protocols while working in / near energized lines. GZA employees are non-electrically qualified. Maximum voltage of any conductor is assumed to be 115 kV. Check in with Eversource personnel to receive guidance for access to areas and work being conducted. Identify location of electrical conductors and maintain minimum approach distance (MAD) of 15 feet from all energized conductors. Be aware of on-site activities and maintain appropriate distance from electrical
	and construction work. When working near the overhead 115 kV lines, site staff shall wear FR clothing (meeting or exceeding 8 cal/cm <sup>2</sup> , HRC 2) as the outermost layer of clothing. In addition, employees will wear natural fiber (cotton) garments underneath the FR coveralls. Additional PPE shall include EH [electrical hazard] rated boots. Stand clear of stacked drill rods. If stack appears unstable inform driller. Be aware of drilling rods and other support equipment that may be extended overhead during drilling activities. Drilling rods may dislodge overhead tree limbs (if any) during both drilling or mobilization around the Site. Existing transmission lines assumed to be 115kV. The drilling subcontractor should not allow drill rods to be raised within 15 feet of existing electrical lines. An on-site, qualified electrical safety spotter shall be responsible for the drilling subcontractor maintaining the MAD. Drilling equipment should be grounded by a qualified electrical safety spotter when working in the vicinity of energized electrical equipment.
	REVIEW GZA'S ELECTRICAL SAFE WORK PRACTICES PROGRAM 03-3003.
Stop Work Authority	Pause and Stop Work Authority is allowed by GZA policy for GZA and GZA-hired contractor personnel. If a true Stop Work occurs, GZA personnel will take prudent corrective action to secure the Work and provide safe conditions for Site personnel and the environment. In order to resume work, the onsite Field Safety Officer, PM, and (if possible) project PIC must all agree that work is safe to resume. All Stop Work occurrences must be accompanied by a GZA EHS Event report as directed in this HASP, and shall be provided as soon as possible but, at a minimum, by 10 a.m. the next day. GZA's Core Safety Team may require an incident investigation to occur, depending on the circumstances of the Stop Work situation.
Other hazards to be added as needed upon commencement of field work based on initial and daily safety tailgate meetings.	Daily safety meetings and updates, add new hazards as work dictates, utilize work pauses and stoppages if unsafe conditions are identified and additional safety procedures are required.

7. AIR MONITORING ACTION LEVELS – Make sure air monitoring instruments are in working order, calibrated before use, and 'bump-checked' periodically throughout the day and/or over multiple days of use			
Is air monitoring to be performed for this project? Yes No			
Action levels for Oxygen Deficiency and Explosive atmospheric hazards (Action levels apply to occupied work space in general work area)			
Applicable, See Below	v. Not Applicabl	e	
Parameter	Response Actions	for Elevated Airborne Hazards	
Methane	At 10% of LEL or g	reater – Exit area, provide adequate ventilation, or discontinue activities.	
Oxygen	At 19.5% or below Verify presence of Note: If oxygen le	v – Exit area, provide adequate ventilation, or discontinue activities f adequate oxygen (approx. 12% or more) before taking readings with LEL meter. vels are below 12%, LEL meter readings are not valid.	
LEL	Less than 10% LEL – Continue working, continue to monitor LEL levels Greater than or Equal to 10% LEL – Discontinue work operations and immediately withdraw from area. Resume work activities ONLY after LEL readings have been reduced to less than 10% through passive dissipation, or through active vapor control measures.		
Action levels for inhalation	of Toxic/Hazardous Su	IBSTANCES (Action levels are for sustained breathing zone concentrations)	
Air Quality Parameters (Check all that apply)	Remain in Level D or Modified D	Response Actions for Elevated Airborne Hazards	
VOCs	0 to ppm	From ppm to ppm: Proceed to Level C, or Ventilate, or Discontinue Activities If greater than ppm: Discontinue Activities and consult EHS Team	
Carbon Monoxide	0 to 35 ppm	At greater than 35 ppm, exit area, provide adequate ventilation, or discontinue activities.	
Hydrogen Sulfide	0 to 10 ppm	At greater than 10 ppm, exit area, provide adequate ventilation, or discontinue activities	
Dust	0 to mg/m <sup>3</sup>		
Methane	0 to 10% LEL	If ambient air reading is greater than 10% LEL, evacuate area and immediately notify Local Fire department (911) and the Town of Thorton (603-726-8168). New Hampshire Dept. of Environmental Service should be made aware of the methane detection above 10% LEL.	
SPECIAL INSTRUCTIONS/COMM	ENTS REGARDING AIR MC	DNITORING (IF APPLICABLE)	

8. HEALTH AND SAFETY EQUIPMENT AND CONTROLS			
AIR MONITORING INSTRUMENTS	PERSONAL PROTECTIVE EQUIPMENT		
PID Type: Lamp Energy: eV	Respirator – Type		
FID Type:	Respirator - Cartridge Type:		
Carbon Monoxide Meter	🔀 Hardhat		
Hydrogen Sulfide Meter	Outer Gloves Type: Work		
O <sub>2</sub> /LEL Meter	🔀 Inner Gloves Type: Nitrile		
Particulate (Dust) Meter	Steel-toed boots/shoes		
Calibration Gas Type	Coveralls – Type		
Others: Multi-gas meter (O2/CH4/H2S/CO/CO2)	Outer Boots – Type		
	Eye Protection with side shields		
OTHER H&S EQUIPMENT & GEAR	Face Shield		
Fire Extinguisher -ABC 10lb	Traffic Vest		
Caution Tape	Personal Flotation Device (PFD)		
Traffic Cones or Stanchions	Fire Retardant Clothing		
Warning Signs or Placards	EH (Electrical Hazard) Rated Boots, Gloves, etc.		
Decon Buckets, Brushes, etc.	Noise/Hearing Protection		
Portable Ground Fault Interrupter (GFI)	☑ Others: seasonal clothing		
Lockout/Tagout Equipment	Discuss/Clarify, as Appropriate:		
Ventilation Equipment	Wear FR/EH clothing and boots when working within an		
Others: cell phone(s), first aid kit, soap, water	energized line ROW		

9. H&S TRAINING/QUALIFICATIONS FOR FIELD PERSONNEL	
Project-Specific H&S Orientation (Required for All Projects/Staff)	Lockout/Tagout Training
OSHA 40-Hour HAZWOPER/8 Hour Refreshers	Electrical Safety Training
Hazard Communication (for project-specific chemical products)	Bloodborne Pathogen Training
First Aid/CPR (required for HAZWOPER for at least one individual on site)	Safe Drilling SOP
Current Medical Clearance Letter (required for HAZWOPER)	Eversource Specific Site Orientation Training
OSHA 10-hour Construction Safety Training	🔀 Landfill Hazard Awareness
Fall Protection Training	
Trenching & Excavation	
Discuss/Clarify, as needed:	

10. PERSONNEL AND EQUIPMENT DECONTAMINATION (SECTION ONLY REQUIRED FOR HAZWOPER SITES)			
Describe personnel decontamination procedures for the project site, including "dry decon" (simple removal of PPE)	Wash hands prior to eating, drinking, smoking, or applying makeup. Wash hands prior to eating, drinking, smoking or applying make-up, taking breaks or leaving site. Change PPE before leaving site.		

11. PROJECT PERSONNEL - ROLES AND RESPONSIBILITIES			
Project Title/Assigned Role	Telephone Numbers		
GZA Project Team Members	Work: 603-232-8778		
	Cell: 603-361-4222		
GZA Project Team Members	Work: 603-232-8771		
	Cell: 603-493-5154		
	PONSIBILITIES Project Title/Assigned Role GZA Project Team Members GZA Project Team Members		

**Site Supervisors and Project Managers (SS/PM)**: Responsibility for compliance with GZA Health and Safety programs, policies, procedures and applicable laws and regulations is shared by all GZA management and supervisory personnel. This includes the need for effective oversight and supervision of project staff necessary to control the Health and Safety aspects of GZA on-site activities.

Field Safety Officer (FSO): The FSO is responsible for implementation of the Site Specific Health and Safety Plan.

**First Aid Personnel:** At least one individual designated by GZA who has current training and certification in basic first aid and cardiopulmonary resuscitation (CPR) must be present during on-site activities involving multiple GZA personnel at HAZWOPER sites.

**GZA Project Team:** Follow instructions relayed by the HASP and GZA manager on-site.

#### **OTHER PROJECT PERSONNEL:**

Name	Project Title/Assigned Role	Telephone Numbers
David Lamothe	Principal-in-Charge	Work: (603) 232-8716
		Cell: (603) 493-9669
Jennifer Baron	Project Manager	Work: (603) 232-8758
		Cell: (207) 232-5832
Samuel P. Despins	Office Safety Coordinator	Work: 603-232-8721
		Cell: 603-767-4318
Richard Ecord	GZA EHS Director	Work: 781-278-3809
		Cell: 404-234-2834

Principal-in-Charge: Responsible of overall project oversight, including responsibility for Health and Safety.

Project Manager: Responsible for day-to-day project management, including Health and Safety.

Health and Safety Coordinator: General Health and Safety guidance and assistance.

**GZA EHS Director:** H&S technical and regulatory guidance, assistance regarding GZA H&S policies and procedures.

12. PLAN ACKNOWLEDGEMENT AND APPROVALS			
GZA Project Site Worker Plan Acknowledgement			
I have read, understood, and agree to abide by the information set forth in this Safety and Accident Prevention Plan. I will follow guidance in this plan and in the GZA Health and Safety Program Manual. I understand the training and medical monitoring requirements covered by the work outlined in this plan and have met those requirements.			
GZA Employee Name	GZA Employee Signature	Date	
	·	•	

Subcontractor Site Worker Plan Acknowledgement			
GZA has prepared this plan solely for the purpose of protecting the health and safety of GZA employees. Subcontractors, visitors, and others at the site must refer to their organization's health and safety program or site-specific HASP for their protection. Subcontractor employees may use this plan for general informational purposes only. Subcontractor firms are obligated to comply with safety regulations applicable to their work, and understand this plan covers GZA activities only.			
Subcontractor Employee Name	Subcontractor Employee Signatures	Date	
G	ZA HASP Approval Signatures		
The following individuals indicate their acknowledgement and/or approval of the contents of this Site Specific H&S Plan based on their understanding of project work activities, associated hazards and the appropriateness of health and safety measures to be implemented. A signed copy of this document must be present at the project site at all times work is being performed.			
GZA Author/Reviewer Role	Signature	Date	
Jennifer Baron HASP Preparer	Alban	4/8/2024, updated 1/20/25	
Chris Mayne EHS Reviewer	Chiestydien D. Mayne	4-10-2024	
David Lamothe Principal in Charge	and furth	4/8/2024, Updated 1/20/25	

# EHS Policy 03-0003 Pausing or Stopping Work



## PAUSE-WORK

GZA highly encourages pausing work for a brief time, and as often as necessary, to address more typical health and safety hazards. Because of the types of hazards GZA employees usually face, pausing work is a more appropriate method of health and safety planning. Pausing work allows a site team to meet and discuss emerging health and safety hazards on a project site, and thus provides effective safety intervention that is typically done directly before performing a new site task.

## **STOP-WORK AUTHORITY**

It is the policy of GZA that GZA employees or GZA-hired subcontractors have both the **AUTHORITY** and the **RESPONSIBILITY** to stop either parties' work if conditions or behaviors are considered unsafe, without fear of reprimand or retaliation. This can include, but is not limited to, the following:

- $\Rightarrow$  Immediately stopping any work activity that presents a danger to the site team or the public;
- ⇒ Questioning and resolving any situation that involves a work activity not being performed in accordance with a site-specific health and safety plan or broader GZA health and safety programs;
- ⇒ Stepping-in to safely correct conditions themselves, or reporting health and safety issues to their Supervisor if beyond their capability or authority to correct; or
- $\Rightarrow$  Refusing to perform any work activity that poses an imminent danger to them.

## **REQUIREMENTS TO RESUME WORK AFTER STOP-WORK**

When work has been stopped on a project site the following actions are required before work may resume:

- ⇒ The cause of the stop work must be investigated and any hazards identified must be mitigated; and
- ⇒ The GZA Project Manager, GZA Field Safety Officer, and, if readily available, the GZA Principal must all

agree that work may be resumed in a safe manner.





Number:	Vol. 03	No. 3002
Date:	8-16-2017	
Supersedes:	8-8-2013	
Approved	Richard Ecord	
rippio (ou.	Environmental Health and Safety	
Sponsoring Function:	Environmental Health and Safety	
Page:	1 of 4	

## MOTOR VEHICLE OPERATION

## TABLE OF CONTENTS

1.0	INTRO	DDUCTION	1
2.0	PROC	EDURES	1
	2.1	GENERAL DRIVING SAFETY REQUIREMENTS	1
	2.2	CELL PHONE AND OTHER ELECTRONIC DEVICE USE WHILE DRIVING	3
3.0	RESPO	ONSIBILITES	3
4.0	JOUR	NEY MANAGEMENT	4
5.0	DOCU	JMENT VERSION:	4

## **1.0 INTRODUCTION**

The safe use of light trucks and automobiles is a basic job requirement for many GZA employees. Automobile accidents are a leading cause of injuries in the United States as well as the leading cause of serious worker injuries. This guidance document describes the minimum qualifications and safety requirements and expectations of GZA employees that operate automobiles and light trucks while performing GZA work. This document also details GZA approaches to fatigue management and journey management. Operation of commercial vehicles with a gross vehicle weight rating (GVWR) over 10,000 pounds is typically not performed by GZA personnel, and is not included in this document.

## 2.0 PROCEDURES

## 2.1 GENERAL DRIVING SAFETY REQUIREMENTS

Only GZA employees who are authorized to drive a motor vehicle, in accordance with applicable statutes and regulations, will be allowed to operate a motor vehicle to conduct work-related activities, or to operate

a company-owned or leased vehicle. GZA employees on GZA business must operate motor vehicles under their control in compliance with all applicable laws and regulations.

The following requirements apply to drivers of GZA-owned or rented vehicles, and personal vehicles if used to conduct company business:

- Possess and carry a valid and current motor vehicle operator's license appropriate for the type of vehicle being operated;
- Do not drive while under the influence of alcohol, illegal drugs or certain medications that can cause impairment of judgment;
- Exercise cautious and reasonable driving habits, particularly regarding high-risk driving activities such as speeding, tailgating, lane changes, and winter driving. Employees shall adhere to posted speed limits and maintain safe distance between other vehicles;
- Wear seat belts whenever the vehicle is moving. Wear seat belts as required while at job sites;
- Select vehicles of the correct size and design for the intended use and that are ergonomically suited. Vehicles used for towing trailers must be rated by the manufacturer for use in towing trailers of the size intended. Trailers must be properly equipped with functioning lights as required by law. Vehicles shall not be overloaded above the manufacturer's design specifications. Secure all materials on a trailer within the manufacturer's and state's legal limits before driving the vehicle;
- Only operate vehicles with current state inspection stickers affixed. If at any time a vehicle owned by GZA fails to meet such requirement it shall be taken out of service and repaired before continued use;
- Carry a reliable method of communication (cell phone) always when driving. All GZA owned vehicles must have a roadside emergency kit and fire extinguisher appropriate for the size and use of the vehicle, a valid insurance identification card, and insurance claim report form;
- Only drive when necessary, and limit to daylight hours when possible. Avoid driving during adverse weather conditions when possible;
- Obtain directions before beginning a trip to an unfamiliar destination and provide details of the trip in the health and safety plan (reviewed by the PIC and EHS Staff);
- Take rest breaks from driving as needed to reduce fatigue; GZA encourages taking at least 3 "Pause Works" per day. These are excellent times to make calls, if needed. If you are too tired to work, inform your Project Manager, and do not attempt to drive. As a consulting firm, our typical work hours do not extend past 10 hours per day. Obtain prior approval from your DOM if the combination of regular project work and driving will exceed 16 hours in a 24-hour period. In these cases, the DOM and EHS Staff will analyze work tasks to control fatigue;
- Report motor vehicle accidents and traffic violations that occur while operating GZA vehicles or personal vehicles on GZA business to the Corporate Insurance Manager and in the GZA EHS Event Report portal or GZA People-Based Safety app;
- Obtain or file a police report for unlawful incidents such as hit and run, vandalism, or theft. Always call the police when an accident causes injuries or potential injuries.

#### 2.2 <u>CELL PHONE AND OTHER ELECTRONIC DEVICE USE WHILE DRIVING</u>

Cell phone use, text messaging, and similar electronic device use while driving a vehicle is dangerous, and GZA strives to provide a safe workplace, including on the road in GZA-owned, GZA-leased, or employee's personal vehicles.

Accordingly, GZA employees will refrain from using their phones while driving GZA-owned or GZAleased vehicles. GZA employees will also refrain from using their phones to conduct company business while driving their personal vehicles. This applies to the vehicle driver only, and to calls, emails, texts, and other forms of communication in either hand-held or hands-free (Bluetooth) mode. Cell phone use in emergency situations is always allowed. This does not apply when GZA employees are driving their personal vehicles and not conducting company business, however for safety reasons GZA highly encourages no cell phone use while driving, no matter the circumstances. For further clarification of this policy, employees should refer to the included FAQ section, or contact GZA Safety staff.

The manipulation of cell phones GPS and mapping apps, and other electronic devices such as radios and CDs should be done while parked when possible, being mindful that these can cause distractions while driving.

GZA employees are required to comply with restrictions on cell phone use applicable in various jurisdictions. Certain GZA clients may have cell phone usage policies that are stricter. In these cases, the client's policy will apply. Employees charged with traffic violations resulting from their use of their cell phone while driving will be solely responsible for all liabilities that result from such actions.

## 3.0 RESPONSIBILITES

The DOM, or designated responsible person, is responsible for the maintenance of GZA owned motor vehicles under his or her supervision. It is the responsibility of those persons designated by the DOM to periodically verify that GZA vehicles are operated in a safe manner. Although not typical for GZA, any use of a GZA-owned vehicle for an employee's personal business must be authorized beforehand by the DOM.

The Corporate EHS or designated EHS staff is responsible for ensuring GZA employees with the "Vehicle Driver" job function receive initial and annual training in defensive driving, fatigue management, and journey management.

It is the responsibility of all GZA employees to operate motor vehicles and other motorized equipment in a safe, responsible and lawful manner. Heavy equipment use is addressed by a separate policy. It is also the responsibility of each GZA employee to obtain an operator's license appropriate for vehicles operated and materials transported in the course of GZA business.

It is the responsibility of all GZA employees to report motor vehicle accidents that occur while operating GZA vehicles or personal vehicles on GZA business.

## 4.0 JOURNEY MANAGEMENT

Certain GZA clients may have a requirement to formally document vehicle trips using a "Journey Management" form. In these cases, GZA employees will incorporate the requirements into safety planning for the client's specific projects and follow the client's program. This includes reviewing the Journey Management plan with affected employees.

## 5.0 DOCUMENT VERSION:

Date	Status	Author
11-19-1996	Issued	Mark P. Malchik
6-18-2010	Revised	Jayanti Chatterjee
8-18-2013	Revised to incorporate fatigue and journey management	Richard Ecord
8-24-2017	Revised to make section 2.2 more descriptive and easier to read, to address Risk Management Committee and Board of Director comments, and to institute requirement to refrain from phone use while driving. Added Frequently Asked Questions (FAQ) section.	Richard Ecord

## FREQUENTLY ASKED QUESTIONS

## 03-3002 MOTOR VEHICLE OPERATIONS

The purpose of this FAQ is to provide clarification on questions GZA employees may have regarding GZA Safety Policy 03-3002, Motor Vehicle Operations, in particular the September 4, 2017 policy change that requires GZA employees refrain from cell phone use while driving. GZA's transition to refraining from cell phone use while driving necessitates additional information so our employees understand how to comply with the policy.

## Q: What is distracted driving, and what is electronic distracted driving:

A: Distracted driving occurs when a vehicle driver's attention is diverted from the roadway. The distraction can be as simple as changing a radio station, eating, or petting an animal, or as complicated as interacting with a social media web site.

Most recent laws restricting distracted driving focus on the use of wireless communication devices. Examples include text messaging, engaging in cell phone calls, interacting with social media web sites, and using handheld devices as GPS receivers.

## Q: <u>What prompted GZA to implement a policy requiring no cell phone use while driving?</u>

A: GZA wants to keep employees safe! In the past several years, it has become more obvious that cell phone use while driving causes unacceptable levels of distraction while driving. GZA strives to provide a safe workplace for our employees, and requiring full focus on the road while driving is part of fulfilling that goal.

## Q: <u>What do current laws say about distracted driving?</u>

A: Federally, at least 5 agencies have issued rules about distracted driving, and President Obama issued an Executive Order that applied to all civilian Federal Government employees. Since 2015, state legislatures have passed laws at a rapid pace dealing with distracted driving. Almost all U.S. states currently ban texting while driving, and a growing number ban the use of handheld cell phone use. Some states bar all cell phone use by novice drivers. Currently, no U.S. states ban the use of a wireless/Bluetooth device to place or receive calls while driving, but 38 states ban all cell phone use by bus drivers, and 20 states ban all cell phone use by novice drivers. Several municipalities ban all phone use in specific areas, such as school zones.

#### Q: <u>Is following the law enough? Why or why not?</u>

A: It is now well documented and understood, regarding distracted driving, that adhering to the minimum applicable state and federal laws may not be enough to keep people safe. A useful comparison may be the use the helmets while driving motorcycles. The law in most states requires use of helmets, however a few states still do not require their use. Clearly, wearing a motorcycle helmet protects motorcycle riders from injuries if accidents happen. Because employers are responsible for ensuring their employees have a safe place to work, they have taken the lead in enacting policies that restrict or eliminate all use of cell phones while driving.

#### Q: What recommendations have been made about distracted driving and by whom?

A: In December 2011, the National Transportation Safety Board (NTSB) issued a recommendation that all 50 states and the District of Columbia enact complete bans of all portable electronic devices for all drivers – including banning use of hands-free devices. The recommendation was made based on NTSB investigations of serious and fatal crashes. This is one of several recommendations made by federal agencies.

#### Q: What does GZA's current cell phone service provider say about distracted driving?

A: Verizon Wireless states "According to the National Highway Traffic Safety Administration (NHTSA), the available research indicates that using a wireless phone while driving degrades a driver's performance, whether it is a hands-free or hand-held wireless phone. For your wellbeing and the wellbeing of those around you, you should consider turning your phone off and allowing calls to go to Voice Mail while you are driving."

## Q: <u>In what circumstances does this revised policy apply?</u>

A: The revised policy applies when a GZA employee is driving: 1) a GZA-owned vehicle, 2) a GZAleased vehicle (including rental cars), and 3) in an employee's personal vehicle if they are conducting company business. It applies only to the driver of the vehicle. It does not apply to employees driving personal vehicles and not conducting GZA business, however GZA highly encourages no cell phone use while driving, no matter the circumstances.

## Q: What does 'conducting GZA business' mean?

A: Conducting GZA business means many things, and listing every circumstance meeting the definition of conducting GZA business is not practical. If the activity being performed benefits GZA in some way, it is conducting GZA business. Some examples include driving to/from a
project site, participating in company or client conference calls, checking texts or emails, and participating in company training sessions. Generally, if an employee is driving a company-owned or leased vehicle, they are conducting company business. Employee acts of solely driving from their place of residence to/from work is not considered company business, unless the employee is being reimbursed by GZA for their time or vehicle mileage.

# Q: <u>What types of cell phone use are prohibited under GZA's revised policy, and when do the restrictions apply?</u>

A: Generally, the following types of activities are prohibited while driving: 1) any hand-held use of a cell phone, 2) any hands-free use of a cell phone that requires viewing the cell phone screen for more than 2-3 seconds (such as viewing slides during a presentation), and 3) hands-free use of a cell phone in combination with a Bluetooth device (when used for any other purpose other than passive listening). These restrictions apply when a GZA employee is driving a vehicle conducting company business, regardless of the time that business is occurring. Specific examples will be provided during GZA staff training.

# Q: <u>What types of cell phone use while driving are allowed under GZA's revised policy?</u>

- A: GZA highly encourages employees to use cell phones only while parked in a safe area, however we realize that employees performing certain activities may be helpful. Passive listening activities are allowed. This includes such things as listening to GPS directions given by cell phone apps, and listening to conference calls (but not actively participating in discussions). Short (less than 2 second) glances at GPS units, radios, etc. are allowed, however these devices should be placed in the vehicle to allow an employee to look in the direction of travel, such as mounted on the vehicle dash or windshield (not placed where the employee must look away from the direction of travel). Cell phone use is always allowed in emergency situations. Specific examples will be provided during GZA staff training.
- Q: <u>When does the new policy take effect?</u>
- A: The revised cell phone use policy takes effect on September 4, 2017.

# Q: In addition to safety of GZA employees, are there company liabilities from using cell phones while driving?

A: Yes. Employers can and have been held liable for actions that are allowed by federal regulations and individual state laws. The legal theory of *respondeat superior* (vicarious responsibility) means that an employer may be held legally accountable for negligent employee actions if the employee

was acting within the scope of his/her employment at the time of a crash. Numerous lawsuits have resulted in large awards payable by employers and their insurers.

# Q: What are some examples of recent lawsuits and/or large awards or settlements?

A: 2013 - \$1 Million settlement before trial - Ohio. Pedestrian struck and killed by a semi-truck driver who was talking with his employer on a hands-free device. The company's safety program, in accordance with existing laws, allowed hands-free device use while driving, and the driver testified he was allowed to use the phone hands-free.

2006 - \$4.1 Million settlement before trial – Illinois. An employee was lost and using a cell phone GPS while driving a company van. The employee allegedly ran a red light, broadsiding another vehicle and seriously injuring a 70-year-old woman. The driver and employer were sued, and admitted liability at the beginning of a trial and settled.

2010 - \$21 Million – Texas. A company driver was talking on a hands-free headset, in compliance with her company's policy, when she struck another vehicle broadside and seriously injured the driver. A jury held the company liable to pay \$21 million in compensatory and punitive damages to the injured driver.



Number:	Vol. 03 No. 3003
Date:	June 18, 2010
Supersedes:	Vol. 03, No. 8200, 1/25/2009
Approved:	Kenneth Johnston Vice President, Risk Management
Sponsoring Function:	Risk Management Department Environmental Health and Safety
Page:	1 of 24

# ELECTRICAL SAFE WORK PRACTICES PROGRAM

# TABLE OF CONTENTS

1.0	INTRO	DDUCTION2
2.0	PURP	OSE2
3.0	RESPO	ONSIBILITIES
4.0	GENE	RAL ELECTRICAL SAFETY
	4.1	GENERAL PRECAUTIONS FOR ALL STAFF4
	4.2	GENERAL REQUIREMENTS PERTAINING TO ELECTRICAL EQUIPMENT
	4.3	REPORTING ELECTRICAL SAFETY HAZARDS
5.0	ELEC	TRIC UTILITY HAZARDS
	5.1	UNDERGROUND UTILITIES
	5.2	OVERHEAD UTILITIES
	5.3	WORKING CLEARANCES FROM OVERHEAD ELECTRIC POWER LINES7
6.0	ELEC' EQUII	TRICAL SAFETY REQUIREMENTS GZA-OPERATED FACILITIES AND PMENT
	6.1	DESIGN OF ELECTRICAL INSTALLATIONS
	6.2	EQUIPMENT LABELING
	6.3	CLEARANCE DISTANCES/CONFINED SPACES
	6.4	ILLUMINATION
	6.5	NFPA AND OSHA REQUIREMENTS FOR ELECTRICAL SAFE WORK PRACTICES
	6.6	ELECTRICAL SAFE WORK CONDITION11
	6.7	SAFE APPROACH BOUNDARIES11
	6.8	LIMITED APPROACH BOUNDARY
	6.9	RESTRICTED APPROACH BOUNDARY

	6.10	PROHIBITED APPROACH BOUNDARY	.13
7.0	EMPL	OYEE TRAINING AND QUALIFICATION	.14
	7.1	UNQUALIFIED PERSON, UNQUALIFIED ELECTRICAL WORKER (LEVEL I)	.14
	7.2	LIMITED QUALIFICATION ELECTRICAL WORKER (LEVEL II)	.15
	7.3	QUALIFIED ELECTRICAL WORKER (LEVEL III)	.16
	7.4	SUPERVISORS	.17
8.0	INFOR	RMATION RESOURCES, REFERENCES	.17
9.0	GLOS	SARY OF TERMS	.17
10.0	PREPA	ARED BY	.24

# **1.0 INTRODUCTION**

The GZA GeoEnvironmental, Inc. ("GZA") Electrical Safe Work Practices is intended to provide GZA employees with the guidance necessary to identify, evaluate, and control electrical hazards to which GZA personnel may be exposed in the normal course of employment. Because electrical work has the potential for personnel electrocution and the potential hazard of catastrophic property damage, extreme caution must be exercised when working with electricity and electrical equipment. Electrical shocks may also be the cause of secondary serious injuries, such as falls from elevated platforms or ladders, temporary unconsciousness and consequential injury. Electrical equipment can also cause fire because of its potential as an ignition source for causing fire or explosion. Fire is frequently caused by short circuits, overheating equipment and failure of current limiters, thermal sensors, and other safety devices. Explosions may occur when flammable liquids, gases, and dusts are exposed to ignition sources generated by electrical equipment.

#### 2.0 PURPOSE

The primary purpose of this program is to prevent injuries and accidents and protect GZA employees from low voltage electrical hazards. "Low Voltage" is defined by the Occupational Safety and Health Administration (OSHA) as work performed directly on or in proximity of systems of 600 volts, nominal, or less. "High voltage" electrical hazards (>600 v) are addressed in this program to a limited extent, pertaining only to the hazards associated with potential contact with or disturbance of underground and overhead utilities, or where GZA employees may work in close proximity to high voltage installations (substations, transformers, switchgears, and similar equipment). No GZA employees are authorized to conduct installation, maintenance, repair, or similar work on systems having voltages greater than 600 volts (often referred to as "power distribution work"), either energized or de-energized; therefore, hazards associated with high voltage work are not addressed in this program.

This program references the primary laws, regulations and codes related to electrical safe work practices, and presents general practices, procedures, training requirements, and other guidelines pertaining to GZA operations. This program is applicable to all GZA operating units, employees, jobsites, and projects involving potential electrical shock hazards to GZA employees. Facility-specific or project-specific

safety procedures for preventing electric shock or other injuries resulting from direct/indirect electrical contact to employees working on or near energized or de-energized parts will be developed and implemented as required on a facility-specific or project-specific basis.

While some GZA employees may work with equipment in the 120 to 600 volt range (as related to remediation system or water treatment system equipment and facilities, and similar project work) most GZA employees who may be at risk of electrical shock normally work in areas with electrical equipment and appliances that operate at 120 volts or less.

# **3.0 RESPONSIBILITIES**

The goal of the electrical safety program is to ensure that all GZA employees who may be exposed to electrical hazards understand the hazards associated with electric energy and are capable of performing the necessary steps to protect themselves and their coworkers.

Primary objectives of this program are to ensure systems are in place for the recognition and identification of electrical safety hazards, providing electrical safety training to employees, commensurate with their job duties, providing necessary safety equipment to employees that will enable to protect themselves from electrical hazards, and ensuring that employees report electrical hazards to their supervisors and/or EHS Coordinators or EHS Director so that hazardous conditions may be promptly corrected.

GZA employees must be aware of electrical safety concerns related to their work, must comply with safe operating procedures when working with electrical equipment, must attend appropriate safety training, and report safety concerns to appropriate managers and supervisors.

Project management staff (Principals, Project Managers) on projects involving electrical safety hazards, particularly on projects involving the operation and maintenance of electrical equipment (such as remediation systems, water treatment systems, and similar electrical equipment), are responsible for adhering to EHS requirements for staff to be trained, qualified, and authorized to work on electrical equipment, shall support policies for conducting periodic hazard analysis of work areas and for correcting identified safety hazards.

The EH&S personnel shall provide assistance in identifying electrical safety issues, provide guidelines on electrical safety laws, regulations and codes, shall provide or facilitate electrical safety training for GZA staff, and provide assistance in the review of electrical equipment safe operating procedures as necessary.

EHS staff coordination with project management staff shall be responsible for providing or making available appropriate levels of training for authorized or qualified persons, and that appropriate personal protective equipment is provided to authorized or qualified staff who work with electrical equipment

# 4.0 GENERAL ELECTRICAL SAFETY

GZA employees use electric powered equipment and systems during many aspects of their work at GZA, whether in offices or other facilities or as part of field work. Voltages as low as 12 volts can be dangerous, especially pertaining to 12 volts systems which allow for high (and hazardous) current flows. When working with or around electrical equipment, one may inadvertently become part of an electrical circuit. Only trained and authorized or qualified individuals should do any repair or work on electrical equipment.

As part of GZA's ongoing injury and illness prevention efforts, departments are required to conduct a hazard analysis of the workplace. This analysis will provide a mechanism for defining work unit specific hazards associated with electricity and create a plan for hazard mitigation and employee training.

#### 4.1 <u>GENERAL PRECAUTIONS FOR ALL STAFF</u>

- Never work on "hot" or energized equipment unless it is necessary to conduct equipment troubleshooting;
- Use extension cords only as temporary power sources.
- Do not connect too many pieces of equipment to the same circuit or outlet as the circuit or outlet could become overloaded;
- Be sure that ground-fault circuit interrupters (GFCI) are used in high-risk areas such as wet locations, outdoors (GFCI's are designed to shut off electrical power within as little as 1/40 of a second);
- Plug strips, such as those used on computers, should be plugged directly into outlets and not into extension cords or other plug strips;
- Inspect all electrical equipment periodically for defects or damage;
- Electrical cords that are worn, frayed, abraded, corroded or otherwise damaged must be replaced;
- When removing a plug from an electrical socket, grasp the plug to remove it from a socket never pull the cord;
- Keep all cords away from heat, oil and sharp edges, and other sources of potential damage;
- Always follow the manufacturer's instructions for use and maintenance of all electrical tools, equipment and appliances;
- Keep equipment operating instructions on file and readily available to equipment users;
- Never touch an electrical appliance and facility plumbing at the same time;
- Always unplug electrical appliances before attempting any repair or maintenance;
- All electrical devices must be properly grounded with approved three wire plugs unless they are "double insulated". Grounding provides a safe path for electricity to the ground, preventing leakage of current in circuits or equipment.
- Electrical equipment used by GZA personnel and in GZA facilities and on GZA job-sites should be UL or FM approved, or equivalent;
- Keep cords out of the way of foot traffic so they don't become tripping hazards or become damaged by traffic.
- Minimize the use of electrical equipment in wet areas; where electrical equipment must be used in wet or potentially wet locations (outdoors, treatment systems, etc.), ensure proper precautions are taken to minimize the risk of electrical shock;
- Ensure energized parts of electrical equipment operating at 50 volts or more are guarded against accidental contact. Similar precautions must be taken with systems less than 50 volts, except when current is limited by equipment design features to less than 5 millivolts.
- Only properly trained employees should work on electrical equipment;
- Know how to respond to emergencies such as electric shock incidents or fires;
- NEVER work with electricity greater than 600 volts without specific permission, training and written procedures. Notify your supervisor immediately if you have any questions;
- Be able to recognize electrical safety hazards in your work area;
- Ensure that all authorized or qualified persons have received appropriate training in order to operate or repair equipment;
- Keep equipment in good working order to help prevent electrical accidents;
- Maintain a three-foot clearance around electrical panels;
- Electrically operated equipment must be de-energized before work may commence;

- Always follow lockout/tag-out procedures when working on electrical equipment (Lockout/Tag-out Program) and wear appropriate Personal Protective Equipment (PPE) such as safety glasses, rated rubber gloves, rated rubber sleeves, insulated boots, or face shield;
- Never override safety devices such as electrical interlocks;
- Remove all rings, key chains or other metal objects when working around electricity; conductive items of jewelry or clothing shall not be worn unless rendered non-conductive by covering, wrapping or other insulating means;
- Wear appropriate personal protective equipment, such as eye protection or insulated gloves, as needed;
- Never use metal ladders when working near energized wiring; portable ladders shall have non-conductive side rails;
- Where workers are required to handle long dimensional conductor objects (ducts, pipes, ladders, etc.) in the vicinity of potentially exposed electrical system components, or overhead power lines, appropriate safety measures shall be incorporated in the work practices.
- Damp or wet environments may be dangerous when working with electricity;
- Never plug in cords that are wet or touch electrical equipment with wet hands;
- Employees working with lasers, performing hardware or software testing, or other activities that do not require direct contact with electrical components, should be aware of electrical safety issues and be alert to the possibility of other employees conducting energized work in the area.

# 4.2 <u>GENERAL REQUIREMENTS PERTAINING TO ELECTRICAL EQUIPMENT</u>

- Electrical installations and utilization equipment will be in accordance with the current edition of the National Electrical Code, National Fire Protection Association (NFPA 70), American National Standards Institute (ANSI) Standard C, and related OSHA standards (see section 8). This code will also apply to every replacement, installation, or utilization equipment
- Equipment or facilities designed, fabricated for, and intended for use by Facilities Department personnel will be procured to meet the requirements of the National Electric Code.
- Frames of all electrical equipment, regardless of voltage shall be grounded.
- Exposed non-current carrying metal parts of electrical equipment that may be come energized under abnormal conditions shall be grounded in accordance with the National Electrical Code.
- Wires shall be covered wherever they are joined, such as: outlets, switches, junction boxes, etc.
- Parts of electrical equipment which in ordinary operation produce arcs, sparks, etc., shall not be operated or used in explosive atmospheres or in close proximity to combustible materials.
- Equipment connected by flexible extension cords shall be grounded either by a 3-wire cord or by a separate ground wire (except double insulated equipment).
- Ground fault circuit interrupters (GFCI) shall be used on all 120-volt, single-phase, 15- and 20-ampere receptacle outlets at job sites when the receptacles are not a part of the permanent wiring of the building or structure. Receptacles on a two wire, single phase portable or vehicle-mounted generator rated not more than 5 kilowatt, where the circuit conductors of the generator are insulated from the generator frame and all or the grounded surfaces, need not be protected with GFCI's [NFPA70E-NEC110.9(c)].

#### 4.3 <u>REPORTING ELECTRICAL SAFETY HAZARDS</u>

Employees who observe workplace conditions that represent potential electrical safety hazards to GZA employees, other employees, guests or the general public, shall report this conditions to your supervisor or EHS Coordinator or EHS Director. Such hazardous conditions may include discrepancies between instruction, procedures, policies and manual, faulty or damaged equipment, misapplication of an electrical device, presence of hazardous materials in locations where electrical sparking or arcing may occur.

Report malfunctioning equipment or devices to your supervisor, EHS Coordinator or EHS Director. Typical concerns that should be reported include:

- Damaged cords, plugs or outlets;
- Receiving a shock when touching the equipment; and
- Arcing, sparking, smoking, or otherwise malfunctioning equipment.

Any electrical equipment not operating properly should be:

- Taken out of service immediately;
- Tagged or labeled as "Do Not Use";
- Dispose of the equipment or report to the appropriate qualified individual for repair.

Do not attempt to repair any electrical equipment yourself unless you are properly trained and authorized to do so.

If safety issues persist, please notify your supervisor or submit an Incident Analysis Report to the EHS Coordinator.

# 5.0 ELECTRIC UTILITY HAZARDS

#### 5.1 <u>UNDERGROUND UTILITIES</u>

Much of the field work performed by GZA involves borings, probes or excavation below the ground surface. Underground utilities, especially electric and gas, pose some of the major potential hazards to which GZA and subcontractor employees are exposed during subsurface explorations. The process of locating underground utilities is the contractual responsibility of the subcontractors who perform subsurface work, not GZA (except in some jurisdictions where both the engineer and its subcontractors have explicit statutory responsibilities). In some cases, particularly on private property, the client may be the primary source of information pertaining to the location of underground utilities. GZA staff shall specify a general location for borings or other subsurface exploration, allowing the subcontractor to make the final decision for the specific location.

Notwithstanding the subcontractor's responsibility, GZA project staff must be observant in the field and coordinate the utility location process, consistent with our project role, in order to minimize the potential for striking an underground utility. GZA personnel engaged in subsurface investigation receive training on the general nature of underground utilities, the process of notifying call centers ("Digsafe," "Call Before You Dig," etc.), call center limitations, utility locating techniques, and underground utility risk management and due diligence practices. A national directory of underground utility call centers, by State, is provided on the GZA Intranet...click "Health and Safety" on the home page side bar, and see the document entitled "National Directory of Utility Location Call Centers."

#### 5.2 <u>OVERHEAD UTILITIES</u>

Also related to much of the work conducted by GZA is the use of equipment that has the potential to come into contact with overhead power lined, such as excavation equipment, trucks, drill rigs, etc. Generally, this equipment is operated by GZA subcontractors, but on-site GZA personnel have the responsibility to conduct general oversight regarding safety performance of contractors. Furthermore, GZA personnel may be at risk from overhead utility hazards, for example if they are in contact with a drill rig or excavator, climbing scaffolds, or may be carrying a conductive ladder or other materials or equipment which may come in contact with overhead lines. The following safety measures shall be followed at all times:

- Conduct initial and daily surveys of the worksite and implement control measures and communication with coworkers to address hazards at the site. When designing underground exploration plans, take into account the location of overhead utilities.
- Don't operate equipment near overhead power lines if at all possible; take into account the potential for equipment to contact power lines during normal operation and also in case of unanticipated tipping/falling of equipment. At a minimum, if it is necessary to work near overhead lines, maintain minimum clearance distances summarized below.
- If an object (scaffolds, crane, etc.) must be moved in the area of overhead power lines, ensure that a competent person is appointed whose sole responsibility is to observe the clearance between the power lines and the object. Warn others if the minimum distance is not maintained.
- Never touch an overhead line if it has been brought down by machinery or has fallen. Never assume lines are dead.
- When a machine is in contact with an overhead line, DO NOT allow anyone to come near or touch the machine. Stay away from the machine and summon outside assistance.
- Also, never touch a person who is in contact with a live power line.
- Be trained in cardiopulmonary resuscitation (CPR).
- If you should be in a vehicle that is in contact with an overhead power line, DON'T LEAVE THE VEHICLE. As long as you stay inside and avoid touching metal on the vehicle, you may avoid an electrical hazard. If you need to get out to summon help or because of fire, jump out without touching any wires or the machine, keep your feet together, and hop to safety.
- When mechanical equipment is being operated near overhead power lines, employees standing on the ground may not contact the equipment unless it is located so that the required clearance cannot be violated even at the maximum reach of the equipment.
- To maximize his or her own safety, an employee should always use tools that work properly. Tools must be inspected before use and, those found questionable, removed from service and properly tagged. Tools and other equipment should be regularly maintained. Inadequate maintenance can cause equipment to deteriorate, resulting in an unsafe condition.
- Tools that are used by employees to handle energized conductors must be designed and constructed to withstand the voltages and stresses to which they are exposed.
- Use the personal protective equipment appropriate for the job that is performed. This equipment may consist of rubber insulating gloves, hoods, sleeves, matting, blankets, etc. These items must be inspected prior to each use and tested annually.
- When working near overhead power lines, the use of non-conductive wooden or fiberglass ladders is recommended. Aluminum ladders and metal scaffolds or frames are efficient conductors of electricity.
- Avoid storing materials under or near overhead power lines.

#### 5.3 WORKING CLEARANCES FROM OVERHEAD ELECTRIC POWER LINES

State and federal safety standards state the minimum safe working clearance from any overhead line is 10 feet, for lines carrying voltages greater than 300 volts. Greater clearances are required for overhead lines operating at voltages exceeding 50,000 volts to ground. A summary of OSHA working clearance requirements is provided below:

From OSHA Construction Safety Standard 1926.451 paragraph (f)(6):

#### INSULATED LINES

Voltage	Minimum distance	Alternatives
Less than 300 volts	3 feet (0.9 m)	
300 volts to 50 kV	10 feet (3.1 m)	
More than 50 kV	10 feet (3.1 m) plus 0.4 inches (1.0 cm) for each 1 kV over 50 kV	2 times the length of the line insulator, but never less than 10 feet (3.1 m)

#### UNINSULATED LINES

Voltage	Minimum distance	Alternatives
Less than 50 kV	10 feet (3.1 m)	
More than 50 kV	10 feet (3.1 m) plus 0.4 inches (1.0 cm) for each 1 kV over 50 kV	2 times the length of the line insulator, but never less than 10 feet (3.1 m)

Exception to paragraph (b)(6)

Scaffolds and materials may be closer to power lines than specified above where such clearance is necessary for performance of work, and only after the utility company, or electrical system operator, has been notified of the need to work closer and the utility company, or electrical system operator, has deenergized the lines, relocated the lines, or installed protective coverings to prevent accidental contact with the lines.

From OSHA Construction Safety Standard 1926.550 paragraph (a)(15):

• 1926.550(a)(15)

Except where electrical distribution and transmission lines have been de-energized and visibly grounded at point of work or where insulating barriers, not a part of or an attachment to the equipment or machinery, have been erected to prevent physical contact with the lines, equipment or machines shall be operated proximate to power lines only in accordance with the following:

- 1926.550(a)(15)(i)
   For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet;
- 1926.550(a)(15)(ii)

For lines rated over 50 kV, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kV over 50 kV, or twice the length of the line insulator, but never less than 10 feet;

• 1926.550(a)(15)(iii) In transit with no load and boom lowered, the equipment clearance shall be a minimum of 4 feet for voltages less than 50 kV, and 10 feet for voltages over 50 kV, up to and including 345 kV and 16 feet for voltages up to and including 750 kV;

- 1926.550(a)(15)(iv)
   A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means;
- Cage-type boom guards, insulating links, or proximity warning devices may be used on cranes, but the use of such devices shall not alter the requirements of any other regulation of this part even if such device is required by law or regulation;
- 1926.550(a)(15)(vi)

Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded;

• 1926.550(a)(15)(vii)

Prior to work near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter shall be de-energized or tests shall be made to determine if electrical charge is induced on the crane. The following precautions shall be taken when necessary to dissipate induced voltages:

• 1926.550(a)(15)(vii)(a)

The equipment shall be provided with an electrical ground directly to the upper rotating structure supporting the boom; and

• 1926.550(a)(15)(vii)(b)

Ground jumper cables shall be attached to materials being handled by boom equipment when electrical charge is induced while working near energized transmitters. Crews shall be provided with nonconductive poles having large alligator clips or other similar protection to attach the ground cable to the load.

• 1926.550(a)(15)(vii)(c)

Combustible and flammable materials shall be removed from the immediate area prior to operations.

Work may be performed closer than the established working clearances only if the power lines have been de-energized and grounded, or if other protective measures (insulators) have been installed under the direction of a Qualified Electrical Worker, Qualified for High Voltage Power Distribution Systems.

# 6.0 ELECTRICAL SAFETY REQUIREMENTS GZA-OPERATED FACILITIES AND EQUIPMENT

In GZA offices, laboratories, storage facilities, equipment annexes and other non-project-related facilities, GZA personnel shall not engage in electrical design, installation or maintenance activities. Such activities are typically the responsibility of the facility owner and its qualified electrical subcontractors. GZA personnel in these facilities shall adhere to normal and typical occupancy activities, and shall conform to typical electrical safe work practices as outlined in Section 4.0 of this program. For various types of project-related activities performed by GZA personnel, such as the design, construction, operation and maintenance of electrical equipment used in remediation system facilities, water treatment systems, air monitoring and other environmental testing systems, specifically with the voltages of such systems typically range from 50 to 600 volts, nominal, GZA shall adhere to applicable laws, codes and regulations pertaining to electrical installations and electrical safe work practices.

#### 6.1 DESIGN OF ELECTRICAL INSTALLATIONS

- 1. National Electrical Code (NFPA)
- 2. Lighting circuits separate from equipment circuits so that if equipment needs to be shut down and locked out for maintenance work, lighting is still available
- 3. To facilitate access to low-voltage information ports, and similar sources of data by "non-qualified" workers, such ports shall be designed to be accessed in a manner that does not expose live electrical components above 50 volts, nominal. This may be accomplished through various means such as, but not limited to, the following:
- Segregation of low voltage (< 50 V) components and information ports from higher voltage components
- Incorporating equipment shutoff devices so that boxes are de-energized when data ports are accessed
- Shielding higher voltage live electrical components
- Installing links to information ports accessed via outside of electric box without opening box.
- 4. Installing sufficient number of 120 v electrical outlets within a system to minimize the potential for reliance on flexible cords (extension cords) as permanent wiring.
- 5. 120 volt outlets shall all be GFI-protected

#### 6.2 EQUIPMENT LABELING

Voltage, Shut offs, breakers (reference the National Electric Code), and arc flash data (see section 6.5-6.10) shall be labeled in accordance with Article 100 of the NFPA 70E standard for electrical safety in the workplace.

#### 6.3 <u>CLEARANCE DISTANCES/CONFINED SPACES</u>

Electrical panels and fuse/breaker boxes shall have proper clearance distances in front of the panel. Equipment shall be located so as to allow panel doors to be open a minimum of 90 degrees. Electrical installations shall be so designed as to provide minimum clearance distances in anticipation of necessary operations and maintenance work, so as to preclude the requirement for using protective shields, barriers or insulating materials during maintenance work. Where such conditions exist, the necessary protective equipment shall be made available at the work site.

#### 6.4 <u>ILLUMINATION</u>

Where exposed energized electrical equipment will be present in a work space, including temporary work when electrical enclosures must be opened, the work area shall have proper and adequate illumination in order to perform the work safely.

#### 6.5 NFPA AND OSHA REQUIREMENTS FOR ELECTRICAL SAFE WORK PRACTICES

The NFPA 70e standard addresses electrical safety requirements for employee workplaces that are necessary for the practical safeguarding of employees during activities such as the installation, operation, maintenance, and demolition of electric conductors, electric equipment, signaling and communications conductors and equipment, and raceways for the following:

- Public and private premises, including buildings, structures, mobile homes, recreational vehicles, and floating buildings
- Yards, lots, parking lots, carnivals, and industrial substations
- Installations of conductors and equipment that connect to the supply of electricity

• Installations used by the electric utility, such as office buildings, warehouses, garages, machine shops, and recreational buildings, that are not an integral part of a generating plant, substation, or control center.

Compliance with NFPA 70e involves an understanding of safety related work practices, safety related maintenance requirements, and safety requirements for special equipment as specified in NFPA 70e Articles 100-130, 200-250, 300-350. Annex D, "Incident Energy and Flash Protection Boundary Calculation Methods", is used to determine the threshold to exposure to dangerous energy.

ESWP-NFPA 70e is a professionally accepted consensus standard that is cited by OSHA and other regulatory programs for compliance enforcement under the general duty clause. Compliance with OSHA involves adherence to a six-point plan:

- A facility must provide, and be able to demonstrate, a safety program with defined responsibilities.
- Calculations for the degree of arc flash hazard.
- Correct personal protective equipment (PPE) for workers.
- Training for workers on the hazards of arc flash.
- Appropriate tools for safe working.
- Warning labels on equipment. Note that the labels are provided by the equipment owners, not the manufacturers. It is expected that the next revision of the National Electric Code will require that the labels contain the equipment's flash protection boundary, its incident energy level, and the required personal protective equipment (PPE).

# 6.6 <u>ELECTRICAL SAFE WORK CONDITION</u>

An electrical safe work condition is defined as a conductor or circuit part that has been isolated from energized parts, locked out in accordance with established standards, tested to ensure the absence of voltage, and, if necessary, grounded.

Do not work on or near energized electrical equipment unless it is in an electrical safe work condition. An exception to this rule is when de-energizing the equipment increases the hazard. A second exemption is when the work cannot be performed unless the circuit is energized (i.e. such as troubleshooting and voltage testing). In this case, you must be qualified and trained to understand the hazards, lockout procedures, and to select and use safe work practices and protective equipment. Treat all exposed or potentially energizable conductors, as energized until proven otherwise by testing or confirmed lockout.

#### 6.7 <u>SAFE APPROACH BOUNDARIES</u>

There are three safe approach boundaries for energized electrical work to protect against electric shock.

- Limited
- Restricted
- Prohibited

Each boundary has a specific distance to be maintained to avoid these hazards as depicted in diagram 1 below.

Under normal circumstances, air separation provides insulation between phases and ground for exposed, energized electrical conductors. The voltage level is the main determinant of how large that separation must be. The Limited Approach Boundary, Prohibited Approach Boundary, and Restricted Approach Boundary are distances where different levels of precaution must be taken to avoid shock from an exposed energized conductor or one that has a potential to become energized.

Each of these boundaries is identified as levels of approach as determined by the voltage level of the conductor. Each approach level requires a different level of precaution. In addition, the Limited Approach Boundary is dependent upon whether the conductor is fixed or movable. Figure 1 illustrates the shock hazard boundaries.



Figure 1: Safe Approach Boundaries, Annex C, Limits of Approach, NFPA 70E

#### 6.8 <u>LIMITED APPROACH BOUNDARY</u>

The following are the Limited Approach Boundary values to an exposed, energized electrical conductor, which is fixed, or movable. The Limited Approach Boundary Dimensions are listed in Table 1: Limited Approach Boundary Dimensions (L).

Nominal Sys (Phase te	stem Voltage o Phase)	<300	300-750	750-2k	2k-15k
<u>L</u> imited Approach	From a <b>Fixed</b> Conductor	3' 6"	3' 6"	4' 0"	5' 0"
Boundary Distance (L)	From a <b>Moveable</b> Conductor	10' 0"	10' 0"	10' 0"	10' 0"

Table 1: Limited Approach Boundary Dimensions (L)

Inside the Limited Approach Boundary (L), a qualified employee must plan necessary safe work practices. Workers must use insulated tools. If the voltage exceeds 750V, an assistant or another qualified employee must accompany a worker. Unqualified person(s) must stay outside of the Limited Approach Boundary.

#### 6.9 <u>RESTRICTED APPROACH BOUNDARY</u>

Inside of the Restricted Approach Boundary, the qualified employee formulates boundary requirements after approval by his/her supervisor. If the voltage exceeds 750V, both the supervisor and a non-resident expert must approve the work plan and an assistant or another qualified employee must be present. The employee(s) must use insulated tools and voltage-rated gloves and instruments. The Restricted Approach Boundary Dimensions are listed in Table 2: Restricted Approach Boundary Dimensions (R).

Nominal System Voltage (Phase to Phase)	<300	300-750	750-2k	2k-15k
<u>R</u> estricted Approach Boundary Dimension (R)	Avoid Contact	1' 0"	2' 0"	2' 2"

Table 2:	Restricted Approach	Boundary Dimensions	(R)
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#### 6.10 PROHIBITED APPROACH BOUNDARY

Crossing the Prohibited Approach Boundary is considered the same as making contact with energized conductors. To work in a Prohibited Approach Boundary follow the five steps below. Also, the qualified person must:

- 1. Have the training and experience to work as a "qualified person" per the definition in Chapter 3.
- 2. Has specialized training in this type of work.
- 3. Have a written plan conforming to the requirements of Chapter 6.0.
- 4. Determine the Prohibited Approach Boundary Dimensions per Table 4 of Annex A.
- 5. Use PPE and insulating equipment rated for the voltage and energy level involved.

**Note:** If the voltage exceeds 750V, both the supervisor and a non-resident expert must approve the work plan and an assistant or another qualified employee must be present.

The Prohibited Approach Boundary Dimensions are as follows in Table 3:

Nominal System Voltage (Phase to Phase)	<300	300-750	750-2k	2k-15k
<u>P</u> rohibited Approach Boundary Dimension (P)	Avoid Contact	0' 1"	0' 3"	0' 7"

 Table 3: Prohibited Approach Boundary Dimensions (P)

Pursuant to the National Fire Protection Association 70e (NFPA 70e) standard and OSHA Regulation 29 CFR 1910.133 for Electrical Safe Work Practices, for electrical system designed, operated and maintained GZA personnel, arc flash survey shall be conducted for the purpose of identifying potential electrical safety hazards. NFPA 70e, Annex D shall be used as a guide and the calculation matrix software provided by the Institute for Electrical and Electronic Engineers (IEEE) 1584, *Guide for Performing Arc Flash Hazard Calculations* (or equivalent) shall be used for arc flash hazard calculations.

From the arch flash analysis, information shall be developed for use in determining safety boundary distances (prohibited, restricted and limited approach boundaries), personal protective equipment (PPE) required within each boundary, and panel labeling requirements. A subsequent hazard/risk analysis shall be completed by GZA personnel using the supplied arch flash data and matrices.

The completion of surveys and review of the operations guideline is just one aspect of a comprehensive ESWP-NFPA 70e safety program. Once the baseline material or practice is in-place, it is incumbent on the

employer to train affected employees and supervisors, validate that the guidelines are being implemented and followed in practice, and that additional safety procedures are in-place to support the guidelines. To have an effective and sustainable program, other aspects must be considered to enable the successful operational practice of the guideline. Proper training and instruction must be developed for affected employees and supervisors so that they understand the theory behind the guidelines, why precautions must be taken where perhaps none have been taken prior to the guidelines establishment, and why following the guidelines is important to everyone's safety. Training elements can be easily extracted from the guideline and developed into effective and time-efficient training modules that meet the requirements of the ESWP-NFPA 70e standard.

# 7.0 EMPLOYEE TRAINING AND QUALIFICATION

OSHA Regulation 29 CFR 1910.333, and the NFPA 70e Standard, both addressing Electrical Safety Work Practices, establish training requirements for individuals performing work that results in a potential electrical shock. It is important to note that while the NFPA 70e Standard is a non-regulatory industry consensus standard, it must be considered a regulatory requirement as it is considered by OSHA an enforceable standard for electrical safe work practices in conjunction with its own 1910.333 standard and it General Duty Clause, Section 5(a)1 of the Occupational Safety and Health Act of 1970. Based on these requirements, GZA has established three categories of "Electrical Worker" Levels 1, 2 and 3. These categories have been established to best represent general categories of concern related to electrical hazards to which GZA employees may be exposed. In all situations where GZA employees may be exposed to the risk of electrical shock, the worker shall receive training in electrical safety work practices pertaining to their respective job assignments. Even within each category, specific training assignments for each individual shall be determined based on the individual's specific job assignment.

#### 7.1 <u>UNQUALIFIED PERSON, UNQUALIFIED ELECTRICAL WORKER (LEVEL I)</u>

Unqualified persons shall be trained in and be familiar with any of the electrical safety related practices that are germane to the worker's work task. The specific nature of the training must be based on an evaluation of the specific hazards to which an employee may be exposed. For example, an office worker who may overload a receptacle or power strip shall be trained on the associated hazards and safe work practices. By contrast, other workers who are also considered to be an unqualified person or unqualified electrical worker, may be exposed to a higher level of electrical hazard just by the nature of their job. At GZA, these workers may include equipment operators, engineers (civil, mechanical, chemical, geotechnical), geologists, environmental scientists, etc.

Such individuals may perform maintenance activities on systems requiring the use of energy isolation devices to lock out the equipment, where the employee may be exposed to mechanical hazards if accidentally energized. These individuals shall have documented training as a Lockout "Authorized" Employee. This course is required for all employees who will perform maintenance on equipment that poses a hazard if accidentally energized. At a minimum, individuals who work in proximity to electrical mechanical systems where lockout devices are used must be trained as an "affected" employee, the training addressing general awareness of lockout practices and procedures.

Level I Unqualified Electrical Worker may open electrical enclosures for electrical components operating at 50 to 600 voltages ONLY if the circuit has been de-energized AND locked out. A level I person is qualified for this work ONLY for visual observations or for access to data ports and information systems operating at less than 50 volts. If the 50-600 volt circuit is not locked out, it shall be considered energized, and only a Level II or Level II Qualified Electrical Worker is allowed to perform the work.

Training topics that may be required for Level I (Unqualified Person) may include the following, commensurate with their job assignment:

- First Aid/CPR/AED
- General Electrical Safety, Safety-Related Work Practices to Prevent Electrical Shock
- Use of GFIs
- Control of Hazardous Energy Lockout/Tagout (Affected or Authorized)
- Hand and Power Tool and Machine Safety
- Clearance Distances, Approach Distances
- Hazards Associated with Conductive Clothing and Apparel

#### 7.2 LIMITED QUALIFICATION ELECTRICAL WORKER (LEVEL II)

A person, designated by GZA, who by reason of experience or instruction has demonstrated familiarity with the operation to be performed and the hazards involved. An employee is considered a qualified person only after they have successfully completed Electrical Safety Awareness and Advanced Electrical Safety trainings as designated by GZA Environmental Health and Safety/Risk Management Department.

Whether a person is considered to be a "qualified" will depend upon various circumstances in the workplace. It is possible and, in fact, likely for an individual to be considered "qualified" with regard to certain equipment in the workplace, but "unqualified" as to other equipment.

An employee who is undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified person is considered to be a qualified person for the performance of those duties.

A Level II Qualified Person or Qualified Electrical worker is permitted into a limited approach boundary of exposed live parts operating in 50 volts or more, and shall at the minimum, be additionally trained in the following:

- 1. The skills and techniques necessary to distinguish exposed energized parts from other parts of the electrical equipment;
- 2. The skills and techniques necessary to determine a nominal voltage of exposed live parts;
- 3. The approach distance and the corresponding voltages to which the person would be exposed;
- 4. The decision-making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely

These individuals must receive documented electrical safety training appropriate and specific for their job assignment, including a combination of classroom and on-the-job training on the specific tasks they will perform and on the specific equipment they will work with, and they must demonstrated proficiency in the work practices involved with their work. Until these provisions are met, they are considered to be employees undergoing on-the-job training and must be under the direct supervision of a qualified person at all times. According to the definition of "qualified employee" the employee must also have demonstrated an ability to perform work safely at his or her level of training.

A Level II Qualified work is not qualified to perform diagnostic testing, fabrication, repair or modification of wiring devices or systems operating at nominal voltages of 50 to 600 volts. A level II Qualified worker may perform diagnostic testing on DC communication and control circuits operating at less than 50 volts, only with appropriate training. Personnel who work with communication circuits and DC circuits with a fault current limited to 5 milli-amp (mA) (if the energy is less than 10 joules) or less are exempt from this requirement.

A Level II Qualified Worker may be qualified to open electric enclosures of systems operating at 50 to 600 volts, for purposes of making visual observations, or for accessing components within the enclosure operating at less than 50 volts. Such work activities are allowed only if training requirements above are addressed, including documented classroom and on the job training on their specific job tasks and on the specific equipment and systems they will work on, hands on demonstrating of competency, AND if the energized components of 50 to 600 volts within the enclosure are clearly marked and shielded. Opening of electrical enclosures containing energized components is allowed only where adequate illumination is provided so that the worker can perform the work safely.

# 7.3 QUALIFIED ELECTRICAL WORKER (LEVEL III)

A Qualified Electrical Worker, Level III, is an individual recognized by GZA as having sufficient understanding of the equipment, device, system, or facility with which they will work to positively control any hazards it presents. Only those persons who are qualified and authorized may install, fabricate, repair, test, calibrate, or modify electrical wiring, devices, and systems, on equipment operating at nominal voltages of 50 to 600 volts. No GZA personnel are qualified to perform such work on systems with voltages greater than 600 volts. Qualification and authorization to perform electrical or electronics work is based on a combination of formal training, experience, and on-the-job training.

A qualified person who by reason of a minimum of two years of electrical training and experience with circuits and equipment he/she will encounter on the job, and who has demonstrated by performance familiarity with the work to be performed and the hazards involved. Only a Qualified Electrical Worker is allowed to work on energized conductors or equipment connected to energized high-voltage systems. With the exception of replacing fuses, operating switches, or other operations that do not require the employee to contact energized high voltage conductors or energized parts of equipment, clearing trouble or emergencies involving hazard to life or property, no such employee shall be assigned to work alone.

The Qualified individual has had sufficient, documented training and experience and can demonstrate appropriate knowledge and skills to be able to work on electrical equipment, whether energized or deenergized. A Qualified Electrical Worker shall be authorized to perform such work only upon review and approval by the EHS department, and submitting documentation of training.

If work on energized components is anticipated, the qualification of a person shall include:

- Specific operations in which energized work is anticipated
- Features of the equipment including any specialized configuration
- Location of energy-isolating devices
- Techniques, tools, and PPE used for the specific equipment
- Use of relevant documents such as wiring diagrams, schematics, service manuals, design packages, and operating, testing, and calibrating procedures
- Systems' energy control procedures, including energy-isolating devices, grounding and shorting procedures, and other energy control procedures
- Recordkeeping and logging requirements that include pre-job briefing and Electrical Hot Work Permit.

Work conducted by GZA employees on energized equipment may be performed only by individuals authorized and qualified to do such work, and only after it has been determined that this type of work must be performed with the equipment energized. Supervisors are responsible for ensuring that employees or others under their supervision are qualified to work on energized components before they are assigned to such work.

# 7.4 <u>SUPERVISORS</u>

Supervisors who assign workers to perform Level II or Level III electrical work shall receive documented training on the following **NFPA 70E Sections and OSHA Standards:** 

- Article 110.3, Employee Training
- Article 110.6(C), Emergency Procedures
- Article 110.6(D)(1), Qualified Persons
- Article 110.6(D)(2), Unqualified Persons
- Articles 120.2(B)(2) and 120.2(D)(5), Annex G, Lockout / Tagout Practices
- Article 110.6(E), Documentation
- Article 310.5(C), Electrolytic Cell Line Working Zones
- Articles 110.3, 110.5(B), 110.6, 310.3, 310.4, 310.5(D)(6), and 330.3, Safety Related Working Practices
- OSHA 29 CFR 1910.147: Control of Hazardous Energy Sources
- OSHA 29 CFR 1910.269: SubPart "R" Special Industries
- OSHA 29 CFR 1910.301: SubPart "S" Electrical, General
- OSHA 29 CFR 1910.302-308: Design Safety Standards for Electrical Systems
- OSHA 29 CFR 1910.302-335: Safety Related Work Practices
- OSHA 29CFR-1926 Construction Standard

# 8.0 INFORMATION RESOURCES, REFERENCES

Industry-wide standards applications related to this program at the time of publication are:

- NFPA 70E, Standard Electrical Safety Requirements for Employee Workplaces, (1995 and) 2000 Edition.
- IEEE 902-1998, IEEE Maintenance, Operation, and Safety of Industrial and Commercial Power Systems
- IEEE 1584a, Guide for Performing Arc Flash Hazard Calculations, Amendment 1, 2004
- OSHA 29 CFR 1910.147: Control of Hazardous Energy Sources
- OSHA 29 CFR 1910.269: SubPart "R" Special Industries
- OSHA 29 CFR 1910.301: SubPart "S" Electrical, General
- OSHA 29 CFR 1910.302-308: Design Safety Standards for Electrical Systems
- OSHA 29 CFR 1910.302-335: Safety Related Work Practices
- OSHA 29CFR-1926 Construction Standard

# 9.0 GLOSSARY OF TERMS

#### Approve

Review job requirements and planning documents, and if appropriate, authorize that actual task(s) can be performed. Requires signature of approver

#### **Barehanded Work**

A technique of performing work on exposed energized conductors or circuit parts, after the worker has been raised to the potential of the energized conductor or circuit part. Barehanded work is not acceptable for employees of General Motors.

# Barricade

A physical obstruction such as tapes, cones, or A-frame type wood or metal structures intended to provide warning about and to limit access to a hazardous area. Barricades are generally only installed temporarily.

#### Barrier

A physical obstruction, which is intended to prevent contact with, exposed energized electrical conductors or circuit parts. Barriers may be installed temporarily or permanently.

#### Bonding

The permanent joining of metallic parts to form an electrically conductive path that will ensure continuity and the capacity to conduct safely, any current likely to be imposed. A bond need not be a weld to be considered a permanent connection.

#### **Buddy or Assistant**

Person assigned to accompany another person on a particular job and is instructed on how to give aid in the event of an incident. For electrical work, this person must be qualified in accordance with the definition of "qualified person".

#### **Clamp-On Ammeter**

A metering device that can be utilized for measuring AC or DC current flowing in a circuit, without having to interrupt or be in series with the circuit. This is accomplished via magnetic coupling between the circuit conductor and a split/clamp-on current transformer integral to the meter.

#### **Close out Inspection**

Inspection to be performed on equipment prior to release for operation, which ensures that all tools, foreign objects, or other improper materials have been removed.

#### Conductive

Any material suitable for carrying electric current.

#### **De-energized**

Having been disconnected from all sources of voltage and/or electrical charge, resulting in zero volts to ground on the conductors.

#### Dielectric

A non-conductor of electrical energy.

#### **Electrical Circuit Conductors**

Components (including wire, bus and terminals), which are intended to be in the normal current carrying path of the electrical system.

#### **Electrical Energy States**

- De-energized Having been disconnected from all sources of voltage and/or electrical charge, resulting in zero volts to ground on the conductors.
- Energized Electrically connected to a source of voltage or electrical charge so as to have conductors elevated above ground potential.

• Potentially Energized Equipment - Any equipment or component that is physically connected to a power source.

# **Electrical Hazard**

A condition where energized conductors exist above 50V AC or DC, and where inadvertent or unintentional contact or equipment failure may result in shock, arc flash burn, thermal burn, or blast.

#### **Electrical Incident**

An event resulting in equipment damage or potential of injury to employees brought about by either personnel action or electrical equipment failure. An electrical incident has the potential to result in injury from:

- Electrical flash and/or burn,
- Electrical shock (if >50 volts), or
- Reflex action to an electric shock.

# **Electrical Safety**

Recognizing hazards associated with the use of electrical energy and taking precautions so that hazards do not cause injury or death.

# **Electrically Non-hazardous Task**

A task, which involves equipment, energized at a voltage less than 50 volts AC or DC.

# **Electrical Safe Working Condition**

A conductor or circuit part that has been disconnected from energized parts, locked, and tested to ensure the absence of voltage, and, if necessary, grounded.

#### Enclosure

The case or housing apparatus, or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts, or to protect the equipment from physical damage.

#### Energized

Electrically connected to a source of voltage or electrical charge such that conductors are elevated above ground potential.

#### Equipment

Individual or multiple electrical enclosures that are adjacent to each other to make a larger unit, such as several sections of MCC's or switchgear.

#### **Exposed - Live Parts**

Capable of being inadvertently touched or approached, nearer than a safe distance by a person. It is applied to parts that are not suitably grounded, isolated, or insulated.

#### **Exposed - Wiring Methods**

On or attached to the surface or behind panels designed to allow access.

#### **Flash Hazard**

A dangerous condition associated with the release of energy caused by an arc that suddenly and violently changes material(s) into a vapor.

#### Gloves

#### (Low - Medium Voltage)

All gloves are only to be used with leather protectors and shall conform to ASTM D120 requirements. Listed below are the voltage level and glove class relationship:

50 - 500 Volts - Class 00 RMS Nominal Rating

501 - 1000 Volts - Class 0 RMS Nominal Rating

1001 - 7500 Volts - Class 1 RMS Nominal Rating

7501 - 17,000 Volts - Class 2 RMS Nominal Rating

#### Ground

A conducting connection, whether intentional or accidental, between an electrical circuit and the earth or some conducting body that serves in place of the earth.

#### Grounded

Connected to earth or some external conducting body that serves in place of the earth. This connection may be intentional or accidental.

#### **Grounded Conductor**

A system or circuit conductor that is intentionally grounded. This is usually a current carrying conductor and is also called the neutral or power return.

#### Grounding Conductor, Equipment or Equipment Grounding Conductor

That conductor used to connect the noncurrent-carrying metal parts of equipment, raceways, and other enclosures to the system grounded conductor and/or the grounding electrode conductor at the service equipment or at the source of a separately derived system. This conductor is also called the "green" wire and must not be used to carry load current. The color green may not be used on any other conductor.

#### **Grounding Electrode**

That conductor that specifically makes contact with the earth for grounding a power system.

#### **Grounding Electrode Conductor**

A conductor used to connect the grounding electrode to the equipment-grounding conductor and/or to the grounded conductor of the circuit at the service equipment or at the source of the separately derived system.

#### **Grounding Jumper or Grounding Strap**

A strap of wire used to connect equipment housings to the equipment-grounding conductor.

# Hot Work

Coming in contact with exposed energized electrical conductors or circuit parts with the hands, feet, or other body parts, with tools, probes, or with test equipment, regardless of the personal protective equipment a person is wearing. This is the same as being inside the Prohibited Approach Boundary.

# **Incoming Supply**

All conductors, cables, or rigid bus work that introduces power to a piece of equipment. This includes the primary or alternate supplies, temporary supply, or interlock control wiring.

#### Insulated

Separated from other conducting surfaces by a dielectric (including air space) offering a high resistance to the passage of current. Note: When any object is said to be insulated, it is understood to be insulated for the conditions to which it is normally subjected. Otherwise, if an object is not insulated per this definition, it should be treated as uninsulated.

#### Isolated

This is a much-abused word in electronics. It can mean lifted from ground or earth, separated by a transformer, use of a shielded transformer, separation by distance, separated by special circuits, and so forth. An isolated circuit may or may not have a conductive path to another circuit.

#### Job Plan

A description of the specific tasks, procedures, timing, and location of an electrical job that addresses all safety considerations. A job plan also includes the sequence of events needed to complete the scope of work safely and efficiently.

#### **Limited Approach Boundary**

See Annex A

#### **Live-Line Tool Work**

A technique of performing work on exposed energized conductors or circuit parts where the worker utilizes insulated live-line tools rated for the voltage rating to protect workers.

#### Live Parts

Energized electric conductors, buses, terminals, or components that are uninsulated or exposed where a shock hazard exists.

#### Main Bonding Jumper or Bonding Jumper

The connection between the grounded circuit and the equipment-grounding conductor at the service. This connection is the key to electrical safety and thus this conductor is given a special name.

#### Multimeter

A combination meter designed to measure voltage, amperage, and resistance.

#### **Neutral Conductor**

The grounded conductor used to bring power to a facility or to a load. This phrase is usually used to describe the grounded conductor in single-phase power.

#### Non-Resident Expert

A person qualified to make engineering and safety judgments regarding issues in question, and who is not in the chain of command of the organization needing assistance.

#### Plan

Actually write out steps for a job by filling out GZA Electrical Work Planning Sheets. Requires signature of planner(s).

#### **Post-Job Evaluation**

A review of a completed job that affords an opportunity to discuss unexpected events and/or hazards. A record of recommendations for a process or procedural change can be made.

#### **Prohibited Approach Boundary**

See Annex A.

#### **Proximity Work (Working Near)**

Working Near is any activity inside the Limited Approach Boundary of exposed energized electrical conductors or circuit parts that are not put into an electrical safe work condition.

#### **Qualified (General Motors)**

Meets the "OSHA Expanded" definition and:

- Is thoroughly familiar with the GZA Safe Electrical Work Practices, and
- Intends to implement the General Motors Safe Electrical Work Practices in the work place.

#### **Qualified (OSHA, Expanded)**

A qualified person is one trained and knowledgeable in the construction and operation of equipment or a specific work method, and is able to recognize and avoid the electrical hazards. A person may be qualified with respect to certain equipment and methods but still unqualified for others. Such persons permitted to work within the limited approach boundary of exposed energized conductors and circuit parts must also be trained in the following:

- (a) The skills and techniques necessary to distinguish exposed energized parts from other parts of electric equipment,
- (b) The skills and techniques necessary to determine the nominal voltage of exposed energized parts, and
- (c) The approach distances specified in Annex B and the corresponding voltages, to which the qualified person will be exposed,
- (d) The decision making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to safely perform the task, as defined in Chapter 6.

#### **Rated Voltage**

A meter rating which indicates the highest voltage that a meter may contact without risking insulation failure and meter failure/destruction (and potentially personal injury).

#### **Restricted Approach Boundary**

See Annex A

#### Review

Review job requirements and planning sheet, looking for errors in logic and procedures, and working with the planner to modify. Requires the signature of the reviewer.

#### **Rubber Glove Work**

A technique of performing work on exposed energized conductors or circuit parts where the worker utilizes rubber insulating gloves, rated for the voltage involved, to provide insulation from the energized part. The insulated gloves must be protected by outer leather gloves.

#### **Scope of Work**

A description of the work to be accomplished, including the physical boundaries of the work.

#### Separately derived system

A new or separate power source such as the secondary of a transformer or the output of a motor generator set.

#### **Shock Hazard**

A dangerous condition associated with the flow of current through a person's body caused by contact or approach to exposed electrical conductors or circuit parts nearer than the minimum air insulation distance.

#### **Step Potential**

A potential difference over the surface of the earth, which can cause current flow from foot-to-foot through the body. This condition is most commonly caused by a nearby lightning strike or a large local ground fault.

#### **Tic Tracer or Induce Voltage Detectors**

A device designed to indicate voltage by sensing the magnetic and/or electric field emitted by energized conductors. This device must be treated very cautiously as it can be easily "fooled" and cause the user to believe that a circuit is de-energized when it is not.

#### **Touch Potential**

A potential difference, which can cause current flow through the body.

#### Troubleshooting

The logical analysis of symptoms to determine the cause of a failure and return the equipment or system to service.

#### **Voltage Testing**

A task intended solely to measure voltage level.

#### **Voltage Sensing**

A task intended solely to sense for the presence or absence of voltage.

#### Voltmeter

An instrument utilized to determine the voltage difference between two points by contacting each of the probes on the points in question. An analog or digital display is utilized to indicate the value of the voltage.

#### Wiggy

A voltage tester commonly carried on electrician's tool belts and utilized as an indicator of the approximate voltage between two points of concern. There is typically a very approximate analog scale indicator, along with an indicator in the end of the device that serves as an "energized" -- "non-energized" gage. This device is useful during troubleshooting where exact voltage values aren't necessary.

#### 10.0 PREPARED BY

This document was prepared by Mark Malchik, Corporate Environmental Health and Safety Director.



Number:	Vol. 03 No. 3004
Date:	June 18, 2010
Supersedes:	NA
Approved:	Kenneth Johnston Vice President, Risk Management
Sponsoring Function:	Risk Management Department Environmental Health and Safety
Page:	1 of 21

# HAND TOOL AND POWER TOOL SAFETY

# TABLE OF CONTENTS

1.0	INTRO	DDUCTION	1
2.0	OBJE	CTIVE	1
3.0	REGU	LATIONS AND GUIDELINES	2
4.0	PROC	EDURES	2
	4.1	GENERAL SAFETY REQUIREMENTS	2
	4.2	PERSONAL PROTECTIVE EQUIPMENT	3
	4.3	INSPECTIONS OF TOOLS	3
	4.4	EMPLOYEE TRAINING	3
	4.5	TOOL SAFETY PROCEDURES	3
5.0	RESPO	ONSIBILITIES	3
6.0	PREPA	ARED BY	4
ATTA	CMEN	T A: HAND AND POWER TOOLS SAFETY PRECAUTIONS	5

# **1.0 INTRODUCTION**

The purpose of this program is to promote the safe use of, and to reduce the likelihood of injuries involving the use of hand or power tools.

#### 2.0 OBJECTIVE

The objective of this program is to identify and evaluate hazards to which employees will be exposed during use of hand and power tools and to provide specific training and control measures to prevent injuries to GZA employees.

# 3.0 REGULATIONS AND GUIDELINES

This program has been developed pursuant to the requirements of OSHA's General Industry and Construction Standards for hand and power tools (29 CFR 1910 Subpart P and 29 CFR 1926 Subpart I).

#### 4.0 **PROCEDURES**

Hand and power tools allow employees to apply additional force and energy to accomplish a task. These tools improve efficiency and make better products. Because of the increased force of hand and power tools, the objective of safety with these tools is to the employee themselves and others. Disabilities resulting from misuse of tools or using damaged tools include loss of eyes and vision; puncture wounds from flying chips; severed fingers, tendons and arteries; broken bones; contusions; infections from puncture wounds; ergonomic stress, as well as many other injuries. The following procedures will be followed when using hand and power tools to minimize and prevent injuries while working with them.

#### 4.1 <u>GENERAL SAFETY REQUIREMENTS</u>

- 1. Each employee shall be responsible for the safe and good condition of tools and equipment used by himself/herself.
- 2. Use the right tool for the job and keep it in a safe place.
- 3. Do not use the tool if it is defective or deformed. Defective tools shall be tagged or labeled "Do Not Use" and reported to the Supervisor so that proper replacement or repair can be arranged.
- 4. Guards shall not be removed from any equipment.
- 5. Use the tools the right way. Before using the tool ensure that the proper way of using the tool has been provided. If not, contact your Supervisor and request the training.
- 6. Always place, keep, store tools in a secure place when not in use (many accidents have been caused by tools falling from overhead and by knives, chisels, and other sharp tools carried in pockets or left in tool boxes with cutting edges exposed).
- 7. Use racks, shelves and tool boxes to securely store the hand and power tools.
- 8. Compressed air shall not be used for cleaning purposes except where pressure is reduced to less than 30psi, and then only with safety glasses with side shields.
- 9. Provide proper personal protective equipment and have employees wear it (e.g. safety glasses, hand and arm protection, hearing protection, etc.)
- 10. Tools must be equipped with appropriate safety switches (type is dependent on blade shrank or wheel size) and must not be loaded until just prior to the intended firing time (e.g. nail gun).
- 11. In general, all tools and blades must be in a good condition and have the appropriate guarding.
- 12. Rotating or moving parts of equipment are guarded to prevent physical contact with the operator.
- 13. Ensure that Power tools are used with the correct shield, guard or attachment recommended by the manufacturer. Guards must prevent hands, arms or any part of an Employees body from making contact with hazardous moving parts.

- 14. All cord-connected, electrically operated tools and equipment are effectively grounded or of the approved double insulated type.
- 15. Portable fans are provided with full guards or screens having openings of <sup>1</sup>/<sub>2</sub>-inch or less.
- 16. When personnel use hand tools while they are working on ladders, scaffolds, platforms, or work stands, they shall use carrying bags for tools which are not in use.

#### 4.2 <u>PERSONAL PROTECTIVE EQUIPMENT</u>

Appropriate personal protective equipment (i.e.: safety glasses, face shield, safety goggles, gloves, etc.) shall be worn to protect from hazards that may be encountered while using portable power tools and hand tools.

Employees that use hand and power tools and are exposed to the hazards of falling, flying, abrasive and splashing materials, or exposed to harmful dusts, fumes, vapors, or gases shall be provided with the specified personal protective equipment necessary to protect them from the hazard.

#### 4.3 <u>INSPECTIONS OF TOOLS</u>

- 1. Before using a tool, the operator shall inspect it to determine that all operating moving parts operate and that it is clean.
- 2. Any tool that is malfunctioning shall be tagged and labeled and immediately removed from service.
- 3. Tools shall be inspected at regular intervals and shall be repaired in accordance with the manufacturer's specification.

#### 4.4 <u>EMPLOYEE TRAINING</u>

- 1. The Principal-in-Charge for the project are responsible for ensuring that employees required to use hand and power tools are properly trained in the use of those tools; and
- 2. The employees are trained to select the right tools for each job.

#### 4.5 <u>TOOL SAFETY PROCEDURES</u>

Attachment A provides additional information on tool safety on a variety of hand and power tools and shall be reviewed with employees during their training.

#### 5.0 **RESPONSIBILITIES**

- 1. The Principal-in-charge (PIC) of the work in progress is responsible for directing supervisors and on-site personnel to comply with this Policy.
- 2. The PIC is responsible for ensuring that training is provided to personnel assigned to use hand and power tools prior to the use of those tools by the employees.
- 3. It is the responsibility of each GZA employee to obtain tool safety training before use of the tools and to use the tools in a safe manner.
- 4. It is the responsibility of the senior on-site GZA employee to notify supervisory personnel of other on-site parties when unsafe practices occur.

# 6.0 PREPARED BY

This document was prepared by Mark Malchik, Corporate Environmental Health and Safety Director, and Jayanti Chatterjee, CIH. Please direct any questions to GZA's Corporate Environmental Health and Safety Director.

# ATTACMENT A: HAND AND POWER TOOLS SAFETY PRECAUTIONS

# I. CARRYING TOOLS

Employees are never to carry tools, which in any way could interfere with using both hands freely on a ladder or while climbing on a structure. A strong bag, bucket, or similar container is to be used to hoist tools from the ground to the job. Tools are to be returned in the same manner. Employees should never bring tools down by hand, carry in pant/shirt pockets, or drop tools to the ground.

Loose tools and tools laid inappropriately can cause a substantial portion of hand tool injuries. Tools will not be left above where employees are moving or walking. This presents a falling object hazard.

Chisels, screwdrivers, and pointed tools shall never be carried in an employee's pocket. They are to be carried in a tool box/cart, a carrying belt (sharp/pointed end down) like those used by electricians and steel employees, a pocket tool pouch, or in the hand with points and cutting edges pointed away from the body.

Employees carrying tools on their shoulders should pay close attention to clearances when turning around. Tools should also be handled so that they will not strike other employees or pedestrians.

#### II NON-POWERED TOOLS

1. <u>Metal-Cutting Hand Tools</u>

Chisels

- Factors determining the selection of cold chisels are the materials to be cut, the size and shape of the tool, and the depth of the cut to be made.
- The chisel should be made heavy enough so that it will not buckle or spring when struck.
- A chisel no larger than the material should be selected so that the blade is used rather than the point or corner. Also, a hammer heavy enough to do the job should be used.
- Employees are required to wear safety goggles when using a chisel and should set up a shield or screen to prevent injury to other employees from flying chips. If a shield does not give protection to all exposed employees, then all employees in the work area are required to wear glasses with side protection.
- 2. <u>Tap and Die Work</u>
  - Tap and die work should be firmly mounted in a vise.
  - Only a T-handle wrench or adjustable tap wrench should be used.
  - When threads are being cut with a hand die, hands and arms should be kept clear of the sharp threads coming through the die, and metal cuttings should be cleared away with a brush.

# 1. Hack Saws

- Hacksaws should be adjusted in the frame to prevent buckling and breaking, but should not be tight enough to break off the pins that support the blade.
- Install blade with teeth pointing forward.
- Pressure should be applied on the forward stroke not on the back stroke.
- If the blade is twisted or too much pressure is applied, the blade may break and cause injury to the hands or arms of the user.
- 2. Files
- Selection of the right kind of file for the job will prevent injuries and lengthen the life of the file.
- The file should never be cleaned by being struck against a vise or other metal object due to file chips becoming possible flying debris.
- A file-cleaning card or brush should be used.
- A file is not to be hammered or used as a pry. Use of a file in this manner frequently results in the file chipping or breaking causing injury to the user.
- A file should not be made into a center punch, chisel, or any other type of tool because the hardened steel may fracture in use.
- A file is never to be used without a smooth, crack-free handle; if the file were to get hung up, the tang may puncture the palm of the hand, the wrist, or other part of the body.
- Under some conditions, a clamp-on raised offset handle may be useful to give extra clearance for the hands.
- Files are not to be used on lathe stock turning at high speed (faster than three turns per file stroke) because the end of the file may strike the chuck, dog, or face plate and throw the file (or metal chip) back at the operator hard enough to inflict serious injury.

#### 3. <u>Tin/Sheet Metal Snips</u>

- Tin snips should be heavy enough to cut the material so easily that the employee needs only one hand on the snips and can use the other to hold the material.
- The material is to be well supported before the last cut is made so that cut edges do not press against the hands.
- Jaws of snips are to be kept tight and well lubricated.
- Employees are required to wear safety goggles when trimming corners or slivers of metal because small particles often fly with considerable force.
- Employees are also required to wear gloves when making cuts.

#### 4. <u>Cutters</u>

- Cutters used on wire, reinforcing rods, or bolts should have ample capacity for the stock; otherwise, the jaws may be sprung or spread.
- Chips may fly from the cutting edge and injure the user.
- Frequently lubricate cutters.
- To keep cutting edges from becoming nicked or chipped, cutters are not to be used as nail pullers or pry bars.
- Cutter jaws should have the hardness specified by the manufacturer for the particular kind of material to be cut.
- By adjustment of the bumper stop behind the jaws, cutting edges are to be set to have a clearance of 0.003 inch when closed.

#### 5. <u>Wood Cutting Hand Tools</u>

• Edged tools are to be used so that if a slip should occur, the direction of force will be away from the body. For efficient and safe work, edged tools are to be kept sharp and ground to the proper angle. A dull tool does a poor job and may stick or bind.

#### 6. <u>Wood Chisels</u>

- Inexperienced employees shall be instructed in the proper method of holding and using chisels. Handles are to be free of splinters.
- The wood handle of a chisel struck by a mallet is to be protected by a metal or leather cap to prevent it from splitting.

• The work to be cut must be free of nails to avoid damage to the blade or cause a chip to fly into the user's face or eye.

# 7. <u>Saws</u>

- Saws should be carefully selected for the work they are to do.
- For crosscut work on green wood, a coarse saw (4 to 5 points per inch) is to be used.
- A fine saw is better for smooth, accurate cutting when using dry wood.
- Saws are to be kept sharp and well set to prevent binding.

#### 8. <u>Axes</u>

- The employee is to make sure that there is a clear circle in which to swing the axe before chopping materials.
- All vines, brush, and shrubbery within the range should be removed, especially overhead vines that may catch or deflect the axe.
- Axe blades are required be protected with a sheath or metal guard wherever possible.
- When the blade cannot be guarded, it is safer to carry the axe at one's side.
- The blade on a single-edged axe shall be pointed down.
- 9. Hatchets
- Hatchets shall not be used for striking hard metal surfaces since the tempered head may injure the user or others by flying chips.
- When using a hatchet in a crowded area, employee shall take special care to prevent injury to themselves and other employees.
- Using a hatchet to drive nails is prohibited.

#### 10. Miscellaneous Cutting Hand Tools

Scrapers, Knives, Scalpels/X-acto Knives, & Box Cutters:

- Are to be used only by experienced employees.
- These tools are to be kept sharp and in good condition.

- The principal hazard in the use of knives is that hands may slip from the handle onto the blade or that the knife may strike the body or the free hand.
- A handle guard or a finger ring (and swivel) on the handle eliminates these hazards and is required to be used.
- Employees who must carry knives with them on the job shall keep them in sheaths or holders.
- Never carry a sheathed knife on the front part of a belt, but carry it over the right or left hip, toward the back. This will prevent severing a leg artery or vein in case of a fall.
- Knives should be stored safely and must never be left lying on benches or in other places such as being hidden under a product, under scrap paper or wiping rags, or among other tools in work boxes or drawers where they may cause hand injuries. Safe placing and storing of knives is one of the most important keys to knife safety.
- Employees who handle knives must ensure that there is ample room in which to work so they are not in danger of being bumped by other employees.
- Knives are to be kept separate from other tools to protect the cutting edge of the knife as well as to protect the employee.
- Horseplay such as throwing knives, "fencing", trying to cut objects into smaller and smaller pieces, and similar practices are prohibited around any knife operations.

Employees shall assure that nothing is cut that requires excessive pressure on the knife.

• Knives shall not be used as a substitute for can openers, screwdrivers, or ice picks.

#### 11. Torsion Tools

#### A. Open-End or Box Wrenches

- Open-end or box wrenches shall be inspected to make sure that they fit properly and that the jaws are not sprung or cracked.
- When defective, the wrench is required to be taken out of service until repaired.

#### 12. Socket Wrenches

- Socket wrenches are safer to use than adjustable or open-end wrenches.
- Socket wrenches give great flexibility in hard-to-reach places. The use of special types shall be encouraged where there is danger of injury.

#### 13. Adjustable Wrenches

• Adjustable wrenches are used for many purposes, but are not intended to take the place of standard open-end, box or socket wrenches.

- They are used mainly for nuts and bolts that do not fit a standard wrench.
- Pressure is always applied to the fixed jaw.

#### 14. Pipe Wrenches

- Pipe wrenches, both straight and chain tong, shall have sharp jaws and be kept clean to prevent slipping.
- The adjusting nut of the wrench is to be inspected frequently, and taken out of service if cracked. A cracked nut may break under strain, causing complete failure of the wrench and possible injury to the user.
- A piece of pipe (also called a 'cheater') slipped over the handle shall not be used to give added leverage because this can strain a pipe wrench to the breaking point.
- The handle of every wrench is designed to be long enough for the maximum allowable safe pressure.
- A pipe wrench should never be used on nuts or bolts, the corners of which will break the teeth of the wrench, making it unsafe to use on pipe and fittings, and it also damages the nuts/bolts.
- A pipe wrench shall not be used on valves, struck with a hammer, nor used as a hammer.

#### 15. Pliers

- Side-cutting pliers sometimes cause injuries when short ends of wires are cut.
- A guard over the cutting edge and the use of safety glasses will help prevent eye injuries.
- The handles of electricians' pliers are to be insulated. In addition, employees shall wear the proper electrical rated gloves if they are to work on energized lines.
- Pliers shall not be used as a substitute for a wrench.

#### Special Cutters for Banding Wire/Strap

• Special cutters include those for cutting banding wire and strap. Claw hammers and pry bars shall not be used to snap metal banding material.

#### 16. Pipe Tongs

• Employees must neither stand nor jump on the tongs nor place extensions on the handles to obtain more leverage. Larger tongs should be used if an employee encounters either scenario.
#### 17. Screwdrivers

- The practice of using screwdrivers for punches, wedges, pinch bars, or pry-bars shall not be allowed.
- Cross-slot (Phillips head) screwdrivers are safer than the square bit type, because they have fewer tendencies to slip. The tip must be kept clean and sharp, however, to permit a good grip on the head of the screw.
- The part to be worked upon must never be held in the hands; it should be laid on a bench or flat surface or held in a vise.
- No screwdriver used for electrical work shall have the blade or rivet extending through the handle. Both blade and handle shall be insulated except at the tip.

#### 18. Shock Tools

#### A. Hammers

• A hammer is to have a securely wedged handle suited to the type of head used. The handle shall be smooth, without cracks or splinters, free of oil, shaped to fit the hand, and of the specified size and length. Employees shall be warned against using a steel hammer on hardened steel surfaces. Instead, a soft-head hammer or one with a plastic, wood, or rawhide head should be used. Safety goggles or safety glasses shall be worn to protect against flying chips, nails, or scale.

#### B. <u>Riveting Hammers</u>

• Riveting hammers, often used by sheet metal employees, must have the same kind of use and care as ball pen hammers and should be watched closely for cracked or chipped faces.

#### C. Carpenter's or Claw Hammers

- The faces shall be kept well dressed at all times to reduce the hazard of flying nails while they are being started into a piece of wood.
- A checker-faced head is sometimes used to reduce this hazard.

# **\*\*When nailing is being conducted in a work area, eye protection is advised to be used by all employees nailing and all employees working in the same area.**

#### 19. Spark-Resistant Hand Tools

Around flammable substances, sparks produced by iron and steel hand tools can be a dangerous ignition source. Where this hazard exists, spark-resistant tools made from brass, plastic, aluminum, or wood will provide for safety.

#### III POWER TOOLS

#### POWER TOOL PRECAUTIONS

Power tools can be hazardous when improperly used. There are several types of power tools, based on the power source they use: electric, pneumatic, liquid fuel, hydraulic, and powder-actuated.

Employees should understand the potential hazards as well as the safety precautions to prevent those hazards from occurring. The following general precautions should be observed by power tool users:

- Never carry a tool by the cord or hose.
- Never yank the cord or the hose to disconnect it from the receptacle.
- Keep cords and hoses away from heat, oil, and sharp edges.
- Disconnect tools when not in use, before servicing, and when changing accessories such as blades, bits and cutters.
- All observers should be kept at a safe distance away from the work area.
- Secure work with clamps or a vise, freeing both hands to operate the tool.
- Avoid accidental starting. The worker should not hold a finger on the switch button while carrying a plugged-in tool.
- Tools should be maintained with care. They should be kept sharp and clean for the best performance. Follow instructions in the user's manual for lubricating and changing accessories.
- Be sure to keep good footing and maintain good balance.
- The proper apparel should be worn. Loose clothing, ties, or jewelry can become caught in moving parts.
- All portable electric tools that are damaged shall be removed from use and tagged "Do Not Use."

#### IV. GUARDS

Hazardous moving parts of a power tool need to be safeguarded. For example, belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or moving parts of equipment must be guarded if such parts are exposed to contact by employees. Guards, as necessary, should be provided to protect the operator and others from the following:

- point of operation,
- in-running nip points,
- rotating parts, and
- flying chips and sparks.

A portable circular saw must be equipped with guards. An upper guard must cover the entire blade of the saw. A retractable lower guard must cover the teeth of the saw, except when it makes contact with the work material. The lower guard must automatically return to the covering position when the tool is withdrawn from the work.

Safety guards shall never be removed when a tool is being used.

#### V. SAFETY SWITCHES

The following tools are required to be equipped with a constant pressure switch or control that will shut off the power when the pressure is released if they do not have a positive accessory holding means:

- All hand-held powered circular saws having a blade diameter greater than 2 inches.
- Electric, hydraulic or pneumatic chain saws.
- Percussion tools.

# All hand-held gasoline powered chain saws shall be equipped with a constant pressure throttle control that will shut off the power to the saw chain when the pressure is released.

The following tools are required to be equipped with a constant pressure switch or control, and may have a lock-on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on:

- All hand-held powered drills.
- Tappers.
- Fastener drivers.
- Horizontal, vertical, and angle grinders with wheels greater than 2 inches in diameter.
- Disc sanders with discs greater than 2 inches in diameter.
- Belt sanders, reciprocating saws, saber, scroll, and jig saws with blade shanks greater than a nominal one-fourth inch (1/4").

• Other similarly operating powered tools shall.

Other hand-held powered tools such as circular saws having a blade diameter greater than 2 inches, chain saws, and percussion tools without positive accessory holding means must be equipped with a constant pressure switch that will shut off the power when the pressure is released.

#### VI. ELECTRIC TOOLS

Employees using electric tools must be aware of several dangers. The most serious of these dangers is the possibility of electrocution.

Among the chief hazards of electric-powered tools are burns and slight shocks which can lead to serious injuries or even heart failure. Under certain conditions, even a small amount of current can result in fibrillation of the heart and eventual death. A shock also can cause the user to fall off a ladder or other elevated work surface.

To protect the user from shock, tools must have a three-wire cord with a ground prong and be grounded, double insulated, or powered by a low-voltage isolation transformer.

**Three-wire cords:** These cords contain two current-carrying conductors and a grounding conductor. One end of the grounding conductor connects to the tool's metal housing. The other end is grounded through a prong on the plug. Anytime an adapter is used to accommodate a two-hole receptacle, the adapter wire must be attached to a known ground. The third prong should never be removed from the plug.

**Double insulation:** This is a more convenient method. The user and the tools are protected in two ways: by normal insulation on the wires inside, and by a housing that cannot conduct electricity to the operator in the event of a malfunction.

The following general practices should be followed when using electric tools:

- Electric tools should be operated within their design limitations.
- Gloves and safety footwear are recommended during use of electric tools.
- When not in use, tools should be stored in a dry place.
- Electric tools should not be used in damp or wet locations.
- Work areas should be well lighted.
- Frayed cords are required to be taken out of service and replaced.
- Electric cords shall be inspected periodically and kept in good condition. Heavy-duty plugs that clamp to the cord should be used to prevent strain on the current-carrying parts, if the cord is accidentally pulled.

- Although no guards are available for drill bits, some protection is afforded if drill bits are carefully chosen for the work to be done, such as being no longer than necessary to do the work.
- Where the operator must guide the drill by hand, the drill is required to be equipped with a sleeve that fits over the drill bit. Oversized bits shall not be ground down to fit small electric drills; instead, an adapter should be used that will fit the large bit and provide extra power through a speed reduction gear; however this again is an indication of improper drill size. When drills are used, the pieces of work are to be clamped or anchored to prevent whipping.
- Electric saws are usually well guarded by the manufacturer, but employees must be trained to use the guard as intended. The guard should be checked frequently to be sure that it operates freely and encloses the teeth completely when it is cutting.
- Circular saws shall not be jammed or crowded into the work. The saw is to be started and stopped outside the work.

### VII. POWERED ABRASIVE WHEEL TOOLS

Powered abrasive grinding, cutting, polishing, and wire buffing wheels create special safety problems because they may throw off flying fragments.

Before an abrasive wheel is mounted, it should be inspected closely and sound- or ring-tested to be sure that it is free from cracks or defects. To test, wheels should be tapped gently with a light non-metallic instrument. If they sound cracked or dead, they could fly apart in operation and so must not be used. A sound and undamaged wheel will give a clear metallic tone or "ring."

To prevent the wheel from cracking, the user should be sure it fits freely on the spindle. The spindle nut must be tightened enough to hold the wheel in place, without distorting the flange. Follow the manufacturer's recommendations. Care must be taken to assure that the spindle wheel will not exceed the abrasive wheel specifications.

Due to the possibility of a wheel disintegrating (exploding) during start-up, the employee should never stand directly in front of the wheel as it accelerates to full operating speed.

Portable grinding tools need to be equipped with safety guards to protect employees not only from the moving wheel surface, but also from flying fragments in case of breakage.

In addition, when using a powered grinder:

- Always use eye protection.
- Turn off the power when not in use.
- Never clamp a hand-held grinder in a vise.

#### VIII. ABRASIVE WHEEL USE:

• Floor stand and bench mounted abrasive wheels, used for external grinding shall be provided with safety guards (protection hoods). The maximum regular exposure of the grinding wheel periphery and sides shall be not more than 90 degrees except that, when work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 125 degrees.

#### **\*\***Safety guards shall be strong enough to withstand the effect of a bursting wheel.

- Floor and bench-mounted grinders shall be provided with work rests which are rigidly supported and readily adjustable. Such work rests shall be kept at a distance not to exceed one-eighth inch (1/8") from the surface of the wheel.
- The top of the guard that covers the abrasive wheel should be no more than one-quarter inch (1/4") from the abrasive wheel.
- Cup type wheels used for external grinding shall be protected by either a revolving cup guard or a band type guard. All other portable abrasive wheels used for external grinding shall be provided with safety guards (protection hoods), except as follows:
  - When the work location makes it impossible, a wheel equipped with safety flanges shall be used.
  - When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.
- Portable abrasive wheels used for internal grinding shall be provided with safety flanges (protection flanges) except as follows:
  - When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.
  - If the wheel is entirely within the work being ground while in use.
- When safety guards are required, they shall be so mounted as to maintain proper alignment with the wheel, and the guard and its fastenings shall be of sufficient strength to retain fragments of the wheel in case of accidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180°.
- When safety flanges are required, they shall be used only with wheels designed to fit the flanges. Only safety flanges, of a type and design and properly assembled so as to ensure that the pieces of the wheel will be retained in case of accidental breakage, shall be used.
- All abrasive wheels shall be closely inspected and ring-tested before mounting to ensure that they are free from cracks and defects.
- Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place.
- All employees using abrasive wheels shall wear Personal Protective Equipment specified below:

- Dust-type safety goggles or plastic face shields should be worn. If dust is created, a respirator the National Institute for Occupational Safety & Health (NIOSH) may be required.
- If a sander is used steadily, it should be dismantled periodically, as well as thoroughly cleaned every day by being blown out with low-pressure air. If compressed air is used the operator shall wear safety goggles or work with a transparent chip guard between his body and the air blast.
- Because wood dust presents a fire and explosion hazard, keep dust to a minimum; sanders can be equipped with a dust collection or vacuum bag. Electrical equipment shall be designed to minimize the explosion hazard. Fire extinguishers approved for Class C (electrical) fires should be available.

#### IX. PNEUMATIC TOOLS

Pneumatic tools are powered by compressed air and include chippers, drills, nail/staple/screw 'guns', hammers, and sanders.

There are several dangers encountered in the use of pneumatic tools. The main one is the danger of getting hit by one of the tool's attachments or by some kind of fastener the employee is using with the tool.

Eye protection is required and face protection (i.e.: Face Shield) is recommended for employees working with pneumatic tools.

Noise is another hazard. Working with noisy tools such as jackhammers requires proper, effective use of hearing protection.

When using pneumatic tools, employees must check to see that they are fastened securely to the hose to prevent them from becoming disconnected. A short wire or positive locking device attaching the air hose to the tool will serve as an added safeguard.

A safety clip or retainer must be installed to prevent attachments, such as chisels on a chipping hammer, from being unintentionally shot from the barrel.

Screens must be set up to protect nearby employees from being struck by flying fragments around chippers, riveting guns, staplers, or air drills.

Compressed air guns should never be pointed toward anyone. Users should never "dead-end" it against themselves or anyone else.

- The operating trigger on portable hand-operated utilization equipment shall be so located as to minimize the possibility of its accidental operation and shall be arranged to close the air inlet valve automatically when the pressure of the operator's hand is removed.
- All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 p.s.i. pressure at the tool shall have a safety device

on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.

- Compressed air shall not be used for cleaning purposes except with an air blow gun limited to 30 p.s.i. static pressure at the outlet nozzle and then only with effective chip guard and personal protective equipment.
- The manufacturer's safe operating pressure for hoses, pipes, valves, filters, and other fitting shall not be exceeded.
- The use of hoses for hoisting or lowering tools shall not be permitted.
- All hoses exceeding 1/2-inch inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.
- Airless spray guns of the type which atomize paints and fluids at high pressures (1,000 pounds or more per square inch) shall be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released.
- In lieu of the above, a diffuser net which will prevent high pressure, high velocity release, while the nozzle tip is removed, plus a nozzle tip guard which will prevent the tip from coming in contact with the operator, or other equivalent protection shall be provided.

### X. FUEL POWERED TOOLS

- All fuel powered tools shall be stopped while being refueled, serviced, or maintained, and fuel shall be transported, handled, and stored in approved safety cans.
- Leakage or spillage of flammable or combustible liquids shall be disposed of promptly and safely.
- When fuel powered tools are used in enclosed spaces, the applicable requirement for concentrations of toxic gases and use of personal protective equipment shall apply.

### XI. HYDRAULIC POWER TOOLS

- The fluid used in hydraulic powered tools shall be fire-resistant and shall retain its operating characteristics at the most extreme temperatures to which it will be exposed.
- The manufacturer's safe operating pressures for hoses, valves, pipes, filters, and other fittings shall not be exceeded.

### XII. JACKS

All jacks - lever and ratchet jacks, screw jacks, and hydraulic jacks - must have a device that stops them from jacking up too high. Also, the manufacturer's load limit must be permanently marked in a prominent place on the jack and should not be exceeded.

A jack should never be used to support a lifted load. Once the load has been lifted, it must immediately be blocked up. Use wooden blocking under the base if necessary to make the jack level and secure. If the lift surface is metal, place a 1-inch-thick hardwood block or equivalent between it and the metal jack head to reduce the danger of slippage.

To set up a jack, make certain of the following:

- The base rests on a firm level surface.
- The jack is correctly centered.
- The jack head bears against a level surface.
- The lift force is applied evenly.

Proper maintenance of jacks is essential for safety. All jacks must be inspected before each use and lubricated regularly. If a jack is subjected to an abnormal load or shock, it should be thoroughly examined to make sure it has not been damaged. Hydraulic jacks exposed to freezing temperatures must be filled with adequate antifreeze liquid.

#### XIII. USE AND MAINTENANCE OF POWDER-ACTUATED TOOLS

#### **\*\*Powder Actuated Tools should not be used in an explosive or flammable atmosphere.**

- Only employees who have been trained in the operation of the particular tool in use shall be allowed to operate a powder actuated tool.
- The tool shall be tested each day before loading to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.
- Any tool found not in proper working order or one that has developed a defect during use shall be removed from service immediately and not used until properly repaired.
- Adequate eye, head, face and/or personal protective equipment as necessitated by working conditions shall be utilized by the operators and persons working in the area.
- The tool shall be designed so that it cannot be fired unless it is equipped with a standard protective shield or guard or a special shield, guard, fixture, or jib.
- The firing mechanism shall be designed so that the tool cannot fire during loading or preparation to fire or if the tool is dropped while loaded. Firing of the tools shall be dependent upon at least

two separate and distinct operations of the operator, with the final firing movement being separate from the operation of bringing the tool into the firing position.

- The tool shall be designed so as not to be operable other than against a work surface and unless the operator is holding the tool against the work surface with force at least 5 pounds greater than the weight of the tool.
- The tool shall be designed so that it will not operate when equipped with the standard guard indexed to the center position if any bearing surface of the guard is tilted more than 8 degrees from contact with the work surface.
- The tool shall be designed so that positive means of varying the power are available or can be made available to the operator as part of the tool or as an auxiliary, to facilitate selection of a power level adequate to perform the desired work without excessive force.
- The tool shall be designed so that all breeching parts will be reasonably visible to allow a check for any foreign matter that may be present.
- Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employees. Hands shall be kept clear of the open barrel end.
- Loaded tools shall not be left unattended.
- Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.
- Driving into materials easily penetrated shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.
- No fastener shall be driven into a spalled (cracked/deteriorated) area caused by an unsatisfactory fastening.
- Power-assisted and hammer-driven tools are used for the same purposes as powder-actuated tools and generally the same precautions are to be followed.
- If a powder-actuated tool misfires, the employee should wait at least 30 seconds, then try firing it again. If it still will not fire, the user should wait another 30 seconds so that the faulty cartridge is less likely to explode, than carefully remove the load. The bad cartridge should be placed in water.

### XIV. ELECTRICAL WOODWORKING TOOLS

• All employees that use woodworking tools are required to use proper eye protection equipment. (i.e. - Safety Glasses, Face Shield, Safety Goggles).

- Disconnect Switches: All "fixed" power driven wood-working tools shall be provided with a disconnect switch that can either be locked or tagged in the "off" position.
- Self-feed: Automatic feeding devices shall be installed on machines whenever the nature of the work will permit. Feeder attachments shall have the feed rolls or other moving parts covered or guarded so as to protect the operator from hazardous points.
- Speeds: The operating speed shall 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. Any saw so marked shall not be operated at a speed other than that marked on the blade. When a marked saw is re-tensioned for a different speed, the marking shall be corrected to show the new speed.



Number:	Vol. 03 No. 3007	
Date:	November 18, 2010	
Supersedes:	May 17, 1995	
Approved:	Kenneth Johnson VP Risk Management	
Sponsoring Function:	Risk Management, Environmental Health and Safety	
Page:	1 of 6	

# SITE SECURITY FOR FIELD OPERATIONS

### TABLE OF CONTENTS

1.0	INTRO	DDUCTION1
2.0	PURP	OSE2
3.0	SCOP	E2
4.0	ASSO	CIATED DOCUMENTS
5.0	PROC	EDURES
	5.1	WORK SITE PROTECTION - GENERAL
	5.2	EXCAVATIONS AND RELATED EARTHWORK ACTIVITIES
	5.3	HEAVY EQUIPMENT
	5.4	MISCELLANEOUS EQUIPMENT AND MATERIALS4
	5.5	HAZARDOUS SUBSTANCES, HAZARDOUS MATERIALS4
	5.6	EQUIPMENT AND MATERIALS TRANSPORTED BY GZA PERSONNEL5
	5.7	VULNERABILITY TO CRIMINAL ACTIVITY
6.0	RESPONSIBILITIES	
	6.1	GZA PERSONNEL
	6.2	SUBCONTRACTORS
7.0	PREPA	ARED BY:

### 1.0 INTRODUCTION

GZA work sites present an attractive nuisance and risk to the public who may be tempted to venture dangerously close risking injury. These risks are present during work hours while work activities are underway, as well as during non-work hours (overnight and weekends) should individuals accidentally or intentionally cross boundaries and enter our work site. Moreover, GZA work sites can be a target for

criminal activity (such as theft, vandalism, or subversive activities), requiring that GZA exercise diligence and appropriate responsibility for the security and control of hazardous locations, equipment and hazardous materials, commensurate with our contractual role and responsibility, and in accordance with generally accepted standards of care.

Our liability insurance may protect GZA from the costs of damages if we fail in these responsibilities, assuming GZA does not exercise negligence. Nevertheless, we have a responsibility to our insurer, in addition to the public, to carry out these activities in a careful, reliable manner. On occasion, we will accept responsibility in our contracts to go beyond our ordinary responsibility in these areas. *These special instances require more than the ordinary level of care.* Insurance is never adequate compensation for the pain and suffering of our employees or someone else who might suffer an injury and lose time at work or at home.

Note that the safety of GZA employees, our subcontractors, and other workers engaged in work activities on our work sites is addressed by other policies, procedures and guidelines related to work place occupational safety and health hazards. *This* policy addresses risks presented by GZA field operations to the general public, as well as similar security risks and GZA liability resulting from unauthorized or criminal access to GZA field operations and to potentially hazardous materials and equipment associated with GZA field operations.

#### 2.0 PURPOSE

This guideline defines the minimum procedures to be exercised by GZA personnel to implement and maintain appropriate work site control and security measures with regard to our field activities and work sites, for the following purposes:

To limit risks of injury and other detrimental impacts to the general public, on-lookers, and nearby workers not directly engaged in work activities on our work sites, through the use of protective control measures that appropriately restrict access to the work site and to site activities.

To limit potential losses and liability to GZA resulting from criminal activities, such as theft and vandalism, or from use of GZA-owned or GZA-controlled equipment and/or materials for other criminal purposes;

To limit risk's to GZA employees related to working in high-crime areas or in other situations where GZA employees may be vulnerable to criminal activity.

#### 3.0 SCOPE

- 1. These guidelines apply to all GZA operating company personnel..
- 2. These provisions apply to all GZA Subcontractors.
- 3. Supplemental guidelines and procedures issued by individual operating companies, departments, or Regions must be at least as stringent as the procedures set forth herein.

### 4.0 ASSOCIATED DOCUMENTS

- 1. GZA Policy 03-2001, Emergency Preparedness and Response Program
- 2. GZA Policy 03-2003, Hazardous Material Safety and Emergency Response
- 3. GZA Policy 03-3006, Trenching and Excavation Safety
- 4. Occupational Safety and Health Administration (OSHA) Rules and Regulations in particular, 29 CFR Part 26.
- 5. Applicable state and local regulations and statutes.

#### 5.0 **PROCEDURES**

#### 5.1 WORK SITE PROTECTION - GENERAL

All work sites, including test boring work areas, test pits, tank excavations, construction activities, remediation systems, and similar potentially hazardous sites must be marked and guarded at all times to keep the public from wandering into a potentially dangerous location. Similarly, hazardous materials, substances and equipment need to be secured and restricted to minimize the potential for unauthorized use, vandalism, and similar activities. The specific nature of the protective measures needed will be determined on a case-by-case basis depending on the nature of the work activities, the nature of materials, proximity to pedestrian and vehicle traffic, and other site-specific factors. Certain materials represent a unique curiosity factor, or may be the target for criminal activities such as arson, terrorist activities or similar (such as flammability liquids, explosive materials, radiation-containing equipment). Certain equipment and materials may also represent an elevated risk of theft, due to the inherent value of the equipment (lap tops, power tools, electronic equipment, etc.). Therefore, GZA personnel must exercise appropriate awareness of circumstances related to these risks, and act accordingly. It is important that where unauthorized access to jobsite locations, equipment or materials under GZA control may result in consequential damages such as injury, criminal activities, interruption of essential community services, or other consequence, that GZA personnel exercise appropriate and responsible actions to either prevent or minimize the potential for damages, as well as to protect individuals employees and GZA as a company from liability.

#### 5.2 EXCAVATIONS AND RELATED EARTHWORK ACTIVITIES

Test pits or excavations left open overnight or unattended should be surrounded by suitable barriers, warning tape, and clearly marked by "Danger" signs. Alternatively, test pits and small excavations left during the day or overnight should be covered with wood or steel panels to prevent someone from deliberately entering or accidentally falling into the excavation.

The type of suitable barrier needed will depend on the location of the site, surrounding activity, size of excavation, and the risks associated with using the selected barrier.

- The simplest barriers are rope or flagging tape around the work site.
- Surrounding the work site with traffic barrels or concrete Jersey barriers may be appropriate if vehicle traffic is nearby.
- In some cases, an installed or moveable fence may need to be installed around the excavation or work site for longer-term needs.
- Sites which present an overnight hazard may need lights or security guards.
- Overnight security or police protection may be warranted, in special circumstances.

Stockpiles shall be graded and sloped appropriately to minimize the potential engulfment/burial hazards associated with soil movement. Stockpiles when left unattended, either during work hours, or after hours, shall be in a configuration in which sloped sides are no steeper than their inherent angle of repose.

#### 5.3 <u>HEAVY EQUIPMENT</u>

On worksites where GZA subcontractors have located heavy equipment, drill rigs, or similar construction equipment, when unattended, equipment shall be left in a safe and secure state, as summarized below:

- Where possible, the cab of the vehicle shall be locked;
- The keys to the equipment shall not be left in the vehicle, and other means of starting the vehicle shall be locked out;
- The equipment shall be left in "park" or similarly "in gear," or with wheels chocked, to minimize the potential for vehicle rolling;
- Equipment buckets, forks and similar features shall be at rest at the ground surface;
- To the extent feasible, heavy equipment to be left unattended shall not be left in an inherently unsafe position, such as atop a steeply sloped stockpile, poised over or in close proximity to a trench or excavation sidewall, or in a similar precarious position.

#### 5.4 <u>MISCELLANEOUS EQUIPMENT AND MATERIALS</u>

Equipment that may represent potential hazards to unauthorized personnel (unqualified workers, trespassers, general public, etc.) shall be used and stored in a manner that restricts access to unauthorized individuals. The nature of the protective measures shall be determined based on the nature of the equipment, proximity to the general public, and vulnerability to curious individuals (such as children, minors) or criminal intent.

Materials such as steel pipe, bagged materials, block & brick, metal stock, lumber, and similar materials shall be stacked and stored in an inherently safe condition to minimize the potential for collapse.

Electrical equipment to which the general public may have access shall be designed and built in accordance with applicable code, and shall be configured in a manner that properly restricts access by means of location (out of reach, overhead) or barriers (conduit, protective fence). Electrical outlets or circuits to which the public may have access shall be equipped with ground fault interrupters, and/or shall be de-energized during non-work hours if possible.

Examples of potentially hazardous equipment that should be secured from vandals, trespassers, etc. due to potentially hazardous consequences include gas driven generators, ladders, power tools, hazardous hand tools, chain saws, etc. Efforts shall be undertaken on job sites to secure these items appropriately.

### 5.5 <u>HAZARDOUS SUBSTANCES, HAZARDOUS MATERIALS</u>

Hazardous substances, hazardous waste, and/or hazardous materials that represent potential hazards including toxicity, flammability, explosivity, compressed gases, radioactivity (such as nuclear density gauges) etc., shall be stored and/or used in a manner that appropriately prevents or restricts access by unauthorized personnel. Where such hazardous materials will be stored on site during non-work hours, these materials shall be stored under lock and key. Where such materials are specifically-regulated (such as nuclear density gauges, flammable liquids, etc.), on-site storage and use shall be in accordance with provisions of applicable laws, regulations, codes and/or licenses. Hazardous materials and hazardous substances shall have appropriate hazard warning labels affixed to the exterior of the equipment and/or container.

#### 5.6 EQUIPMENT AND MATERIALS TRANSPORTED BY GZA PERSONNEL

Equipment and materials transported by GZA personnel either in GZA-owned vehicles or personal vehicles shall be transported in a safe and manner. Where equipment and materials will be stored or left unattended in a vehicle, appropriate precautions shall be used: for example, make sure valuable equipment is not in plain view; such materials should be locked in a trunk, or in locked cap of truck, or in locked cab of vehicle, covered so as not to be in plain view.

Where equipment being transported by GZA may be specifically regulated, transport and storage in a vehicle shall be in accordance with applicable laws, regulations, codes and/or licenses. Examples of such materials and equipment include hazardous chemical substances, nuclear density gauges, and other materials regulated as hazardous materials by the Department of Transportation. In accordance with the DOT Hazardous Materials Regulations, individuals engaged in the transportation of hazardous materials are required to exercise appropriate measures to maintain security of the materials and to prevent access by unauthorized individuals.

#### 5.7 <u>VULNERABILITY TO CRIMINAL ACTIVITY</u>

GZA operations may be vulnerable to criminal activity based on many factors. Work sites located in known high crime areas or in similarly risk situations, may result in risk of violence committed against GZA personnel, or the risk of vandalism, theft, and similar criminal activities. At all times, GZA employees are to exercise good judgment regarding these risks, and act accordingly. Where GZA employees may be uncertain of the appropriate protective or preventative measures, consult with your project supervisory personnel, District Office Manager, Vice President of Risk Management or EHS Director. Depending on the jobsite circumstance, potentially appropriate security measures may include police detail, security guards, and similar security measures.

#### 6.0 **RESPONSIBILITIES**

#### 6.1 <u>GZA PERSONNEL</u>

- 1. The PIC is ultimately responsible for addressing site security concerns that may arise on a project, and which are beyond the control of site personnel or Project Manager
- 2. The Project Manager and all persons whom he or she delegates are responsible for the implementation of the general site security and site protection procedures outlined in this policy.
- 3. The Project Manager, and all persons whom he or she delegates, are responsible for seeing that subcontracts require the implementation of excavation safety and site protection procedures outlined in this policy and that subcontractors meet these requirements in execution.
- 4. Every GZA employee is responsible for adhering to GZA policies and procedures which provide for the safety, health and security of GZA employees, for maintaining a safe work site, and for leaving an unguarded work site that, in his or her own opinion, is safe.
- 5. Every GZA employee is responsible for reporting to his or her supervisor, and to the party responsible for work site safety, if s/he believes unsafe conditions are present.

#### 6.2 <u>SUBCONTRACTORS</u>

1 GZA must require by subcontract provisions that all subcontractors adhere strictly to these procedures at a minimum.

2 GZA Project Managers and field personnel must insist in the field that subcontractors operations satisfy at least the same objectives and procedures as set forth herein.

### 7.0 **PREPARED BY:**

This document was prepared by Mark Malchik and Walter Jawarski. For questions, comments or recommended changes to this document, contact the Environmental Health and Safety Director.



Number:	Vol. 03	No. 3008
Date:	December 3, 20	15
Supersedes:	February 15, 2011	
Approved:	Richard Ecord Corporate EHS Director	
Sponsoring Function:	Environmental Health and Safety	
Page:	1 of 5	

# HEAT-RELATED ILLNESS PREVENTION

### TABLE OF CONTENTS

1.0	INTRODUCTION1		
2.0	DEFIN	NITIONS	.2
3.0	HEAT	STRESS PREVENTION	.3
4.0	EMER	GENCY PREPAREDNESS AND RESPONSE	.4
	4.1	HEAT EXHAUSTION	.4
	4.2	HEAT STROKE	.4
5.0	TRAI	NING	.4
	5.1	GENERAL TRAINING	.4
	5.2	SUPERVISOR TRAINING	.5
6.0	DOCL	JMENT VERSION	.5

### 1.0 INTRODUCTION

Heat-related illness is a recognized occupational hazard and occurs when the body's natural defenses are overcome, resulting in a rise in temperature and possible heat-related illness. Very high body temperatures may damage the brain or other vital organs. Risk factors include hot temperatures, direct sunlight, high humidity, stagnant air (no breeze), and sustained strenuous activity. Other risk factors include age, physical condition, obesity, fever, dehydration, heart disease, poor circulation, sunburn, and prescription drug and alcohol use. Individuals with certain medical conditions, such as heart disease or high blood pressure, or individuals who take medications which require them to limit intake of fluids, may be at higher risk of heat-related illness and should consult their physician. This guidance document summarizes measures necessary to protect employees from heat-related illness. Specific measures to protect employees, including physical work factors that can contribute to heat-related illnesses, are included in site-specific health and safety plans.

Printed copies of this document are uncontrolled. Please refer to the EHS SharePoint site for the most current guidance.

#### 2.0 **DEFINITIONS**

- **Dehydration**, occurs when the body loses water and electrolytes. This may be caused by various medical conditions (excessive vomiting, etc.) but is most commonly caused by strenuous work or exercise during hot weather and failure to replace fluids and take other heat stress precautionary measures. Warning signs of dehydration are:
  - Dryness or a sticky feeling in the mouth.
  - Urine that is a dark yellow color; less frequent urinating.
  - Inability to produce tears.
  - Eyes that appear sunken.
  - Feeling tired or having no energy.
  - Loss of elasticity of the skin (pinched doesn't immediately spring back to shape).

To prevent dehydration, and other heat-related illnesses, drink plenty of fluids (sports drinks with electrolytes are best), and take heat stress precautions (frequent breaks, stay out of sun, avoid strenuous activities in the heat of the day, etc.)

- **Sunburn** is a burn to living tissue, such as skin, which is produced by overexposure to ultraviolet (UV) radiation, commonly from the sun's rays. Precautionary measures include minimizing exposure to sun, wear protective clothing and use sunscreen on exposed skin. Photokeratitis (or ultraviolet keratitis) is a painful eye condition caused by exposure of insufficiently protected eyes to UV rays. Symptoms include increased tears, a feeling of gritty pain in the eyes (like sand in the eyes).
- **Heat rash** (prickly heat), occurs when the skin's sweat ducts become blocked or swell, and cause discomfort and itching.
- Heat cramps, swelling cramps may occur in muscles after exercise due to loss of water, salt, and minerals (electrolytes). Swelling in the legs and hands can occur when you sit or stand for a long time in a hot environment.
- **Heat syncope** (fainting), which occurs from low blood pressure when heat causes the blood vessels to expand (dilate) and body fluids move into the legs because of gravity.
- **Heat exhaustion** (heat prostration), which generally develops when a person is working or exercising in hot weather and does not drink enough liquids to replace those lost liquids. Heat exhaustion occurs when a person becomes dehydrated, and cannot sweat enough to cool the body. <u>Symptoms of heat exhaustion include fatigue, hyperventilation, weakness, headache, dizziness/fainting, nausea, skin is pale, cool, and moist.</u> Mild cases of heat exhaustion usually do not require medical treatment (unless there are medical complications). Moderate to severe heat exhaustion can sometimes lead to heatstroke, which requires emergency treatment.
- Heatstroke (sunstroke), which occurs when the body fails to regulate its own temperature and body temperature continues to rise, often to 105° F (40.6° C) or higher. Heatstroke is a medical emergency. Even with immediate treatment, it can be life-threatening or cause serious long-term health effects. Symptoms of heatstroke include:
  - Unconsciousness for longer than a few seconds.
  - Confusion, severe restlessness, or anxiety.

- Convulsion (seizure).
- Symptoms of moderate to severe difficulty breathing.
- Fast heart rate.
- Profuse sweating (earlier symptom), or stopped sweating (later symptom).
- Skin that may be red, hot, and dry, even in the armpits.

### 3.0 HEAT STRESS PREVENTION

- 1. **Drink Plenty of Fluids** Employees shall have access to potable drinking water. Where it is not plumbed or otherwise continuously supplied, it shall be provided in sufficient quantity at the beginning of the work shift. During hot weather, employees will need to increase fluid intake regardless of their activity level. During strenuous activity in a hot environment, drink two to four glasses (16-32 ounces) of cool fluids each hour. Skip the coffee and caffeinated soft drinks caffeine will dehydrate you faster. Sports drinks and lightly salted foods will help to replace lost salt and electrolytes. (If you are on a low salt diet, consult with your physician.)
- 2. **Frequent Breaks in the Shade** Take frequent breaks out of the sun's heat! Establish work-rest cycles (short and frequent are more beneficial than long and seldom). Identify a cool, shaded area for breaks. If there are no shady areas, bring a shade tent to the worksite, or take breaks inside an air-conditioned building or your vehicle. At or below 85 degrees Fahrenheit the employee shall have timely access to shaded areas for breaks. For temperatures at or above 85 degrees Fahrenheit, one or more areas with shade shall be provided at all times while employees are present.
- 3. At temperatures above 95 degrees Fahrenheit Ensure effective means of communication (by voice or electronically) with all employees are in place; supervisory personnel shall make periodic observations of employees for alertness and signs/symptoms of heat illness; supervisory personnel shall remind employees to drink water throughout the shift;
- 4. Work Pace and Schedule If workers are not accustomed to working or exercising in a hot environment, start slowly and pick up the pace gradually. Save the most strenuous tasks for early morning or early evening
- 5. Acclimatization Individuals not accustomed to hot environments may need one to two weeks to become acclimatized. New employees shall be closely supervised and monitored by their supervisors for the first two weeks of working in a hot environment.
- 6. **Proper Clothing** Wear light weight, light colored, loose fitting clothing. Cover your head in direct sun...wear your hard hat (or at least wear a hat, if appropriate).
- 7. **Sun Screen** Apply sun screen to exposed skin...use products with SPF 15 or higher (the most effective products say "broad spectrum" or "UVA/UVB protection" on their labels).
- 8. Eye Protection wear sun glasses or tinted safety glasses when outdoors in direct sunlight for extended periods.
- 9. **Monitor Coworkers** Monitor the condition of your co-workers and have someone do the same for you. Look for symptoms such as abnormal coloring (flushed or pale), confusion, lightheadedness (unsteady on their feet), heavy breathing, etc.

#### 4.0 EMERGENCY PREPAREDNESS AND RESPONSE

#### 4.1 <u>HEAT EXHAUSTION</u>

Cases of heat exhaustion (see above) require prompt action to prevent serious illness. Administer cool beverages (nonalcoholic/non-caffeinated) to the victim, discontinue work activities and rest in the shade or air conditioned environment, and instruct the victim to take a cool shower/splash water, wear lightweight clothing. Continue these efforts until symptoms subside. Alter work activities as needed. *If symptoms of heat exhaustion are severe, seek immediate medical attention.* 

#### 4.2 <u>HEAT STROKE</u>

*Heat Stroke is a Medical Emergency!* If you see any of the signs of heat stroke, immediately call for medical assistance and begin cooling the victim:

- Get the victim to a shady area, or preferably to an air-conditioned environment.
- Cool the victim rapidly using whatever methods you can. For example, immerse the victim in a tub of cool water; place the person in a cool shower; spray the victim with cool water from a garden hose; sponge the person with cool water; or if the humidity is low, wrap the victim in a cool, wet sheet and fan him or her vigorously.
- If emergency medical personnel are delayed, call the hospital emergency room for further instructions.
- Do not give the victim fluids to drink.
- Sometimes a victim's muscles will begin to twitch uncontrollably as a result of heat stroke. If this happens, keep the victim from injuring himself, but do not place any object in the mouth and do not give fluids. If there is vomiting, make sure the airway remains open by turning the victim on his or her side.

#### 5.0 TRAINING

#### 5.1 <u>GENERAL TRAINING</u>

GZA employees who may be exposed to the hazards of heat-induced illness shall receive training on the company's heat illness prevention procedures. Training shall include:

- The environmental and personal risk factors for heat illness;
- Company procedures for complying with the requirements of this standard;
- The importance of frequent consumption of small quantities of water, up to 4 cups per hour, when the work environment is hot and employees are likely to be sweating more than usual in the performance of their duties;
- The importance of acclimatization;
- The different types of heat illness and the common signs and symptoms of heat illness;
- The importance to employees of immediately reporting to the employer, directly or through the employee's supervisor, symptoms or signs of heat illness in themselves, or in co-workers;

- Company procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary;
- Company procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider;
- Company procedures for ensuring that, in the event of an emergency, clear and precise directions to the work site can and will be provided as needed to emergency responders

#### 5.2 <u>SUPERVISOR TRAINING</u>

Prior to supervision of employees working in the heat, supervisors will be trained in heat-related illness. Training should include:

- Review of the company's procedures for heat illness prevention, and procedures the supervisor is to follow to implement the applicable procedures to prevent heat illness;
- Procedures to be followed when an employee exhibits symptoms of heat illness;
- Emergency response procedures for heat related illness.

### 6.0 DOCUMENT VERSION

Date	Status	Author
2-15-2011	Issued	Mark P. Malchik
12-3-2015	Revised to reference site-specific	Richard Ecord
	HASP	



Number:	Vol. 03 No. 3009	
Date:	February 15, 2011	
Supersedes:	NA	
Approved:	Kenneth Johnston Vice President, Risk Management	
Sponsoring Function:	Risk Management Department Environmental Health and Safety	
Page:	1 of 3	

# MANUAL LIFTING SAFETY

### TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	HAZARD ASSESSMENT OF LIFTING OPERATIONS	1
3.0	EMPLOYEE TRAINING	2
4.0	INCIDENT REPORTING AND ANALYSIS	2
5.0	PREPARED BY	3

### **1.0 INTRODUCTION**

It is recognized that improper lifting, either lifting too much weight, or lifting with improper procedures, can be a significant risk factor contributing to back injury and other musculoskeletal injuries. This policy is intended to outline health and safety program procedures intended to minimize the risk of manual lifting to GZA employees.

### 2.0 HAZARD ASSESSMENT OF LIFTING OPERATIONS

In accordance with GZA Policy 03-1003 entitled "Hazard Assessment, Health and Safety Plans," a Health and Safety Plan shall be prepared for each field project. This plan shall be site specific in nature, and shall include a hazard assessment of hazards known or likely to be encountered by employees. As part of this hazard assessment, the prospect that employees may be assigned to perform various material handling tasks including manual lifting shall be considered. In appropriate circumstances where the scope of a project is anticipated to include manual lifting and related tasks, the hazard assessment performed as part of the health and safety plan process shall address the specific hazards associated with manual lifting, as well as the control measures to be implemented to minimize the risk of manual lifting. Manual lifting by GZA employees may also occur in GZA facilities not directly related to field work activities. The types of work activities which may involve hazardous manual lifting tasks include:

- Projects where loading and unloading of vehicles will occur;
- Projects involving the use of heavy equipment (portable generators, nuclear density gauges, etc.);
- Lifting environmental, geological samples (coolers, cores, core boxes, etc.);
- Organization, cleaning, maintenance activities at GZA-operated facilities (moving equipment, etc.)

Before manual lifting is to be performed, the employee shall conduct a hazard assessment. This assessment shall include the following:

- Consider size, bulk, and weight of the object(s) to be lifted;
- Evaluate if mechanical lifting equipment is available and/or necessary for the task at hand;
- Consider if help from a second person is necessary and available;
- Consider if your vision will be obscured while carrying the object;
- Evaluate the safety of the walking surface and path where the object is to be carried.

Where lifting equipment (hoists, hydraulic tailgates, fork lift, etc.) is impractical or unavailable, and where lifting would pose a recognized risk to a single individual, a two-person lift shall be performed. Furthermore, manual lifting equipment and other engineering controls shall be provided to employees where appropriate and feasible, such as dollies, hand trucks, lift-assist devices, jacks, carts, hoists must be provided for employees.

Given that GZA performs work on temporary field work jobsites often, engineering controls such as conveyors, lift tables, and work station design may be infeasible, but should be considered. Such engineering controls may be more appropriate in permanent facilities operated by GZA. Where manual lifting equipment or engineering controls are provided, the use of this equipment shall be enforced by supervisory personnel.

As is applicable to all GZA work operations, supervisory personnel shall periodically evaluate current work station configurations and employees' work techniques to assess the potential for elimination of hazards and prevention of injuries. New operations should be evaluated to engineer out hazards before work processes are implemented.

#### **3.0 EMPLOYEE TRAINING**

GZA shall provide employees at risk from manual lifting injuries training on proper lifting techniques and avoidance of musculoskeletal injuries. Training shall include general principles of ergonomics, recognition of hazards and injuries, safe lifting and work practices, hazards, and controls. Training shall also include GZA procedures for reporting hazardous conditions, and injuries.

### 4.0 INCIDENT REPORTING AND ANALYSIS

In accordance with GZA Policy 03-1005, "Incident Reporting and Analysis," all incidents and injuries shall be reported internally per specified requirements, and analyzed for root causes, and results of the analysis must be communicated within GZA and incorporated into similar work practices in order to avoid future injuries. Injuries resulting from manual lifting shall be reported and recorded in OSHA 300 Log of Injuries and Illnesses in accordance with corresponding requirements.

### 5.0 PREPARED BY

Prepared by Mark P. Malchik, Environmental Health and Safety Director. Please refer questions, comments or recommendations for changes to the Risk Management Department.



Number:	Vol. 03	No. 3019
Date:	March 20, 2015	
Supersedes:	NA	
Approved:	Richard Ecord	
- pprovou	Corporate EHS Director	
Sponsoring Function:	Environmental Health and Safety	
Page:	1 of 3	

# LYME DISEASE PREVENTION

### TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	PREVENTING TICK BITES	1
3.0	WHAT TO DO IF YOU FIND AN ATTACHED TICK	2
4.0	DOCUMENT VERSION	3

### **1.0 INTRODUCTION**

Over 25,000 cases of Lyme disease among Americans will be reported this year, and the risk is greatest among those living in or visiting New England, the mid-Atlantic states, and the upper Midwest. GZA office locations and project work is largely concentrated in these areas. To ensure our employees are aware of the dangers of Lyme disease and are provided with practices to prevent Lyme disease, GZA has developed this document. Lyme disease is carried by black-legged ticks, commonly known as deer ticks.

### 2.0 PREVENTING TICK BITES

Black-legged ticks may be present at all times of the year, but after a significant thawing of snow in spring, they emerge ready to feed on animals and humans. This generally occurs when the temperatures are 40 degrees F or higher.

For all work outside the office, GZA requires that a Health and Safety Plan shall be prepared. This plan is site specific in nature, and especially during spring and summer it should include specific actions GZA will take to avoid tick bites. These actions could include any of the following:

1. **Know where to expect ticks**. They live in moist and humid environments, particularly in or near wooded or grassy areas. You may come into contact with ticks during outdoor activities, when walking through vegetation, or when around leaf litter or shrubs.

- 2. Arrange for grassy areas to be mowed or treated when possible. Walking through tall grass or working in areas with tall grass will likely expose you to ticks. At specific areas at fixed facilities or project sites, clients may be able to mow areas of tall grass prior to GZA's arrival at the project site. Clients may also be willing to treat areas, if asked. A single springtime application of acaricide can reduce the population of ticks that cause Lyme disease by 68-100%.
- 3. **Dress correctly for spotting ticks**. Long pants and a long-sleeved shirt should be worn, and pants should be tucked inside white socks. Wearing white socks will allow you to better see ticks if they are on you.
- 4. Use a repellent with DEET (on skin or clothing) or permethrin (on clothing and gear). Repellents containing 20% or more DEET (N, N-diethyl-m-toluamide) can be applied to the skin and protect you for several hours. DEET should be re-applied regularly, especially if you're sweating. Always read and follow product instructions. Products containing permethrin can be used to treat boots, clothes, and camping gear. Permethrin-treated producted remain protective through several washings.
- 5. **Take a hot shower immediately after being outdoors**. Taking a shower within two hours of coming indoors has been shown to reduce your risk of getting Lyme disease. Showering may help wash off unattached ticks and is a good opportunity to do a thorough tick check.
- 6. **Perform daily tick checks**. Check your body thoroughly for ticks after being outdoors. Black-legged ticks are very small, so a hand-held or full-body mirror should be used to view all parts of your body. Take special care to check the following parts of your body:
  - a. Under the arms
  - b. In and around the ears
  - c. Inside the bellybutton
  - d. Back of the knees
  - e. In and around all head and body hair
  - f. Between your legs
  - g. Around your waist
- 7. **Place clothes in a dryer**. Placing clothes into a dryer on high heat for at least an hour effectively kills ticks.

### 3.0 WHAT TO DO IF YOU FIND AN ATTACHED TICK

Even if you take all the precautions listed in section 2 of this document, you may find a tick attached to your body. Taking certain actions can keep your chances of developing Lyme disease very small. These actions include:

- 1. **Remove the tick as soon as you find it**. Remove an attached tick with the tick removal tool supplied by GZA or with fine-tipped tweezers, as close to the skin as possible, and pulling it straight out. If you remove an attached tick within 24 hours, it is very unlikely that Lyme disease will be transferred to you from the tick.
- 2. **Save the tick**. If you are sure a tick has been attached for more than 24 hours, and are sure the tick is a black-legged tick, save the tick for potential testing.

- 3. **Call WorkCare's Incident Intervention service**. If a tick has been attached to your body for more than 24 hours, call WorkCare immediately after removing it. WorkCare has a specific medical protocol used for tick bites, and can advise you of first aid measures to take that are specific to ticks and Lyme disease. They will also be able to advise you if you need to save the tick.
- 4. **Be alert for fever or a rash**. Fever and a rash may be the first signs of a tickborne illness. If you have been in areas where ticks are likely to be present, even if you do not find a tick attached to your body, call WorkCare to get additional medical advice.

#### 4.0 DOCUMENT VERSION

Date	Status	Author
3.20.2015	Issued for use	Richard Ecord
10/15/2015	Revised document number	Richard Ecord



Job: Groundwater Sampling		
Analysis By: Andrew Whitsitt	Reviewed By: Guy Dalton	Approved By: Jayanti Chatterjee , CIH
Date: October 2, 2011	Date: June 15, 2012	Date: June 26, 2012
Revised: June 15, 2012		

	Task 4	.2	
GROUNDWATER SAMPLING			
	HAZARD CON	ITROLS	
GZA Job Tasks	Potential Hazards	Controls	
Review Related THA's –			
21.1 – General Outdoor Field Wor	k		
Deploying Traffic Protection Equipment	Personal injury due to vehicle traffic; Collisions, injuries	GZA drivers shall be properly licensed and abide by driving safety procedures. Inspect vehicle to determine if it is in safe operating condition. Park in designated parking locations, or select off-road areas that are firm and without hazards. Directly observe parking location on foot if necessary.	
		Use emergency flashers or other appropriate vehicle warning system as appropriate to local conditions.	
		while entering traffic safety zone, if applicable.	
Handling Flammable Liquids	Fire Hazards	Use only approved fuel containers for fuel, heavy duty metal cans with stable base and self closing nozzle is recommended.	
		Store flammable liquids in an appropriate area when not in use.	
		Provide working fire extinguisher with current inspection certificate with the sampling equipment.	
		Observe GZA's "no smoking" policy at all work sites.	
Mobilizing Equipment	Collision; struck by	Perform a pre-operation check of the vehicle, ensuring service brakes, parking brake, steering, lights, tires, horn, wipers mirrors, and glass are in good condition. Do not drive a vehicle that is not roadworthy.	
		All vehicle occupants shall wear seat belts.	
		Secure loose materials in the cab or bed of the vehicle.	
		Keep the windows and lights clean.	
		Do not operate the vehicle if it is in an unsafe condition.	
		Abide by driving safety procedures and laws.	
Positioning vehicle at monitoring well	Unstable, uneven terrain and ground obstacles	Locate the vehicle on stable ground.	



Job: Groundwater Sampling			
Analysis By: Andrew Whitsitt	Reviewed By: Guy Dalton	Approved By: Jayanti Chatterjee , CIH	
Date: October 2, 2011	Date: June 15, 2012	Date: June 26, 2012	
Revised: June 15, 2012			

Task 4.2			
GROUNDWATER SAMPLING			
	HAZARD CONT	ROLS	
GZA Job Tasks	Potential Hazards	Controls	
		Avoid wet areas/mud when possible.	
		Assess the need for blocking/chocking wheels	
	Backing Collisions	If possible, avoid backing by taking a route that allows you to pull straight through.	
		If you must back, do a complete walk around the vehicle to look for objects that could be struck or run over by the vehicle.	
		Use a spotter when available to help guide the backing safely.	
		Look over shoulders and glance back to make sure fenders are clearing objects. Back out slowly.	
Well Sampling	Hazardous material contact	Identify wells with hazardous concentrations of contaminants.	
		Sample wells in order from least to most impacted.	
		Wear proper gloves specified in the project HASP when handling jars, preservatives could leak during shipment from the laboratory.	
	Cuts and bruises from Sample jar	Do not over-tighten glass jars (especially VOAs); they can break, causing a laceration.	
	Exposure to Hazardous Substances	Become familiar with the hazards associated with hazardous commercial products used while groundwater sampling (laboratory preservatives, decontamination solutions, etc.). Review Safety Data Sheets (SDS) for such products.	
		Wear proper personal protective equipment (PPE) as specified in the Health and Safety Plan (HASP) to avoid direct contact with Site contaminants, calibration solutions, decontamination supplies, and laboratory preservatives.	
		Respiratory protection as specified by the HASP must be available and used when necessary.	
		Decontamination procedures as specified in the HASP must be followed.	
Sampling Equipment Operation	Splashes, electrical shocks, fires, caught by	Perform an equipment observation before use; pumps, flow meters, and water quality meters must be calibrated and in good working condition.	
		Use GFCI with all electrical cords.	



Job: Groundwater Sampling Analysis By: Andrew Whitsitt Reviewed By: Guy Dalton Approved By: Jayanti Chatterjee , CIH Date: October 2, 2011 Date: June 15, 2012 Date: June 26, 2012 Revised: June 15, 2012

Task 4.2		
GROUNDWATER SAMPLING		
	HAZARD CONT	ROLS
GZA Job Tasks	Potential Hazards	Controls
		All equipment (especially generators) must be properly grounded.
		Completely shut down all equipment prior to conducting maintenance activities, fueling, servicing or repairs. Follow lock-out/tag-out procedures as needed.
	Manual lifting, equipment handling	Use proper lifting techniques when lifting equipment (generators, pumps, air compressors, tubing, etc.) Seek assistance with heavy loads.
		Use work gloves where appropriate to prevent hand injuries.
		Wear steel toed boots.
		When containerizing water, do not try to carry more than you can safely carry. It is better to make multiple trips.
	Noise	Wear appropriate hearing protection during activities that produce noise (running generators, pumps, air compressors, etc.)
	Slips, trips and falls	Maintain a clean and sanitary work area free of tripping/slipping hazards.
		Store hand tools in their proper storage location when not in use.
		Provide adequate space for each employee to work safely with sound footing.
		Provide adequate lighting.
	Tool-related hazards	Do not use electrical tools with damaged cords or other electrical components.
		Observe proper electrical safety practices.
		Properly maintain tools; do not use damaged tools.
		Wear eye protection.
		Store and carry tools correctly.
		Use the correct tool for the job.
		Protect from gouges, hammer blows, cutting tools, etc. Position your hands to prevent injury in case the tool slips while in use.



Analysis By: Andrew Whitsitt	Reviewed By: Guy Dalton	Approved By: Jayanti Chatterjee , CIH
Date: October 2, 2011	Date: June 14, 2012	Date: June 26, 2012
Revised: June 14, 2012		

Task 4.1 DRILLING OBSERVATIONS, MONITORING WELL		
INSTALLAT		IUNS, SUIL SAMPLING
GZA Job Tasks	RAZARD CON	Controls
<u>Review Related THA's</u> – 21.1 – General Outdoor Field Work		
Observation of Deploying of Traffic Protection Equipment by Drilling Contractor	Personal injury due to vehicle traffic, Collisions, injuries	Wear high visibility vest at all times when out of vehicle.
(e.g., cones, signs, etc.)		Park in designated parking locations or select off-road areas that are firm and free of hazards. Directly inspect parking location on foot if necessary.
		Use emergency flashers or other appropriate vehicle warning system as appropriate to local conditions when parking personal or GZA vehicle and/or equipment.
		If parking outside of a designated parking area, demarcate vehicle with traffic cones or equivalent.
		Use emergency flashers or other appropriate vehicle warning system when placing equipment.
		Observe if police detail or other required traffic control system (if necessary) is in place.
		Stay within the confines of the work area and do not venture outside of the demarcated work area into traffic.
		If you observe that contractor may back into structures, vehicles, fences, etc., notify contractor immediately with pre-determined signals. Do not cross the path of the heavy equipment.
		Stand clear of moving Drill Rig.
Observation of Mobilizing Drill Rig To Job Site and positioning at borehole by Drilling Contractor	Struck by drill rig	Before drilling begins, confirm that drill rig has been parked properly and securely by the drilling contractor.
		Wear high visibility vests. Make sure that the driver can see you and is aware of your location at all times.
		Inform the driller if it is observed that the rig is being moved with the mast raised and/or tools and other equipment on the rig are not secured and can fall over and potentially hurt personnel.



Analysis By: Andrew Whitsitt	Reviewed By: Guy Dalton	Approved By: Jayanti Chatterjee , CIH
Date: October 2, 2011	Date: June 14, 2012	Date: June 26, 2012
Revised: June 14, 2012		

Task 4.1			
DRILLING OBSERVATIONS, MONITORING WELL			
HAZARD CONT	ROLS		
Potential Hazards	Controls		
Overhead utility	Look overhead to assess if any utilities are present and confirm with driller that they are aware of the overhead utility location and to take appropriate actions to prevent contact with the overhead utilities and to minimize any arc flash hazards. Review GZA's Electrical Safe Work Practices Program 03-3003.		
Underground utilities	Confirm that underground utility clearance procedures have been completed in accordance with GZA Policy # 04-0301 Responsibility for Utility Clearance of Exploration Locations for clearing utility locations prior		
Moving machinery, rotating parts, cables, ropes, etc.	Do not wear loose fitting clothing. All GZA personnel working in proximity to a drill rig will be familiarized with the location and operation of emergency kill switches prior to equipment start- up. Maintain safe distance from rotating auger, drill casing, rods and cathead at all times. Observe operations from a safe distance. Persons shall not pass under or over a moving stem or auger Check that "kill" switches are present and working. Confirm with driller that daily inspection of rig has been performed prior to commencing work and no conditions were noted with the rig that would affect its proper operation. Do not touch or operate or assist with any rig operations and maintenance work. Make eye contact with operator before approaching equipment. Be alert and take proper precautions regarding slippery ground surfaces and similar hazards near rotating auger. Do not engage the driller or helper when drill is in operation. Work out prearranged signals to get their attention before approaching them. Confirm prior to drilling operations that driller and helper communicate and coordinate their actions and movements.		
	Task 4.   OBSERVATIONS   Indexador   Potential Hazards   Overhead utility   Underground utilities   Moving machinery, rotating parts, cables, ropes, etc.		



Analysis By: Andrew Whitsitt	Reviewed By: Guy Dalton	Approved By: Jayanti Chatterjee , CIH
Date: October 2, 2011	Date: June 14, 2012	Date: June 26, 2012
Revised: June 14, 2012		

Task 4.1 DRILLING OBSERVATIONS, MONITORING WELL		
INSTALLATION OBSERVATIONS, SOIL SAMPLING		
	HAZARD CO	NTROLS
GZA Job Tasks	Potential Hazards	Controls
		Wear steel toed boots, hardhat and side-shielding safety glasses/goggles.
	Falling objects, debris	Stand clear of stacked drill rods. If stack appears unstable inform driller.
	Noise	Wear appropriate hearing protection.
	Roadway/traffic hazards	Be alert at all times; never step outside traffic cones.
		Wear high visibility vests at all times.
		Be familiar with escape routes at each location.
		Follow project Traffic Control Plan. Be alert at all times and never step outside the traffic cones. Use a Police detail when necessary.
	Slips, trips and falls	Maintain clean and sanitary work area free of tripping/slipping hazards. All borings, excavations, or partially completed groundwater monitoring wells will be adequately covered and/or barricaded if left unattended for any period of time to prevent injury.
		Store any hand tools used for sampling in their proper storage location when not in use. Provide adequate space for each employee to work safely with sound footing. Do not perform work if adequate lighting is not available.
		Maintain an exit pathway away from the rig at all times.
	Cuts, bruises, shocks, laceration sprains and strains during tool u	ns, When working with a driller, do not assist the drilling se crew with their work. Use properly maintained tools: do not use damaged
		tools. Wear the proper Personal Protective Equipment based on the task being performed.
		Store and carry tools correctly.
		Use the correct tool for the job.
		Do not use electrical tools with damaged cords or other electrical components.
		Observe proper electrical safety practices. Do not use electrical tools in wet areas.



Analysis By: Andrew Whitsitt	Reviewed By: Guy Dalton	Approved By: Jayanti Chatterjee , CIH
Date: October 2, 2011	Date: June 14, 2012	Date: June 26, 2012
Revised: June 14, 2012		

Task 4.1 DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING		
	HAZARD CO	JNIKULS
GZA Job Tasks	Potential Hazards	Controls
		Coordinate activities with driller. Allow driller to open sampling equipment (i.e., split spoons, Geoprobe sleeves, etc.)
	Fire hazards	Be familiar with emergency procedures and where fire extinguishers are present on site.
		Inform GZA subcontractor if you observe improper storage of used rags and unsafe storage of flammable/combustible liquids brought on site.
		GZA and its subcontractors, suppliers and vendors shall not smoke in the work area in GZA project sites.
		Smoking can only be in designated smoking areas away from work areas and potential fire hazard locations.
		Confirm with driller that a fire extinguisher present with rig and will be available at all times and that inspection tag is not expired.
		If driller is welding or cutting on site confirm there are no flammables or combustible materials near the vicinity of welding machines or torches (such as debris, fuels, grass/weeds, etc.). Review Site requirements for obtaining "Hot Work Permit".
		Stand well clear of welding/cutting/burning areas.
		When drilling activities encounter the presence of gas or electric, the drill crew shall immediately curtail drilling activity, shut down the drill rig and contact the Project Manager.
	Exposure to Hazardous Substances/Chemicals	Become familiar with hazards associated with hazardous commercial products used in drilling (fuels, silica sand, grout, cement, bentonite, etc.). Review Safety Data Sheets (SDSs) for such products and participate in daily safety tailgate meetings.
		Do not handle drilling chemicals.
		Wear appropriate personal protective equipment.
		Review hazards of chemicals that may have been used or currently are being used on site.
		Refer to the site specific HASP for chemical hazards and the necessary precautions required for sampling.



Analysis By: Andrew Whitsitt	Reviewed By: Guy Dalton	Approved By: Jayanti Chatterjee , CIH
Date: October 2, 2011	Date: June 14, 2012	Date: June 26, 2012
Revised: June 14, 2012		

Task 4.1		
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING		
HAZARD CONTROLS		
GZA Job Tasks	Potential Hazards	Controls
		Be alert for hazardous site contaminants (as indicated by odor, visual characteristics, location, and site history). Assess whether procedures and contingencies are in place for characterizing hazards and protecting workers by use of appropriate air monitoring, personal protective clothing and respiratory protection, as needed. If contamination is identified at the Site only personnel trained and medically qualified to work on hazardous sites will be permitted to proceed with the work.
Sampling Soil	Exposure to chemicals	Refer to the site specific HASP for chemical hazards and the necessary precautions required for sampling.
		Understand potential hazards associated with handling sample collection preservatives.
		Review and have SDS available for chemicals being brought on site, including that of sample preservatives.
		Wear appropriate PPE identified in the HASP
		Wash hands before eating and drinking. Eating and drinking are prohibited in areas of soil contamination/work area.


Analysis By: Anthony Zemba, CHMM	Reviewed By: Guy Dalton	Approved By: Jayanti Chatterjee , CIH
Date: June 25, 2012	Date: June 25, 2012	Date: July 12, 2012

Task 21.1			
General Outdoor Field Work			
	HAZARD CON	ITROLS	
GZA Job Tasks	Potential Hazards	Controls	
Pre-work preparation	Overlooking of potential hazards	Become familiar with project area and job site by reviewing available on-line mapping (USGS Topographic, NWI Wetland, NRCS Soil, etc.; and aerial photographs before visiting site. Understand related hazards through review of this and other Task Hazard Analyses and participate in daily safety tailgate meetings (where applicable).	
		Communicate Task Hazard Analysis and Lessons Learned information to operator(s) prior to initiating work and throughout the project as needed.	
Driving to site	Vehicle accidents/collisions/injuries	Perform pre-operation check of vehicle, verifying service brakes, parking brake, steering, lights, tires, horn, wipers mirrors and glass are in good condition. verify that the rig is roadworthy.	
		Wear seat belts always when driving even on site.	
		Secure loose materials in cab or bed of vehicle.	
		Keep windshields, windows and lights cleans.	
		Abide by safe driving procedures.	
	Backing collisions	If possible avoid backing by using a route that allows you to pull through.	
		If backing up from a parked area do a quality 360 walker.	
Working within transportation corridors or active construction sites	Collisions injuries	Wear high visibility safety vest on site when out of personal or GZA vehicle.	
		Park vehicle in designated parking locations, or select off-road area that is firm, and without hazards. Directly inspect parking location on foot if necessary.	
		Use emergency flashers or other appropriate vehicle warning system as appropriate to local conditions when parking vehicle.	
		Use emergency flashers or other appropriate vehicle warning system when parking outside of standard parking spaces, or to stop in right-of- Be alert at all times; never step outside traffic	
		cones.	
	JOD Hazard Ar Task 21.1 - General Out	door Field Work	



Analysis By: Anthony Zemba, CHMM	Reviewed By: Guy Dalton	Approved By: Jayanti Chatterjee , CIH
Date: June 25, 2012	Date: June 25, 2012	Date: July 12, 2012

Task 21.1			
General Outdoor Field Work			
	HAZARD CONT	ROLS	
GZA Job Tasks	Potential Hazards	Controls	
		Stand clear of moving heavy equipment and away from any overhead utility lines until equipment is safely in position and parked properly and securely by the contractor. Do not wear headphones or earbuds, or listen to music or talk on the phone, which may distract from work hazards.	
	Crossing Automobile traffic lanes	Wear high visibility safety vests at all times when out of vehicle and working within or adjacent to the roadway.	
	Crossing Airport Movement Areas (e.g., Runways, taxiways, approaches)	Learn, know, and conform to project site Airport's, Airfield's, or Airbase's protocol for crossing movement areas (whether on foot or in vehicle).	
		Work within airport movement areas or safety zones must be coordinated with the Air Traffic Control Tower.	
		Vehicles to have blinking or flashing lights or beacons; pedestrians to wear high visibility safety vests.	
		Using protocol, maintain communication with airport security and air traffic controllers.	
	Crossing Railways	Work within active railroad ROWs requires railroad safety training. No work can be done within the railroad traffic envelope without the permission of a railroad flagman.	
		No equipment or vehicles can cross without the permission of a railroad flagman. Expect any train on any track coming from either direction at any time.	
Working in Natural or Remote Areas	Slips, trips, fall	Be aware of loose ground materials such as talus, unconsolidated rock, soil, sediment, ice and other media that could cause slips, trips or falls.	
		Be careful when walking in heavily vegetated areas. Mind tangles of vines, thorny branches, and slippery logs and rock surfaces. Dense vegetation and especially entangled vines present trip hazards, or can mask voids, sharp objects, or other hazards beneath.	

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Analysis By: Anthony Zemba, CHMM	Reviewed By: Guy Dalton	Approved By: Jayanti Chatterjee , CIH
Date: June 25, 2012	Date: June 25, 2012	Date: July 12, 2012

Task 21.1		
General Outdoor Field Work		
HAZARD CONTROLS		
GZA Job Tasks	Potential Hazards	Controls
		Be vigilant for signs of cracking, shifting, fracturing, and evidence of past movement.
		Use wood mats or other stabilizing materials for equipment if soft ground conditions are present.
		Use walking stick, auger, or ski poles to steady yourself when traversing loose material or slopes.



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Date: June 25, 2012	Date: June 25, 2012	Date: July 12, 2012

Task 21.1			
General Outdoor Field Work			
	HAZARD CON	TROLS	
GZA Job Tasks	Potential Hazards	Controls	
		Wear proper footwear for conditions.	
		Store tools in their proper storage location when	
		not in use.	
		Provide adequate lighting when necessary.	
	Falls into excavations/ voids	Stand away from edges of excavations and voids. Do not attempt access without proper equipment / training. Remember that some excavations or voids may constitute a confined space and may present structural stability issues.	
	Cave-ins and engulfment	DO NOT enter caves, sinkholes, excavations, and other voids or concavities that are not sloped or shored properly and have not been evaluated by a competent person to be safe.	
		Stand away from edges of excavations, cliffs, dug	
		Watch for cracks/fissures in the ground surface in	
		the immediate vicinity of a pit or void, which	
		Assess if confined space entry procedures need to be implemented.	
		Before entering void (if required to do so and with proper training) be aware of any hazards at the surface (boulders, equipment) which may fall into the void.	
Working among hazardous biota	Plant toxins Incidental contact	Know the appearance of poison ivy and poison sumac in all seasons, and if sensitive to these toxins, carry and use special cleaning soaps/solutions when thought to be exposed. Stock first aid kit with poison ivy/sumac cleaning soaps/solutions.	
	Ticks	Ticks carry risk of Lyme's and other Diseases. Tick season is basically any field day above 40 degrees F.	
		Tuck pants into long socks.	
		The application of DEET (or permethrin pre- treatment) to clothing in season to control exposure to ticks is recommended.	
		Check clothing for ticks frequently.	



Analysis By: Anthony Zemba,	Reviewed By: Guy Dalton	Approved By: Jayanti Chatterjee , CIH
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Date: June 25, 2012	Date: June 25, 2012	Date: July 12, 2012

Task 21.1			
General Outdoor Field Work			
	HAZARD CO	NTROLS	
GZA Job Tasks	Potential Hazards	Controls	
		Check whole body immediately upon returning from field and shower.	
	Mosquitoes	Be aware of intermittent seasonal reports of mosquito borne diseases, such as West Nile disease and Eastern Equine Encephalitis (EEE), and their locations relative to your field site. Use of DEET or other mosquito repellant is recommended.	
	Stinging bees and wasps	Be aware of potential cavity, suspended or ground nesting bee/wasp/hornet nests. Avoid undue disturbance or approach with appropriate safety clothing, protection and netting.	
		Take appropriate precautions if allergic to bees. Carry at least two epi-pens in first aid kit as well as anti-histamines (oral and inhalers).	
		Avoid areas of heavy bee activity if allergic. Avoid perfumed soaps, shampoos, deodorants, colognes, etc. that may attract bees.	
	Poisonous Snakes	Be aware of terrain likelihood of harboring poisonous snakes in your work zone. Avoid reaching or stepping into hidden areas (such as into wood pile, rock pile, debris pile, stone wall, etc.) without pre-inspection.	
		Coordinate with local hospitals to verify they have proper anti-venom in stock.	
		Learn first aid procedures in case of poisonous snake bite. Devise an action plan and include in the site-	
	Wild Animals	Do NOT handle wildlife unless properly trained to do so.	
		Beware of any wild animal that shows no sign of wariness of humans.	
		apparently injured wild animals.	
		a threat such as dogs off leash, bulls out to pasture, etc.	



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Task 21.1			
General Outdoor Field Work			
HAZARD CONTROLS			
GZA Job Tasks	Potential Hazards	Controls	
Working in Adverse Weather Conditions	Heat / cold stress and other weather related hazards	Assess weather conditions prior to on-site work and examine forecast for anticipated period of work.	
		Dress appropriately for weather conditions (e.g., precipitation, temperature ranges over anticipated duration of field work). Include clothing and the presence / absence of shade when calculating a heat index.	
		Schedule work day to avoid working during hottest or coldest parts of the day, to the extent practicable.	
		Keep exposed skin covered in extremely cold weather.	
		Recognize signs of frostbite; use warming packs and layer clothing to maintain warmth.	
		Use a wicking layer of clothing against your body to keep moisture away from skin.	
		Wool clothing will continue to keep you warm after it becomes wet; cotton will not.	
		Use protective ointments such as sunscreen and chap stick, as appropriate to the field conditions.	
		Stay hydrated in hot weather; drink fluids regularly throughout the day, even if not thirsty.	
		Recognize signs of heat stress; take frequent breaks in shade when working in direct sunlight for prolonged periods.	
		Be familiar with Heat index chart - add 20 degrees to chart if fully clothed and if working in direct sunlight.	
		NOTE: Unacceptable field work conditions are not precise, but may include site specific conditions, general location, extreme weather conditions (e.g., icing, lightning, excessive cold or wind), travel conditions, and other factors. Professional judgment is required, and personal assessment of safety must always be individually assessed.	
	Working on Ice	Assess relative load bearing capacity of ice on lakes, ponds and other waterways. If unsure do not venture onto the ice.	



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Task 21.1				
General Outdoor Field Work				
	HAZARD CO	NTROLS		
GZA Job Tasks	Potential Hazards	Controls		
		Wear proper footwear modified for traction on ice.		
	Electrical storms	If lightning is observed during drilling activities, work shall be suspended immediately and employees shall find suitable shelter (building or vehicle at minimum). Work will commence no sooner than 30 minutes after the last indications of lightning have been observed		
		Seek shelter inside a walled building or your vehicle.		
		Open picnic pavilions and under trees are not adequate shelters.		
		Assess vulnerability to lightning strikes as soon as thunder is heard on the horizon. Open areas and higher elevations are more susceptible to strikes.		
		Tall objects such as metal towers and flag poles may attract lightning.		
		Consult internet weather radar tracking devices to learn of impending storm patterns proximal to your work area.		
	High Winds	Avoid working at high elevations, elevated platforms, and other exposed areas during high wind conditions.		
		Assess work area for equipment that may be blown down, over, or carried aloft by high winds.		
Working in areas without sanitary facilities	Hygiene related hazards	Provide hand washing kits (e.g., baby wipes, hand sanitizers, paper towels, bottled water, etc.) to be used prior to eating and drinking.		
		Have garbage bags handy to collect trash.		
Working in remote areas	Emergency Conditions	Be familiar with onsite emergency procedures and route to nearest hospital. Have a first aid kit available; know its contents and how to use them.		
		Carry a cell phone during all field work for emergency purposes, and confirm the nearest location of cell phone signal on site prior to start of worksite.		
	Disorientation	Plan your route and anticipated progress prior to field work.		



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Task 21.1				
General Outdoor Field Work				
	HAZARD CONTROLS			
GZA Job Tasks	Potential Hazards	Controls		
		Have multiple navigation aids (e.g., USGS Map, compass, GPS, etc.) and know how to use them before entering field. Remember to have charged batteries and battery back-ups for electronic devices.		
		Share your progress plan with office staff prior to entering the field.		
		Check in with office personnel periodically to update progress.		
		Review and comply with GZA's Working Alone Policy 03-1009 in advance of working alone on a project site.		
	Hunting	Be familiar with the various game hunting seasons. Follow rules and guidelines for remaining visible to hunters.		
		Try to plan work around active hunting seasons or daily peak hunting hours as warranted.		

### I. Introduction

1. These Work Rules govern the safety and health aspects of the way that Contractors and their subcontractors and agents perform work at Eversource facilities, properties or work sites.

These Work Rules convey Eversource's minimum expectations regarding safety and health practices and may exceed the requirements of federal, state and local regulatory agencies.

These Work Rules are in addition to any safety and health procedures, policies, guidance, and/or work instructions of the Contractor. Failure to comply with any portion of these Work Rules is a breach of contract, and is just cause for placement in a probationary program and/or expulsion from Eversource properties and/or termination of the contract.

2. Contractors are required to inform their employees, subcontractors, and agents of these Work Rules prior to the start of work and to ensure compliance with the Work Rules.

3. All Contractors and their employees are responsible for ensuring safety and health compliance. This includes adherence to the following:

- a) State, federal, and local safety and health requirements that are in effect or that may take effect during the work;
- b) Guidance and work instructions;
- c) Site-specific rules and/or addenda.

It is the responsibility of the Contractor to enforce these safety requirements with her/his own personnel as well as with personnel of sub-contractors who he/she engages for performing the requested work action. Compliance with these safety requirements does not (1) relieve or diminish the responsibility of the Contractor to perform the work in a manner that complies with applicable Federal, State and local laws, rules, regulations and/or requirements and with all applicable provisions of the Contractor's contract with Eversource regarding the work (the "Contract"), nor (2) relieve the Contractor from liability to Eversource or others for negligent or improper performance of the work, as provided in the Contract.

4. Each Contractor is and shall remain an independent Contractor as to all work performed under the contract. Nothing herein shall relieve Contractors of their sole responsibility for the safety of their employees and their work performance. As such, Eversource expects them to take appropriate action to ensure that safety and health requirements are adhered to.

5. Neither compliance with these Work Rules nor Eversource's approval of any actions or procedures of the Contractor shall relieve the Contractor of its obligation to always use due care in performing work and to take any additional precautions necessary to prevent injury, adverse effects to the public, and/or property damage. The Contractor shall ensure safe work practices, protect their employees and monitor the project's safety and health effects during the work.

7. Safety Statistics - Contractors, subcontractors, and other Contractor representatives must maintain work site records of man-hours worked and of all injuries and illnesses occurring and reported at the work site, specifically identifying those that meet the Occupational Safety and Health Administration (OSHA) definition of "recordable." Particularly for large or long-duration projects, Eversource shall be provided with copies of such work site injury and work-hour records at the completion of the job.

Eversource's focus on evaluating Contractor safety performance, as demonstrated by work site injury and illness statistics, indicates to Contractors that satisfactory performance extends far beyond pre-bid and pre-job submittals and discussions. Such statistics can also be used to measure the effectiveness of Contractor safety programs and the Contractor's performance of the work.

8. The Contractor shall assign or designate a competent person as required in 29 CFR 1926.20(b)(2) and defined in 29 CFR 1926.32(f) to each construction site. The competent person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. Contractors will document such designation and shall maintain such documentation upon the work site and make it available to Eversource representatives at their request.

Safety-related communication between the Contractor and Eversource should be made through Contractor's competent person and Eversource's designated representative.

Contractor's competent person shall take appropriate corrective actions for safety violations committed by personnel of Contractor or its sub-contractors. However, if the Eversource designated representative notes safety violations either as to personnel or equipment, the Eversource designated representative will be empowered to halt work progress at the Contractor's expense until such time that the unsafe condition has been corrected.

#### Penalty for Non-Conformance

Any Contractor or sub-contractor who fails to take the necessary safety corrective measures to conform to these safety requirements shall be brought to the attention of the Director of Procurement, Director of Eversource Safety and the Executive Health & Safety Committee with a recommendation for one or more of the following remedies with regard to the contractor:

- 1. Suspension of work in progress.
- 2. Termination of any and all active contracts.
- 3. Removal of the contractor from Eversource's approved contractor list.

## **II. General Safety and Health Rules**

1. Planning and Forethought – The Contractor shall exercise planning and forethought regarding all work. As a minimum, this requires the Contractor to apply the same planning and management skills to the safety aspects of the job as to the bid preparation, work assignment, job scheduling, and other productivity and quality aspects.

To facilitate this planning process, Contractors are required to complete a Safe Work Plan for each phase of the job which they have bid. A sample Safe Work Plan must be submitted for evaluation as a part of the bid and prior to work commencing. Safe Work Plans for each phase of the work must be submitted to Eversource.

These plans will include: project specific work rules which will be followed, a list of JHA's which identify the hazards that could be expected, actions to be taken to eliminate or control exposures to these

hazards, emergency contacts, and employee signatures to ensure the plan has been properly communicated to all employees on the project.

In some cases, this may also require that a Contractor develop a site specific safety plan for the work and/or assign a person with full-time or collateral safety oversight responsibilities.

2. Emergency Response/Medical – Prior to the start of work, Contractors must coordinate their emergency response/E-911 protocol plans with Eversource. This may include preferred means of reporting and responding to medical, security emergencies, evacuation alarms and routes, available medical treatment facilities, etc. Periodic drills should be conducted to practice and improve the plans. Contractors shall be equipped with their own first aid kits Contractors and are responsible for arranging for transportation for their employees to receive medical attention for minor injuries.

3. Pre-job Safety Briefings – High risk Contractors (Civil, Line, Electrical, Test, Vegetation Management, General Construction, etc.) must conduct documented pre-job safety discussions (commonly known as toolbox discussions, tailboard discussions, etc.) with all workers that will be involved in the job at the start of each shift, when the scope of work changes, and/or before new work assignments. These discussions must cover the actual and potential hazards of the job, safety considerations, the specific PPE requirements, Eversource site specific safety requirements, and all other precautions required to prevent injury or damage and to protect the environment.

All other contractors (Low risk) shall perform a similar Pre-job safety briefing, but it need not be documented.

Contractors shall maintain such documentation upon the work site and make it available to Eversource representatives at their request.

4. Training – Contractors shall have training and certification records, licenses, and other such documentation for their employees that are pertinent to the work to be performed either on site or available within twenty-four hours and subject to review by Eversource, upon formal request. *Failure to produce training records within such time may be considered breach of the contract and shall entitle Eversource, at its option, to terminate such contract without further liability on its part.* 

## A. Eversource Safety Orientation Review

Contractors shall provide a review of the Eversource Contractor Safety and Health Work Rules (and applicable addendums) to all personnel and all subcontractors prior to commencing work activities. The review shall be documented (Appendix E Eversource Contractor Safety Awareness of the prequalification questionnaire).

## B. OSHA 10 Hour Training (effective 3/31/11)

All Vegetation Management, General Construction, Civil, Line, Electrical and Test contractor <u>Supervisors</u> with greater than 6 employees under their routine direct supervision shall have at a minimum a 10-hour OSHA training certificate (General Industry, Construction or Transmission & Distribution [T&D]). Contractors under other contract types may be required to have training at the discretion of Eversource.

5. Inspection and Maintenance Records – Inspection, maintenance, repair, and certification records of cranes, hoists, personnel lifts, scaffolds, excavations, etc., are subject to Eversource review and must be readily available, upon formal request.

6. Alcohol, Controlled Substances, and Weapons – No alcoholic beverages, beverages labeled as nonalcoholic, controlled substances (other than prescribed drugs), or weapons are allowed on Eversource facilities, properties or work sites, including parking lots, nor shall any worker under the influence of alcohol and/or drugs be allowed on Eversource facilities, properties, or work sites. The sale or use of alcohol and/or controlled substances on Eversource facilities, properties, or work sites is strictly prohibited. All Contractor and sub-contractor personnel reporting for work in an unfit condition to safely perform assigned work functions shall be immediately dismissed from the work site.

7. Regulatory Inspections – Contractors shall promptly inform the Eversource liaison of any and all inspections, visits, observations, audits, or inquiries of any kind (telephone, electronic, in-person, etc.) (collectively "Inspections") affecting or pertaining in any way to the Contractors' work under the contract by any federal, state or local agency, and the reasons therefore. Contractors shall keep the Eversource liaison updated on the status of any regulatory matters arising out of such Inspections, including but not limited to safety, health citations and/or violations.

### **III. Specific Safety and Health Rules**

1. Trenching and Excavating – No trenching or excavation work may begin until the Contractor has designated a competent person to oversee the work and has informed Eversoure of the name(s) of the competent person(s) and the basis for such determination. Contractors are to assume the soil is Type C unless they prove otherwise with appropriate engineering tests. Contractor is responsible for contacting the appropriate "Call Before You Dig" or "Dig Safe" agency the requisite number of days (typically 2 to 3 business days) prior to the planned start of any excavation. An active "Call Before You Dig" or "Dig Safe" clearance is required before any mechanical excavation work. All unattended trenches and excavations shall be guarded to prevent inadvertent falls.

Work areas shall be cleaned up at the end of each day or more often if conditions warrant. Excess backfill material shall be removed promptly and transported to designated facilities in accordance with Eversource Environmental Materials Handling Guidelines. All street surfaces and sidewalks swept clean at the end of each day.

2. Scaffolding – No scaffolding work may begin until the Contractor has designated a competent person to oversee the work and has informed Eversource of the name(s) of the competent person(s) and the basis for such determination. 100% fall protection or restraint is required at all times during erection, maintenance, use and dismantling of the scaffold whenever the fall hazard is six (6) feet or greater unless the competent person possesses documentation clearly describing why using 100% fall protection or restraint is not feasible or creates greater hazards. The documentation shall also describe the methods that will be implemented to achieve as close to 100% fall protection or restraint as possible. Scaffold components may not be used for fall protection or restraint anchorage unless Contractor similarly possesses documentation by a "qualified person" as defined by OSHA 29CFR 1926.450 validating the suitability of the components for such use. All documentation must be readily available for review by Eversource. In addition, from the time scaffold erection is begun until scaffold dismantling is completed, the competent person shall inspect all scaffolding and associated components at least once each work shift prior to their use and shall affix signs, tags, or equivalent means to conspicuously mark whether the scaffolding must be coordinated and clearly noted among Eversource and other parties involved.

3. Fall Protection – Eversource Transmission (includes MA Transmission) - 100% fall protection is required for all workers exposed to fall hazards of four (4) feet or greater from structures that support overhead electrical lines (e.g., poles, towers, structures), six (6) feet or greater, in other construction activities, and lesser heights with the potential for serious injury, unless the competent person possesses documentation clearly describing why using 100% fall protection or restraint is not feasible or creates

greater hazards. The documentation shall also describe the methods that will be implemented to achieve as close to 100% fall protection or restraint as possible.

Eversource Electric Distribution Operating Companies do not require 100% fall protection for workers exposed to fall hazards of four (4) feet or greater from structures that support overhead electrical lines (e.g., poles, towers, structures). The Eversource Electric Distribution Companies require employees who climb structures and who are exposed to fall hazards of four (4) feet or greater from structures that support overhead electrical lines (e.g., poles, towers, structures) to be Qualified Climbers. An employee who is a qualified climber must be trained as required by paragraph OSHA 29 CFR 1910.269(a)(2)(i) and (a)(2)(ii) before the employee can be allowed to climb.

4. Housekeeping – Contractors shall keep the job site neat, clean, and free of debris, trash, and hazards. Contractor shall store all materials in a neat and orderly fashion. At a minimum, the Contractor shall police the work area at the end of each shift.

5. Hot Work – Hot work is any work that involves the use of burning or welding equipment, brazing equipment, explosives, open flames, grinders, and any other activity that produces a flame, spark, or excessive heat. Hot work shall be coordinated with the Eversource liaison in advance. Hot work requires the Contractor to conduct a hazard assessment and take appropriate actions to prevent the ignition of combustible and flammable materials, including but not limited to the use of welding tarps, fire watches, and the ready availability of fire extinguishers rated for the specific nature of the anticipated fire hazard(s).

6. Smoking – Smoking is prohibited in and within 25 feet of all Eversource facilities, within 25 feet of flammable materials, and in other areas designated as such.

7. Lifting and Hoisting – Contractors must certify that all operators of mobile equipment such as cranes, derricks, boom lifts, etc., have been trained and certified on the proper operation of the equipment. Non-operators, such as Signal Persons, shall also be trained and have proper certifications. Copies of this training and certification shall be maintained on the project by the Contractor and provided to Eversource upon request. Mobile crane operators must be qualified on each specific crane (type & rating) they are assigned to operate through a testing and qualification procedure.

The Contractor shall not move loads suspended from mobile equipment without the load being secured to prevent swinging. Tag lines shall be used on all loads except when there is a danger of the equipment, load, or tag line making contact with energized parts. Swing load radius must be kept clear during moving of suspended loads. Lifting devices and hardware (slings, chain, shackles, etc.) shall be rated and properly connected for the application. Load charts shall be available and no load may be lifted until its weight has been determined.

8. Guarding of Holes and Openings – The Contractor shall guard or place appropriate barricades around temporary openings in floors, walls, excavations, etc., to prevent inadvertent entry. Covers over excavations or floor holes shall be of sufficient strength, conspicuously marked to indicate the hazard and the danger of removal, and secured to prevent inadvertent movement or removal whenever feasible.

9. Ladders – Only ladders constructed of fiberglass may be used in and around electrical equipment, including substations. Ladders are to be properly positioned. Straight and extension ladders are to be tied off at the top and bottom or footed by another person. Step ladders may be used only in the fully open position with the spreader brackets locked in place. No person may stand or sit on the steps or platforms on which standing or sitting is prohibited.

10. Tools and Equipment – Contractors are responsible for providing proper tools and equipment. Except in rare or emergency situations, Eversource will not provide or lend tools or equipment, including personal protective equipment (PPE). Tools and equipment shall be maintained in safe condition and used as designed and without removing, defeating, or otherwise compromising guards or other safety devices.

11. Walks and Roadways – When working on Eversource facilities, properties, or work sites, Contractors shall not hinder or obstruct the normal flow of vehicular or pedestrian traffic without prior coordination with the Eversource Liaison. In such cases, appropriate actions must be taken to alert traffic of the hazard and/or control the flow of traffic to ensure safety. In such cases, Contractor shall provide approved lights, barriers, signs, warning devices, signal persons, and/or other precautions appropriate to the situation.

12. Lock out/Tag out – Work at Eversource facilities may require the use of a lock out/tag out system. The Contractor is to coordinate lock out/tag out with the Eversource liaison. In some cases, the Contractor may be required to comply with Eversource's lock out/tag out requirements.

13. Confined Space Entry (including Enclosed Space Entry) – Contractor is to consider all confined spaces as permit-required confined spaces until informed otherwise by Eversource or until Contractor conducts a written hazard assessment that documents otherwise. The Contractor is to coordinate all entries into confined spaces (whether permit-required confined spaces, non-permit confined spaces, or enclosed areas) with the Eversource liaison, the local facilities/building supervisor, and other work groups to ensure each other's activities will not affect the safety or health of any person.

14. Personal Protective Equipment (PPE) – As a minimum, most physical work requires the use of safety glasses (including side shields) meeting the ANSI Z87 standard, safety shoes meeting the ASTM F 2413-05 international standard, and head protection shall be ANSI Z89.1 Type I class E&G. Contractors shall comply with local Eversource PPE requirements for the location or the type of work. Determining any additional PPE requirements is the responsibility of the Contractor. The Contractor's PPE hazard assessment certifications are subject to review by Eversource.

15. Barriers, Warnings, Signs, and Signage Credibility – Work areas, whether indoors or outdoors, restricted to entry by authorized persons shall be clearly marked and delineated. Unless otherwise permitted, such marking shall consist of conspicuous rope or tape barrier with appropriate DANGER, CAUTION, or other appropriate signs that (1) note the nature of the hazard and (2) provide guidance to the reader. When the signs or barriers are not available or their use is not practicable, such as for a momentary hazard exposure, the Contractor shall post employees to prevent others from being exposed to the hazard(s).

All Traffic Control Plans and activities shall conform to the Occupational Safety and Health Administration (OSHA) revised construction industry safety standards (1926.200) and Part VI of either the 1988 Edition of the Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD), with 1993 revisions (Revision 3) or the Millennium Edition of the FHWA MUTCD (Millennium Edition), instead of the American National Standards Institute (ANSI) D6.1-1971, Manual on Uniform Traffic Control Devices for Streets and Highways (1971 MUTCD). The placement of orange cones or signs alone is generally not considered adequate. Detours, whether for vehicular or pedestrian traffic, shall be clearly marked along the entire route. Signs, barriers, and similar markings shall be checked and maintained throughout the work period of need and shall be removed promptly when the need has ended.

16. Communications with Eversource Personnel – Planned work activities which may affect Eversource personnel or disrupt their work shall be coordinated with the Eversource liaison and communicated to such personnel far enough in advance to allow for coordination, accommodations, or resolution of conflicts.

17. Asbestos, Lead, and Other Hazardous Substances – Asbestos, lead, and other hazardous substances may exist on or at Eversource facilities, properties and work sites. Eversource will inform the Contractor of the known presence, location, and quantity of such substances in or adjacent to areas in which the Contractor is expected to work, and the Contractor shall so inform its employees, bring to

Eversource's attention any suspect or questionable substances that may be encountered during the course of work, and take appropriate precautions.

18. Nail Guns and Powder-Actuated Tools – Nail guns, Hilti Guns, powder activated nail gun and similar tools shall be used in such a manner to ensure the projected fastener cannot miss or penetrate the intended surface and strike an unintended person or object, including but not limited to the fastener becoming an airborne projectile. Precautions include but are not limited to directing the line of fire away from other persons, including passersby, preventing access to the opposite sides of nailing surfaces (e.g. walls) and preventing access closer than 20 feet to Hilti or powder activated nail i.e., gun use. Powder actuated tools shall require the use of a Hot Work Permit in the area of natural gas, propane or LNG facilities (see Rule #5)

19. Flame Resistant (FR) Clothing/Arc Flash Protection – The wearing of flame resistant clothing is required in certain locations (e.g., substations, energized distribution primary zone) and while performing certain electrical or natural gas activities. The Contractor is to consult with the Eversource liaison to determine the specific requirements for FR Clothing, including arc flash protection. All FR clothing shall meet ASTM F1506 or ASTM F1959 and OSHA 29 CFR 1910.269 for electrical work. All FR clothing shall meet NFPA 2112 and 2113 for affected natural gas, propane or LNG work activities.

20. Electrical Awareness – Low and high voltage electrical lines and equipment exist throughout the Eversource system. The Contractor must provide, to all persons working under a contract, or ensure they have received, electrical awareness training appropriate to the work they will be performing. The intent of the training is to ensure persons understand the hazards of electricity and the actions they must take to prevent inadvertent contact.

Persons may enter a substation or switchyard only if they have: (1) attended a pre-entry safety training class and are escorted by an approved escort; (2) received a pre-entry safety briefing appropriate to the work they will be performing and are escorted by an approved escort; or (3) completed unescorted access training and been granted unescorted access privileges by appropriate Eversource personnel.

21. Hazard Communication – All Contractor-supplied hazardous materials and chemicals must be approved by Eversource prior to entry and use on Eversource facilities, properties or work sites. All Safety Data Sheets or Material Safety Data Sheets and associated instruction/warning sheets must be provided to Eversource far enough in advance of the time of intended use to allow for Eversource review, or the materials/chemicals may not enter Eversource property. Contractor must also have a copy of its Hazard Communication program available. All containers used to handle chemicals, fluids, or hazardous material must be labeled. Minimum label requirements are product name, manufacturer or distributor, and hazard warning and shall meet OSHA and/or the United Nations Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.

22. Event Reporting - Contractors shall report to the Eversource liaison all workplace hazards, unsafe conditions, and safety and environmental concerns, regardless of cause. Eversource also requires Contractor management to:

- immediately (no later than 24 hours of occurrence) inform Eversource and analyze all
  occupational injuries, illnesses, vehicle accidents and other safety-related or environmental
  incidents (e.g., near-misses, fires, spills);
- identify their causes and actions taken to prevent recurrence in a written report; and, provide copies of all injury reports and analysis to Eversource.

Contractors also must inform the Eversource liaison immediately about safety, health, or environmental inspections or other inquires by governmental authorities, deviations from governmental or site requirements, and damage to property or equipment.

## SAFETY & ENVIRONMENTAL AWARENESS CONTRACTOR ROSTER

In accordance with Appendix H of Northeast Utilities' contractor work rules, this form (or equivalent) documents that the individuals listed below have received awareness training on Northeast Utilities' contractor work rules, and any actual/potential policy, safety and environmental impacts from work they will perform.

## What do I have to know?

- NU's Environmental Policy (Compliance, Leadership, Accountability, Stewardship a.k.a. CLAS)
- Procedures I have to follow (i.e., for proper disposal of wastes generated)
- How the work I perform interacts with (examples: use of chemical or fuel) and impacts the environment (examples: waste disposal or water pollution)
- All oil or chemical releases shall be reported to your Supervisor or the NU liaison
- Safety work rules
- Jobsite hazards and barriers/controls
- Electrical hazards barriers and controls
- Personal accountability and limitation

COMPANY NAME:	CONTACT NAME:	PHONE NUMBER:	
PROJECT/JOB/PURCHASE ORDER NUMBERS			

NAME	DATE	NAME	DATE
1.		11.	
2.		12.	
3.		13.	
4.		14.	
5.		15.	
6.		16.	
7.		17.	
8.		18.	
9.		19.	
10.		20.	

NOTE: Ensure that this form (or equivalent) is maintained and can be produced for Northeast Utilities when required

## DRILL RIG EQUIPMENT SAFETY CHECKLIST

#### 1. Drilling Controls

 $\square$  All controls, linkages, warning & operation lights & lenses are free of oil, grease and/or ice  $\square$  All controls, feed levers & gearboxes are in neutral prior to starting

## 2. Emergency Shut-Off

□ Check that trip wires, shut-offs & guards are in place & working correctly

#### 3. Cathead & Ropes

- □ Free from rust, oil & grease
- □ No unusual wear or damage
- $\square$  No excessive rust
- $\square$  Rope is in good condition
- □ Rope is proper length

#### 4. Hoists, Cables & Rope

- □ Check sheaves, bearings & guides, hooks, shackles & rings for wear
- □ Check rope for ice
- □ Check all connections & fittings
- □ Cable fasteners checked & U-bolts tightened

#### 5. Hammers & Ropes

- Check wire ropes for broken wires, abrasion, heat damage, reduction in diameter, corrosion, kinking, bird caging, improper reeving, jamming, core protrusion, wire protrusion, fatigue or damage
- □ Check that buckeyes & chains are secure
- D Lubricate swivel bearings as needed

## 6. Hydraulic Lines & Connections

- □ Check for leaks
- □ Check that connections are secure
- Check for excessive wear

#### 7. Chains and Belt Guards

- □ Check for excessive wear
- □ Check that guards are in place & working correctly

### 8. Personal Protective Equipment

#### 🗆 Hard Hat

- □ Safety Glasses
- Ear Plugs
- □ Steel Toed Shoes
- Gloves
- Life Jacket
- □ Safety belt/lifeline, when working on elevated platforms

#### 9. General

- □ Suitable storage locations for all tools, materials or supplies within or on the mast (derrick) of the drill rig
- □ Pipes, drill rods, casing, augers, etc. are stacked in an orderly fashion on racks or sills to prevent spreading, rolling or sliding
- Driving hammers are placed securely to prevent movement when not in use.
- □ Work areas, platforms, walkways, scaffolding & other access ways are kept free of debris, obstruction & substances such as ice, oil or grease that could cause a surface to become slick or otherwise hazardous.
- □ All hand tools are clean & in good repair

#### 10. Water Work

- □ Ring buoys & line are in place
- □ At least one lifesaving skiff is immediately available

#### 11. Other

□ Check fluid levels in radiator, gearbox, hydraulics & engine

Driller

## TAILGATE SAFETY MEETING

CHECK ONE:	Initial H&S Orientation	Periodic "To	oolbox" Safety Meeting
Project Site/Location_			
Date	Time		Job No
PM		PIC	
The undersigned have att H&S Plan, and/or appro measures for the project.	tended a Health and Safety briefing priate prior H&S events or conce	g, consisting of a review o rns, and/or review of ant	f the provisions of the Site Specific icipated H&S concerns and safety

SUMMARY OF HEALTH AND SAFETY TOPICS COVERED (required topics are listed below to be covered in addition to regular site-specific topics)

- **1.** Pausing and Stopping Work
- 2. Preparation for Natural Hazards (insects and ticks, poisonous plants)
- **3.** Uneven and/or Unstable Terrain in Work Area(s)

4. How GZA People-Based Safety will be implemented on the site

NAME (printed)	SIGNATURE	COMPANY

## Google Maps

Thornton Transfer Station, 1629 New Hampshire Rte 175, Thornton, NH 03285 to Speare Memorial Hospital: Emergency Room, 16 Hospital Rd, Plymouth, NH 03264

Drive 10.8 miles, 16 min



Map data ©2024 Google 1 mi

Thornton Transfer Station

1629 New Hampshire Rte 175, Thornton, NH 03285

Get on I-93 S in Campton from New Hampshire Rte 175 S and NH-49 W

6 min (3.1 mi)

1	1. A	Head southeast toward New Hampshire Rte 7 Restricted usage road	175 S
¢	2.	Turn right onto New Hampshire Rte 175 S	466 TT
¢	3.	Turn right onto NH-49 W	1.0 mi
*	4.	Turn left to merge onto I-93 S toward Plymouth/Concord	1.2 mi
			0.3 mi
Follo <sup>v</sup> from	w I-9 I-93	93 S to NH-175A W in Holderness. Take exit 25 S	<b>j</b>
≮	5.	Merge onto I-93 S	5.0 mi)
4	6.	Take exit 25 for NH-175A toward Holderness Rd/Plymouth	6.2 mi
			0.3 mi
Conti	inue	on NH-175A W to your destination in Plymout	h
		4 min (	1.1 mi)
с Р	7.	Turn right onto NH-175A W	
Φ	8.	At the traffic circle, take the 3rd exit onto Main	0.4 mi n St
¢	9.	Turn right onto Highland St	0.2 mi
۲	10.	Turn left onto Avery St	0.4 mi
۲	11.	Turn left	0.1 mi
			144 ft

## ← 12. Turn left

① Destination will be on the right

43 ft